StorageWorks by Compaq

SAN Director 64
Service Manual

Part Number: AA-RPL8B-TE

Second Edition (February 2002)

This manual describes the Director and attached SANworks Director Connectivity Manager. For service representatives, it describes diagnostic procedures, repair procedures, and the removal and replacement procedures for field-replaceable units (FRUs). An illustrated parts breakdown is included for all FRUs.

COMPAQ

© 2002 Compaq Information Technologies Group, L.P.

Compaq, the Compaq logo, Armada, ProLiant, and StorageWorks are trademarks of Compaq Information Technologies Group, L.P. in the U.S. and/or other countries.

Microsoft, MS-DOS, Windows, and Windows NT are trademarks of Microsoft Corporation in the U.S. and/or other countries.

Intel, Pentium, Intel Inside, and Celeron are trademarks of Intel Corporation in the U.S. and/or other countries.

The Open Group, Motif, OSF/1, UNIX, the "X" device, IT DialTone are trademarks of The Open Group in the U.S. and/or other countries.

All other product names mentioned herein may be trademarks of their respective companies.

Compaq shall not be liable for technical or editorial errors or omissions contained herein. The information is provided “as is” without warranty of any kind and is subject to change without notice. The warranties for Compaq products are set forth in the express limited warranty statements accompanying such products. Nothing herein should be construed as constituting an additional warranty.

Printed in the U.S.A.

SAN Director 64 Service Manual
Second Edition (February 2002)
Part Number: AA-RPL8B-TE

Contents

About This Guide

Text Conventions xiii
Symbols in Text xiv
Symbols on Equipment xiv
Rack Stability xv
Getting Help xvi
Compaq Technical Support xvi
Compaq Website xvi
Compaq Authorized Reseller xvi

Chapter 1

General Information

Director Description 1–2
Director Management 1–4
Error-Detection, Reporting, and Serviceability Features 1–5
Zoning Feature 1–6
Multiswitch Fabrics 1–7
Director Specifications 1–9
Equipment Cabinet Service Clearances 1–11
SDCM Server Description 1–11
SDCM Server Specifications 1–12
Ethernet Hub (Optional) 1–12
Embedded Web Server Interface 1–13
Maintenance Approach 1–13
Remote Workstation Configurations 1–14
Minimum Remote Console Hardware Specifications 1–15
Field-Replaceable Units 1–16
Cable Management Assembly 1–18

Front Bezel 1–18
CTP Card 1–19
FPM Card 1–19
Power Supply 1–21
Power Module Assembly 1–22
Fan Module 1–22
SBAR Assembly 1–22
Backplane 1–23
Software Diagnostic Features 1–23
SDCM Server Diagnostics 1–23
SDC Management Services Application 1–24
Embedded Web Server Diagnostics 1–27
SNMP Trap Message Support 1–28
Tools and Test Equipment 1–29
Tools Supplied with the Director 1–29
Tools Supplied by Service Personnel 1–31

Chapter 2
Diagnostics

Maintenance Analysis Procedures 2–1
MAP 0000: Start MAP 2–2
MAP 0100: Power Distribution Analysis 2–30
MAP 0200: POST Failure Analysis 2–40
MAP 0300: Console Application Problem Determination 2–45
MAP 0400: Loss of Console Communication 2–51
MAP 0500: FRU Failure Analysis 2–64
MAP 0600: FPM Card Failure and Link Incident Analysis 2–72
MAP 0700: Fabric, ISL, and Segmented Port Problem Determination 2–90
MAP 0800: Console PC Problem Determination 2–103

Chapter 3
Repair Information

Procedural Notes 3–2
Using Log Information 3–2
SDCM Audit Log 3–3
SDCM Event Log 3–3
Session Log 3–4
Product Status Log 3–4
SD-64 Director Audit Log 3–6
SD-64 Director Event Log 3–6
Hardware Log 3–7

Link Incident Log 3–9
Threshold Alert Log 3–10
Using Views. 3–12
Port List View. 3–12
FRU List View 3–14
Node List View. 3–16
Performance View 3–18
Zoning View. 3–18
Performing Port Diagnostics 3–19
FPM card LEDs 3–20
Port Card View. 3–20
Performance View 3–27
Perform Loopback Tests. 3–29
Collecting Maintenance Data 3–34
Clean Fiber-Optic Components 3–35
Power-On Procedure 3–36
Power-Off Procedure. 3–37
IPL the Director. 3–37
Set the Director Online or Offline 3–39
Set Online State 3–39
Set Offline State 3–40
Block and Unblock Ports. 3–40
Block a Port 3–41
Block an FPM Card 3–41
Unblock a Port 3–42
Unblock an FPM Card 3–43
Manage Firmware Versions. 3–44
Determine a Director Firmware Version 3–44
Add a Firmware Version 3–45
Modify a Firmware Version Description 3–47
Delete a Firmware Version. 3–48
Download a Firmware Version to a Director 3–48
Manage Configuration Data 3–50
Back Up the Configuration. 3–51
Restore the Configuration. 3–52
Reset Configuration Data 3–53
Install or Upgrade Software. 3–54

Chapter 4

FRU Removal and Replacement

Procedural Notes 4–1

Remove and Replace FRUs. 4–2
ESD Information 4–2
Concurrent FRUs 4–3
Nonconcurrent FRUs 4–4
Cable Management Assembly 4–4
Redundant CTP Card 4–6
FPM Card 4–9
SFF Optical Transceiver 4–13
FPM Filler Blank 4–16
Redundant Power Supply 4–17
Redundant SBAR Assembly 4–20
Redundant Fan Module 4–24
Power Module Assembly 4–26
Backplane 4–29

Chapter 5

Illustrated Parts Breakdown

Front-Accessible FRUs 5–1
Rear-Accessible FRUs 5–3

Appendix A

Messages

SDCM Application and Fabric Manager Messages A–2
SD-64 Director Product Manager Messages A–16

Appendix B

Event Code Tables

System Events (000 through 199) B–2
Power Supply Events (200 through 299) B–14
Fan Module Events (300 through 399) B–18
CTP Card Events (400 through 499) B–25
FPM Card Events (500 through 599) B–37
SBAR Assembly Events (600 through 699) B–43
Thermal Events (800 through 899) B–47

Glossary

Index

Figures

Figure 1–1: Cabinet-Mount SD-64 Directors and SDCM Server 1–3
Figure 1–2: Out-of-Band Director Management 1–5
Figure 1–3: SDCM Server 1–11
Figure 1–4: Typical Network Configuration (One Ethernet Connection) 1–15
Figure 1–5: Director FRUs (Front Access) 1–17
Figure 1–6: Director FRUs (Rear Access) 1–18
Figure 1–7: FPM Card LEDs and Connectors 1–20
Figure 1–8: SDC Management Services Window 1–25
Figure 1–9: Torque Tool and Hex Adapter 1–29
Figure 1–10: SFF Fiber-Optic Loopback Plug 1–30
Figure 1–11: Fiber-Optic Protective Plug 1–30
Figure 1–12: Null Modem Cable 1–31
Figure 2–1: Product View 2–4
Figure 2–2: Port Properties Dialog Box 2–10
Figure 2–3: Link Incident Log 2–11
Figure 2–4: Event Log 2–12
Figure 2–5: View Unit Panel 2–17
Figure 2–6: View Port Properties Panel 2–20
Figure 2–7: View FRU Properties Panel 2–22
Figure 2–8: Monitor Log Panel 2–24
Figure 2–9: Task Manager Dialog Box, Applications Tab 2–46
Figure 2–10: SDCM Login Dialog Box 2–47
Figure 2–11: Modify Network Address Dialog Box 2–60
Figure 2–12: New Product Dialog Box 2–61
Figure 2–13: FPM Card Diagram 2–74
Figure 2–14: Clear Link Incident Alert(s) 2–85
Figure 3–1: SDCM Event Log 3–3
Figure 3–2: Product Status Log 3–5

Figure 3–3: SD-64 Director Event Log . . . 3–6
Figure 3–4: Hardware Log . . . 3–8
Figure 3–5: Link Incident Log . . . 3–9
Figure 3–6: Threshold Alert Log . . . 3–11
Figure 3–7: Port List View . . . 3–13
Figure 3–8: FRU List View . . . 3–15
Figure 3–9: Node List View . . . 3–17
Figure 3–10: Zoning View . . . 3–18
Figure 3–11: Port Card View . . . 3–21
Figure 3–12: Port Properties Dialog Box . . . 3–24
Figure 3–13: Performance View . . . 3–27
Figure 3–14: Port Diagnostics Dialog Box . . . 3–30
Figure 3–15: Save Data Collection Dialog Box . . . 3–35
Figure 3–16: Data Collection Dialog Box . . . 3–35
Figure 3–17: Clean Fiber-Optic Components . . . 3–36
Figure 3–18: Information Dialog Box . . . 3–38
Figure 3–19: Set Online State Dialog Box (Current State is Offline) . . . 3–39
Figure 3–20: Set Online State Dialog Box (Current State is Online) . . . 3–40
Figure 3–21: Block Port n Dialog Box . . . 3–41
Figure 3–22: Block All Ports Dialog Box . . . 3–42
Figure 3–23: Unblock Port n Dialog Box . . . 3–43
Figure 3–24: Unblock All Ports Dialog Box . . . 3–44
Figure 3–25: Firmware Library Dialog Box . . . 3–45
Figure 3–26: New Firmware Version Dialog Box . . . 3–46
Figure 3–27: New Firmware Description Dialog Box . . . 3–47
Figure 3–28: Modify Firmware Description . . . 3–47
Figure 3–29: Send Firmware Dialog Box . . . 3–49
Figure 3–30: Send Firmware Complete Dialog Box . . . 3–50
Figure 3–31: Backup and Restore Configuration Dialog Box . . . 3–51
Figure 3–32: Backup Complete Dialog Box . . . 3–51
Figure 3–33: Backup and Restore Configuration Dialog Box . . . 3–52
Figure 3–34: Warning Dialog Box . . . 3–52
Figure 3–35: Restore Complete Dialog Box . . . 3–53
Figure 3–36: Reset Configuration Dialog Box . . . 3–53
Figure 3–37: Run Dialog box . . . 3–55
Figure 3–38: SANworks Director Connectivity Manager Dialog Box (Introduction) . . . 3–56
Figure 4–1: ESD Grounding Point (Front) . . . 4–3
Figure 4–2: ESD Grounding Point (Rear) . . . 4–3
Figure 4–3: Cable Management Assembly Removal and Replacement . . . 4–5
Figure 4–4: CTP Card Removal and Replacement . . . 4–7
Figure 4–5: FPM Card Removal and Replacement . . . 4–11
Figure 4–6: SFF Optical Transceiver Removal and Replacement . . . 4–14

Figure 4–7: FPM Filler Blank Removal and Replacement 4–17
Figure 4–8: Redundant Power Supply Removal and Replacement 4–19
Figure 4–9: SBAR Assembly Removal and Replacement 4–22
Figure 4–10: Fan Module Removal and Replacement 4–25
Figure 4–11: Power Module Assembly Removal and Replacement 4–28
Figure 4–12: Backplane Removal and Replacement 4–31
Figure 5–1: Front-Accessible FRUs 5–2
Figure 5–2: Rear-Accessible FRUs (Part 1) 5–3
Figure 5–3: Rear-Accessible FRUs (Part 2) 5–4

Tables

Table 1–1: SDC Management Services Status Symbols 1–26
Table 2–1: Event Codes 2–24
Table 2–2: MAP 100: Event Codes 2–30
Table 2–3: MAP 200: Event Codes 2–41
Table 2–4: Byte 0 FRU Codes 2–41
Table 2–5: MAP 400: Event Codes 2–52
Table 2–6: MAP 400: Error Messages 2–54
Table 2–7: MAP 500: Event Codes 2–64
Table 2–8: MAP 600: Event Codes 2–73
Table 2–9: MAP 600: Port Operational States 2–76
Table 2–10: MAP 600: Invalid Attachments 2–80
Table 2–11: MAP 600: Port Operational States 2–89
Table 2–12: MAP 700: Event Codes 2–91
Table 2–13: MAP 700: Segmentation Reasons 2–92
Table 2–14: MAP 700: Byte 4, Segmentation Reasons 2–96
Table 2–15: MAP 700: Segmentation Reason 2–102
Table 3–1: Port Operational States 3–22
Table 3–2: Invalid Attachment Messages 3–25
Table 4–1: Concurrent FRUs 4–4
Table 4–2: Nonconcurrent FRUs 4–4
Table 5–1: Front-Accessible FRU Parts List 5–2
Table 5–2: Rear-Accessible FRU Parts List (Part 1) 5–4
Table 5–3: Rear-Accessible FRU Parts List (Part 2) 5–4
Table 5–4: Miscellaneous Parts 5–5
Table A–1: SDCM Messages A–2
Table A–2: Product Manager Messages A–16

About This Guide

This guide is designed to be used as a reference for operation, troubleshooting, and future upgrades.

Text Conventions

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

Keys	Keys appear in boldface. A plus sign (+) between two keys indicates that they should be pressed simultaneously.
USER INPUT	User input appears in a different typeface and in uppercase.
FILENAMES	File names appear in uppercase italics.
Menu Options, Command Names, Dialog Box Names	These elements appear in initial capital letters.
COMMANDS, DIRECTORY NAMES, and DRIVE NAMES	These elements appear in upper case. **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.

Chapter 1

General Information

The Compaq StorageWorks SAN Director 64 (SD-64 Director or Director) provides dynamic switched connections between Fibre Channel servers and devices in a storage area network (SAN) environment. SANs introduce the concept of server-to-device networking and multiswitch fabrics, eliminate requirements for dedicated connections, and enable the enterprise to become data-centric. A SAN provides speed, high capacity, and flexibility for the enterprise, and is primarily based upon Fibre Channel architecture. The Director implements Fibre Channel technology that provides scalable bandwidth (1.0625 gigabits per second), redundant switched data paths, and long transmission distances (up to 20 kilometers).

This chapter describes the Director and attached SANworks Director Connectivity Manager (SDCM) server. The chapter specifically discusses:

- Director management, error detection and reporting features, serviceability features, zoning, multiswitch fabrics, and specifications.
- The SDCM server and minimum hardware specifications.
- Maintenance approach.
- Remote workstation configurations and hardware specifications.
- Field-replaceable units (FRUs).
- Software diagnostic features.
- Tools and test equipment.

Director Description

The Director is a second- generation, 32-port product (expandable to 64 ports) that provides dynamic switched connections between Fibre Channel servers and devices in a SAN environment. Directors (from one to four) can be configured to order in a Compaq-supplied 9000 or M-series equipment rack.

Directors are managed and controlled through a Compaq-supplied SANworks Director Connectivity Manager (SDCM) server with the SDCM, SD-64 Product Manager, and Fabric Manager applications installed. The SDCM server is a notebook personal computer (PC) that provides a central point of control for up to 48 Directors. Multiple Directors and the SDCM server communicate through the customer's local area network (LAN).

Figure 1–1 on page 1–3 illustrates an equipment rack with

❶ Four SD-64 Directors.

❷ The shelf-mount SDCM server.

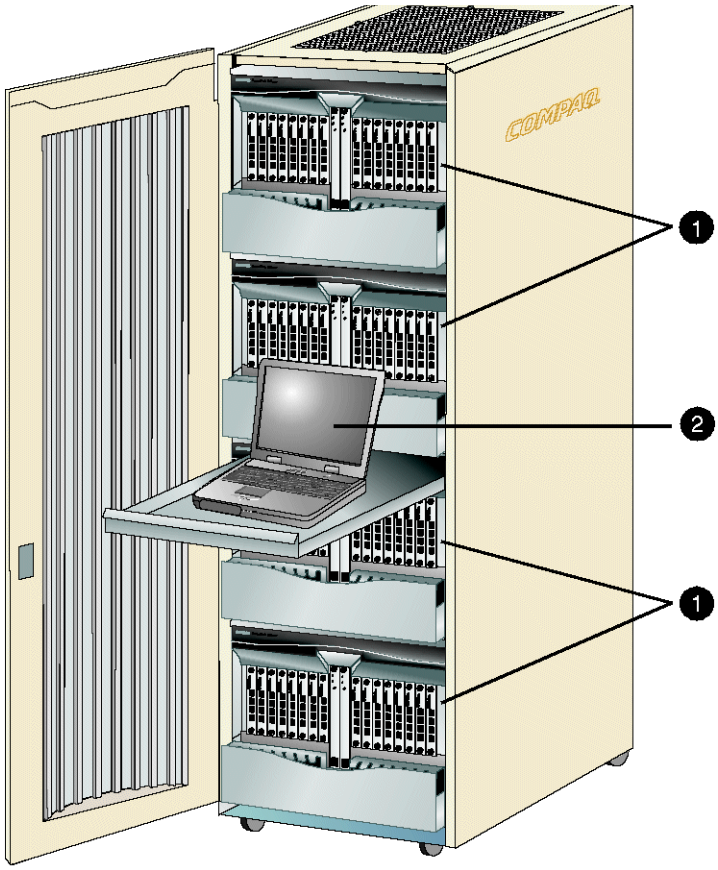


Figure 1–1: Cabinet-Mount SD-64 Directors and SDCM Server

The Director provides dynamic switched connections for servers and devices, supports mainframe and open-systems interconnection (OSI) computing environments, and provides data transmission and flow control between device node ports (N_Ports) as dictated by the *Fibre Channel Physical and Signaling Interface* (FC-PH 4.3). Through interswitch links (ISLs), the Director can also connect to one or more additional Directors to form a Fibre Channel multiswitch fabric.

Director Management

Management access to the Director is provided through an Ethernet LAN connection to the Director's control processor (CTP) cards (out-of-band management), or as an optional feature, a Fibre Channel connection to an FPM card (inband management). The following out-of-band management access methods are provided:

- Management through the SDCM application. This graphical user interface (GUI) resides on the SDCM server and provides a single point of management for all Directors, and a launching point for the SD-64 Product Manager and Fabric Manager applications.
- Management using simple network management protocol (SNMP). An SNMP agent is implemented through the SDCM application that allows administrators on SNMP management workstations to access Director management information using any standard network management tool. Administrators can assign internet protocol (IP) addresses and corresponding community names for up to six SNMP workstations functioning as SNMP trap message recipients.
- Management through the Internet using the embedded web server interface installed on the Director. This interface supports configuration, statistics monitoring, and basic operation of the Director, but does not offer all the capabilities of the SD-64 Product Manager application. Administrators launch the web server interface from a remote PC by entering the Director's IP address as the Internet uniform resource locator (URL), then entering a user name and password at a login screen. The PC browser then becomes a management console.
- Management through a customer-supplied remote workstation communicating with the SDCM Server through a corporate intranet.
- Management through 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).

Figure 1–2 on page 1–5 illustrates out-of-band Director management. The figure shows the following elements connected through a customer-supplied intranet:

❶ SNMP management workstation.

❷ SDCM server.

❸ Web browser.

❹ SD-64 Director.

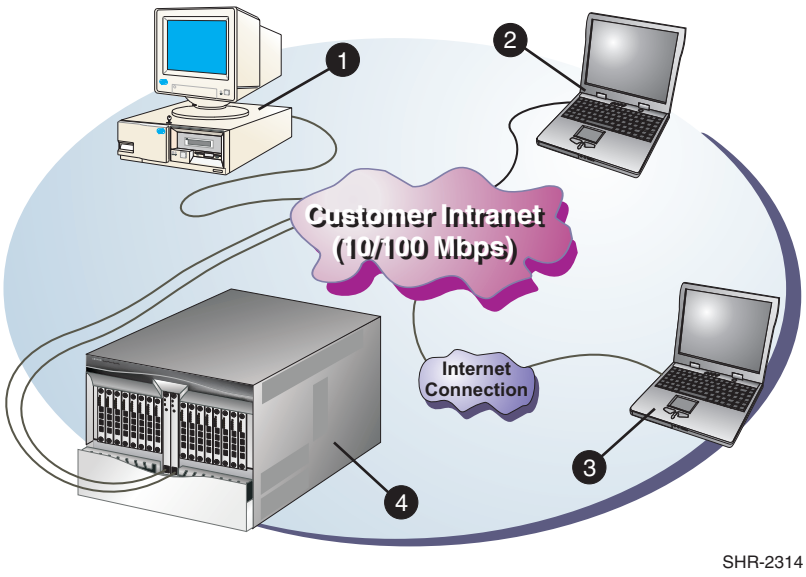


Figure 1–2: Out-of-Band Director Management

Error-Detection, Reporting, and Serviceability Features

The Director provides the following error detection, reporting, and serviceability features:

- Light-emitting diodes (LEDs) on Director FRUs and the front bezel that provide visual indicators of hardware status or malfunctions.
- System and threshold alerts, event logs, audit logs, link incident logs, threshold alert logs, and hardware logs that display Director, Ethernet link, and Fibre Channel link status at the SDCM server or on a remote workstation.
- Diagnostic software that performs power-on self-tests (POSTs) and port diagnostics (internal loopback and external loopback).
- Automatic notification of significant system events (to support personnel or administrators) through e-mail messages or the call-home feature.
- An RS-232 maintenance port at the rear of the Director (port access is password protected) that enables installation or service personnel to change the Director's internet protocol (IP) address, subnet mask, and gateway address; or to run diagnostics and isolate system problems through a local or remote terminal.
- Redundant FRUs (logic cards, power supplies, and cooling fans) that are removed or replaced without disrupting Director or Fibre Channel link operation.

- A modular design that enables quick removal and replacement of FRUs without the use of special tools or equipment.
- Concurrent port maintenance. FPM cards are added or replaced and fiber-optic cables are attached to ports without interrupting other ports or Director operation.
- Beaconing to assist service personnel in locating a specific port, FRU, or Director in a multiswitch environment. When port beaconing is enabled, the amber LED associated with the port flashes. When FRU beaconing is enabled, the amber (service required) LED on the FRU flashes. When unit beaconing is enabled, the system error indicator on the front bezel flashes. Beaconing does not affect port, FRU, or Director operation.
- Data collection through the Product Manager application to help isolate system problems. The data includes a memory dump file and audit, hardware, and engineering logs.
- Status monitoring of redundant FRUs and alternate Fibre Channel data paths to ensure continued Director availability in case of failover. The SDCM application queries the status of each backup FRU daily. A backup FRU failure is indicated by an illuminated amber LED.
- Simple network management protocol (SNMP) using the Fibre Alliance management information base (MIB) that runs on the SDCM server. Up to 12 authorized management workstations can be configured through the SDCM application to receive unsolicited SNMP trap messages. The trap messages indicate operational state changes and failure conditions.
- SNMP using the Fibre Channel Fabric Element MIB (Version 1.10), transmission control protocol/internet protocol (TCP/IP) MIB-II definition (RFC 1213), or a product-specific MIB that runs on each Director. Up to six authorized management workstations can be configured through the Product Manager application to receive unsolicited SNMP trap messages. The trap messages indicate operational state changes and failure conditions.

Zoning Feature

The Director supports a name server zoning feature that partitions attached devices into restricted-access groups called zones. Devices in the same zone can recognize and communicate with each other through switched port-to-port connections. Devices in separate zones cannot communicate with each other.

Zoning is configured by authorizing or restricting access to name server information associated with device N_Ports that attach to Director fabric ports (F_Ports). A zone member is specified by the Director port number to which a device is attached, or by the 8-byte (16-digit) world-wide name (WWN) assigned to the host bus adapter (HBA) or Fibre Channel interface installed in a device. A device can belong to multiple zones.

CAUTION: If zoning is implemented by port number, a change to the Director fiber-optic cable configuration disrupts zone operation and may incorrectly include or exclude a device from a zone.

If zoning is implemented by WWN, removal and replacement of a device HBA or Fibre Channel interface (thereby changing the device WWN) disrupts zone operation and may incorrectly include or exclude a device from a zone.

Zones are grouped into zone sets. A zone set is a group of zones that is enabled (activated) or disabled across all Directors and switches in a multiswitch fabric. Only one zone set can be enabled at one time.

Multiswitch Fabrics

A Fibre Channel topology that consists of one or more interconnected Director or switch elements is called a fabric. Operational software provides the ability to interconnect Directors [through expansion port (E_Port) connections] to form a multiswitch fabric. The data transmission path through the fabric is typically determined by fabric elements and is user-transparent. Subject to zoning restrictions, devices attached to any interconnected Director can communicate with each other through the fabric.

Because a multiswitch fabric is typically complex, maintenance personnel should be aware that several factors can degrade fabric performance or cause connectivity failures. These factors include:

- **Domain ID assignment**-each Director in a fabric is identified by a unique domain ID that ranges from 1 through 31. A domain ID of 0 is invalid. If two operational fabrics join, they determine if any domain ID conflicts exist between the fabrics. If one or more conflicts exist, the E_Ports that form the interswitch link (ISL) segment to prevent the fabrics from joining.
- **Zoning**-in a multiswitch fabric, zoning is configured on a fabric-wide basis, and a change to the zoning configuration is applied to all Directors in the fabric. To ensure zoning is consistent across a fabric, the following rules are enforced when two fabrics (zoned or unzoned) join:

- ❏ **Fabric A unzoned and Fabric B unzoned**-the fabrics join successfully, and the resulting fabric remains unzoned.
- ❏ **Fabric A zoned and Fabric B unzoned**-the fabrics join successfully, and fabric B automatically inherits the zoning configuration from fabric A.
- ❏ **Fabric A unzoned and Fabric B zoned**-the fabrics join successfully, and fabric A automatically inherits the zoning configuration from fabric B.
- ❏ **Fabric A zoned and Fabric B zoned**-the fabrics join successfully only if the zone configurations can be merged. If the fabrics cannot join, the connecting E_Ports segment and the fabrics remain independent.

Zone configurations for two fabrics are compatible (the zones can join) if the active zone set name is identical for each fabric, and if zones with the same name have identical elements.

- ■ **Port segmentation-**When an ISL activates, Directors exchange operating parameters to determine if they are compatible and can join to form a single fabric. If incompatible, the connecting E_Port at each Director segments to prevent the creation of a single fabric. A segmented link transmits only Class F traffic; the link does not transmit Class 2 or Class 3 traffic. The following conditions cause ports to segment:
  - ❏ **Incompatible operating parameters**-either the resource allocation time-out value (R_A_TOV) or error-detect time-out value (E_D_TOV) is inconsistent between Directors. To prevent E_Port segmentation, the same E_D_TOV and R_A_TOV must be specified for each Director.
  - ❏ **Duplicate domain IDs**-one or more domain ID conflicts are detected.
  - ❏ **Incompatible zoning configurations**-zoning configurations for the Directors are not compatible.
  - ❏ **Build fabric protocol error**-a protocol error is detected during the process of forming the fabric.
  - ❏ **No principal switch-**no Director in the fabric is capable of becoming the principal switch.
  - ❏ **No response from attached switch**-after a fabric is created, each Director in the fabric periodically verifies operation of all attached switches and Directors. An ISL segments if a switch or Director does not respond to a verification request.
  - ❏ **ELP retransmission failure timeout-**a Director that exhibits a hardware failure or connectivity problem cannot transmit or receive Class F frames. The Director did not receive a response to multiple exchange link protocol (ELP) frames, did not receive a fabric login (FLOGI) frame, and cannot join an operational fabric.

Director Specifications

This section lists physical characteristics, storage and shipping environment, operating environment, and service clearances for the SD-64.

Physical Characteristics

Dimensions:

Height: 39.7 centimeters (15.7 inch)

Width: 44.5 centimeters (17.5 inch)

Depth: 54.6 centimeters (21.5 inch)

Weight: 52.3 kilograms (115.0 pounds)

Shipping weight: 76.4 kilograms (168 pounds)

Power requirements:

Input voltage: 100 to 120 or 200 to 240 VAC

Input frequency: 50/60 Hz

Plan for single phase or phase-to-phase connections and 5-ampere dedicated service

Heat dissipation:

16 FPM cards (maximum): 490 watts (1,672 BTUs/hr)

Cooling airflow clearances (Director chassis):

Right and left side: 5.1 centimeters (2.0 inches)

Front and rear: 7.6 centimeters (3.0 inches)

Top and bottom: No clearance required

Shock and vibration tolerance:

60 Gs for 10 milliseconds without nonrecoverable errors

Acoustical noise:

55 dB “A” scale

Inclination:

10° maximum

Storage and Shipping Environment

Protective packaging must be provided to protect the Director under all shipping methods (domestic and international).

Shipping temperature:

-40° C to 60° C (-40° F to 140° F)

Storage temperature:

1° C to 60° C (34° F to 140° F)

Shipping relative humidity:

5% to 100%

Storage relative humidity:

5% to 80%

Maximum wet-bulb temperature:

29° C (84° F)

Altitude:

12,192 meters (40,000 feet)

Operating Environment

Temperature:

4° C to 40° C (40° F to 104° F)

Relative humidity:

8% to 80%

Maximum wet-bulb temperature:

27° C (81° F)

Altitude:

3,048 meters (10,000 feet)

Equipment Cabinet Service Clearances

Front: 1 meter (39.37 inches)

Rear: 1 meter (39.37 inches)

Right side: No clearance required

Left side: No clearance required

SDCM Server Description

The SDCM server is a notebook personal computer (PC) that provides a central point of control for up to 48 LAN-connected Directors or other managed products. Figure 1–3 illustrates the SDCM server.

The server is mounted in a slide-out drawer in the Compaq-supplied 9000 or M-series (H9A10 or H9A15) equipment rack. The SDCM server or Internet access to the embedded web server interface is required to install, configure, and manage the Director.

Although a configured Director operates normally without SDCM server intervention, an attached server should operate at all times to monitor Director operation, log events and configuration changes, and report failures.

Figure 1–3: SDCM Server

The SDCM server provides an auto-detecting 10/100 Mbps LAN connector, provided by an Ethernet adapter card installed in the personal computer memory card international association (PCMCIA) slot at the left side of the PC. The adapter card attaches to the LAN segment containing the Directors and to a customer intranet to allow access from remote user workstations.

> **NOTE:** The SDCM laptop server is connected to the customer intranet using the external Ethernet card on the left side of the PC (the PCMCIA slot). The Ethernet connection on the rear of the PC is not currently used.

SDCM Server Specifications

The following list summarizes hardware specifications for the SDCM server notebook platform. Current platforms may ship with more enhanced hardware, such as a faster processor, additional random- access memory (RAM), or a higher-capacity hard drive or removable disk drive.

- Notebook PC with color monitor, keyboard, and keyboard- mounted trackpad (mouse).
- Intel Celeron processor with a 600 megahertz (MHz) or greater clock speed, running the Microsoft Windows NT 4.0 operating system.
- 2-gigabyte (GB) or greater internal hard drive.
- 128-megabyte (MB) or greater RAM.
- CD-ROM drive.
- 1.44-MB 3.5-inch disk drive.
- 100-MB external disk (Zip) drive.
- Two 10/100 Mbps Ethernet adapters with RJ-45 connectors.

Ethernet Hub (Optional)

The SDCM server and managed Directors can connect through a customer-provided cabinet-mounted 10/100 Base-T Ethernet hub.

Embedded Web Server Interface

Administrators or operators with a browser-capable PC and an Internet connection can monitor and manage the Director through an embedded web server interface. The application provides a graphical user interface (GUI) similar to the Product Manager application, and supports Director configuration, statistics monitoring, and basic operation.

Maintenance Approach

Whenever possible, the Director maintenance approach instructs service personnel to perform fault isolation and repair procedures without degrading or interrupting operation of the Director, attached devices, or associated applications. Director fault isolation begins when one or more of the following occur:

- System event information displays at the attached SDCM server, a remote workstation communicating with the SDCM server, or the embedded web server interface.
- LEDs on the Director front bezel or FRUs illuminate to indicate a hardware malfunction.
- An unsolicited SNMP trap message is received at a management workstation, indicating an operational state change or failure.
- Notification of a significant system event is received at a designated support center through an e-mail message or the call-home feature.

System events can be related to a:

- Director or SDCM server failure (hardware or software).
- Ethernet LAN communication failure between the Director and SDCM server.
- Link failure between a port and attached device.
- ISL failure or segmentation of an E_Port.

Fault isolation and service procedures vary depending on the system event information provided. Fault isolation and related service information is provided through maintenance analysis procedures (MAPs) documented in Chapter 2. MAPs consist of step-by-step procedures that prompt service personnel for information or describe a specific action to be performed. MAPs provide information to interpret system event information, isolate a Director failure to a single FRU, remove and replace the failed FRU, and verify Director operation. The fault isolation process normally begins with MAP 0000: Start MAP on page 2–2.

Ensure the correct Director is selected for service (if the SDCM server manages multiple Directors or other Compaq products) by enabling unit beaconing at the failed Director. The amber system error LED on the Director front bezel blinks when beaconing is enabled. Instructions to enable beaconing are incorporated into MAP steps.

Remote Workstation Configurations

Customer system administrators determine whether to allow access to Directors from remote workstations. If administrators allow remote sessions, they may restrict access to selected workstations by configuring the IP addresses of those workstations through the SDCM application. When a remote session is allowed, the remote user has the same rights and permissions as if the session were on the local SDCM server. Up to nine SDCM application sessions can be simultaneously active (one local and eight remote).

Remote workstations must have access to the customer intranet (LAN segment) on which the SDCM server is installed. Director administrative functions are accessed through the LAN and SDCM server. The customer intranet is part of the 10/100 Mbps LAN that provides access to managed Directors. This Director-to-SDCM server connection is part of the equipment rack installation and is required. Connection of remote workstations through the customer intranet is optional. This type of network configuration using an Ethernet connection through the SDCM server is shown in Figure 1–4.

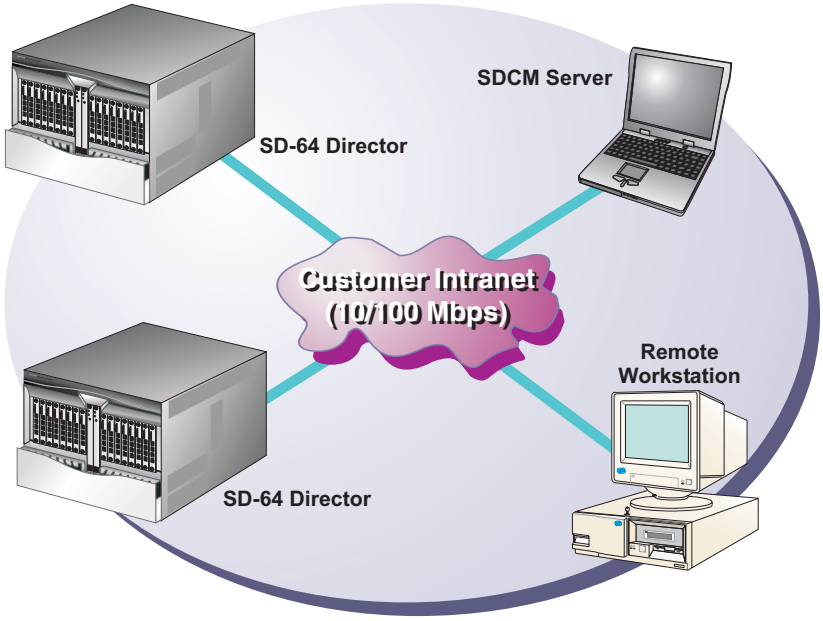


Figure 1–4: Typical Network Configuration (One Ethernet Connection)

If the SDCM server connection is provided through the customer intranet, all functions provided by the SDCM server are available to users throughout the enterprise.

To optimize security, it is recommended that the SDCM server and all Directors reside in a secure physical network domain for storage and servers in the information technology (IT) enterprise.

> **NOTE:** The Ethernet adapter in the SDCM server provides an auto-detecting 10/100 Mbps connection.

Minimum Remote Console Hardware Specifications

Client SDCM and Product Manager applications download and install to remote workstations (from the SDCM server) using a standard web browser. The applications operate on platforms that meet the following minimum system requirements:

- Desktop or notebook PC with color monitor, keyboard, and mouse, using an Intel Pentium processor with a 200 MHz or greater clock speed, and using the Microsoft Windows 95, Windows 98, Windows 2000, Windows NT 4.0, or Linux 2.2 operating system.
- Unix workstation with color monitor, keyboard, and mouse, using a:
  - Hewlett-Packard HA PA-RISC processor with a 360 MHz or greater clock speed, using the HP-UX 11 or higher operating system.
  - Sun Microsystems UltraSPARC-II processor with a 300 MHz or greater clock speed, using the SunOS Version 5.5.1 or higher operating system, or Solaris Version 2.5.1 or higher operating system.
  - IBM PowerPC microprocessor with a 233 MHz or greater clock speed, or POWER3 microprocessor with a 333 MHz or greater clock speed, using the AIX Version 4.3.3 or higher operating system.
- At least 15 MB available on the internal hard drive.
- 32 MB or greater RAM.
- Video card supporting 256 colors at 800 x 600 pixel resolution.
- Ethernet network adapter.
- Java-enabled Internet browser, such as Microsoft Internet Explorer (Version 4.0 or later) or Netscape Navigator (Version 4.0 or later).

Field-Replaceable Units

The Director provides a modular design that enables quick removal and replacement of FRUs. This section describes Director FRUs and controls, connectors, and indicators associated with the FRUs.

Figure 1–5 illustrates the front of the Director. FRUs accessed from the front include:

❶ Power and system error light-emitting diodes (LEDs).

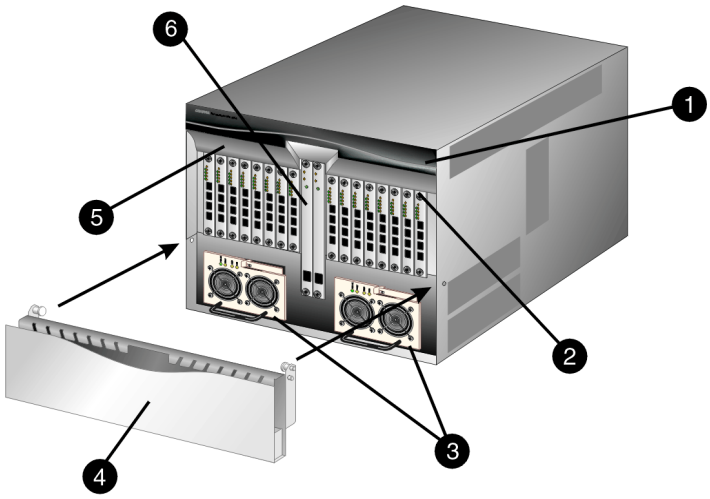
❷ Fiber port module (FPM) cards.

❸ Power supplies.

❹ Cable management assembly.

❺ Front bezel.

❻ Control processor (CTP) cards.



SHR-2272

Figure 1–5: Director FRUs (Front Access)

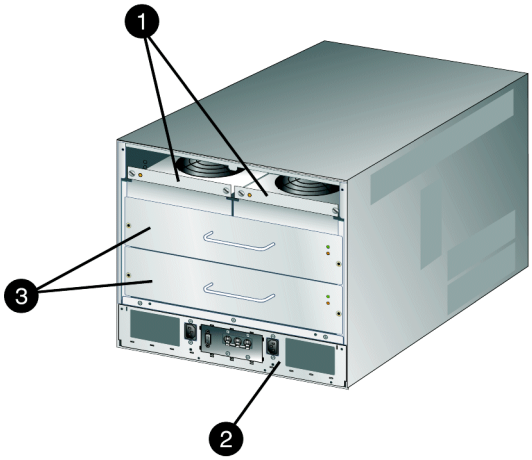
Figure 1–6 illustrates the rear of the Director. FRUs accessed from the rear include:

❶ Fan modules.

❷ Power module assembly.

❸ Serial crossbar (SBAR) assemblies.

■ Backplane (not shown).



SHR-2312

Figure 1–6: Director FRUs (Rear Access)

Cable Management Assembly

The cable management assembly at the bottom front of the Director provides routing for Ethernet cables attached to CTP cards and fiber-optic cables attached to Director ports. The assembly rotates up to provide front access to the redundant power supplies.

Front Bezel

The bezel at the top front of the Director includes an amber system error light-emitting diode (LED) and a green power LED. The power LED illuminates when the Director is powered on and operational. If the LED extinguishes, a facility power source, alternating current (AC) power cord, or Director power distribution failure is indicated.

The system error LED illuminates when the Director detects an event requiring immediate operator attention, such as a FRU failure. The LED remains illuminated as long as an event is active. The LED extinguishes when the Clear System Error Light function is selected from the Product Manager application. The LED blinks if unit beaconing is enabled. An illuminated system error LED (indicating a failure) takes precedence over unit beaconing.

CTP Card

The Director is delivered with two CTP cards. The active CTP card initializes and configures the Director after power on and contains the microprocessor and associated logic that coordinate Director operation. A CTP card provides an initial machine load (IML) button on the faceplate. When the button is pressed and held for three seconds, the Director reloads firmware and resets the CTP card without switching off power or affecting operational fiber-optic links.

Each CTP card also provides a 10/100 megabit per second (Mbps) RJ-45 twisted pair connector on the faceplate that attaches to an Ethernet local area network (LAN) to communicate with the SDCM Server or a simple network management protocol (SNMP) management station.

Each CTP card provides system services processor (SSP) and embedded port (EP) subsystems. The SSP subsystem runs Director applications and the underlying operating system, communicates with Director ports, and controls the RS-232 maintenance port and 10/100 Mbps Ethernet port. The EP subsystem provides Class F and exception frame processing, and manages frame transmission to and from the SBAR assembly. In addition, a CTP card provides nonvolatile memory for storing firmware, Director configuration information, persistent operating parameters, and memory dump files. Director firmware is upgraded concurrently (without disrupting operation).

The backup CTP card takes over operation if the active card fails. Failover from a faulty card to the backup card is transparent to attached devices.

Each card faceplate contains a green LED that illuminates if the card is operational and active, and an amber LED that illuminates if the card fails. Both LEDs are extinguished on an operational backup card. The amber LED blinks if FRU beaconing is enabled.

FPM Card

Each FPM card provides four full-duplex generic ports (G_Ports) that transmit or receive data at 1.0625 gigabits per second (Gb/s). G_Port functionality depends on the type of cable attachment. FPM cards use nonopen fiber control (OFC) Class 1 laser transceivers that comply with Section 21 of the Code of Federal Regulations (CFR), Subpart (J) as of the date of manufacture.

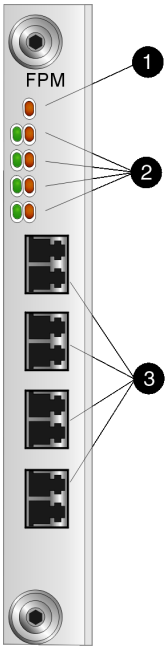
Figure 1–7 on page 1–20 illustrates the faceplate of an FPM card.

❶ An amber LED (at the top of the card) that illuminates if any port fails or blinks if FRU beaconing is enabled.

❷ A bank of amber and green LEDs above the ports. One amber LED and one green LED are associated with each port and indicate port status as follows:

- ❏ The green LED illuminates (or blinks if there is active traffic) and the amber LED extinguishes to indicate normal port operation.
- ❏ The amber LED illuminates and the green LED extinguishes to indicate a port failure.
- ❏ Both LEDs extinguish to indicate a port is operational but not communicating with an N_Port (no cable attached, loss of light, port blocked, or link recovery in process).
- ❏ The amber LED flashes and the green LED either remains on, extinguishes, or flashes to indicate a port is beaconing or running online diagnostics.

❸ Four duplex LC connectors for attaching fiber-optic cables.



SHR-2274

Figure 1–7: FPM Card LEDs and Connectors

The Director is delivered with eight FPM cards installed (32 ports), but provides chassis slots for up to 16 FPM cards (64 ports total). An FPM card is a concurrent FRU and can be added or replaced while the Director is powered on and operating.

Depending on device connections, G_Ports behave as follows:

- If the G_Port is attached to a Fibre Channel device, the port functions as a fabric port (F_Port). An F_Port is the interface on a Director that connects to a device N_Port.
- If the G_Port is attached to another Director to form an interswitch link (ISL), the port functions as an expansion port (E_Port). A multiswitch fabric is formed through multiple Directors and ISLs.

Singlemode or multimode fiber-optic cables attach to FPM cards through small form factor (SFF) pluggable optic transceivers. The fiber-optic transceivers provide duplex LC connectors, and can be detached from FPM cards (through a 10-pin interface) for easy replacement. Two fiber-optic transceiver types are available:

- **Shortwave Laser-**Shortwave laser transceivers provide connections for transferring data over short distances (2 to 500 meters) through 50-micron or 62.5-micron multimode fiber.
- **Longwave Laser-**Longwave laser transceivers provide connections for transferring data over long distances (up to 20 kilometers) through 9-micron singlemode fiber.

Power Supply

Redundant, load-sharing power supplies step down and rectify facility input power to provide 48-volt direct current (VDC) power to Director FRUs. The power supplies also provide overvoltage and overcurrent protection. Either power supply can be replaced while the Director is powered on and operational.

Each power supply has a separate backplane connection to allow for different AC power sources. The power supplies are input rated at 85 to 264 volts alternating current (VAC). The faceplate of each power supply provides the following status LEDs:

- A green **PWR OK** LED illuminates if the power supply is operational and receiving AC power.
- An amber **FAULT** LED illuminates if the power supply fails.
- An amber **TEMP** LED illuminates if the power supply shuts down due to an overtemperature condition.
- An amber **I LIM** LED illuminates if the power supply is overloaded and operating at the current limit (15.6 amperes).

Power Module Assembly

The power module assembly is located at the bottom rear of the Director. The module is a nonconcurrent FRU, and the Director must be powered off prior to scheduled removal and replacement. The module provides:

- Two single-phase AC power connectors. Each connector is input rated at 85 to 264 VAC.
- A power switch (circuit breaker) that controls AC power distribution to both power supplies. The breaker is set manually, or is automatically tripped by internal software if thermal sensors indicate the Director is overheated.
- A 9-pin maintenance port that provides a connection for a local terminal or dial-in connection for a remote terminal. Although the port is typically used by maintenance personnel, operations personnel use the port to configure network addresses.
- An input filter and AC system harness (internal to the FRU) that provides the wiring to connect the AC power connectors to the power switch and power supplies (through the backplane).

Fan Module

Two fan modules, each containing three fans (six fans total), provide cooling for Director FRUs, as well as redundancy for continued operation if a fan fails.

The fan module can be replaced while the Director is powered on and operating, provided the module is replaced within ten minutes (after which software powers off the Director). An amber LED for each fan module illuminates if one or more fans fail or rotate at insufficient angular velocity.

SBAR Assembly

The Director is delivered with two SBAR assemblies. The active SBAR is responsible for Fibre Channel frame transmission from any Director port to any other Director port. Connections are established without software intervention. The assembly accepts a connection request from a port, determines if a connection can be established, and establishes the connection if the destination port is available. The assembly also stores busy, source connection, and error status for each Director port.

The backup SBAR takes over operation if the active assembly fails, and provides the ability to maintain connectivity and data frame transmission without interruption. Failover to the backup assembly is transparent to attached devices.

Each SBAR assembly consists of a card and steel carriage that mounts flush on the backplane. The carriage provides protection for the back of the card, distributes cooling airflow, and assists in aligning the assembly during installation. The rear of the carriage contains a green LED that illuminates if the assembly is operational and active, and an amber LED that illuminates if the assembly fails. Both LEDs are extinguished on an operational backup assembly. The amber LED blinks if FRU beaconing is enabled.

Backplane

The backplane provides 48 VDC power distribution and connections for all logic cards. The backplane is a nonconcurrent FRU. The Director must be powered off prior to FRU removal and replacement.

Software Diagnostic Features

The Director provides the following diagnostic software features that aid in fault isolation and repair of problems:

- Director FRUs provide on-board diagnostic and monitoring circuits that continuously report FRU status to the SDCM, Product Manager, and Fabric Manager applications. These applications provide system alerts and logs that display failure and diagnostic information at the SDCM server or a remote workstation communicating with the SDCM server.
- The SDCM application that runs as a Windows NT service and provides an additional user interface to display Director operational status.
- The embedded web server interface that provides Internet access to isolate problems for a single Director.
- Unsolicited SNMP trap messages that indicate operational state changes or failures can be transmitted to up to 12 authorized management workstations.
- E-mail messages or call-home reports provide automatic notification of significant system events to designated support personnel or administrators.

SDCM Server Diagnostics

The SDCM, Product Manager, and Fabric Manager applications provide a Java-based GUI to manage, monitor, and isolate problems for multiple Directors and multiswitch fabrics.

The SDCM application opens automatically when the SDCM server is powered on, and the default display is the Product View. Managed products (including Directors) appear as icons at the right panel of the window, and a navigation control panel with a series of icons displays at the left side of the window. An alert panel displays below the navigation control panel.

The Product Manager application provides a Java-based GUI to manage, monitor, and isolate problems for a specific Director. The application operates locally on the SDCM server or through an Ethernet LAN connection from a remote user workstation.

Click a Director icon to open the Product Manager application. When the application opens, the default display is the Hardware View. A SD-64 Director Status table appears at the top of the window, a graphical representation of Director hardware (front and rear) appears at the right panel of the window, and a navigation control panel with a series of icons appears at the left side of the window. An alert panel displays below the navigation control panel.

The Fabric Manager application provides a Java-based GUI to manage, monitor, and isolate problems for Fibre Channel fabrics. The application operates locally on the SDCM server, or through an Ethernet LAN connection from a remote user workstation. Select the Fabric menu option from the View icon to open the Fabric View.

Click a pentagonal icon to open the Fabric Manager application. When the application opens, the default display is the Topology View. The Topology View displays graphical fabric elements and ISLs for a multiswitch fabric. The graphical representation of the fabric emulates the configuration and operational status of the corresponding real fabric. Note that a single Director without ISLs is still considered a fabric.

- For a description of the Product Manager Fabric application, refer to the *SANworks by Compaq SAN Director 64 Product Manager User Guide* (AA-RPL9B-TE).
- For a description of the SDCM and Fabric Manager applications, refer to the *SANworks by Compaq Director Connectivity Manager User Guide* (AA-RPL7B-TE).

SDC Management Services Application

The SDC Management Services (SMS) application provides both a central control point and server-side functionality (in a client-server environment). The application runs as a Windows NT service and starts automatically when the SDCM Server is powered on.

The user interface consists of the SDCM Services window (Figure 1–8), which provides SMS application status and diagnostic information when the SMS application cannot communicate with the SDC Manager application. The SDCM Services window consists of:

- An event table that displays SDC Management Services events that occurred since the SMS application was started.
- A status line at the bottom of the panel that provides a status indicator and message area.

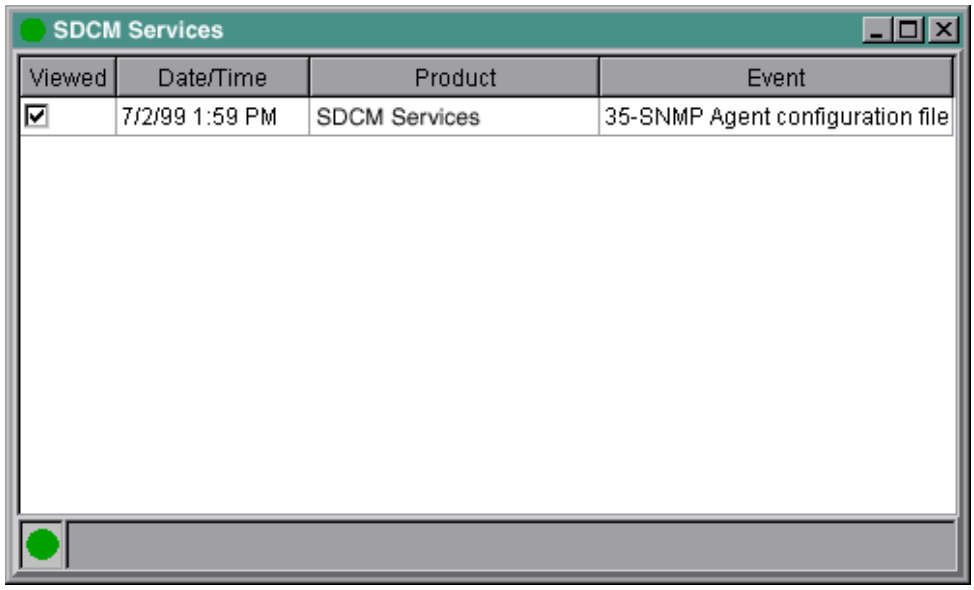


Figure 1–8: SDC Management Services Window

Event Table

The event table displays the last ten events that occurred since the SMS application was started. Events that occurred during a prior instance of the application do not display. If a new event occurs while ten events display, the oldest event is discarded. A deeper event history is maintained in the form of a log file viewed through the SDCM application.

The events are internal error conditions detected by the SMS applications, and are not related to product-specific events reported by a director. Events typically relate to SDCM audit log and file corruption, invalid product definition and firmware files, missing product services class, or missing version information.

The event table contains the following columns:

- **Viewed** - this column provides a check box associated with each event. Each check box allows service personnel to mark an event as viewed (acknowledged with appropriate action taken).
- **Date/Time** - the date and time the event was reported to the SDCM Server.
- **Product** - the product associated with the event. Some events are associated with the SMS application, while others are associated with a specific instance of the Product Manager application. In the latter case, the product (SD-64) and configured name (or IP address) associated with the instance are displayed.
- **Event** - the numeric event code and a brief description of the event.

Status Line

The status line provides a status indicator and message area. SMS status symbols are explained in Table 1–1.

The SMS application icon (upper left corner of the window) is dynamic and matches the status indicator. This feature allows users and service personnel to observe the status when the application is minimized to the Windows NT task bar.

The message area briefly displays messages during SMS application startup to indicate the progress of startup activities.

Table 1–1: SDC Management Services Status Symbols

Alert Symbol	Meaning
Blank	The status indicator is blank during SMS application initialization.
Green circle	All events are viewed (acknowledged with appropriate action taken).
Yellow triangle	One or more nonfatal events have not been viewed.
Red diamond (with yellow background)	A fatal error occurred.

Embedded Web Server Diagnostics

If SDCM server access is not available, the embedded web server interface provides a GUI accessed through the Internet (locally or remotely) to manage, monitor, and isolate problems for a single Director. This interface does not replace nor offer the full management capability of the SDCM and Product Manager applications.

The embedded web server interface can be opened from a standard web browser running Netscape Navigator Version 4.6 (or higher) or Microsoft Internet Explorer Version 4.0 (or higher). At the browser, enter the IP address of the Director as the Internet uniform resource locator (URL). When prompted at a login screen, enter a user name and password. When the interface opens, the default display is the View panel. Service personnel can perform monitoring, configuration, maintenance and diagnostic functions as follows:

- **View panel-**quickly inspect and determine the operational status of the Director, and inspect Director properties and operating parameters, FRU properties, and Fibre Channel port properties.
- **Configure panel-**configure or change:
  - Director Fibre Channel ports.
  - Director identification, date and time, operating parameters, and network addresses.
  - SNMP trap message recipients.
  - User passwords.
- **Monitor panel-**inspect and monitor:
  - Fibre Channel ports and port performance statistics.
  - The active zone set.
  - Event log entries, and clear the system error LED at the Director front bezel.
  - Information about attached devices (nodes).
- **Operations panel**-perform the following operations and maintenance tasks:
  - Enable port beaconing and perform port diagnostics (internal and external loopback tests).
  - Reset Fibre Channel ports.
  - Set the Director online state.
  - Upgrade Director firmware.

General tasks performed through the web server interface are very similar in form and function to tasks performed through the SDCM and Product Manager applications; therefore, they are not documented in this publication. For explicit task information and descriptions, open the online user documentation (Help selection) that supports the interface.

This publication provides explicit instructions for Director fault isolation using the embedded web server interface. Refer to Diagnostics on page 2–1 for the fault isolation tasks.

SNMP Trap Message Support

Unsolicited SNMP trap messages that indicate Director operational state changes or failure conditions can be customer-configured to be transmitted to up to 12 management workstations. If installed on a dedicated Ethernet LAN, the workstations communicate directly with each Director. If installed on a customer intranet, workstations communicate with Directors through the SDCM server.

SNMP data and trap messages are defined in the Fibre Channel FE-MIB definition, a subset of the TCP/IP MIB-II definition (RFC 1213), and a custom, Director-specific MIB. Customers can install these MIBs (in standard ASN.1 format) on any SNMP management workstation.

Although SNMP trap messages are typically transmitted to customer personnel only, the messages may be provided to service personnel as initial notification of a Director problem or as information included in the fault isolation process. Generic SNMP traps include:

- **coldStart-**reports that the SNMP agent is reinitializing due to a Director reset.
- **warmStart**-reports that the SNMP agent is reinitializing due to a Director IPL.
- **authorizationFailure**-reports attempted Director access by an unauthorized SNMP manager. This trap is configurable and is disabled by default.

Director-specific SNMP traps specified in the custom MIB include Fibre Channel port operational state changes and FRU operational state changes.

If authorized through the Configure SNMP dialog box in the Product Manager application, users at SNMP management workstations can modify MIB variables.

Director modifications performed through SNMP management work stations are recorded in the associated Director audit log and are available through the Product Manager application. For additional information, refer to the *StorageWorks by Compaq SAN Director SNMP Guide* (AA-RQ7BA-TE).

Tools and Test Equipment

This section describes tools and test equipment that may be required to test, service, and verify operation of the Director and attached SDCM server. These tools are either supplied with the Director or must be supplied by service personnel.

Tools Supplied with the Director

The following tools are supplied with the Director. Use of the tools may be required to perform test, service, or verification tasks.

- **Torque tool with hexagonal adapter-**The torque tool (with 5/32" hexagonal adapter) is required to remove and replace Director logic cards. The tool is shown in Figure 1–9.

CAUTION: The torque tool supplied with the Director is designed to tighten Director logic cards and is set to release at a torque value of six inch-pounds. Do not use an Allen wrench or torque tool designed for use with another Compaq product. Use of the wrong tool may overtighten and damage logic cards.

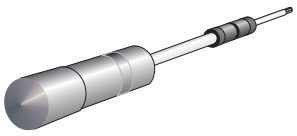


Figure 1–9: Torque Tool and Hex Adapter

- **Fiber-optic loopback plug-**An SFF multimode (shortwave laser) or singlemode (longwave laser) loopback plug is required to perform port loopback diagnostic tests. Four multimode loopback plugs are shipped with the Director. Both plug types are shipped if shortwave laser and longwave laser transceivers are installed. The plug is shown in Figure 1–10.

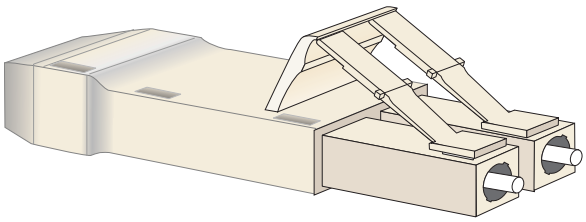


Figure 1–10: SFF Fiber-Optic Loopback Plug

- **Fiber-optic protective plug**-For safety and port transceiver protection, fiber-optic protective plugs must be inserted in all Director ports without fiber-optic cables attached. The Director is shipped with protective plugs installed in all ports. A protective plug is shown in Figure 1–11.

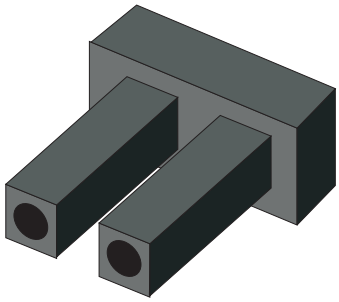


Figure 1–11: Fiber-Optic Protective Plug

- **Null modem cable**-An asynchronous RS-232 null modem cable is required to configure Director network addresses and acquire event log information through the maintenance port. The cable has nine conductors and DB-9 male and female connectors. A null modem cable is shown in Figure 1–12.

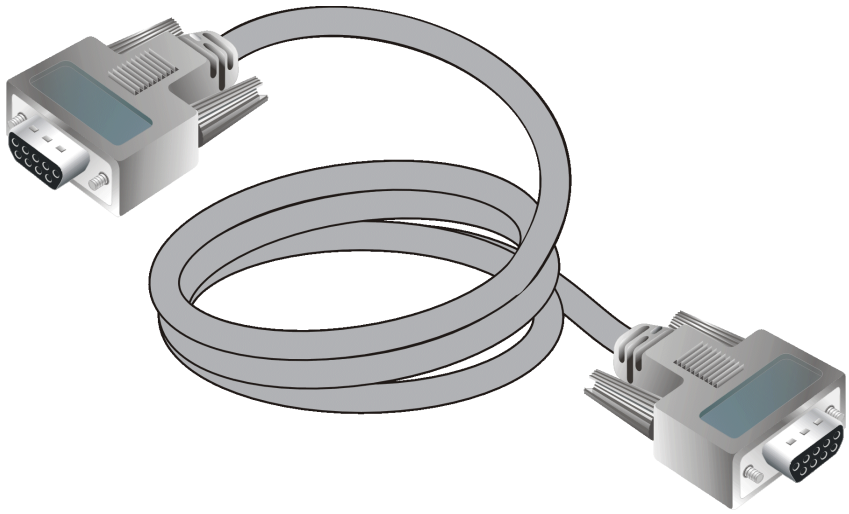


Figure 1–12: Null Modem Cable

Tools Supplied by Service Personnel

The following tools are expected to be supplied by service personnel performing Director maintenance actions. Use of the tools may be required to perform one or more test, service, or verification tasks.

- **Scissors or pocket knife-**A sharp cutting edge (scissors or knife blade) may be required to cut the protective strapping when unpacking replacement FRUs.
- **Standard flat-tip and cross-tip (Phillips) screwdrivers-**Screwdrivers are required to remove, replace, adjust or tighten various FRUs, chassis, or cabinet components.
- **Electrostatic discharge (ESD) grounding cable with attached wrist strap**-Use of the ESD wrist strap is required when working in and around the Director card cage.
- **Maintenance terminal (desktop or notebook PC)**-the PC is required to configure Director network addresses and acquire event log information through the maintenance port. The PC must have:
  - ❏ The Microsoft Windows 98, Windows 2000, Windows NT, or Windows Millennium Edition operating system installed.
  - ❏ RS-232 serial communication software installed, such as ProComm Plus or HyperTerminal. HyperTerminal is provided with Windows operating systems.
- **Fiber-optic cleaning kit**-The kit contains tools and instructions to clean fiber-optic cable, connectors, loopback plugs, and protective plugs.

Chapter 2

Diagnostics

This chapter describes diagnostic procedures used by service representatives to fault isolate the SD-64 Director problems or failures to the field-replaceable unit (FRU) level. The chapter specifically describes how to perform maintenance analysis procedures (MAPs). However, Table 2–1 starting on page 2-24 lists the event codes and the corresponding MAPs, and may be used as a quick start if an event code is readily available.

Maintenance Analysis Procedures

Fault isolation and related service procedures are provided through MAPs. The procedures vary depending on the diagnostic information provided. MAPs consist of step-by-step procedures that prompt service personnel for information or describe a specific action to be performed. MAPs provide information to interpret system events, isolate a Director failure to a single FRU, remove and replace the failed FRU, and verify Director operation. Following are the MAPs documented in this chapter. The fault isolation process normally begins at MAP 0000: Start MAP on page 2–2. However, Table 2–1 starting on page 2-24 lists the event codes and the corresponding MAPs, and may be used as a quick start if an event code is readily available.

- MAP 0000: Start MAP
- MAP 0100: Power Distribution Analysis
- MAP 0200: POST Failure Analysis
- MAP 0300: Console Application Problem Determination
- MAP 0400: Loss of Console Communication
- MAP 0500: FRU Failure Analysis

- MAP 0600: FPM Card Failure and Link Incident Analysis
- MAP 0700: Fabric, ISL, and Segmented Port Problem Determination
- MAP 0800: Console PC Problem Determination

MAP 0000: Start MAP

This MAP describes initial fault isolation for the SD-64 Director. Fault isolation begins at the SDCM server, failed Director, Internet-connected personal computer (PC) running the embedded web server interface, or attached host.

1

Prior to fault isolation, acquire the following information from the customer:

- A system configuration drawing or planning worksheet that includes the SDCM server, Directors, other Compaq products, and device connections.
- The physical location of the SDCM server and all Directors.
- The internet protocol (IP) address, gateway address, and subnet mask for the Director reporting the problem.
- If performing fault isolation using the SDCM server:
  - The Windows NT user name and password. These are required when prompted during any MAP or repair procedure that directs the SDCM server to be rebooted.
  - The user name, maintenance password, and SDCM server name. All are case sensitive and required when prompted at the SDCM application Login dialog box.
- If performing fault isolation using the embedded web server interface, the Director user name and password. Both are case sensitive and required when prompted at the Username and Password Required dialog box.

Continue to the next step.

2

Are you at the SDCM server?

YES **NO**

↓ Go to step 24.

3

Did the SDCM server lock up or crash and:

- Display an application warning or error message, or
- Not display an application warning or error message, or
- Display a Dr. Watson for Windows NT dialog box?

NO **YES**

↓ An SDCM server application problem is indicated. Event codes are not recorded. Go to MAP 0300: Console Application Problem Determination on page 2–45. **Exit MAP.**

4

Did the SDCM server crash and display a blue screen with the system dump file in hexadecimal format (blue screen of death)?

NO **YES**

↓ An SDCM server application problem is indicated. Event codes are not recorded. Go to MAP 0300: Console Application Problem Determination on page 2–45. **Exit MAP.**

5

Is the SDCM application active?

NO **YES**

↓ Go to step 7.

6

Reboot the SDCM server PC.

1. Click the Windows Start button. The Windows NT Workstation menu displays.
2. At the Windows NT Workstation menu, select Shut Down. The Shut Down Windows dialog box appears.

3. At the Shut Down Windows dialog box, select Shut Down The Computer and click Yes to power off the PC.
4. Wait approximately 30 seconds and power on the PC. After POSTs complete, the Begin Logon dialog box displays.
5. Simultaneously press the **Ctrl**, **Alt**, + **Delete** keys to display the Logon Information dialog box. Type a user name and password (obtained in step 1) and click OK. The SDCM application starts and the SDCM application Login dialog box displays.
6. At the SDCM application Login dialog box, type a user name, password, and SDCM server name (obtained in step 1, and all are case sensitive), and click Login. The application opens and the Product View (Figure 2–1) displays.

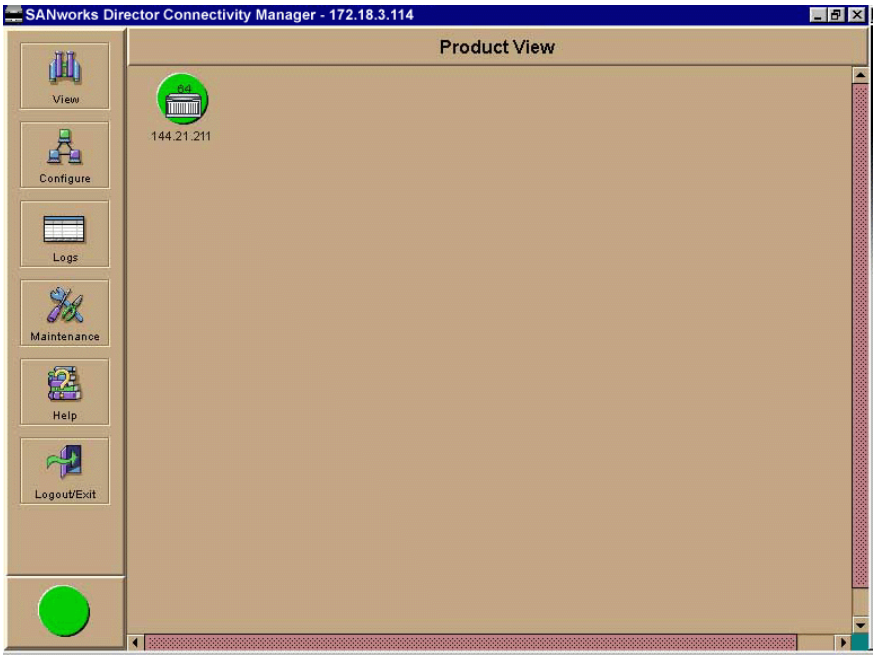


Figure 2–1: Product View

Did the Product View display and does the SDCM application appear operational?

YES **NO**

↓ An SDCM server hardware problem is indicated. Event codes are not recorded. Go to MAP 0800: Console PC Problem Determination on page 2–103. **Exit MAP.**

7

Inspect the alert panel at the lower left corner of the Product View. The indicator shows the status of managed Directors or the status of the link between the SDCM server and managed Directors as follows:

- A green circle indicates all Directors are operational.
- A yellow triangle indicates at least one Director is operating in degraded mode.
- A red diamond with yellow background indicates at least one Director is not operational.
- A grey square indicates the status of at least one Director is unknown.

Does a grey square appear at the alert panel and as the background to the icon representing the Director reporting the problem?

YES **NO**

↓ Go to step 11.

The grey square indicates the SDCM server cannot communicate with the Director because:

- The Director-to-SDCM server Ethernet link failed.
- AC power distribution in the Director failed, or AC power was disconnected.
- Both of the Director's control processor (CTP) cards failed.

Continue to the next step.

8

Ensure the Director reporting the problem is connected to facility AC power and the power switch (circuit breaker) at the rear of the Director is set to the **ON** (up) position. Inspect the Director for indications of being powered on, such as:

- At the front bezel, an illuminated power LED (green) or system error LED (amber).
- An illuminated green LED on the active CTP card, and illuminated green **PWR OK** LEDs on both power supplies.
- Audio emanations and airflow from cooling fans.

Does the Director appear powered on?

YES **NO**

↓ A power distribution problem is indicated. Go to step 23 to obtain event codes. If no event codes are found, go to MAP 0100: Power Distribution Analysis on page 2–30. **Exit MAP.**

9

At the Director, inspect the amber LED at the top of each CTP card.

Is the amber LED illuminated on both CTP cards?

NO **YES**

↓ Failure of both CTP cards is indicated. Event codes are not recorded. Go to MAP 0500: FRU Failure Analysis on page 2–64. **Exit MAP.**

10

A Director-to-SDCM server Ethernet link failure is indicated.

Go to step 23 to obtain event codes. If no event codes are found, go to MAP 0400: Loss of Console Communication on page 2–51.
Exit MAP.

11

Does a red diamond with yellow background (failure indicator) appear at the alert panel and as the background to the icon representing the Director reporting the problem?

YES **NO**

↓ Go to step 14.

12

Click the icon representing the Director reporting the problem. The Hardware View displays. At the Hardware View:

- Observe the Director Status table is yellow and the Director status is **NOT OPERATIONAL**.

- Inspect FRUs for a blinking red and yellow diamond (failed FRU indicator) that overlays the FRU graphic.

Do blinking red and yellow diamonds overlay all FPM card graphics?

NO **YES**

↓ Failure of all installed FPM cards is indicated. **Go to step 23** to obtain event codes. If no event codes are found, go to MAP 0600: FPM Card Failure and Link Incident Analysis on page 2–72. **Exit MAP.**

13

Blinking red and yellow diamonds overlay both serial crossbar (SBAR) assembly graphics or both fan module graphics.

Redundant FRU failures are indicated. **Go to step 23** to obtain event codes. If no event codes are found, go to MAP 0500: FRU Failure Analysis on page 2–64. **Exit MAP.**

14

Does a yellow triangle (attention indicator) appear at the alert panel and as the background to the icon representing the Director reporting the problem?

YES **NO**

↓ Go to step 18.

15

Click the icon representing the Director reporting the problem. The Hardware View displays. At the Hardware View:

- Observe the SD-64 Director Status table is yellow and the Director status is **Minor Failure** or **Redundant Failure**.
- Inspect FRUs for a blinking red and yellow diamond (failed FRU indicator) that overlays the FRU graphic.

Does a blinking red and yellow diamond overlay a power supply graphic?

NO **YES**

↓ A power supply failure is indicated. Go to step 23 to obtain event codes. If no event codes are found, go to MAP 0100: Power Distribution Analysis on page 2–30. **Exit MAP.**

16

Does a blinking red and yellow diamond overlay an FPM card graphic?

NO **YES**

↓ An FPM card failure is indicated. Go to step 23 to obtain event codes. If no event codes are found, go to MAP 0600: FPM Card Failure and Link Incident Analysis on page 2–72. **Exit MAP.**

17

A blinking red and yellow diamond overlays a control processor (CTP) card, SBAR assembly, or fan module graphic.

A FRU failure is indicated. Go to step 23 to obtain event codes. If no event codes are found, go to MAP 0500: FRU Failure Analysis on page 2–64. **Exit MAP.**

18

A green circle appears at the alert panel and as the background to the icon representing the Director reporting the problem. Although the Director is operational, a minor problem may exist.

Click the icon representing the Director reporting the problem. The Hardware View displays. At the Hardware View:

- Inspect CTP cards, SBAR assemblies, and fan modules for a yellow triangle that overlays the FRU graphic and indicates FRU beaconing is enabled.
- Inspect FPM cards for a yellow triangle (attention indicator) that overlays the FPM card graphic.

Does a yellow triangle overlay a CTP card, SBAR assembly, or fan module graphic?

YES **NO**

↓ Go to step 20.

19

Beaconing is enabled for the FRU.

1. Consult with the customer and next level of support to determine the reason FRU beaconing is enabled.
2. Disable FRU beaconing.
   a. At the Hardware View, right-click the FRU graphic. A pop-up menu appears.
   b. Click Enable Beaconing. The check mark disappears from the box adjacent to the option, and FRU beaconing is disabled.

Was FRU beaconing enabled because a FRU failure or degradation was suspected?

YES **NO**

↓ The Director appears operational. **Exit MAP.**

Go to step 22.

20

Does a yellow triangle (attention indicator) overlay an FPM card graphic?

YES **NO**

↓ Go to step 22.

21

Inspect the port state and LED status for all FPM cards with an attention indicator.

1. Click the FPM card to open the Port Card View. At the Port Card View, click the port graphic with the attention indicator. The Port Properties dialog box (Figure 2–2) displays.

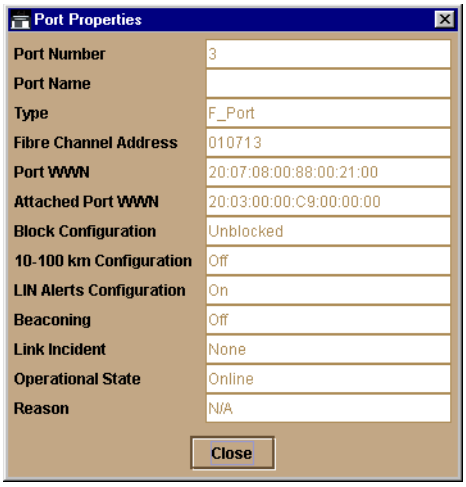


Figure 2–2: Port Properties Dialog Box

2. Inspect the Operational State field.

Does the Operational State field display a **Segmented E_Port** message?

NO **YES**

↓ Expansion port (E_Port) segmentation is indicated. Go to step 23 to obtain event codes. If no event codes are found, go to MAP 0700: Fabric, ISL, and Segmented Port Problem Determination on page 2–90. **Exit MAP.**

A message displays indicating a link incident problem. Go to step 23 to obtain event codes. If no event codes are found, go to MAP 0600: FPM Card Failure and Link Incident Analysis on page 2–72.
Exit MAP.

22

A link incident may have occurred, but the LIN alerts option is not enabled for the port and the attention indicator does not appear.

At the Hardware View or Port Card View, select Link Incident Log from the Logs menu. The Link Incident Log (Figure 2–3) displays.

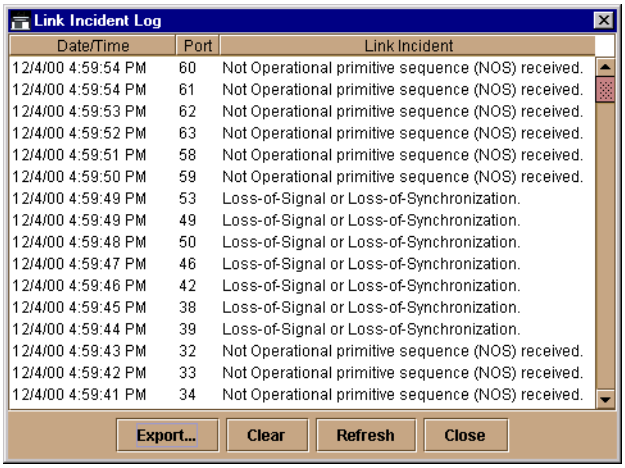


Figure 2–3: Link Incident Log

If a link incident occurred, the affected port number is listed with one of the following messages.

Link interface incident-implicit incident.

Link interface incident-bit-error threshold exceeded.

Link failure-loss of signal or loss of synchronization.

Link failure-not-operational primitive sequence (NOS) received.

Link failure-primitive sequence timeout.

Link failure-invalid primitive sequence received for the current link state.

Did one of the listed messages appear in the Link Incident Log?

YES **NO**

↓ The Director appears operational. **Exit MAP.**

A link incident problem is indicated. Go to step 23 to obtain event codes. If no event codes are found, go to MAP 0600: FPM Card Failure and Link Incident Analysis on page 2–72. **Exit MAP.**

23

Obtain event codes from the Director Event Log.

> **NOTE:** If multiple event codes are found, note all codes and associated severity levels. Record the date, time, and listed sequence, and determine if the codes are related to the reported problem. Begin fault isolation with the most recent event code with the highest severity level. Other codes may accompany this event code, or may indicate a normal indication after a problem has been recovered.

1. At the Hardware View, select the Event Log option from the Logs menu. The Event Log (Figure 2–4) displays.
2. Record the event code, date, time, and severity (Informational, Minor, Major, or Severe).
3. Record all event codes that may relate to the reported problem.

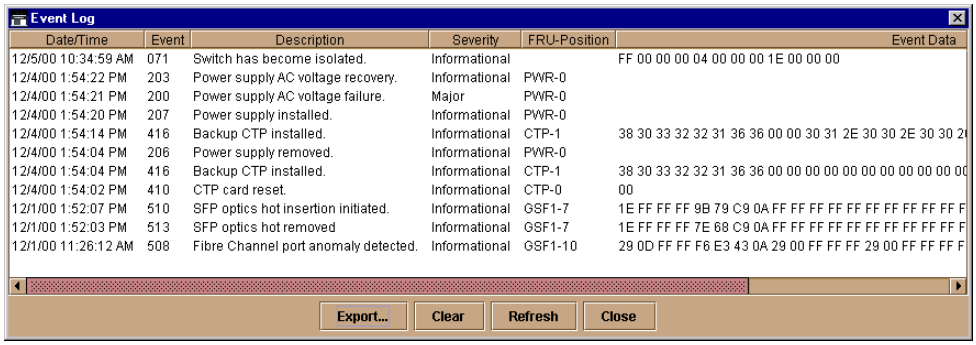


Figure 2–4: Event Log

Were one or more event codes found?

NO **YES**

↓ Go to step 52.

Return to the MAP step that sent you here.

24

Are you at the Director reporting the problem?

YES **NO**

↓ Go to step 36.

25

Is the power LED (green) at the Director front bezel illuminated?

NO **YES**

↓ Go to step 30.

26

Is the Director connected to facility AC power and powered on?

NO **YES**

↓ Go to step 29.

27

Connect the Director to facility AC power and set the power switch (circuit breaker) at the rear of the Director to the **ON** (up) position. Inspect the Director for indications of being powered on, such as:

- At the front bezel, an illuminated power LED (green) or system error LED (amber).
- An illuminated green LED on the active CTP card, and illuminated green **PWR OK** LEDs on both power supplies.
- Audio emanations and airflow from cooling fans.

Does the Director appear powered on?

YES **NO**

↓ A power distribution problem is indicated. Go to step 23 to obtain event codes. If no event codes are found, go to MAP 0100: Power Distribution Analysis on page 2–30. **Exit MAP.**

28

Is the power LED (green) at the Director front bezel illuminated?

NO **YES**

↓ Go to step 30.

A faulty power LED is indicated, but Director and Fibre Channel port operation is not disrupted. The LED is connected to the circuitry in a fan module, and the module must be removed and replaced. Refer to Redundant Fan Module on page 4–24 for instructions. **Exit MAP.**

29

Inspect the Director for indications of being powered on, such as:

- At the front bezel, an illuminated power LED (green) or system error LED (amber).
- An illuminated green LED on the active CTP card, and illuminated green **PWR OK** LEDs on both power supplies.
- Audio emanations and airflow from cooling fans.

Does the Director appear powered on?

YES **NO**

↓ A power distribution problem is indicated. Go to step 23 to obtain event codes. If no event codes are found, go to MAP 0100: Power Distribution Analysis on page 2–30. **Exit MAP.**

A faulty power LED is indicated, but Director and Fibre Channel port operation is not disrupted. The LED is connected to the circuitry in a fan module, and the module must be removed and replaced. Refer to Redundant Fan Module on page 4–24 for instructions. **Exit MAP.**

30

Is the system error LED (amber) at the Director front bezel blinking?

YES **NO**

↓ Go to step 32.

31

Unit beaconing is enabled for the Director.

1. Consult with the customer and next level of support to determine the reason unit beaconing is enabled.
2. Disable unit beaconing.
   a. At the Hardware View, right-click the front bezel graphic (away from a FRU). A menu appears.
   b. Click Enable Unit Beaconing. The check mark disappears from the box adjacent to the option, and unit beaconing is disabled.

Was unit beaconing enabled because a Director failure or degradation was suspected?

YES **NO**

↓ The Director appears operational. **Exit MAP.**

Go to step 24.

32

Is the system error LED (amber) at the Director front bezel illuminated?

YES **NO**

↓ The Director appears operational. Verify operation at the SDCM server. Go to step 3.

33

Check FRUs (FPM cards, CTP cards, SBAR assemblies, power supplies, and fan modules) for failure symptoms.

Is the amber LED at the top of an FPM card illuminated or are any amber LEDs associated with Fibre Channel ports illuminated?

NO **YES**

↓ An FPM card or Fibre Channel port failure is indicated. Go to step 23 to obtain event codes. If no event codes are found, go to MAP 0600: FPM Card Failure and Link Incident Analysis on page 2–72. **Exit MAP.**

34

Is the amber LED on a CTP card, SBAR assembly, or fan module illuminated?

NO **YES**

↓ A FRU failure is indicated. Go to step 23 to obtain event codes. If no event codes are found, go to MAP 0500: FRU Failure Analysis on page 2–64. **Exit MAP.**

35

Is the green **PWR OK** LED on a power supply extinguished?

NO **YES**

↓ A power supply failure is indicated. Go to step 23 to obtain event codes. If no event codes are found, go to MAP 0100: Power Distribution Analysis on page 2–30. **Exit MAP.**

The Director appears operational. **Exit MAP.**

36

You are at a PC with a web browser (such as Netscape Navigator or Microsoft Internet Explorer) and an Internet connection to the Director reporting the problem.

Is the web browser PC powered on and communicating with the Director through the Internet connection?

NO **YES**

↓ Go to step 38.

37

Boot the web browser PC.

1. Power on the PC in accordance with the instructions delivered with the PC. The Windows desktop appears.
2. Launch the PC browser application by double-clicking the appropriate icon at the Windows desktop.
3. At the Netsite field (Netscape Navigator) or Address field (Internet Explorer), type **http://xxx.xxx.xxx.xxx**, where **xxx.xxx.xxx.xxx** is the IP address of the Director (obtained in step 1 on page 2-2). The Username And Password Required dialog box appears.
4. Type the user name and password obtained in step 1, and click OK. The embedded web server interface opens with the View panel (Figure 2–5) displayed.

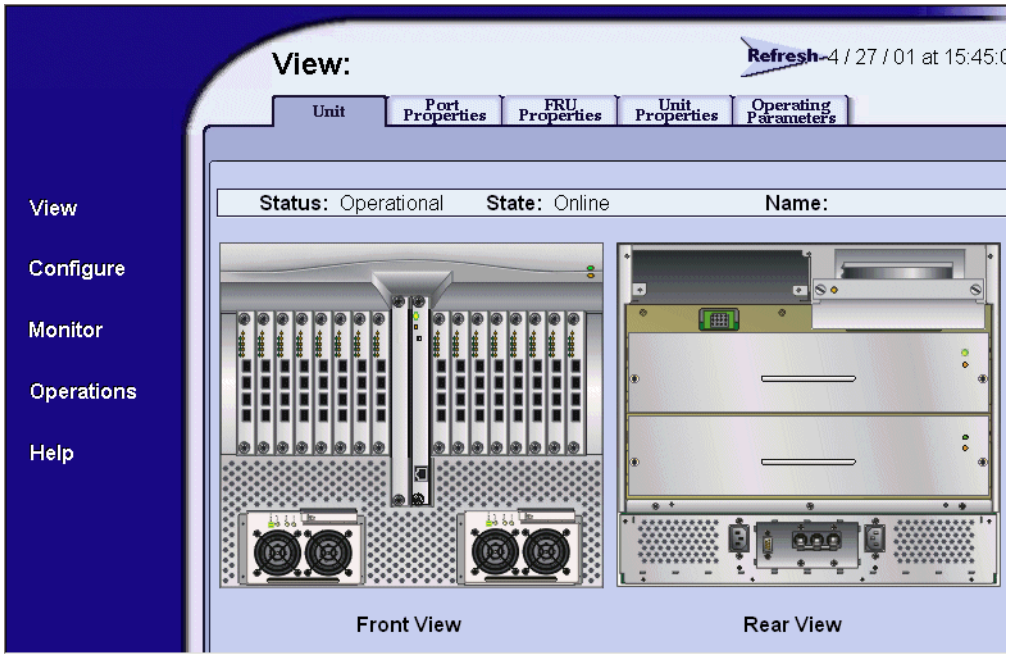


Figure 2–5: View Unit Panel

Continue to the next step.

38

Does the embedded web server interface appear operational with the View panel displayed?

NO **YES**

↓ Go to step 43.

39

A **Page cannot be found, Unable to locate the server, HTTP 404-file not found**, or other similar message appears. The message indicates the web browser PC cannot communicate with the Director because:

- The Director-to-PC Internet link could not be established.
- AC power distribution in the Director failed, or AC power was disconnected.
- Both of the Director's CTP cards failed.

Continue to the next step.

40

Ensure the Director reporting the problem is connected to facility AC power and the power switch (circuit breaker) at the rear of the Director is set to the **ON** (up) position. Inspect the Director for indications of being powered on, such as:

- At the front bezel, an illuminated power LED (green) or system error LED (amber).
- An illuminated green LED on the active CTP card, and illuminated green **PWR OK** LEDs on both power supplies.
- Audio emanations and airflow from cooling fans.

Does the Director appear powered on?

YES **NO**

↓ A power distribution problem is indicated. Go to MAP 0100: Power Distribution Analysis on page 2–30. **Exit MAP.**

41

At the Director, inspect the amber LED at the top of each CTP card.

Is the amber LED illuminated on both CTP cards?

NO **YES**

↓ Failure of both CTP cards is indicated. Event codes are not recorded. Go to MAP 0500: FRU Failure Analysis on page 2–64. **Exit MAP.**

42

A Director-to-PC Internet link problem (Internet too busy or IP address typed incorrectly) is indicated.

1. Wait approximately five minutes, then attempt to login to the Director again.
2. At the Netsite field (Netscape Navigator) or Address field (Internet Explorer), type **http://xxx.xxx.xxx.xxx**, where **xxx.xxx.xxx.xxx** is the IP address of the Director (obtained in step 1). The Username and Password Required dialog box appears.
3. Type the user name and password obtained in step 1, and click OK. If the View panel does not display, wait another five minutes and perform this step again.

Does the embedded web server interface appear operational with the View panel displayed?

YES **NO**

↓ Perform Director fault isolation at the SDCM server. Go to step 3.

43

At the View panel, inspect the Status field.

Does the Director status indicate **Operational**?

NO **YES**

↓ The Director appears operational. **Exit MAP.**

44

Inspect Fibre Channel port operational states.

1. At the View panel, click the Port Properties tab. The View panel (Figure 2–6) displays with port **0** highlighted.
2. Inspect the Beaconing and Operational State fields.

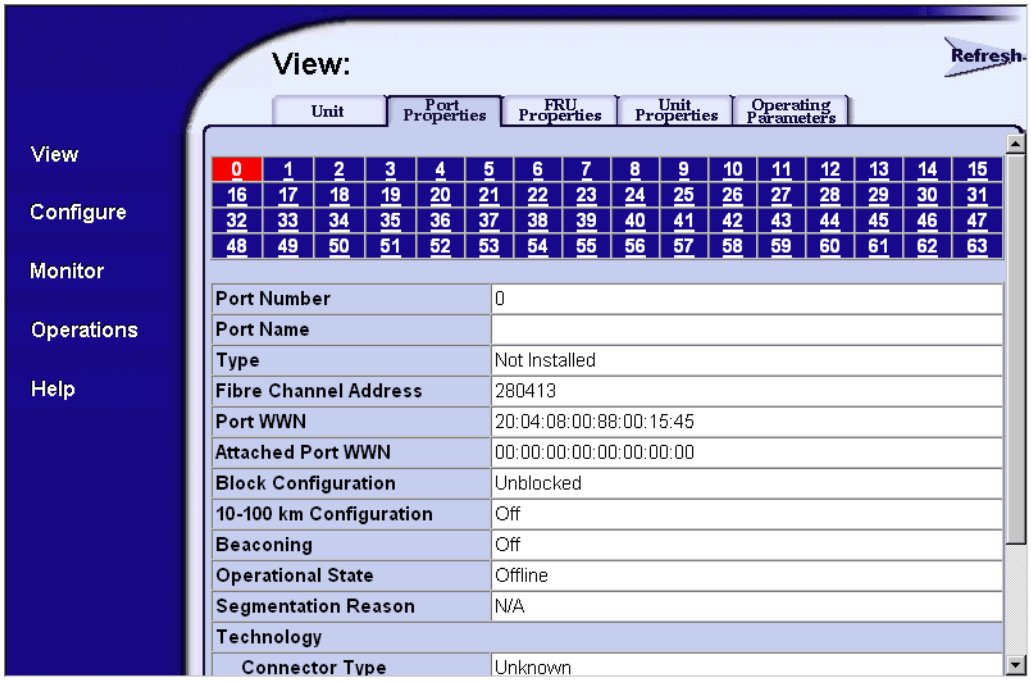


Figure 2–6: View Port Properties Panel

Does the Beaconing field display an **On** message?

YES **NO**

↓ Go to step 46.

45

Port beaconing is enabled.

1. Consult with the customer and next level of support to determine the reason port beaconing is enabled.
2. Disable port beaconing:
   a. At the View panel, select the Operations option at the left side of the panel. The Operations panel opens with the Port Beaconing page displayed.
   b. Click the Beaconing State check box for the port. The check mark disappears from the box and port beaconing is disabled.
   c. Return to the View panel (Port Properties tab).

Continue to the next step.

46

At the View panel, does the Operational State field display a **Segmented** message?

NO **YES**

↓ Port segmentation is indicated. Go to step 51 to obtain event codes. If no event codes are found, go to MAP 0700: Fabric, ISL, and Segmented Port Problem Determination on page 2–90. **Exit MAP.**

47

At the View panel, does the Operational State field display a message indicating a port problem?

NO **YES**

↓ Go to step 51 to obtain event codes. If no event codes are found, go to MAP 0600: FPM Card Failure and Link Incident Analysis on page 2–72. **Exit MAP.**

48

Repeat step 44 through step 47 for each remaining Fibre Channel port for which a problem is suspected.

Is a problem indicated for any of the ports?

NO **YES**

↓ Go to step 51 to obtain event codes. If no event codes are found, go to MAP 0600: FPM Card Failure and Link Incident Analysis on page 2–72. **Exit MAP.**

49

Inspect power supply operational states.

1. At the View panel, click the FRU Properties tab. The View panel (Figure 2–7) displays.

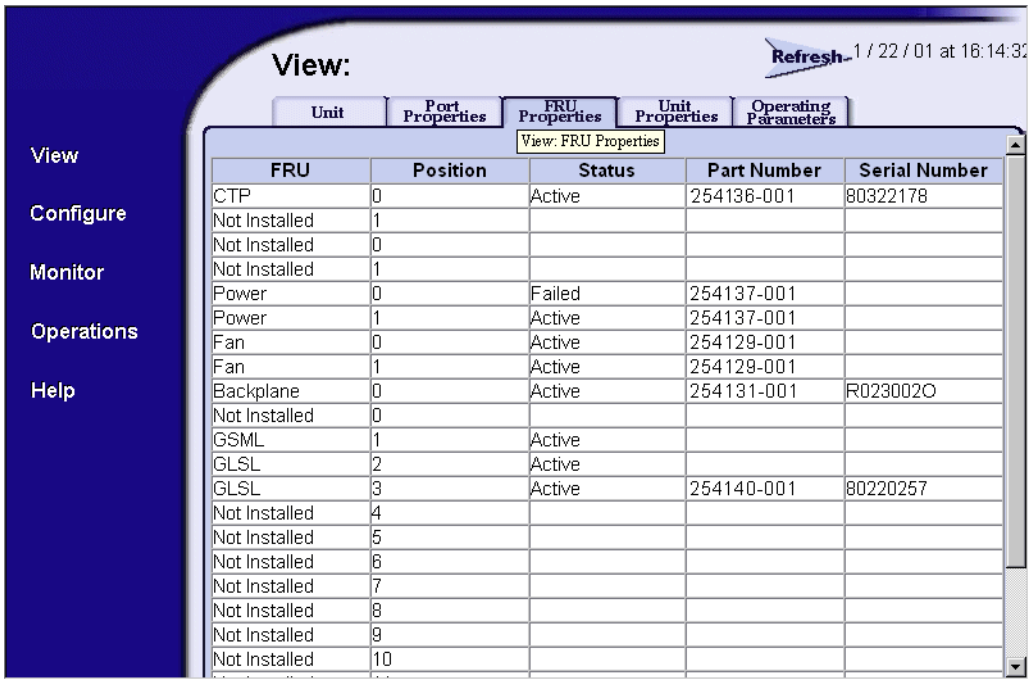


Figure 2–7: View FRU Properties Panel

1. Inspect the Status fields for both power supplies.

Does the Status field display a **Failed** message for either power supply?

NO **YES**

↓ A power supply failure is indicated. Go to step 51 to obtain event codes. If no event codes are found, go to MAP 0100: Power Distribution Analysis on page 2–30. **Exit MAP.**

50

Inspect the Status fields for Director FRUs, including CTP cards, SBAR assemblies, fan modules, and the backplane.

Does the State field display a **Failed** message for any of the FRUs?

YES **NO**

↓ The Director appears operational. **Exit MAP.**

A FRU failure is indicated. Continue to the next step to obtain event codes. If no event codes are found, go to MAP 0500: FRU Failure Analysis on page 2–64. **Exit MAP.**

51

Obtain event codes from the embedded web server event log.

> **NOTE:** If multiple event codes are found, note all codes and associated severity levels. Record the date, time, and listed sequence, and determine if the codes are related to the reported problem. Begin fault isolation with the most recent event code with the highest severity level. Other codes may accompany this event code, or may indicate a normal indication after a problem is recovered.

1. At the View panel, select the Monitor option at the left side of the panel. The Monitor panel opens with the Status page displayed.
2. At the Monitor panel, click the Log tab. The Monitor panel (Figure 2–8) displays.
3. Record the event code, date, time, and severity (Informational, Minor, Major, or Severe).
4. Record all event codes that may relate to the reported problem.

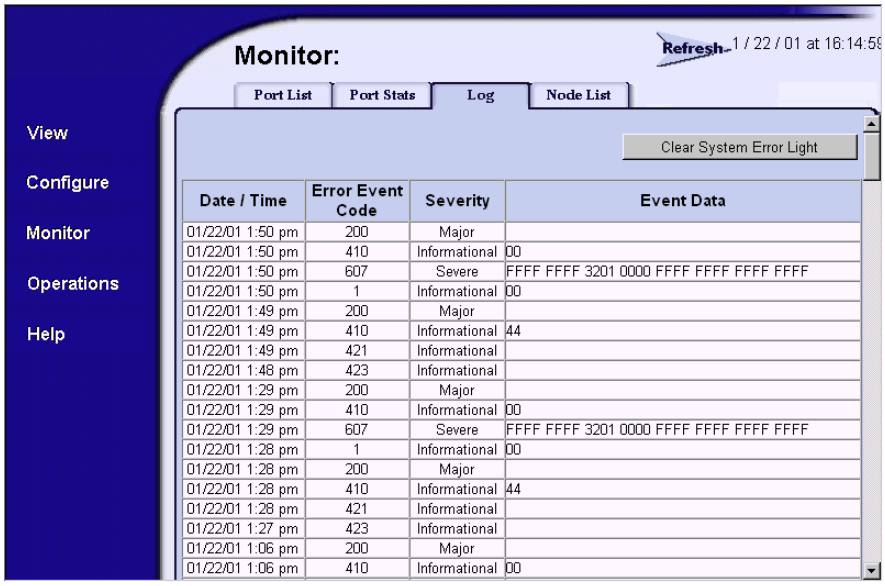


Figure 2–8: Monitor Log Panel

Were one or more event codes found?

NO **YES**

↓ Go to step 52.

Return to the MAP step that sent you here.

52

Table 2–1 lists event codes, brief explanations of the codes, and associated MAPs that describe fault isolation procedures.

Table 2–1: Event Codes

Event Code	Explanation	Action
001	System power-down.	Power on Director.
010	Login server unable to synchronize databases.	Go to MAP 0700: Fabric, ISL, and Segmented Port Problem Determination.
011	Login server database invalid.	Go to MAP 0700: Fabric, ISL, and Segmented Port Problem Determination.

Table 2–1: Event Codes (Continued)

Event Code	Explanation	Action
020	Name server unable to synchronize databases.	Go to MAP 0700: Fabric, ISL, and Segmented Port Problem Determination.
021	Name server database invalid.	Go to MAP 0700: Fabric, ISL, and Segmented Port Problem Determination.
031	SNMP request received from unauthorized community.	Add community name.
050	Management server unable to synchronize databases.	Go to MAP 0700: Fabric, ISL, and Segmented Port Problem Determination.
051	Management server database invalid.	Go to MAP 0700: Fabric, ISL, and Segmented Port Problem Determination.
052	Management server internal error.	Go to MAP 0700: Fabric, ISL, and Segmented Port Problem Determination.
060	Fabric controller unable to synchronize databases.	Go to MAP 0700: Fabric, ISL, and Segmented Port Problem Determination.
061	Fabric controller database invalid.	Go to MAP 0700: Fabric, ISL, and Segmented Port Problem Determination.
062	Maximum interswitch hop count exceeded.	Go to MAP 0700: Fabric, ISL, and Segmented Port Problem Determination.
063	Received link state record too large.	Go to MAP 0700: Fabric, ISL, and Segmented Port Problem Determination.
070	E_Port is segmented.	Go to MAP 0700: Fabric, ISL, and Segmented Port Problem Determination.
071	Director is isolated.	Go to MAP 0700: Fabric, ISL, and Segmented Port Problem Determination.
072	E_Port connected to unsupported switch.	Go to MAP 0700: Fabric, ISL, and Segmented Port Problem Determination.
080	Unauthorized world-wide name.	Go to MAP 0600: FPM Card Failure and Link Incident Analysis.
090	Database replication time out.	Perform the data collection procedure and return the information to Compaq for analysis by third-level support personnel.

Table 2–1: Event Codes (Continued)

Event Code	Explanation	Action
091	Database replication discontinued.	No action required, unless this Event occurs without the backup CTP failing or being removed. If so, perform the data collection procedure and return the information to Compaq for analysis by third-level support personnel.
200	Power supply AC voltage failure.	Go to MAP 0100: Power Distribution Analysis.
201	Power supply DC voltage failure.	Go to MAP 0100: Power Distribution Analysis.
202	Power supply thermal failure.	Go to MAP 0100: Power Distribution Analysis.
203	Power supply AC voltage recovery.	No action required.
204	Power supply DC voltage recovery.	No action required.
206	Power supply removed.	Replace FRU.
207	Power supply installed.	No action required.
208	Power supply false shutdown.	Go to MAP 0100: Power Distribution Analysis.
300	Cooling fan propeller failed.	Go to MAP 0500: FRU Failure Analysis
301	Cooling fan propeller failed.	Go to MAP 0500: FRU Failure Analysis.
302	Cooling fan propeller failed.	Go to MAP 0500: FRU Failure Analysis.
303	Cooling fan propeller failed.	Go to MAP 0500: FRU Failure Analysis.
304	Cooling fan propeller failed.	Go to MAP 0500: FRU Failure Analysis.
305	Cooling fan propeller failed.	Go to MAP 0500: FRU Failure Analysis.
310	Cooling fan propeller recovered.	No action required.
311	Cooling fan propeller recovered.	No action required.
312	Cooling fan propeller recovered.	No action required.
313	Cooling fan propeller recovered.	No action required.
314	Cooling fan propeller recovered.	No action required.
315	Cooling fan propeller recovered.	No action required.
320	Fan module removed.	Replace FRU.
321	Fan module installed.	No action required.
400	Power-up diagnostic failure.	Go to MAP 0200: POST Failure Analysis.

Table 2–1: Event Codes (Continued)

Event Code	Explanation	Action
410	CTP card reset.	No action required.
411	Firmware fault.	Go to MAP 0200: POST Failure Analysis.
413	Backup CTP card POST failure.	Go to MAP 0200: POST Failure Analysis.
414	Backup CTP card failed.	Go to MAP 0500: FRU Failure Analysis.
415	Backup CTP card removed.	Replace FRU.
416	Backup CTP card installed.	No action required.
417	CTP card firmware synchronization initiated.	No action required.
418	User-initiated CTP card switchover.	No action required.
420	Backup CTP card NV-RAM failure.	Go to MAP 0500: FRU Failure Analysis.
421	Firmware download complete.	No action required.
422	CTP firmware synchronization complete.	No action required.
423	CTP firmware download initiated.	No action required.
430	Excessive Ethernet transmit errors.	Go to MAP 0400: Loss of Console Communication.
431	Excessive Ethernet receive errors.	Go to MAP 0400: Loss of Console Communication.
432	Ethernet adapter reset.	Go to MAP 0400: Loss of Console Communication.
433	Non-recoverable Ethernet fault.	Go to MAP 0500: FRU Failure Analysis.
440	Embedded port hardware failed.	Go to MAP 0500: FRU Failure Analysis.
442	Embedded port anomaly detected.	No action required.
450	Serial Number mismatch detected.	No action required – any configured Feature Keys will be cleared, configuration information will be synched with the backplane VPD and the CTP will automatically be IPLed.
451	Switch speed incompatibility detected.	No action required – Switch speed configuration and port speed configuration data will be set to a level that is compatible with the CTP and the CTP will automatically be IPLed.

Table 2–1: Event Codes (Continued)

Event Code	Explanation	Action
452	Backup CTP incompatible with configured system settings.	Replace the backup CTP with a version of hardware capable of supporting the user-configured settings, or adjust the user settings to be compatible with the backup CTP, and reseat the backup CTP.
460	Management request out of range.	The Director found request data from the management tool (typically SDCM) to be larger or smaller than expected. The connection to the management tool will be temporarily lost. After the link is reestablished, verify that all information changed in the managing tool is within the specified ranges. For example, verify that the zones and zone members in a zone set fall within the limits stated in the user manual. Try sending the request again.
500	FPM card hot-insertion initiated.	No action required.
501	FPM card recognized.	No action required.
502	FPM card anomaly detected.	No action required.
503	FPM card hot-removal completed.	No action required.
504	FPM card failure.	Go to MAP 0600: FPM Card Failure and Link Incident Analysis.
505	FPM card revision not supported.	Go to MAP 0600: FPM Card Failure and Link Incident Analysis.
506	Fibre Channel port failure.	Go to MAP 0600: FPM Card Failure and Link Incident Analysis.
507	Loopback diagnostics port failure.	Go to MAP 0600: FPM Card Failure and Link Incident Analysis.
508	Fibre Channel port anomaly detected.	No action required.
510	SFF optical transceiver hot-insertion initiated.	No action required.
512	SFF optical transceiver nonfatal error.	Go to MAP 0600: FPM Card Failure and Link Incident Analysis.

Table 2–1: Event Codes (Continued)

Event Code	Explanation	Action
513	SFF optical transceiver hot-removal completed.	No action required.
514	SFF optical transceiver failure.	Go to MAP 0600: FPM Card Failure and Link Incident Analysis.
600	SBAR assembly hot-insertion initiated.	No action required.
601	SBAR assembly recognized.	No action required.
602	SBAR assembly anomaly detected.	No action required.
603	SBAR assembly hot-removal completed.	No action required.
604	SBAR assembly failure.	Go to MAP 0500: FRU Failure Analysis.
605	SBAR assembly revision not supported.	Go to MAP 0500: FRU Failure Analysis.
607	Director contains no operational SBAR assemblies.	Go to MAP 0500: FRU Failure Analysis.
608	User initiated SBAR switch-over.	No action required.
800	High temperature warning (FPM card thermal sensor).	Go to MAP 0600: FPM Card Failure and Link Incident Analysis.
801	Critically hot temperature warning (FPM card thermal sensor).	Go to MAP 0600: FPM Card Failure and Link Incident Analysis.
802	FPM card shutdown due to thermal violation.	Go to MAP 0600: FPM Card Failure and Link Incident Analysis.
805	High temperature warning (SBAR assembly thermal sensor).	Go to MAP 0500: FRU Failure Analysis.
806	Critically hot temperature warning (SBAR assembly thermal sensor).	Go to MAP 0500: FRU Failure Analysis.
807	SBAR assembly shutdown due to thermal violation.	Go to MAP 0500: FRU Failure Analysis.
810	High temperature warning (CTP card thermal sensor).	Go to MAP 0500: FRU Failure Analysis.
811	Critically hot temperature warning (CTP card thermal sensor).	Go to MAP 0500: FRU Failure Analysis.
812	CTP card shutdown due to thermal violation.	Go to MAP 0500: FRU Failure Analysis.
850	System shutdown due to CTP card thermal violations.	Go to MAP 0500: FRU Failure Analysis.

MAP 0100: Power Distribution Analysis

This MAP describes fault isolation for the Director power distribution system, including defective AC power cords, redundant power supplies, or the power module assembly.

1

Was an event code **200**, **201**, **202**, or **208** observed at the SD-64 Director Event Log (SDCM server) or at the embedded web server event log?

YES **NO**

↓ Go to step 10.

2

Table 2–2 lists event codes, brief explanations of the codes, and the associated steps that describe fault isolation procedures.

Table 2–2: MAP 100: Event Codes

Event Code	Explanation	Action
200	Power supply AC voltage failure.	Go to step 3.
201	Power supply DC voltage failure.	Go to step 7.
202	Power supply thermal failure.	Go to step 7.
208	Power supply false shutdown.	Go to step 8.

3

A redundant power supply is disconnected from facility power, not properly installed, or has failed.

Verify the power supply is connected to facility power.

1. Ensure the AC power cord associated with the power supply (**PS0** or **PS1**) is connected to the rear of the Director and a facility power receptacle. If not, connect the cord as directed by the customer.
2. Ensure the associated facility circuit breaker is on. If not, ask the customer to set the circuit breaker on.
3. Ensure the AC power cord is not damaged. If damaged, replace the cord.

Was a corrective action performed?

YES **NO**

↓ Go to step 5.

4

Verify redundant power supply operation.

1. Inspect the power supply and ensure the green **PWR OK** LED illuminates and all amber LEDs extinguish.
2. At the SDCM Server's Hardware View, observe the graphic representing the power supply and ensure a failure symbol (blinking red and yellow diamond) does not appear.

Is a failure indicated?

YES **NO**

↓ The Director appears operational. **Exit MAP.**

5

Ensure the indicated power supply is correctly installed and seated in the Director. If required, partially remove and reseat the power supply.

Was a corrective action performed?

YES **NO**

↓ Go to step 7.

6

Verify redundant power supply operation.

1. Inspect the power supply and ensure the green **PWR OK** LED illuminates and all amber LEDs extinguish.
2. At the SDCM server's Hardware View, observe the graphic representing the power supply and ensure a failure symbol (blinking red and yellow diamond) does not appear.

Is a failure indicated?

YES **NO**

↓ The Director appears operational. **Exit MAP.**

7

A redundant power supply failed and must be removed and replaced. Refer to Redundant Power Supply on page 4–17 for instructions.

- This procedure is concurrent and can be performed while Director power is on.
- Perform the data collection procedure as part of FRU removal and replacement.

Did power supply replacement solve the problem?

NO **YES**

↓ The Director appears operational. **Exit MAP.**

Contact the next level of support. **Exit MAP**.

8

Power sense circuitry is defective in the indicated power supply or there is a problem with facility input power.

Have the customer inspect and verify that facility power is within specifications. These specifications are:

- One single-phase connection for each power supply.
- Input power between 100 and 240 VAC, and between 2 and 4 amps.
- Input frequency between 47 and 63 Hz.

Is facility power within specifications?

NO **YES**

↓ Go to step 7**.**

Ask the customer to correct the facility power problem. When facility power is corrected, continue to the next step.

9

Verify Director operation:

1. Inspect the Director front bezel and ensure the green power LED illuminates. Inspect the active CTP card and ensure the green LED illuminates.
2. Inspect both power supplies. Ensure both green **PWR OK** LEDs illuminate and all amber LEDs extinguish.
3. At the SDCM server's Hardware View, observe all graphics representing FRUs and power supplies, and ensure emulated green LEDs illuminate.

Is a failure indicated?

YES **NO**

↓ The Director appears operational. **Exit MAP.**

Contact the next level of support. **Exit MAP**.

10

Is fault isolation being performed at the Director?

YES **NO**

↓ Fault isolation is being performed at the SDCM server or embedded web server interface. Go to step 21.

11

Verify the Director is connected to facility power and is powered on.

1. Ensure AC power cords (**PS0** and **PS1**) are connected to the rear of the Director and to facility power receptacles. If not, connect the cords as directed by the customer.
2. Ensure associated facility circuit breakers are on. If not, ask the customer set the circuit breakers on.
3. Ensure the AC power cords are not damaged. If damaged, replace the cords.
4. Ensure the power switch (circuit breaker) at the rear of the Director is set to the **ON** (up) position.

Continue to the next step.

12

Inspect the Director for indications of being powered on, such as:

- At the front bezel, an illuminated power LED (green) or system error LED (amber).
- An illuminated green LED on the active CTP card.
- At least one green **PWR OK** LED illuminated on a power supply.
- Audio emanations and airflow from cooling fans.

Does the Director appear powered on?

YES **NO**

↓ Go to step 14.

13

Does inspection of a power supply indicate a failure (green **PWR OK** LED extinguished and one or more amber LEDs illuminated)?

NO **YES**

↓ A redundant power supply failed. Go to step 7.

The Director appears operational. **Exit MAP.**

14

The Director's AC power distribution system failed. Possible causes include failure of:

- Both power supplies.
- Power module assembly.
- Backplane.

Does inspection of both power supplies indicate a dual failure (both green **PWR OK** LEDs extinguished and one or more amber LEDs illuminated on each power supply)?

YES **NO**

↓ One or both power supplies appear operational, but a power distribution failure through the backplane is indicated. Go to step 19.

15

Ensure both power supplies are correctly installed and seated in the Director. If required, partially remove and reseat the power supplies.

Was a corrective action performed?

YES **NO**

↓ Go to step 17.

16

Verify operation of both power supplies.

a. Inspect the power supplies and ensure the green **PWR OK** LEDs illuminate and all amber LEDs extinguish.

b. At the SDCM Server's Hardware View, observe the graphics representing the power supplies and ensure failure symbols (blinking red and yellow diamonds) do not appear.

Is a dual power supply failure still indicated?

YES **NO**

↓ The Director appears operational. **Exit MAP.**

17

Both power supplies failed and must be removed and replaced. Refer to Redundant Power Supply on page 4–17 for instructions. Perform the data collection procedure as part of FRU removal and replacement.

Did dual power supply replacement solve the problem?

NO **YES**

↓ The Director appears operational. **Exit MAP.**

A dual power supply failure is not confirmed. Replace both original power supplies to avoid the cost of expending replacement FRUs. Continue to the next step.

18

A power module assembly failure is indicated and the FRU must be removed and replaced. Refer to Power Module Assembly on page 4–26 for instructions. This procedure is non concurrent and must be performed while Director power is off.

Did power module assembly replacement solve the problem?

NO **YES**

↓ The Director appears operational. **Exit MAP.**

A power module assembly failure is not confirmed. Replace the original power module assembly to avoid the cost of expending a replacement FRU. Continue to the next step.

19

One or both power supplies appear operational, but logic cards are not receiving DC power. In-card circuit breakers for all logic cards may have tripped due to a power surge, or the backplane failed.

Power cycle the Director to reset all logic cards. Refer to Power-On Procedure on page 3–36 for instructions.

Did power cycling the Director solve the problem?

NO **YES**

↓ The Director appears operational. **Exit MAP.**

20

The backplane failed and must be removed and replaced. Refer to Backplane on page 4–29 for instructions.

- This procedure is nonconcurrent and must be performed while Director power is off.
- Perform the data collection procedure as part of FRU removal and replacement.

Did backplane replacement solve the problem?

NO **YES**

↓ The Director appears operational. **Exit MAP.**

Contact the next level of support. **Exit MAP**.

21

Is fault isolation being performed at the SDCM server?

YES **NO**

↓ Fault isolation is being performed at the embedded web server interface. Go to step 25.

22

At the SDCM server's Hardware View, does a yellow triangle appear at the alert panel and a blinking red and yellow diamond (failed FRU indicator) appear to overlay a power supply graphic?

NO **YES**

↓ A redundant power supply failed. Go to step 7.

23

At the SDCM server's Hardware View, does a grey square appear at the alert panel, a No Link status appear at the Director Status table, and graphical FRUs appear uninstalled?

YES **NO**

↓ A green circle appears at the alert panel and the Director appears operational. **Exit MAP.**

The grey square indicates the SDCM server cannot communicate with the Director because:

- The Director-to-SDCM server Ethernet link failed.
- AC power distribution in the Director failed, or AC power was disconnected.
- Both of the Director's CTP cards failed.

Continue to the next step.

24

Ensure the Director reporting the problem is connected to facility AC power and the power switch (circuit breaker) at the rear of the Director is set to the **ON** (up) position. Inspect the Director for indications of being powered on, such as:

- At the front bezel, an illuminated power LED (green) or system error LED (amber).
- An illuminated green LED on the active CTP card.
- At least one green **PWR OK** LED illuminated on a power supply.
- Audio emanations and airflow from cooling fans.

Does the Director appear powered on?

YES **NO**

↓ Go to step 14.

Analysis for an Ethernet link or dual CTP card failure is not described in this MAP. Go to MAP 0000: Start MAP on page 2–2. If this is the second time at this step, contact the next level of support. **Exit MAP.**

25

Does the embedded web server interface appear operational?

NO **YES**

↓ Go to step 28.

26

A **Page cannot be found, Unable to locate the server, HTTP 404-file not found**, or other similar message appears. The message indicates the web browser PC cannot communicate with the Director because:

- The Director-to-PC Internet link could not be established.
- AC power distribution in the Director failed, or AC power was disconnected.

- Both of the Director's CTP cards failed.

Continue to the next step.

27

Ensure the Director reporting the problem is connected to facility AC power and the power switch (circuit breaker) at the rear of the Director is set to the **ON** (up) position. Inspect the Director for indications of being powered on, such as:

- At the front bezel, an illuminated power LED (green) or system error LED (amber).
- An illuminated green LED on the active CTP card.
- At least one green **PWR OK** LED illuminated on a power supply.
- Audio emanations and airflow from cooling fans.

Does the Director appear powered on?

YES **NO**

↓ Go to step 14.

Analysis for an Ethernet link or dual CTP card failure is not described in this MAP. Go to MAP 0000: Start MAP on page 2–2. If this is the second time at this step, contact the next level of support. **Exit MAP.**

28

Inspect power supply operational states at the embedded web server interface.

a. At the View panel, click the FRU Properties tab. The View panel (FRU Properties tab) displays.

b. Inspect the Status fields for both power supplies.

Does the Status field display a **Failed** message for either power supply?

NO **YES**

↓ A redundant power supply failed. Go to step 7.

The Director appears operational. **Exit MAP.**

MAP 0200: POST Failure Analysis

When the Director is powered on, it performs a series of power-on self-tests (POSTs). When POSTs complete, the Director performs an initial program load (IPL) that loads firmware and brings the unit online. This MAP describes fault isolation for problems that may occur during the POST/IPL process.

If an error is detected, the POST/IPL process continues in an attempt to initialize the Director and bring it online. An event code **400** is displayed when the Director completes the POST/IPL process.

1

Ensure the Director reporting the problem is connected to facility AC power and the power switch (circuit breaker) at the rear of the Director is set to the **ON** (up) position. Inspect the Director for indications of being powered on, such as:

- At the front bezel, an illuminated power LED (green) or system error LED (amber).
- An illuminated green LED on the active CTP card.
- At least one green **PWR OK** LED illuminated on a power supply.
- Audio emanations and airflow from cooling fans.

Does the Director appear powered on?

YES **NO**

↓ An AC power distribution problem is indicated, and analysis for the failure is not described in this MAP. Go to MAP 0100: Power Distribution Analysis on page 2–30. **Exit MAP.**

2

Was an event code **400**, or **411**, or **413** observed at the Director Event Log (SDCM server) or at the embedded web server event log?

YES **NO**

↓ Analysis for the failure is not described in this MAP. Go to MAP 0000: Start MAP on page 2–2. Exit MAP.

3

Table 2–3 lists event codes, brief explanations of the codes, and the associated steps that describe fault isolation procedures.

Table 2–3: MAP 200: Event Codes

Event Code	Explanation	Action
400	Power-up diagnostic failure.	Go to step 4.
411	Firmware fault.	Go to step 11.
413	Backup CTP card POST failure.	Go to step 12.

4

POST/IPL diagnostics detected a FRU failure as indicated by an event code **400** with supplementary event data.

1. At the SDCM Server's Hardware View, select the Event Log option from the Logs icon on the navigation control panel. The Event Log displays.
2. Examine the first two bytes (**0** and **1**) of event data.
3. Byte **0** is a FRU code that indicates the failed component. Byte **1** is the slot number of the failed FRU (**00** for a nonredundant FRU, **00** or **01** for redundant FRUs, and **00** through **15** for FPM cards.

   Table 2–4 lists byte **0** FRU codes and associated steps that describe fault isolation procedures.

Table 2–4: Byte 0 FRU Codes

Byte 0	Failed FRU	Action
01	Backplane.	Go to step 5.
02	CTP card.	Go to step 6.
03	SBAR assembly.	Go to step 7.
05	Fan module.	Go to step 8.
06	Power supply.	Go to step 9.
08-0F	FPM card.	Go to step 10.

5

The backplane failed POSTs (indicated by a **01** FRU code) and must be removed and replaced. Refer to Backplane on page 4–29 for instructions.

- This procedure is nonconcurrent and must be performed while Director power is off.
- Perform the data collection procedure as part of FRU removal and replacement.

Did backplane replacement solve the problem?

NO **YES**

↓ The Director appears operational. **Exit MAP.**

Contact the next level of support. **Exit MAP**.

6

A CTP card failed POSTs (indicated by a **02** FRU code) and must be removed and replaced. Refer to Redundant CTP Card on page 4–6 for instructions.

- This procedure is concurrent and can be performed while Director power is on.
- Perform the data collection procedure as part of FRU removal and replacement.

Did CTP card replacement solve the problem?

NO **YES**

↓ The Director appears operational. **Exit MAP.**

Contact the next level of support. **Exit MAP**.

7

An SBAR assembly failed POSTs (indicated by a **03** FRU code) and must be removed and replaced. Refer to Redundant SBAR Assembly on page 4–20 for instructions.

- This procedure is concurrent and can be performed while Director power is on.
- Perform the data collection procedure as part of FRU removal and replacement.

Did SBAR assembly replacement solve the problem?

NO **YES**

↓ The Director appears operational. **Exit MAP.**

Contact the next level of support. **Exit MAP**.

8

A fan module failed POSTs (indicated by a **05** FRU code) and must be removed and replaced. Refer to Redundant Fan Module on page 4–24 for instructions.

- This procedure is concurrent and can be performed while Director power is on.
- Perform the data collection procedure as part of FRU removal and replacement.

Did fan module replacement solve the problem?

NO **YES**

↓ The Director appears operational. **Exit MAP.**

Contact the next level of support. **Exit MAP**.

9

A power supply failed POSTs (indicated by a **06** FRU code) and must be removed and replaced. Refer to Redundant Power Supply on page 4–17 for instructions.

- This procedure is concurrent and can be performed while Director power is on.
- Perform the data collection procedure as part of FRU removal and replacement.

Did power supply replacement solve the problem?

NO **YES**

↓ The Director appears operational. **Exit MAP.**

Contact the next level of support. **Exit MAP**.

10

An FPM card failed POSTs (indicated by a **08** through **0F** FRU code) and must be removed and replaced. Refer to FPM Card on page 4–9 for instructions.

- This procedure is concurrent and can be performed while Director power is on.
- Perform the data collection procedure as part of FRU removal and replacement.

Did FPM card replacement solve the problem?

NO **YES**

↓ The Director appears operational. **Exit MAP.**

Contact the next level of support. **Exit MAP**.

11

POST/IPL diagnostics detected a firmware failure (as indicated by an event code **411**) and performed an online dump. All Fibre Channel ports reset after the failure and devices momentarily logout, login, and resume operation.

Perform the data collection procedure and return the information to Compaq for analysis by third-level support personnel. **Exit MAP.**

12

The backup CTP card failed POST/IPL diagnostics (as indicated by an event code **413**) and must be removed and replaced. Refer to Redundant CTP Card on page 4–6 for instructions.

- This procedure is concurrent and can be performed while Director power is on.
- Perform the data collection procedure as part of FRU removal and replacement.

Did CTP card replacement solve the problem?

NO **YES**

↓ The Director appears operational. **Exit MAP.**

Contact the next level of support. **Exit MAP**.

MAP 0300: Console Application Problem Determination

This map describes isolation of SDCM server application problems, including problems associated with the Windows NT operating system and SDCM, Product Manager, and Fabric Manager applications.

1

Did the SDCM server lock up or crash without displaying a warning or error message?

YES	NO
↓	Go to step 4.

2

An application or operating system problem is indicated. Close the SDCM Manager application.

1. Simultaneously press the **Ctrl**, **Alt**, + **Delete** keys. The Windows NT Security dialog box displays.
2. At the Windows NT Security dialog box, click the Task Manager button. The Windows NT Task Manager dialog box (Figure 2–9) displays with the Applications page open.

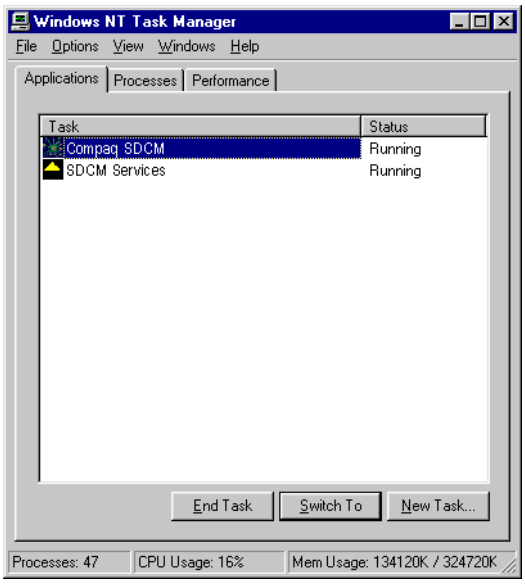


Figure 2–9: Task Manager Dialog Box, Applications Tab

3. Select (highlight) the Compaq Enterprise Fabric Connectivity Manager entry and click End Task. The SDCM application closes.

Continue to the next step.

3

Attempt to clear the problem by rebooting the SDCM server PC.

1. Click the Windows Start button. The Windows NT Workstation menu displays.
2. At the Windows NT Workstation menu, select Shut Down. The Shut Down Windows dialog box displays.
3. At the Shut Down Windows dialog box, select Shut Down The Computer and click Yes to power off the PC.
4. Wait approximately 30 seconds and power on the PC. After POSTs complete, the Begin Logon dialog box displays.
5. Simultaneously press the **Ctrl**, **Alt**, + **Delete** keys to display the Logon Information dialog box. Type a user name and password (obtained in MAP 0000: Start MAP on page 2–2) and click OK. The SDCM application starts and the SDCM Login dialog box (Figure 2–10) displays.

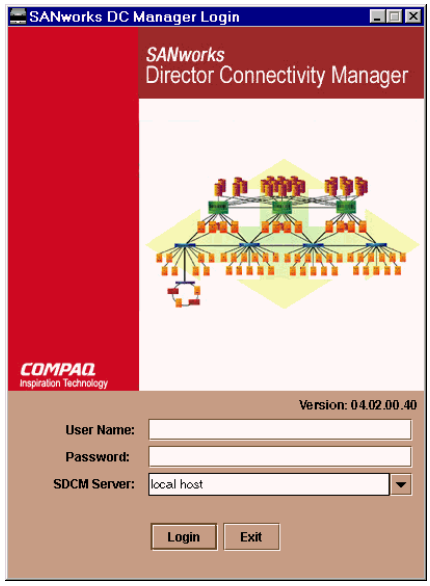


Figure 2–10: SDCM Login Dialog Box

6. At the SDCM Login dialog box, type a user name, password, and SDCM server name (obtained in MAP 0000: Start MAP on page 2–2, and all are case sensitive), and click Login. The application opens and the Product View displays.

Did the Product View display and does the SDCM application appear operational?

NO **YES**

↓ The problem is transient and the SDCM server appears operational. **Exit MAP.**

Contact the next level of support. **Exit MAP**.

4

Did the SDCM application display a dialog box with the message **Connection to SDCM Server lost-click OK to exit application or SDCM Manager error n** (where ***n*** is an error message number **1** through **8** inclusive)?

NO **YES**

↓ An SDCM application error occurred. Click OK to close the dialog box and close the SDCM application. Go to step 3**.**

5

Did the SDCM application display a dialog box with the message **The software version on this SDCM server is not compatible with the version on the remote SDCM server**?

YES **NO**

↓ Go to step 8.

6

The SDCM applications running on the SDCM server and client workstation are not at compatible release levels. Recommend to the customer that the downlevel version be upgraded.

Does the customer want the SDCM application upgraded?

YES **NO**

↓ Power off the client workstation. **Exit MAP.**

7

Upgrade the downlevel SDCM application. Refer to Install or Upgrade Software on page 3–54 for instructions.

Did the software upgrade solve the problem?

NO **YES**

↓ The SDCM server appears operational. **Exit MAP.**

Contact the next level of support. **Exit MAP**.

8

Did the Product Manager application display a dialog box with the message **Product Manager error 5001** or **Product Manager error 5002**?

NO **YES**

↓ A Product Manager application error occurred. Click OK to close the dialog box and close the SDCM and Product Manager applications. Go to step 3**.**

9

Did the Product Manager application display a dialog box with the message **Send firmware failed**?

YES **NO**

↓ Go to step 11.

10

An attempt to download a firmware version from the SDCM server hard drive to the Director failed. Retry the operation. Refer to Manage Firmware Versions on page 3–44 for instructions.

Did the firmware version download to the Director?

NO **YES**

↓ The SDCM Server appears operational. **Exit MAP.**

A CTP card failure is suspected. Go to MAP 0000: Start MAP on page 2–2 to isolate the problem. **Exit MAP.**

11

Did the Product Manager application display a dialog box with the message **The data collection process failed**?

YES **NO**

↓ Go to step 13.

12

The data collection process failed. Retry the process using a new Zip disk. Refer to Collecting Maintenance Data on page 3–34 for instructions.

Did the data collection process complete?

NO **YES**

↓ Return the Zip disk to Compaq for analysis by third-level support. **Exit MAP.**

Contact the next level of support. **Exit MAP**.

13

Did the SDCM server lock up or crash and display a Dr. Watson for Windows NT dialog box?

NO **YES**

↓ A Windows NT operating system or SDCM application error occurred. Click Cancel to close the dialog box and SDCM application. Go to step 3.

14

Did the SDCM server crash and display a blue screen with the system dump file in hexadecimal format (blue screen of death)?

YES **NO**

↓ The SDCM server appears operational. **Exit MAP.**

15

Attempt to clear the problem by power cycling the SDCM server PC.

1. Power off the PC.
2. Wait approximately 30 seconds and power on the PC. After POSTs complete, the Begin Logon dialog box displays.

3. Simultaneously press the **Ctrl**, **Alt**, + **Delete** keys to display the Logon Information dialog box. Type a user name and password (obtained in MAP 0000: Start MAP on page 2–2) and click OK. The SDCM application starts and the SDCM Login dialog box displays.
4. At the SDCM Login dialog box, type a user name, password, and SDCM server name (obtained in MAP 0000: Start MAP on page 2–2, and all are case sensitive), and click Login. The application opens and the Product View displays.

Did the Product View display and does the SDCM application appear operational?

NO **YES**

↓ The problem is transient and the SDCM server appears operational. **Exit MAP.**

Contact the next level of support. **Exit MAP**.

MAP 0400: Loss of Console Communication

This MAP describes fault isolation of the Ethernet communication link between a Director and the SDCM server, or between a Director and a web browser PC running the embedded web server interface. Failure indicators include:

- At the Product View, a grey square at the alert panel and as the background to the icon representing the Director reporting the problem.
- At the Hardware View, a grey square at the alert panel, a **No Link** status and reason at the Director Status table, and no FRUs visible for the Director.
- At the web browser PC, a **Page cannot be found, Unable to locate the server, HTTP 404-file not found**, or other similar message.
- Event codes recorded at the Director Event Log or embedded web server event log.

When the logical connection between the Director and SDCM server is initiated, it may take up to five minutes for the link to activate at the Product View, and a green circle to appear at the alert panel and the background to the icon representing the Director. This delay is normal.

CAUTION: Prior to servicing a Director or SDCM server, determine the Ethernet LAN configuration. Installation of Directors and the SDCM server on a public customer intranet can complicate problem determination and fault isolation.

1

Was an event code **430**, **431**, or **432** observed at the Director Event Log (SDCM server) or at the embedded web server event log?

YES **NO**

↓ Go to step 3.

2

Table 2–5 lists event codes, brief explanations of the codes, and associated steps that describe fault isolation procedures.

Table 2–5: MAP 400: Event Codes

Event Code	Explanation	Action
430	Excessive Ethernet transmit errors.	Go to step 8.
431	Excessive Ethernet receive errors.	Go to step 8.
432	Ethernet adapter reset.	Go to step 14.

3

Is fault isolation being performed at the SDCM server?

YES **NO**

↓ Fault isolation is being performed through the embedded web server interface. Go to step 25.

4

At the SDCM server's Product View, does a grey square appear at the alert panel and as the background to the icon representing the Director reporting the problem?

YES **NO**

↓ The Director-to-SDCM server connection is restored and appears operational. **Exit MAP.**

The grey square indicates the SDCM server cannot communicate with the Director because:

- The Director-to-SDCM server Ethernet link failed.
- AC power distribution in the Director failed, or AC power was disconnected.
- Both of the Director's CTP cards failed.

Continue to the next step.

5

Ensure the Director reporting the problem is connected to facility AC power and the power switch (circuit breaker) at the rear of the Director is set to the **ON** (up) position. Inspect the Director for indications of being powered on, such as:

- At the front bezel, an illuminated power LED (green) or system error LED (amber).
- An illuminated green LED on the active CTP card, and illuminated green **PWR OK** LEDs on both power supplies.
- Audio emanations and airflow from cooling fans.

Does the Director appear powered on?

YES **NO**

↓ A power distribution problem is indicated. Go to MAP 0100: Power Distribution Analysis on page 2–30. **Exit MAP.**

6

At the Director, inspect the amber LED at the top of each CTP card.

Is the amber LED illuminated on both CTP cards?

NO **YES**

↓ Failure of both CTP cards is indicated. Go to MAP 0500: FRU Failure Analysis on page 2–64. **Exit MAP.**

7

The Director-to-SDCM server Ethernet link failed. Click the icon with the grey square representing the Director reporting the problem. The Hardware View displays. At the Hardware View:

- A grey square appears at the alert panel.
- No FRUs are visible for the Director.
- The SD-64 Director Status table is yellow, the Status field displays **No Link**, and the **Reason** field displays an error message.

Table 2–6 lists the error messages and associated steps that describe fault isolation procedures.

Table 2–6: MAP 400: Error Messages

Error Message	Action
Never connected.	Go to step 8.
Link timeout.	Go to step 8.
Protocol mismatch.	Go to step 15.
Duplicate session.	Go to step 18.
Unknown network address.	Go to step 21.
Incorrect product type.	Go to step 23.

8

Transmit or receive errors for a Director's Ethernet adapter (on each CTP card) exceeded a threshold, the Director-to-SDCM server link was not connected, or the Director-to-SDCM server link timed out. A problem with the Ethernet cable, Ethernet hub or hubs, or other LAN-attached device is indicated.

Verify the Director is connected to the SDCM server through one or more Ethernet hubs.

1. Ensure an RJ-45 Ethernet cable connects both of the Director's CTP cards to an Ethernet hub. If not, connect the cables as directed by the customer.
2. Ensure an RJ-45 Ethernet cable connects the SDCM Server adapter card to an Ethernet hub. If not, connect the cable as directed by the customer.
3. Ensure the Ethernet cables are not damaged. If damaged, replace the cables.

Was a corrective action performed?

NO **YES**

↓ Go to step 1.

9

Does the LAN configuration use multiple (up to four) Ethernet hubs that are daisy-chained?

YES **NO**

↓ Go to step 11.

10

If appropriate, verify that the hubs are correctly daisy-chained.

Was a corrective action performed?

NO **YES**

↓ Go to step 1.

11

Verify operation of the Ethernet hub or hubs. Inspect each hub for indications of being powered on, such as:

- Green Power LED illuminated.
- Green Status LEDs illuminated.

Is a hub failure indicated?

YES **NO**

↓ Go to step 13.

12

Remove and replace the Ethernet hub. Refer to the supporting documentation shipped with the hub for instructions.

Did hub replacement solve the problem?

NO **YES**

↓ The Director-to-SDCM server connection is restored and appears operational. **Exit MAP.**

Contact the next level of support. **Exit MAP**.

13

A problem with another LAN-attached device is indicated.

- If the problem is associated with another Director or SDCM Server, go to MAP 0000: Start MAP on page 2–2 to isolate the problem for that device. **Exit MAP.**
- If the problem is associated with an unrelated device, notify the customer and have the system administrator correct the problem.

Did repair of an unrelated LAN-attached device solve the problem?

NO **YES**

↓ The Director-to-SDCM server connection is restored and appears operational. **Exit MAP.**

Contact the next level of support. **Exit MAP**.

14

The Ethernet adapter on the Director's active CTP card reset in response to an error. The connection to the SDCM server terminated briefly, then recovered upon reset.

Perform the data collection procedure and return the Zip disk to Compaq for analysis by third-level support personnel. **Exit MAP.**

15

A protocol mismatch occurred because the SDCM application (running on the SDCM server) and the Director firmware are not at compatible release levels. Recommend to the customer that the downlevel version (software or firmware) be upgraded.

Does the SDCM application require upgrade?

YES **NO**

↓ Go to step 17.

16

Upgrade the SDCM application. Refer to Install or Upgrade Software on page 3–54 for instructions.

Did the Director-to-SDCM server Ethernet connection recover?

NO **YES**

↓ The Director-to-SDCM server connection is restored and appears operational. **Exit MAP.**

Contact the next level of support. **Exit MAP**.

17

A Director firmware upgrade is required. Refer to Download a Firmware Version to a Director on page 3–48 for instructions. Perform the data collection procedure after the download.

Did the Director-to-SDCM server Ethernet connection recover?

NO **YES**

↓ The Director-to-SDCM server connection is restored and appears operational. **Exit MAP.**

Contact the next level of support. **Exit MAP**.

18

An instance of the SDCM application is open at another SDCM server and communicating with the Director (duplicate session). Notify the customer and either:

- Power off the SDCM server running the second instance of the application, or
- Configure the SDCM server running the second instance of the application as a client workstation.

Does the customer want the second SDCM server configured as a client?

YES **NO**

↓ Power off the SDCM Server reporting the **Duplicate Session** communication problem. **Exit MAP.**

19

Determine the internet protocol (IP) address of the SDCM server running the first instance of the SDCM application.

1. Click the Windows Start button. The Windows NT Workstation menu displays.
2. At the Windows NT Workstation menu, select Settings. From the menu that displays, select Control Panel. The Control Panel window displays.
3. At the Control Panel window, double-click the Network icon. The Network dialog box displays with the Identification page open.
4. Click Protocols. The Protocols page opens.
5. Select (highlight) the TCP/IP Protocol entry from the list box and click Properties. The Microsoft TCP/IP Properties dialog box displays with the IP Address page open.
6. Record the IP address, then click OK to close the dialog box. At the Network dialog box, click OK to close the dialog box.
7. Close the Control Panel window.

Continue to the next step.

20

Configure the SDCM server reporting the **Duplicate Session** communication problem as a client.

1. At the Product View, select Logout from the Logout menu on the navigation control panel. The SDCM Login dialog box displays.
2. At the SDCM Login dialog box, type a user name and password (obtained in MAP 0000: Start MAP on page 2–2, and both are case sensitive).
3. Type the IP address of the SDCM server running the first instance of the SDCM application in the SDCM server field.
4. Click Login. The SDCM application opens as a client and the Product View displays.

Did the SDCM server reconfigure as a client and did the Ethernet connection recover?

NO **YES**

↓ The Director-to-SDCM server connection is restored and the second SDCM server appears operational as a client.
Exit MAP.

Contact the next level of support. **Exit MAP**.

21

The IP address defining the Director to the SDCM application is incorrect or unknown and must be verified. A maintenance terminal (PC) and asynchronous RS-232 null modem cable are required to verify the Director's IP address. The tools are provided with the Director or by service personnel. To verify the IP address:

1. Remove the protective cap from the 9-pin maintenance port at the rear of the Director (a flat-tip screwdriver may be required). Connect one end of the RS-232 null modem cable to the port.
2. Connect the other cable end to a 9-pin communication port (**COM1** or **COM2**) at the rear of the maintenance terminal PC.
3. Power on the maintenance terminal. After the PC powers on, the Windows desktop displays.
4. Click the Windows Start button. The Windows Workstation menu displays.

   NOTE: The following steps describe inspecting the IP address using HyperTerminal serial communication software.

5. At the Windows Workstation menu, sequentially select Programs, Accessories, and HyperTerminal. The Connection Description dialog box displays.
6. Type 64 in the Name field and click OK. The Connect To dialog box displays.
7. Ensure the Connect using field displays **COM1** or **COM2** (depending on the serial communication port connection to the Director), and click OK. The COMn dialog box displays (where n is **1** or **2**).
8. Configure the Port Settings parameters as follows:

- Bits per second-**57600**.
- Data bits-**8**.

- Parity-**None**.
- Stop bits-**1**.
- Flow control-**Hardware**.

  When the parameters are set, click OK. The SD-64 Director-HyperTerminal window displays.

9. At the **>** prompt, type the user-level password (the default is **password**) and press the **Enter** key. The password is case sensitive. The SD-64 Director-HyperTerminal window displays with an **SSP0>** prompt at the bottom of the window.
10. At the **SSP0>** prompt, type the **ipconfig** command and press the **Enter** key. The SD-64 Director-HyperTerminal window displays with configuration information listed (including the IP address).
11. Record the Director's IP address.
12. Select Exit from the File menu to close the HyperTerminal application.
13. Power off the maintenance terminal.
14. Disconnect the RS-232 null modem cable from the Director and the maintenance terminal. Replace the protective cap over the maintenance port.

Continue to the next step.

22

Define the Director's correct IP address to the SDCM server.

1. At the Product View, right-click the icon with the grey square representing the Director reporting the problem. A menu displays.
2. Select Modify. The Modify Network Address dialog box (Figure 2–11) displays.

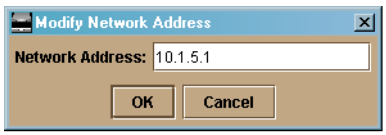


Figure 2–11: Modify Network Address Dialog Box

3. Type the correct IP address and click OK.

Did the IP address below the Director icon change to the new entry and did the Ethernet connection recover?

NO **YES**

↓ The Director-to-SDCM Server connection is restored and appears operational. **Exit MAP.**

Contact the next level of support. **Exit MAP**.

23

An incorrect product type is defined to the SDCM server.

1. At the Product View, right-click the icon with the grey square representing the product reporting the problem. A menu displays.
2. Select Delete. A Warning dialog box displays asking if the product is to be deleted.
3. Click Yes to delete the product.
4. At the Product View, select the New Product option from the Configure menu. The New Product dialog box (Figure 2–12) displays.

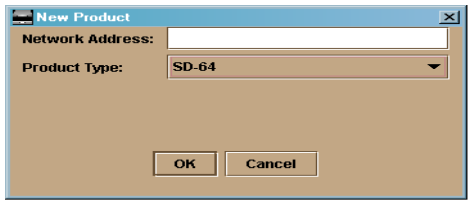


Figure 2–12: New Product Dialog Box

5. Type the configured IP address in the Network Address field.
6. Select **SD-64** from the Product Type list box and click OK.

Did the IP address below the Director icon change to the new entry and did the Ethernet connection recover?

NO **YES**

↓ The Director-to-SDCM server connection is restored and appears operational. **Exit MAP.**

24

The product at the configured IP address is not a Compaq managed product. Notify the customer of the problem.

1. At the Product View, right-click the icon with the grey square representing the product reporting the problem. A menu displays.
2. Select Delete. A Warning dialog box displays asking if the product is to be deleted.
3. Click Yes to delete the product.

Exit MAP.

25

Does the embedded web server interface appear operational?

NO **YES**

↓ The Director-to-web server PC connection is restored and appears operational. **Exit MAP.**

26

A **Page cannot be found, Unable to locate the server, HTTP 404-file not found**, or other similar message appears. The message indicates the web browser PC cannot communicate with the Director because:

- The Director-to-PC Internet (Ethernet) link could not be established.
- AC power distribution in the Director failed, or AC power was disconnected.
- Both of the Director's CTP cards failed.

Continue to the next step.

27

Ensure the Director reporting the problem is connected to facility AC power and the power switch (circuit breaker) at the rear of the Director is set to the **ON** (up) position. Inspect the Director for indications of being powered on, such as:

- At the front bezel, an illuminated power LED (green) or system error LED (amber).
- An illuminated green LED on the active CTP card, and illuminated green **PWR OK** LEDs on both power supplies.
- Audio emanations and airflow from cooling fans.

Does the Director appear powered on?

YES **NO**

↓ A power distribution problem is indicated. Go to MAP 0100: Power Distribution Analysis on page 2–30. **Exit MAP.**

28

At the Director, inspect the amber LED at the top of each CTP card.

Is the amber LED illuminated on both CTP cards?

NO **YES**

↓ Failure of both CTP cards is indicated. Go to MAP 0500: FRU Failure Analysis on page 2–64. **Exit MAP.**

29

Either a Director-to-PC Internet link problem (Internet too busy or IP address typed incorrectly) or a Director Ethernet port failure is indicated.

1. Wait approximately five minutes, then attempt to login to the Director again.
2. At the Netsite field (Netscape Navigator) or Address field (Internet Explorer), type **http://xxx.xxx.xxx.xxx**, where **xxx.xxx.xxx.xxx** is the IP address of the Director (obtained in MAP 0000: Start MAP on page 2–2). The Username And Password Required dialog box appears.
3. Type the user name and password obtained in MAP 0000: Start MAP on page 2–2 and click OK. If the View panel does not display, wait five minutes and perform this step again.

Does the embedded web server interface appear operational with the View panel displayed?

NO **YES**

↓ The Director-to-web server PC connection is restored and appears operational. **Exit MAP.**

Failure of the CTP card's Ethernet port is indicated. Go to MAP 0500: FRU Failure Analysis on page 2–64. **Exit MAP.**

MAP 0500: FRU Failure Analysis

This MAP describes fault isolation for the CTP card, SBAR assembly, and fan module. Failure indicators include:

- The amber LED on the FRU illuminates.
- The amber emulated LED on a fan graphic at the Hardware View illuminates.
- A blinking red and yellow diamond (failed FRU indicator) appears over a FRU graphic; or a grey square (status unknown indicator) or yellow triangle (attention indicator) appears at the alert panel of the Product View or Hardware View.
- An event code recorded at the Director Event Log or the embedded web server event log.
- A **Failed** message associated with a FRU at the embedded web server interface.

1

Was an event code **300**, **301**, **302**, **303**, **304**, **305**, **414**, **420**, **433**, **440**, **604**, **605**, **607**, **805**, **806**, **807**, **810**, **811**, **812**, or **850** observed at the Director Event Log (SDCM server) or at the embedded web server event log?

YES **NO**

↓ Go to step 3.

2

Table 2–7 lists event codes, brief explanations of the codes, and associated steps that describe fault isolation procedures.

Table 2–7: MAP 500: Event Codes

Event Code	Explanation	Action
300	Cooling fan propeller failed.	Go to step 5.
301	Cooling fan propeller failed.	Go to step 5.
302	Cooling fan propeller failed.	Go to step 5.
303	Cooling fan propeller failed.	Go to step 5.
304	Cooling fan propeller failed.	Go to step 5.
305	Cooling fan propeller failed.	Go to step 5.
414	Backup CTP card failed.	Go to step 7.

Table 2–7: MAP 500: Event Codes (Continued)

Event Code	Explanation	Action
420	Backup CTP card NV-RAM failure.	Go to step 7.
433	Non-recoverable Ethernet fault.	Go to step 7.
440	Embedded port hardware failed.	Go to step 7.
604	SBAR assembly failure.	Go to step 9.
605	SBAR assembly revision not supported.	Go to step 16.
607	Director contains no operational SBAR assemblies.	Go to step 9.
805	High temperature warning (SBAR assembly thermal sensor).	Go to step 9.
806	Critically hot temperature warning (SBAR assembly thermal sensor).	Go to step 9.
807	SBAR assembly shutdown due to thermal violation.	Go to step 9.
810	High temperature warning (CTP card thermal sensor).	Go to step 7.
811	Critically hot temperature warning (CTP card thermal sensor).	Go to step 7.
812	CTP card shutdown due to thermal violation.	Go to step 7.
850	System shutdown due to CTP card thermal violations.	Go to step 7.

3

Is fault isolation being performed at the Director?

YES **NO**

↓ Fault isolation is being performed at the SDCM server or embedded web server interface. Go to step 10.

4

Inspect both fan modules at the rear of the Director. Fan module LEDs can be inspected through the hexagonal cooling vents of the radio frequency interference (RFI) shield.

Does inspection of a Director fan module indicate a failure? Indicators include:

- The amber LED is illuminated but not blinking (beaconing) on one or both fan modules.

- One or more cooling fans are not rotating.

YES **NO**

↓ Go to step 6.

5

One or more cooling fans failed, and one or both fan modules must be removed and replaced. Refer to Redundant Fan Module on page 4–24 for instructions.

- If one or more fans in a module are operating, do not remove the fan module unless the replacement is immediately available.
- If a multiple fan failure caused a thermal shutdown, power on the Director after the fan modules are replaced. Refer to Power-On Procedure on page 3–36 for instructions.

Do the fan modules appear to function?

NO **YES**

↓ The Director appears operational. **Exit MAP.**

Contact the next level of support. **Exit MAP**.

6

Inspect the faceplates of both CTP cards at the front of the Director.

Is the amber LED at the top of a CTP card illuminated but not blinking (beaconing)?

YES **NO**

↓ Go to step 8.

7

A CTP card failed and must be removed and replaced. Refer to Redundant CTP Card on page 4–6 for instructions.

- This procedure is concurrent and can be performed while Director power is on.
- Perform the data collection procedure as part of FRU removal and replacement.

Did CTP card replacement solve the problem?

NO **YES**

↓ The Director appears operational. **Exit MAP.**

Contact the next level of support. **Exit MAP**.

8

Inspect both SBAR assemblies at the rear of the Director. SBAR assembly LEDs can be inspected through the hexagonal cooling vents of the RFI shield.

Is the amber LED on an SBAR assembly illuminated but not blinking (beaconing)?

YES **NO**

↓ The Director appears operational. **Exit MAP.**

9

An SBAR assembly failed and must be removed and replaced. Refer to Redundant SBAR Assembly on page 4–20 for instructions.

- This procedure is concurrent and can be performed while Director power is on.
- Perform the data collection procedure as part of FRU removal and replacement.

Did SBAR assembly replacement solve the problem?

NO **YES**

↓ The Director appears operational. **Exit MAP.**

Contact the next level of support. **Exit MAP**.

10

Is fault isolation being performed at the SDCM server?

YES **NO**

↓ Fault isolation is being performed at the embedded web server interface. Go to step 18.

11

Does a blinking red and yellow diamond (failed FRU indicator) appear to overlay a fan module graphic at the Hardware View?

NO **YES**

↓ A fan module failure is indicated. Go to step 5.

12

Does a blinking red and yellow diamond (failed FRU indicator) appear to overlay a CTP card graphic at the Hardware View?

NO **YES**

↓ A CTP card failure is indicated. Go to step 7.

13

Does a blinking red and yellow diamond (failed FRU indicator) appear to overlay an SBAR assembly graphic at the Hardware View?

NO **YES**

↓ An SBAR assembly failure is indicated. Go to step 9.

14

At the Hardware View, does a grey square appear at the alert panel, a **No Link** status appear at the SD-64 Director Status table and graphical FRUs appear uninstalled?

YES **NO**

↓ A green circle appears at the alert panel and the Director appears operational. **Exit MAP.**

The grey square indicates the SDCM server cannot communicate with the Director because:

- The Director-to-SDCM server Ethernet link failed.
- AC power distribution in the Director failed, or AC power was disconnected.
- Both of the Director's CTP cards failed.

Continue to the next step.

15

At the Director, inspect the amber LED at the top of each CTP card.

Is the amber LED illuminated on both CTP cards?

NO **YES**

↓ Failure of both CTP cards is indicated. Go to step 7**.**

Analysis for an Ethernet link or AC power distribution failure is not described in this MAP. Go to MAP 0000: Start MAP on page 2–2. If this is the second time at this step, contact the next level of support. **Exit MAP.**

16

An SBAR assembly is not recognized by Director firmware because the firmware version is not supported or the SBAR assembly failed. Advise the customer of the problem and determine the correct firmware version to download from the SDCM server.

Download the firmware. Refer to Download a Firmware Version to a Director on page 3–48 for instructions. Perform the data collection procedure after the download.

Continue to the next step.

17

Did the firmware download solve the problem?

NO **YES**

↓ The Director appears operational. **Exit MAP.**

An SBAR assembly failure is indicated. Go to step 9.

18

Does the embedded web server interface appear operational?

NO **YES**

↓ Go to step 22.

19

A **Page cannot be found, Unable to locate the server, HTTP 404-file not found**, or other similar message appears. The message indicates the web browser PC cannot communicate with the Director because:

- The Director-to-PC Internet link could not be established.
- AC power distribution in the Director failed, or AC power was disconnected.
- Both of the Director's CTP cards failed.

Continue to the next step.

20

Ensure the Director reporting the problem is connected to facility AC power and the power switch (circuit breaker) at the rear of the Director is set to the **ON** (up) position. Inspect the Director for indications of being powered on, such as:

- At the front bezel, an illuminated power LED (green) or system error LED (amber).
- An illuminated green LED on the active CTP card.
- At least one green **PWR OK** LED illuminated on a power supply.
- Audio emanations and airflow from cooling fans.

Does the Director appear powered on?

YES **NO**

↓ Analysis for an AC power distribution failure is not described in this MAP. Go to MAP 0000: Start MAP on page 2–2. If this is the second time at this step, contact the next level of support. Exit MAP.

21

At the Director, inspect the amber LED at the top of each CTP card.

Is the amber LED illuminated on both CTP cards?

NO **YES**

↓ Failure of both CTP cards is indicated. Go to step 7**.**

Analysis for an Ethernet link failure is not described in this MAP. Go to MAP 0000: Start MAP on page 2–2. If this is the second time at this step, contact the next level of support. **Exit MAP.**

22

Inspect fan module operational states at the embedded web server interface.

1. At the View panel, click the FRU Properties tab. The View panel (FRU Properties tab) displays.
2. Inspect the Status fields for both fan modules.

Does the Status field display a **Failed** message for either fan module?

NO **YES**

↓ A fan module failure is indicated. Go to step 5.

23

Inspect CTP card operational states at the embedded web server interface. Inspect the Status fields for both CTP cards.

Does the Status field display a **Failed** message for either CTP card?

NO **YES**

↓ A CTP card failure is indicated. Go to step 7.

24

Inspect SBAR assembly operational states at the embedded web server interface. Inspect the Status fields for both assemblies.

Does the Status field display a **Failed** message for either SBAR assembly?

NO **YES**

↓ An SBAR assembly failure is indicated. Go to step 9.

The Director appears operational. **Exit MAP.**

MAP 0600: FPM Card Failure and Link Incident Analysis

This MAP describes fault isolation for FPM cards, shortwave laser small form factor (SFF) optical transceivers, and longwave laser SFF optical transceivers; and for Fibre Channel link incidents. Failure indicators include:

- One or more amber LEDs on the FPM card illuminate.
- One or more emulated amber LEDs on an FPM card graphic at the Hardware View illuminate.
- A blinking red and yellow diamond (failed FRU indicator) appears over an FPM card graphic or a yellow triangle (attention indicator) appears at the alert panel of the Product View, Hardware View, or Port Card View.
- An event code recorded at the SD-64 Director Event Log or the embedded web server event log.
- A port operational state message or a **Failed** message associated with an FPM card at the embedded web server interface.
- A link incident message recorded in the Link Incident Log or Port Properties dialog box.

1

Was an event code **080**, **504**, **505**, **506**, **507**, **512**, **514**, **800**, **801**, or **802** observed at the Director Event Log (SDCM server) or at the embedded web server event log?

YES **NO**

↓ Go to Step 3.

2

Table 2–8 lists event codes, brief explanations of the codes, and associated steps that describe fault isolation procedures.

Table 2–8: MAP 600: Event Codes

Event Code	Explanation	Action
080	Unauthorized world-wide name.	Go to step 22.
504	FPM card failure.	Go to step 6.
505	FPM card revision not supported.	Go to step 35.
506	Fibre Channel port failure.	Go to step 6.
507	Loopback diagnostics port failure.	Go to step 13.
512	SFF optical transceiver nonfatal error.	Go to step 5.
514	SFF optical transceiver failure.	Go to step 5.
800	High temperature warning (FPM card thermal sensor).	Go to step 6.
801	Critically hot temperature warning (FPM card thermal sensor).	Go to step 6.
802	FPM card shutdown due to thermal violation.	Go to step 6.

3

Is fault isolation being performed at the Director?

YES **NO**

↓ Fault isolation is being performed at the SDCM server or embedded web server interface. Go to step 7.

4

Inspect the faceplates of FPM cards at the front of the Director. Each card has an amber LED (at the top of the card) that illuminates if the card fails or if any Fibre Channel port fails.

Each card also has a bank of amber and green LEDs above the ports. Each LED pair is associated with a corresponding port (for example, the top LED pair is associated with the top port). The amber LED illuminates and the green LED extinguishes if the port fails.

Are an amber port LED and the amber LED at the top of the FPM card illuminated but not blinking (beaconing)?

YES **NO**

↓ The Director appears operational, however a link incident or other problem may have occurred. Perform fault isolation at the SDCM server. Go to step 7.

5

A Fibre Channel port failed, and the pluggable SFF optical transceiver must be removed and replaced. Refer to SFF Optical Transceiver on page 4–13 for instructions.

- This procedure is concurrent and can be performed while Director power is on.
- Verify location of the failed port. Figure 2–13 shows FPM card numbers (**0** through **15**) and port numbers (**00** through **63**).

FPM Cards										FPM Cards							
15	**14**	**13**	**12**	**11**	**10**	**9**	**8**	CTP - 1 Card	CTP - 0 Card	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**0**
63	59	55	51	47	43	39	35			31	27	23	19	15	11	07	03
62	58	54	50	46	42	38	34			30	26	22	18	14	10	06	02
61	57	53	49	45	41	37	33			29	25	21	17	13	09	05	01
60	56	52	48	44	40	36	32			28	24	20	16	12	08	04	00

Figure 2–13: FPM Card Diagram

- Replace the optical transceiver with a transceiver of the same type (shortwave or longwave).
- Perform an external loopback test for the port as part of FRU removal and replacement.

Did optical transceiver replacement solve the problem?

NO **YES**

↓ The Director appears operational. **Exit MAP.**

6

An FPM card failed, and the card must be removed and replaced. Refer to FPM Card on page 4–9 for instructions.

- This procedure is concurrent and can be performed while Director power is on.

- Verify location of the failed card. Refer to the FPM card diagram above. The figure shows FPM card numbers (**0** through **15**) and port numbers (**00** through **63**).
- Notify the customer that all ports on the defective card are to be blocked. Ensure the customer's system administrator quiesces Fibre Channel frame traffic through any operational ports on the card and sets attached devices offline.
- Perform an external loopback test for all ports on the replacement card as part of FRU removal and replacement.
- Perform the data collection procedure as part of FRU removal and replacement.

Did FPM card replacement solve the problem?

NO **YES**

↓ The Director appears operational. **Exit MAP.**

Contact the next level of support. **Exit MAP**.

7

Is fault isolation being performed at the SDCM server?

YES **NO**

↓ Fault isolation is being performed at the embedded web server interface. Go to step 37.

8

Does a blinking red and yellow diamond (failed FRU indicator) appear to overlay an FPM card graphic at the Hardware View or appear adjacent to a Fibre Channel port graphic at the Port Card View?

NO **YES**

↓ A port or FPM card failure is indicated. Go to step 5.

9

Did a Fibre Channel port or FPM card (all ports) fail a loopback test?

NO **YES**

↓ Go to step 13.

10

Does a yellow triangle (attention indicator) appear to overlay an FPM card graphic at the Hardware View or appear adjacent to a port graphic at the Port Card View?

YES **NO**

↓ Go to step 12.

11

Inspect the port state and LED status for all ports with an attention indicator.

1. At the Port Card View, click the port graphic with the attention indicator. The Port Properties dialog box displays.
2. Inspect the Operational State field at the Port Properties dialog box, and the emulated green and amber LEDs adjacent to the port at the Port Card View.
3. Table 2–9 lists LED and port operational state combinations and associated MAP 0600 (or other) steps that describe fault isolation procedures.

Table 2–9: MAP 600: Port Operational States

Operational State	Green LED	Amber LED	Action
Offline	Off	Off	Go to step 15.
Not Operational	Off	Off	Go to step 15.
Testing	Off	Blinking	Internal loopback test in process. **Exit MAP.**
Testing	On	Blinking	External loopback test in process. **Exit MAP.**
Beaconing	Off or On	Blinking	Go to step 16.
Invalid Attachment	On	Off	Go to step 17.
Link Reset	Off	Off	Go to step 27.
Link Incident	Off	Off	Go to step 28.
Segmented E_Port	On	Off	Go to MAP 0700: Fabric, ISL, and Segmented Port Problem Determination.

12

A link incident may have occurred, but the LIN alerts option is not enabled for the port and the attention indicator does not appear.

At the Hardware View or Port Card View, select Link Incident Log from the Logs menu. The Link Incident Log displays. If a link incident occurred, the affected port number is listed with one of the following messages.

Link interface incident-implicit incident.

Link interface incident-bit-error threshold exceeded.

Link failure-loss of signal or loss of synchronization.

Link failure-not-operational primitive sequence (NOS) received.

Link failure-primitive sequence timeout.

Link failure-invalid primitive sequence received for the current link state.

Did one of the listed messages appear in the Link Incident Log?

YES **NO**

↓ The Director appears operational. **Exit MAP.**

Go to step 28.

13

A Fibre Channel port or FPM card (all ports) failed an internal or external loopback test.

1. Reset each port that failed the loopback test.
   a. At the Port Card View, right-click the port. A menu appears.
   b. Select Reset Port. A Reset Port **n** message box displays, where **n** is the port number.
   c. Click OK. The port resets.
2. Perform an external loopback test for all ports that were reset.

Did resetting ports solve the problem?

NO **YES**

↓ The Director appears operational. **Exit MAP.**

14

An electronic circuit breaker on the FPM card may have tripped. To reset the circuit breaker, partially remove and reseat the FPM card for which external loopback tests failed. Refer to FPM Card on page 4–9 for instructions.

1. Unseat and disconnect the FPM card from the backplane. Unseat the card only, do not remove it from the Director chassis.
2. Reseat the FPM card in the backplane.
3. Perform an external loopback test on the FPM card.

Did reseating the FPM card solve the problem?

NO **YES**

↓ The Director appears operational. **Exit MAP.**

Go to step 6.

15

A Director port is unblocked and receiving the offline sequence (OLS) or not operational sequence (NOS) from an attached device.

Inform the customer that the attached device failed or is set offline. **Exit MAP.**

16

Beaconing is enabled for the port.

1. Consult with the customer and next level of support to determine the reason port beaconing is enabled.
2. Disable port beaconing.
   a. At the Port Card View, right-click the port graphic. A menu appears.
   b. Click Enable Beaconing. The check mark disappears from the box adjacent to the option, and port beaconing is disabled.

Was port beaconing enabled because port failure or degradation was suspected?

YES **NO**

↓ The Director appears operational. **Exit MAP.**

Go to step 1.

17

The port has an invalid attachment. The information in the Port Properties dialog box specifies the reason as listed in Table 2–10.

Table 2–10: MAP 600: Invalid Attachments

Reason	Action
Unknown	Contact the next level of support.
ISL connection not allowed on this port.	Go to step 18.
Incompatible switch at other end of ISL.	Go to step 19.
External loopback adapter connected to the port.	Go to step 20.
N-Port connection not allowed on this port.	Go to step 18.
Non-Compaq switch at other end of the ISL.	Go to.step 19.
Port binding violation-Unauthorized WWN.	Go to step 22.
Unresponsive node connected to port.	Go to step 23.

18

The port connection conflicts with the configured port type. Either an expansion port (E_Port) is incorrectly cabled to a Fibre Channel device or a fabric port (F_Port) is incorrectly cabled to a fabric element (Director or switch).

1. At the SDCM server's Hardware View, select Ports from the Configure menu. The Configure Ports dialog box displays.
2. Use the vertical scroll bar as necessary to display the information row for the port indicating an invalid attachment.
3. Click the Type field and configure the port from the list box as follows:

- Select fabric port (**F_Port**) if the port is cabled to a device (node).
- Select expansion port (**E_Port**) if the port is cabled to a fabric element (Director or switch) to form an ISL.

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

Did reconfiguring the port type solve the problem?

NO **YES**

↓ The Director appears operational. **Exit MAP.**

Contact the next level of support. **Exit MAP.**

19

The Director is configured for Open Fabric mode but the switch or Director at the other end of the ISL is not configured to Open Fabric mode.

Configure the Director operating mode:

1. Ensure the Director is set offline. For instructions, refer to Set Offline State on page 3–40 and return here.
2. At the Hardware View for the selected Director, click the Configure icon at the navigation control panel and select Operating Mode from the pop-up menu. The Configure Operating Mode dialog box displays.
3. Select the open fabric operating mode.
4. Click Activate to save the selection and close the dialog box.

Did configuring the operating mode solve the problem?

NO **YES**

↓ The Director appears operational. **Exit MAP.**

Contact the next level of support. **Exit MAP.**

20

A loopback plug is connected to the port and there is no diagnostic test running. Is a loopback plug in the port receptacle?

YES **NO**

↓ Contact the next level of support. **Exit MAP.**

21

Remove the loopback plug from the port receptacle. If directed by the customer, connect a fiber-optic jumper cable attaching a device to the Director.

- If the port is operational and a device is not attached, both LEDs adjacent to the port extinguish and the port state is No Light.

- If the port is operational and a device is attached, the green LED illuminates, the amber LED extinguishes, and the port state is Online.

Did removing the loopback plug solve the problem?

NO **YES**

↓ The Director appears operational. **Exit MAP.**

Contact the next level of support. **Exit MAP.**

22

The WWN 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.

Open the Node List View and select Node List from the View menu. Note the Port WWN column.

The Port WWN is the 8-byte (16-digit) world-wide name (WWN) assigned to the port or Fibre Channel interface installed on the attached device.

- If a nickname is not assigned to the WWN, the WWN is prefixed by the device manufacturer's name.
- If a nickname is assigned to the WWN, the nickname appears in place of the WWN.

The Bound WWN must be in the form of the raw WWN format (xx:xx:xx:xx:xx:xx:xx:xx) or must be a valid nickname.

Did configuring the WWN or nickname solve the problem?

NO **YES**

↓ The Director appears operational. **Exit MAP.**

Contact the next level of support. **Exit MAP.**

23

Clean the fiber-optic connectors on the cable.

1. Notify the customer the port will be blocked. Ensure the customer's system administrator quiesces Fibre Channel frame traffic through the port and sets the attached device offline.
2. Block the port. Refer to Block a Port on page 3–41 for instructions.
3. Disconnect both ends of the fiber-optic cable.
4. Clean the fiber-optic connectors. Refer to Clean Fiber-Optic Components on page 3–35 for instructions.
5. Reconnect the fiber-optic cable.
6. Unblock the port. Refer to Unblock a Port on page 3–42 for instructions.
7. Monitor port operation for approximately five minutes.

Did the link incident recur?

YES **NO**

↓ The Fibre Channel link and Director appear operational.
Exit MAP.

24

Inspect both SBAR assemblies at the rear of the Director. SBAR assembly LEDs can be inspected through the hexagonal cooling vents of the RFI shield.

Is the amber LED on an SBAR assembly illuminated but not blinking (beaconing)?

YES **NO**

↓ The Director appears operational. Go to step 26.

25

An SBAR assembly failed and must be removed and replaced. Refer to Redundant SBAR Assembly on page 4–20 for instructions.

- This procedure is concurrent and can be performed while Director power is on.
- Perform the data collection procedure as part of FRU removal and replacement.

Did SBAR assembly replacement solve the problem?

NO **YES**

↓ The Director appears operational. **Exit MAP.**

Contact the next level of support. **Exit MAP**.

26

Inspect and service the host bus adapters (HBAs), as necessary.

Did service of the HBAs solve the problem?

NO **YES**

↓ **Exit MAP.**

Contact the next level of support. **Exit MAP**.

27

The Director and attached device are performing a Fibre Channel link reset. This is a transient state. Wait approximately 30 seconds and inspect port state and LED behavior.

Did the link recover and resume operation?

NO **YES**

↓ The Fibre Channel link and Director appear operational. **Exit MAP.**

Go to step 1.

28

A link incident message appeared in the *Link Incident Log* or in the *Link Incident* field of the *Port Properties* dialog box.

Clear the link incident for the port.

1. At the *Port Card View,* right-click the port. A pop-up menu appears.
2. Select the *Clear Link Incident Alert(s)* option. The *Clear Link Incident Alert(s)* dialog box displays (Figure 2–14).

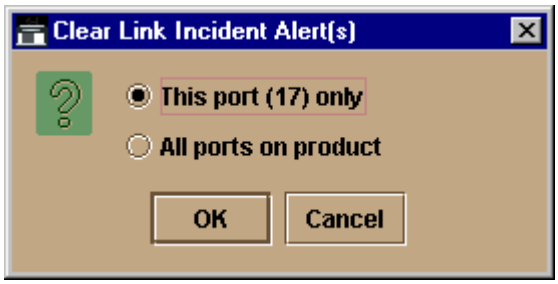


Figure 2–14: Clear Link Incident Alert(s)

3. Select the *This port (n) only* radio button (where *n* is the port number) and click *OK*. The link incident clears.
4. Monitor port operation for approximately five minutes.

Did the link incident recur?

YES **NO**

↓ The problem is transient and the Fibre Channel link and director appear operational. **Exit MAP.**

29

Inspect the fiber-optic jumper cable attached to the port and ensure the cable is not bent and connectors are not damaged. If the cable is bent or connectors are damaged:

1. Notify the customer the port will be blocked. Ensure the customer's system administrator quiesces Fibre Channel frame traffic through the port and sets the attached device offline.
2. Block the port (Block a Port on page 3–41).
3. Remove and replace the fiber-optic jumper cable.
4. Unblock the port (Unblock a Port on page 3–42).

Was a corrective action performed?

YES **NO**

↓ **Go to** step 31**.**

30

Monitor port operation for approximately five minutes.

Did the link incident recur?

YES **NO**

↓ The Fibre Channel link and director appear operational. **Exit MAP.**

31

Clean fiber-optic connectors on the jumper cable.

1. Notify the customer the port will be blocked. Ensure the customer's system administrator quiesces Fibre Channel frame traffic through the port and sets the attached device offline.
2. Block the port (Block a Port on page 3–41).
3. Disconnect both ends of the fiber-optic jumper cable.
4. Clean the fiber-optic connectors (Clean Fiber-Optic Components on page 3–35).
5. Reconnect the fiber-optic jumper cable.
6. Unblock the port (Unblock a Port on page 3–42).
7. Monitor port operation for approximately five minutes.

Did the link incident recur?

YES **NO**

↓ The Fibre Channel link and director appear operational. **Exit MAP.**

32

Disconnect the fiber-optic jumper cable from the director port and connect the cable to a spare port.

Is a link incident reported at the new port?

YES **NO**

↓ **Go to** step 34**.**

33

The attached device is causing the recurrent link incident. Notify the customer of the problem and have the system administrator:

1. Inspect and verify operation of the attached device.
2. Repair the attached device if a failure is indicated.
3. Monitor port operation for approximately five minutes.

Did the link incident recur?

YES **NO**

↓ The attached device, Fibre Channel link, and director appear operational. **Exit MAP.**

34

The director port reporting the problem is causing the recurrent link incident. The recurring link incident indicates port of FPM card degradation and a possible pending failure. **Go to step 5.**

35

An FPM card is not recognized by Director firmware because the firmware version is not supported or the FPM card failed. Advise the customer of the problem and determine the correct firmware version to download from the SDCM server.

Download the firmware. Refer to Download a Firmware Version to a Director on page 3–48 for instructions. Perform the data collection procedure after the download.

Continue to the next step.

36

Did the firmware download solve the problem?

NO **YES**

↓ The Director appears operational. **Exit MAP.**

An FPM card failure is indicated. Go to step 6.

37

Does the embedded web server interface appear operational?

NO **YES**

↓ Go to step 40.

38

A **Page cannot be found, Unable to locate the server, HTTP 404-file not found**, or other similar message appears. The message indicates the web browser PC cannot communicate with the Director because:

- The Director-to-PC Internet link could not be established.
- AC power distribution in the Director failed, or AC power was disconnected.
- Both of the Director's CTP cards failed.

Continue to the next step.

39

Ensure the Director reporting the problem is connected to facility AC power and the power switch (circuit breaker) at the rear of the Director is set to the **ON** (up) position. Inspect the Director for indications of being powered on, such as:

- At the front bezel, an illuminated power LED (green) or system error LED (amber).
- An illuminated green LED on the active CTP card.
- At least one green **PWR OK** LED illuminated on a power supply.
- Audio emanations and airflow from cooling fans.

Does the Director appear powered on?

YES **NO**

↓ Analysis for an Ethernet link, AC power distribution, or dual CTP card failure is not described in this MAP. Go to MAP 0000: Start MAP on page 2–2. If this is the second time at this step, contact the next level of support. **Exit MAP**.

40

Inspect FPM card operational states at the embedded web server interface.

1. At the View panel, click the FRU Properties tab. The View panel (FRU Properties tab) displays.
2. Inspect the Status fields for FPM cards. Scroll down the View panel as necessary.

Does the Status field display a **Failed** message for an FPM card?

NO **YES**

↓ An FPM card failure is indicated. Go to step 6.

41

Inspect Fibre Channel port operational states at the embedded web server interface.

1. At the View panel, click the Port Properties tab. The View panel (Port Properties tab) displays with port **0** highlighted in red.
2. Click the port number (**0** through **63**) for which a failure is suspected to display properties for that port.
3. Inspect the Operational State field. Scroll down the View panel as necessary.
4. Table 2–11 lists port operational states and associated MAP 0600 steps that describe fault isolation procedures.

Table 2–11: MAP 600: Port Operational States

Operational State	Action
Offline	Go to step 15.
Not Operational	Go to step 15.
Port Failure	Go to step 5.
Testing	Internal or external loopback test in process. **Exit MAP.**
Invalid Attachment	Go to step 17.
Link Reset	Go to step 27.
Not Installed	Go to step 42.

42

Install a pluggable SFF optical transceiver in the port receptacle. Refer to SFF Optical Transceiver on page 4–13 for instructions.

- This procedure is concurrent and can be performed while Director power is on.
- Verify location of the uninstalled port transceiver. Refer to the FPM card diagram below. The figure shows FPM card numbers (**0** through **15**) and port numbers (**00** through **63**).

FPM Cards										FPM Cards							
15	**14**	**13**	**12**	**11**	**10**	**9**	**8**	CTP - 1 Card	CTP - 0 Card	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**0**
63	59	55	51	47	43	39	35			31	27	23	19	15	11	07	03
62	58	54	50	46	42	38	34			30	26	22	18	14	10	06	02
61	57	53	49	45	41	37	33			29	25	21	17	13	09	05	01
60	56	52	48	44	40	36	32			28	24	20	16	12	08	04	00

- Perform an external loopback test for the port as part of FRU removal and replacement.

Exit MAP.

MAP 0700: Fabric, ISL, and Segmented Port Problem Determination

This MAP describes isolation of fabric logout, interswitch link (ISL), and E_Port segmentation problems. Failure indicators include:

- An event code recorded at the Director Event Log or the embedded web server event log.
- A segmentation reason associated with a Fibre Channel port at the embedded web server interface.
- A yellow triangle (attention indicator) appears over an FPM card graphic or at the alert panel of the Product View, Hardware View, or Port Card View.
- A link incident message recorded in the Link Incident Log or Port Properties dialog box.

1

Was an event code **010**, **011**, **020**, **021**, **050**, **051**, **052**, **060**, **061**, **062**, **063**, **070**, **071**, or **072** observed at the Director Event Log (SDCM server) or at the embedded web server event log?

YES **NO**

↓ Go to step 3.

2

Table 2–12 lists event codes, brief explanations of the codes, and associated steps that describe fault isolation procedures.

Table 2–12: MAP 700: Event Codes

Event Code	Explanation	Action
010	Login server unable to synchronize databases.	Go to step 7.
011	Login server database invalid.	Go to step 7.
020	Name server unable to synchronize databases.	Go to step 7.
021	Name server database invalid.	Go to step 7.
050	Management server unable to synchronize databases.	Go to step 8.
051	Management server database invalid.	Go to step 8.
052	Management server internal error.	Go to step 8.
060	Fabric controller unable to synchronize databases.	Go to step 9.
061	Fabric controller database invalid.	Go to step 9.
062	Maximum interswitch hop count exceeded.	Go to step 10.
063	Received link state record too large.	Go to step 11.
070	E_Port is segmented.	Go to step 12.
071	Director is isolated.	Go to step 12.
072	E_Port connected to unsupported switch.	Go to step 13.

3

Is fault isolation being performed at the SDCM server?

YES **NO**

↓ Fault isolation is being performed through the embedded web server interface. Go to step 22.

4

Does a yellow triangle (attention indicator) appear to overlay an FPM card graphic at the Hardware View or appear adjacent to a Fibre Channel port graphic at the Port Card View?

YES **NO**

↓ The problem is transient and the Director-to-fabric element connection appears operational. **Exit MAP.**

5

Inspect the port state and LED status for all ports with an attention indicator.

1. At the Port Card View, click the port graphic with the attention indicator. The Port Properties dialog box displays as shown on the following page.
2. Inspect the Operational State field at the Port Properties dialog box.

Does the Operational State field indicate **Segmented E_Port**?

YES **NO**

↓ Analysis for an FPM card failure or other link incident is not described in this MAP. Go to MAP 0600: FPM Card Failure and Link Incident Analysis on page 2–72. **Exit MAP.**

6

Inspect the Segmentation Reason field at the Port Properties dialog box. Table 2–13 lists port segmentation reasons and associated steps that describe fault isolation procedures.

Table 2–13: MAP 700: Segmentation Reasons

Segmentation Reason	Action
Incompatible operating parameters.	Go to step 14.
Duplicate domain IDs.	Go to step 15.
Incompatible zoning configurations.	Go to step 16.

Table 2–13: MAP 700: Segmentation Reasons

Segmentation Reason	Action
Build fabric protocol error.	Go to step 17.
No principal switch.	Go to step 19.
No response from attached switch.	Go to step 20.
ELP retransmission failure timeout.	Go to step 21.

7

A minor error occurred that caused fabric services databases to be reinitialized to an empty state. As a result, a disruptive fabric logout and login occurred for all attached devices. The following list explains the errors.

- **Event code 010**-following a CTP card reset, the login server attempted to acquire a fabric server database copy from the other CTP card and failed.
- **Event code 011**-following a CTP card failover, the login server database failed cyclic redundancy check (CRC) validation.
- **Event code 020**-following a CTP card reset, the name server attempted to acquire a fabric server database copy from the other CTP card and failed.
- **Event code 021**-following CTP card failover, the name server database CRC validation.

All attached devices resume operation after fabric login. Perform the data collection procedure and return the Zip disk to Compaq for analysis by third-level support personnel. **Exit MAP.**

8

A minor error occurred that caused management server databases to be reinitialized to an empty state. As a result, a disruptive server logout and login occurred for all attached devices. The following list explains the errors.

- **Event code 050-**following CTP card reset, the management server attempted to acquire a database copy from the other CTP card and failed.
- **Event code 051**-following CTP card failover, the management server database CRC validation.
- **Event code 052**-an internal operating error was detected by the management server subsystem.

All attached devices resume operation after management server login. Perform the data collection procedure and return the Zip disk to Compaq for analysis by third-level support personnel. **Exit MAP.**

9

A minor error occurred that caused fabric controller databases to be reinitialized to an empty state. As a result, the Director briefly lost interswitch link capability. The following list explains the errors.

- **Event code 060**-following CTP card reset, the fabric controller attempted to acquire a database copy from the other CTP card and failed.
- **Event code 061**-following CTP card failover, the fabric controller database failed CRC validation.

All interswitch links resume operation after CTP card reset or failover. Perform the data collection procedure and return the Zip disk to Compaq for analysis by third-level support personnel. **Exit MAP.**

10

As indicated by an event code **062**, the fabric controller software detected a path to another Director (or fabric element) in a multiswitch fabric that traverses more than three interswitch links (hops). Fibre Channel frames may persist in the fabric longer than timeout values allow.

Advise the customer of the problem and work with the system administrator to reconfigure the fabric so the path between any two fabric elements does not traverse more than three hops.

Did fabric reconfiguration solve the problem?

NO **YES**

↓ The Director and multiswitch fabric appear operational.
Exit MAP.

Contact the next level of support. **Exit MAP.**

11

As indicated by an event code **063**, the fabric controller software detected a fabric element (Director or switch) in a multiswitch fabric that has more than 32 ISLs attached. Fibre Channel frames may be lost or routed in loops because of potential fabric routing problems.

Advise the customer of the problem and work with the system administrator to reconfigure the fabric so that no Director or switch elements have more than 32 ISLs.

Did fabric reconfiguration solve the problem?

NO **YES**

↓ The Director and multiswitch fabric appear operational.
Exit MAP.

Contact the next level of support. **Exit MAP.**

12

A **070** event code indicates an E_Port detected an incompatibility with an attached Director and prevented the Directors from forming a multiswitch fabric. A segmented E_port cannot transmit Class 2 or Class 3 Fibre Channel traffic.

A **071** event code indicates the Director is isolated from all Directors in a multiswitch fabric, and is accompanied by a **070** event code for each segmented E_Port. The **071** event code is resolved when all **070** events are corrected.

Obtain supplementary event data for each **070** event code.

1. At the SDCM server's Hardware View, select Event Log from the Logs menu. The Event Log displays.
2. Examine the first five bytes (**0** through **4**) of event data.
3. Byte **0** specifies the Director port number (**00** through **63**) of the segmented E_port. Byte **4** specifies the segmentation reason as listed in Table 2–14.

Table 2–14: MAP 700: Byte 4, Segmentation Reasons

Byte 4	Segmentation Reason	Action
01	Incompatible operating parameters.	Go to step 14.
02	Duplicate domain IDs.	Go to step 15.
03	Incompatible zoning configurations.	Go to step 16.
04	Build fabric protocol error.	Go to step 17.
05	No principal switch.	Go to step 19.
06	No response from attached switch.	Go to step 20.
07	ELP retransmission failure timeout.	Go to step 21.

13

As indicated by an event code **072**, a Director E_Port is connected to an unsupported switch or fabric element.

Advise the customer of the problem and disconnect the interswitch link to the unsupported switch. **Exit MAP.**

14

A Director E_Port segmented because the error detect time out value (E_D_TOV) or resource allocation time-out value (R_A_TOV) is incompatible with the attached fabric element.

1. Contact Compaq customer support or engineering personnel to determine the recommended E_D_TOV and R_A_TOV values for both Directors.
2. Notify the customer both Directors will set offline. Ensure the system administrator quiesces Fibre Channel frame traffic through the Directors and sets attached devices offline.
3. Set both Directors offline. Refer to Set Offline State on page 3–40 for instructions.
4. At the Hardware View or Port Card View for the first Director reporting the problem, select Operating Parameters from the Configure menu. The Configure Operating Parameters dialog box displays.
5. Type the recommended E_D_TOV and R_A_TOV values, then click Activate.

6. Repeat steps 4 and 5 at the Hardware View or Port Card View for the Director attached to the segmented E_Port (second Director). Use the same E_D_TOV and R_A_TOV values.
7. Set both Directors online. Refer to Set Online State on page 3–39 for instructions.

Did the operating parameter change solve the problem and did both Directors join through the ISL to form a fabric?

NO **YES**

↓ The Directors, associated ISL, and multiswitch fabric appear operational. **Exit MAP.**

Contact the next level of support. **Exit MAP.**

15

A Director E_Port segmented because two fabric elements had duplicate domain IDs.

1. Work with the system administrator to determine the desired domain ID (**1** through **31** inclusive) for each Director.
2. Notify the customer both Directors will set offline. Ensure the system administrator quiesces Fibre Channel frame traffic through the Directors and sets attached devices offline.
3. Set both Directors offline. Refer to Set Offline State on page 3–40 for instructions.
4. At the Hardware View or Port Card View for the first Director reporting the problem, select the Operating Parameters option from the Configure menu. The Configure Operating Parameters dialog box displays.
5. Type the customer-determined preferred domain ID value, then click Activate.
6. Repeat steps 4 and 5 at the Hardware View or Port Card View for the Director attached to the segmented E_Port (second Director). Use a different preferred domain ID value.
7. Set both Directors online. Refer to Set Online State on page 3–39 for instructions.

Did the domain ID change solve the problem and did both Directors join through the ISL to form a fabric?

NO **YES**

↓ The Directors, associated ISL, and multiswitch fabric appear operational. **Exit MAP.**

Contact the next level of support. **Exit MAP.**

16

A Director E_Port segmented because two Directors had incompatible zoning configurations. An identical zone name is recognized in the active zone set for both Directors, but the zones contain different members.

1. Work with the system administrator to determine the desired zone name change for one of the affected Directors. Zone names must conform to the following rules:

- The name must be 64 characters or fewer in length.
- The first character must be a letter (**a** through **z**), upper or lower case.
- Other characters are alphanumeric (**a** through **z** or **0** through **9**), dollar sign (**$**), hyphen (**-**), caret (**^**), or underscore (_).

2. Close the Product Manager application (Hardware View). The Product View displays.
3. At the navigation control panel, select Fabric from the View menu. The Fabric View displays with pentagonal icons representing single-switch or multiswitch fabrics.
4. Click the fabric icon representing the Director for which the zone name change will be implemented. The Fabric Manager application opens and the Topology View displays.
5. At the navigation control panel, select Zoning from the View menu. The Zoning View displays with the active zone set.
6. Inspect zone names in the active zone set to determine the incompatible name.
7. Modify the incompatible zone name as directed by the customer:
   a. At the navigation control panel, select Zone Sets from the Configure menu. The Zone Sets dialog box displays.
   b. Select (highlight) the active zone set name, then select Modify from the Actions menu on the dialog box. The Modify Zone Set dialog box displays.
   c. Select (highlight) the zone name to be modified (and later deleted) at the Zone Library list, then select Copy Zone from the Actions icon on the dialog box. The Copy Zone dialog box displays.

d. Type the new zone name (specified by the customer) and click OK. The new zone name appears in the Zone Library list. The new zone contains the same members as the copied zone.

e. Select (highlight) the new zone name and drag (holding the left mouse button) the name to the Zones in Set list.

f. At the Zones in Set list, select the zone name to be deleted, then drag (holding the left mouse button) the name off the Modify Zone Set dialog box.

g. At the Modify Zone Set dialog box, click Save Zone Set. The zone set (with the new zone name) is saved and the dialog box closes.

h. At the Zone Sets dialog box, select the active zone set name, then select Activate from the Actions icon on the dialog box. The Activate Zone Set dialog box displays.

i. Click Start. The status message changes to **Activate zone set complete**. Click Close to close the dialog box.

j. Click Close to close the Zone Sets dialog box and return to the Zoning View with the modified active zone set.

Did the zone name change solve the problem and did both Directors join through the ISL to form a fabric?

NO **YES**

↓ The Directors, associated ISL, and multiswitch fabric appear operational. **Exit MAP.**

Contact the next level of support. **Exit MAP.**

17

A Director E_Port segmented because a build fabric protocol error was detected.

1. Disconnect the fiber-optic jumper cable from the segmented E_Port.
2. Reconnect the cable to the same port.

Did disconnecting and reconnecting the cable solve the problem and did both Directors join through the ISL to form a fabric?

NO **YES**

↓ The Directors, associated ISL, and multiswitch fabric appear operational. **Exit MAP.**

18

Initial program load (IPL) the Director. Refer to IPL the Director on page 3–37 for instructions.

Did the IPL solve the problem and did both Directors join through the ISL to form a fabric?

NO **YES**

↓ The Directors, associated ISL, and multiswitch fabric appear operational. **Exit MAP.**

Perform the data collection procedure and contact the next level of support. **Exit MAP.**

19

A Director E_Port segmented because no Director in the fabric is capable of becoming the principal switch.

1. Notify the customer the Director will set offline. Ensure the system administrator quiesces Fibre Channel frame traffic through the Director and sets attached devices offline.
2. Set the Director offline. Refer to Set Offline State on page 3–40 for instructions.
3. At the Hardware View or Port Card View for the Director, select Operating Parameters from the Configure menu. The Configure Operating Parameters dialog box displays.
4. At the *Switch Priority* field, select a switch priority (*Principal, Never Principal,* or *Default*). The switch priority value designates the fabric's principal switch. The principal switch is assigned a priority of 1 and controls the allocation and distribution of domain IDs for all fabric directors and switches (including itself).

   Principal is the highest priority setting, *Default* is the next highest, and *Never Principal* is the lowest priority setting. The setting *Never Principal* means that the switch is incapable of becoming a principal switch. If all switches are set to *Principal* or *Default,* the switch with the highest priority and the lowest WWN becomes the principal switch.

At least one switch in a multiswitch fabric must be set as *Principal* or *Default.* If all switches are set to *Never Principal,* all ISLs segment and the message *No Principal Switch* appears in the *Reason* field of the *Port Properties* dialog box.

After switch priority is selected, click Activate.

5. Set the Director online. Refer to Set Online State on page 3–39 for instructions.

Did the switch priority change solve the problem and did both Directors join through the ISL to form a fabric?

NO **YES**

↓ The Directors, associated ISL, and multiswitch fabric appear operational. **Exit MAP.**

Contact the next level of support. **Exit MAP.**

20

A Director E_Port segmented (at an operational Director) because a response to a verification check indicates an attached Director is not operational.

1. Perform the data collection procedure at the operational Director and return the Zip disk to Compaq for analysis by third-level support personnel.
2. Go to MAP 0000: Start MAP on page 2–2 and perform fault isolation for the failed Director.

Exit MAP.

21

A Director E_Port segmented because the Director was unable to receive a response (from an operational fabric element) to multiple exchange link protocol (ELP) frame transmissions, and unable to receive a fabric login (FLOGI) frame. The Director's inability to receive responses is caused by a hardware or link failure. Port segmentation occurs after five ELP transmissions, and prevents the failed Director from joining an operational Fibre Channel fabric.

The Director exhibits other failure symptoms and one or more other failure event codes are recorded in addition to the **070** event code (E_Port is segmented). Go to MAP 0000: Start MAP on page 2–2 and perform fault isolation for the failed Director.

Exit MAP.

22

Does the embedded web server interface appear operational?

YES **NO**

↓ Analysis for an Ethernet link, AC power distribution, or CTP card failure is not described in this MAP. Go to MAP 0000: Start MAP on page 2–2. If this is the second time at this step, contact the next level of support. **Exit MAP**.

23

Inspect the Fibre Channel port segmentation reason at the embedded web server interface.

1. At the View panel, click the Port Properties tab. The View panel (Port Properties tab) displays.
2. Click the port number (**0** through **63**) of the segmented port.
3. Inspect the Segmentation Reason field for the selected port.

Is the Segmentation Reason field blank or does it display an **N/A** message?

NO **YES**

↓ The Director ISL appears operational. **Exit MAP**.

The Segmentation Reason field displays a message. Table 2–15 lists segmentation reasons and associated steps that describe fault isolation procedures.

Table 2–15: MAP 700: Segmentation Reason

Segmentation Reason	Action
Incompatible operating parameters.	Go to step 14.
Duplicate domain IDs.	Go to step 15.
Incompatible zoning configurations.	Go to step 16.
Build fabric protocol error.	Go to step 17.
No principal switch.	Go to step 19.
No response from attached switch.	Go to step 20.
ELP retransmission failure timeout.	Go to step 21.

MAP 0800: Console PC Problem Determination

This MAP describes isolation of hardware-related problems with the SDCM server platform. Although this MAP provides high-level fault isolation instructions, refer to the documentation provided with the PC for detailed problem determination and resolution.

1

At the SDCM server, close the SDCM application.

1. At the navigation control panel of the Product View, select Exit from the Logout/Exit icon. The SDCM application closes.
2. Close any other applications that are running.

Continue to the next step.

2

Inspect the available random access memory (RAM). The computer must have a minimum of 128 megabytes (MB) of memory to run the Windows NT operating system and SDCM Manager application.

1. Right-click anywhere in the Windows NT task bar at the bottom of the desktop. A menu appears.
2. Select Task Manager. The Windows NT Task Manager dialog box displays with the Applications page open. Click Performance to open the Performance page.
3. At the Physical Memory (K) portion of the dialog box, inspect the total amount of physical memory.
4. Close the dialog box by clicking Close at the upper right corner of the window.

Does the computer have sufficient memory?

YES **NO**

↓ A memory upgrade is required. Inform the customer of the problem and contact the next level of support. **Exit MAP.**

3

Reboot the SDCM server PC and perform system diagnostics.

1. Click the Windows Start button. The Windows NT Workstation menu displays.
2. At the Windows NT Workstation menu, select Shut Down. The Shut Down Windows dialog box appears.
3. At the Shut Down Windows dialog box, select Shut Down The Computer and click Yes to power off the PC.
4. Wait approximately 30 seconds and power on the PC. After POSTs complete, the Begin Logon dialog box displays.
5. Simultaneously press the **Ctrl**, **Alt**, + **Delete** keys to display the Logon Information dialog box. Type a user name and password (obtained in MAP 0000: Start MAP on page 2–2) and click **OK**. The Windows NT desktop displays.

Did POSTs detect a problem?

NO **YES**

↓ A computer hardware problem exists. Refer to the supporting documentation shipped with the PC for instructions on resolving the problem. **Exit MAP.**

4

After rebooting the PC, the Compaq Management Services (CMS) and SDCM applications start and the SDCM Login dialog box displays.

Did the SDCM Manager Login dialog box display?

YES **NO**

↓ Go to step 6.

5

At the SDCM Login dialog box, type a user name, password, and SDCM server name (obtained in MAP 0000: Start MAP on page 2–2, and all are case sensitive), and click Login. The application opens and the Product View displays.

Did the Product View display and does the SDCM application appear operational?

NO **YES**

↓ The PC appears operational. **Exit MAP.**

6

Perform one of the following:

- If the PC has standalone diagnostic test programs resident on the hard drive, perform the diagnostics. Refer to supporting documentation shipped with the PC for instructions.
- If the PC does not have standalone diagnostic test programs resident on fixed disk, go to step 7.

Did diagnostic test programs detect a problem?

NO **YES**

↓ Refer to the supporting documentation shipped with the PC for instructions to resolve the problem. **Exit MAP.**

7

Reboot the SDCM server PC.

1. Click the Windows Start button. The Windows NT Workstation menu displays.
2. At the Windows NT Workstation menu, select Shut Down. The Shut Down Windows dialog box appears.
3. At the Shut Down Windows dialog box, select the Shut Down The Computer option and click Yes to power off the PC.
4. Wait approximately 30 seconds and power on the PC. After POSTs complete, the Begin Logon dialog box displays.
5. Simultaneously press the **Ctrl**, **Alt**, + **Delete** keys to display the Logon Information dialog box. Type a user name and password (obtained in MAP 0000: Start MAP on page 2–2) and click OK. The CMS and SDCM applications start and the SDCM Login dialog box displays.
6. At the SDCM Login dialog box, type a user name, password, and SDCM server name (obtained in MAP 0000: Start MAP on page 2–2, and all are case sensitive), and click Login. The application opens and the Product View displays.

Did the Product View display and does the SDCM application appear operational?

NO **YES**

↓ The PC appears operational. **Exit MAP.**

8

Re-install the SDCM application. Perform the procedures under Install or Upgrade Software on page 3–54.

Did the SDCM application install and open successfully?

NO **YES**

↓ The PC appears operational. **Exit MAP.**

9

Advise the customer and next level of support that the PC hard drive should be formatted. If the customer and support personnel do not concur, go to step 10**.**

1. Format the PC hard drive. Refer to supporting documentation shipped with the PC for instructions.
2. Install the Windows NT operating system and SDCM application.

Did the PC hard drive format, and did the operating system and SDCM application install and open successfully?

NO **YES**

↓ The PC appears operational. **Exit MAP.**

10

Additional analysis for the failure is not described in this MAP. Contact the next level of support. **Exit MAP.**

Chapter 3

Repair Information

This chapter describes repair and repair-related procedures used by service representatives for the SD-64 Director and associated field-replaceable units (FRUs). The following procedures are described:

- Obtaining log information at the SANworks Director Connectivity Manager (SDCM) server.
- Displaying and use SDCM server views.
- Obtaining and interpreting port diagnostic and performance data, and performing port diagnostic loopback tests.
- Collecting maintenance data.
- Cleaning fiber-optic components.
- Powering the Director on and off.
- Performing a Director initial program load (IPL).
- Setting the Director online or offline.
- Blocking or unblocking Fibre Channel ports.
- Managing firmware versions.
- Managing configuration data.
- Installing or upgrading software.

Do not perform repairs until a failure is isolated to a FRU. If fault isolation was not performed, refer to MAP 0000: Start MAP on page 2–2.

Procedural Notes

The following procedural notes are referenced in applicable repair procedures. The notes do not necessarily apply to all procedures in the chapter.

1. Before performing a repair procedure, read the procedure carefully and thoroughly to familiarize yourself with the information and reduce the possibility of problems or customer down time.
2. When performing procedures described in this chapter, follow all electrostatic discharge (ESD) procedures, **WARNING** and **CAUTION** statements, and statements listed in the preface of this manual.
3. After completing steps of a detailed procedure that is referenced from another procedure, return to the initial (referencing) procedure and continue to the next step of that procedure.
4. After completing a FRU replacement procedure, extinguish the amber system error light-emitting diode (LED) on the bezel at the top front of the Director.

Using Log Information

The SDCM, Product Manager, and Fabric Manager applications provide access to eight logs that provide information for administration, operation, and maintenance personnel. Each log stores up to 1,000 entries. The most recent entry appears at the top of a log. If a log is full, a new entry overwrites the oldest entry.

Four logs are accessed through the SDCM or Fabric Manager applications (Product View, Fabric View, Session View, Topology View, or Zoning View):

- SDCM Audit Log.
- SDCM Event Log.
- Session Log.
- Product Status Log.

Four logs are accessed through the Product Manager application (Hardware View, Port Card View, Port List View, FRU list View, Node List View, or Performance View):

- SD-64 Director Audit Log.
- SD-64 Director Event Log.
- Hardware Log.
- Link Incident Log.

SDCM Audit Log

The SDCM Audit Log displays a history of user actions performed through the SDCM application. This information is useful for system administrators and users. To open the SDCM Audit Log from the Product View, Fabric View, or Session View, select Audit Log from the Logs menu.

For a description of the SDCM Audit Log and an explanation of button functions at the bottom of the log window, refer to the *SANworks by Compaq SAN Director 64 Product Manager User Guide* (AA-RPL9B-TE).

SDCM Event Log

The SDCM Event Log (Figure 3–1) displays events or error conditions recorded by the SDCM Management Services application. Entries reflect the status of the application and managed Directors.

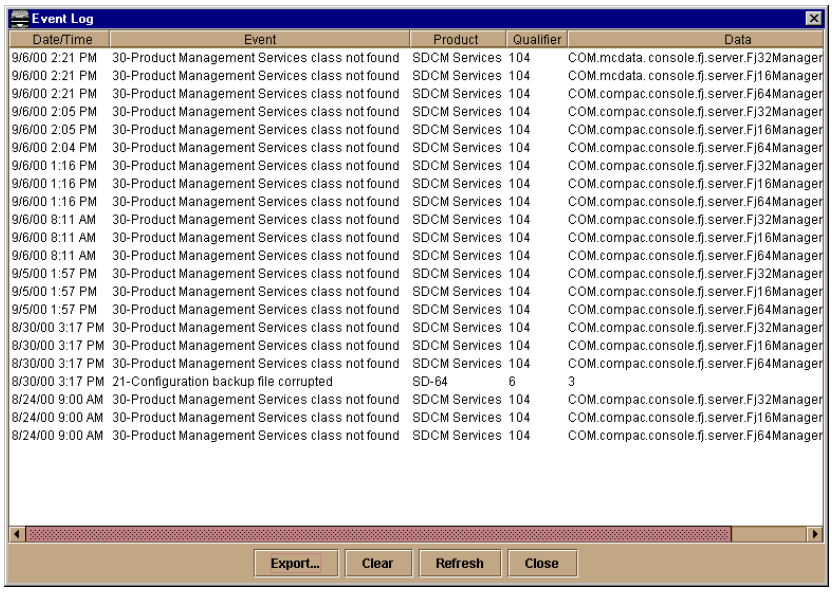


Figure 3–1: SDCM Event Log

Information is generally intended for use by third-level support personnel to fault isolate more significant problems.

To open the SDCM Event Log from the Product View, Fabric View, Session View, Topology View, or Zoning View, select Event Log from the Logs menu. The log contains the following columns:

- **Date/Time**-the date and time the event was reported to the SDCM server.
- **Event**-an event number and brief description of the event. Include both the event number and description when reporting an event to third-level customer support.
- **Product**-the product associated with the event. Some events are associated with the SDCM Management Services application, while others are associated with a specific instance of the Product Manager application. In the latter case, the product (SD-64 Director) and configured name (or internet protocol (IP) address) associated with the instance are displayed.
- **Qualifier**-this column provides an event qualifier for use by engineering personnel. Include this number when reporting an event to third-level customer support.
- **Data**-additional event data for fault isolating a problem. Include the information when reporting an event to third-level customer support.

Session Log

The Session Log displays session (login and logout) history for the SDCM server, including the date and time, user name, and network address of each session. This information is useful for system administrators and users. To open the Session Log from the Product View, Fabric View, Session View, Topology View, or Zoning View, select Session Log from the Logs menu.

For a description of the Session Log and an explanation of button functions at the bottom of the log window, refer to the *SANworks by Compaq SAN Director 64 Product Manager User Guide* (AA-RPL9B-TE).

Product Status Log

The Product Status Log (Figure 3–2 on page 3–5) records an entry when the status of a Director changes. The log reflects the previous status and current status of the Director, and indicates the instance of a Product Manager application that should be opened to investigate a problem. The information is useful to maintenance personnel for fault isolation and repair verification.

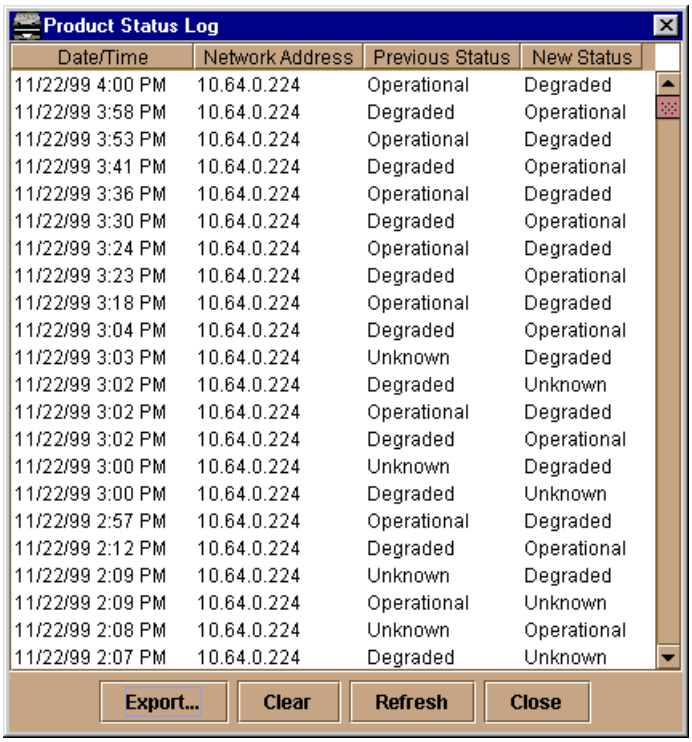


Figure 3–2: Product Status Log

To open the Product Status Log from the Product View, Fabric View, Session View, Topology View, or Zoning View, select Product Status Log from the Logs menu. The log contains the following columns:

- **Date/Time**-the date and time the Director status change occurred.
- **Network Address**-the IP address or configured name of the Director. This address or name corresponds to the address or name displayed under the Director icon at the Product View.
- **Previous Status**-the status of the Director prior to the reported status change (Operational, Degraded, Failed, or Unknown). An Unknown status indicates the SDCM application cannot communicate with the Director.
- **New Status**-the status of the Director after the reported status change (Operational, Degraded, Failed, or Unknown).

SD-64 Director Audit Log

The SD-64 Director Audit Log displays a history of all configuration changes made to a Director from the Product Manager application, a simple network management protocol (SNMP) management workstation open systems host, or the maintenance port. This information is useful for administrators and users. To open the SD-64 Director Audit Log from the Hardware View, Port Card View, Port List View, FRU list View, Node List View, or Performance View, select Audit Log from the Logs menu.

For a description of the SD-64 Director Audit Log and an explanation of button functions at the bottom of the log window, refer to the *SANworks by Compaq SAN Director 64 Product Manager User Guide* (AA-RPL9B-TE).

SD-64 Director Event Log

The SD-64 Director Event Log (Figure 3–3) displays a history of events for the Director, such as system events, degraded operation, FRU failures, FRU removals and replacements, port problems, Fibre Channel link incidents, and SDCM server-to-Director communication problems. All detected software and hardware failures are recorded in the SD-64 Director Event Log. The information is useful to maintenance personnel for fault isolation and repair verification.

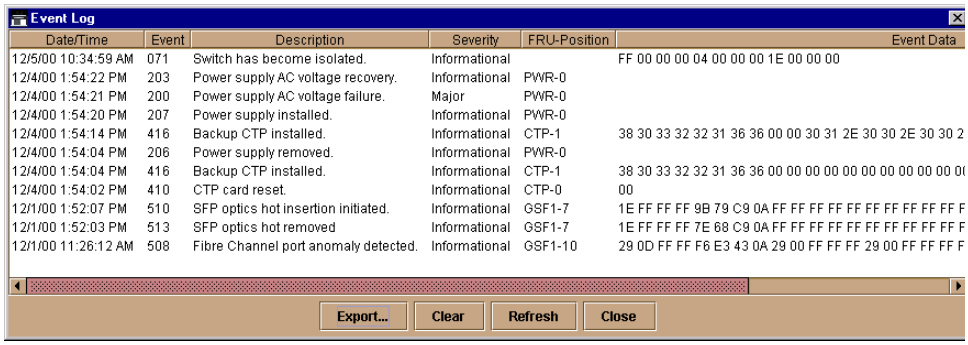


Figure 3–3: SD-64 Director Event Log

To open the SD-64 Director Event Log from the Hardware View, Port Card View, Port List View, FRU list View, Node List View, or Performance View, select Event Log from the Logs menu. The log contains the following columns:

- **Date/Time**-the date and time the Director event occurred.
- **Event**-the three-digit event code associated with the event. Refer to Appendix B, Event Code Tables for an explanation of event codes.

- **Description**-a brief description of the event.
- **Severity**-the severity of the event (Informational, Minor, Major, or Severe).
- **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** inclusive.
- **Event Data**-up to 32 bytes of supplementary event data (if available for the event) in hexadecimal format. Refer to Appendix B, Event Code Tables for an explanation of the supplementary event data.

Refresh the SD-64 Director Event Log

To ensure recently-created events appear in the SD-64 Director Event Log, periodically refresh the log display. This is particularly important when inspecting the log for informational event codes to verify a repair procedure. To refresh the log, click Refresh at the bottom of the log window.

Clear the SD-64 Director Event Log

To ensure the SD-64 Director Event Log is up-to-date and not filled with archived events, periodically clear the log display. To clear the log, click Clear at the bottom of the log window.

Hardware Log

The Hardware Log (Figure 3–4 on page 3–8) displays a history of FRU removals and replacements (insertions) for the Director. The information is useful to maintenance personnel for fault isolation and repair verification.

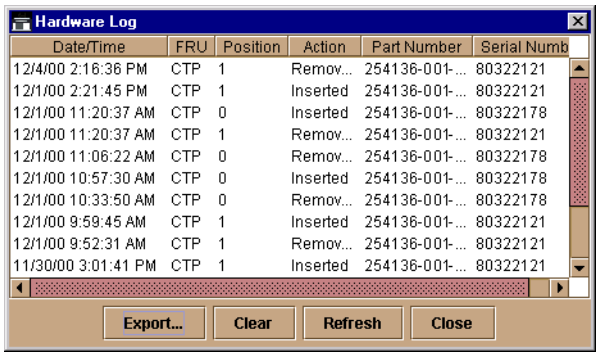


Figure 3–4: Hardware Log

To open the Hardware Log from the Hardware View, Port Card View, Port List View, FRU List View, Node List View, or Performance View, select Hardware Log from the Logs menu. The log contains the following columns:

- **Date/Time**-the date and time the FRU was inserted or removed.
- **FRU**-an acronym representing the FRU type. FRU acronyms are:
  - **BKPLNE**-backplane.
  - **CTP-**CTP card.
  - **SBAR**-SBAR card.
  - **FPM**-FPM card.
  - **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.
- **Action**-the action performed (Inserted or Removed).
- **Part Number-**the part number of the inserted or removed FRU.
- **Serial Number-**the serial number of the inserted or removed FRU.

Link Incident Log

The Link Incident Log (Figure 3–5) displays a history of Fibre Channel link incidents (with associated port numbers) for the Director. The information is useful to maintenance personnel for isolating port problems (particularly expansion port (E_Port) segmentation problems) and repair verification.

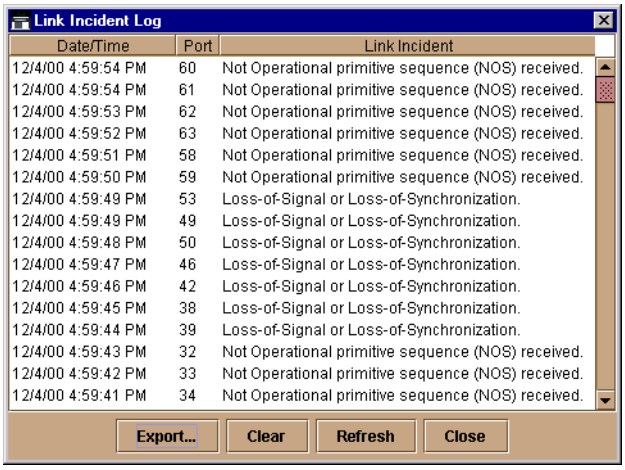


Figure 3–5: Link Incident Log

To open the Link Incident Log from the Hardware View, Port Card View, Port List View, FRU list View, Node List View, or Performance View, select Link Incident Log from the Logs menu. The log contains the following columns:

- **Date/Time**-the date and time the link incident occurred.
- **Port-**the port number (**0** through **63** inclusive) that reported the link incident.
- **Link Incident-**a brief description of the link incident. Problem descriptions include:
  - Implicit incident.
  - Bit-error threshold exceeded.
  - Link failure-loss-of-signal or loss-of-synchronization.
  - Link failure-not-operational primitive sequence received.
  - Link failure-primitive sequence timeout.
  - Link failure-invalid primitive sequence received for current link state.

Refer to MAP 0600: FPM Card Failure and Link Incident Analysis on page 2–72 or MAP 0700: Fabric, ISL, and Segmented Port Problem Determination on page 2–90 for corrective actions in response to these link incident messages.

Refresh the Link Incident Log

To ensure recently-created link incidents appear in the Link Incident Log, periodically refresh the log display. To refresh the log, click Refresh at the bottom of the log window.

Clear the Link Incident Log

To ensure the Link Incident Log is up-to-date and not filled with archived incidents, periodically clear the log display. To clear the log, click Clear at the bottom of the log window.

Threshold Alert Log

The *Threshold Alert Log* (Figure 3–6) provides details of the 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 Alert(s)* option under the *Configure* menu.

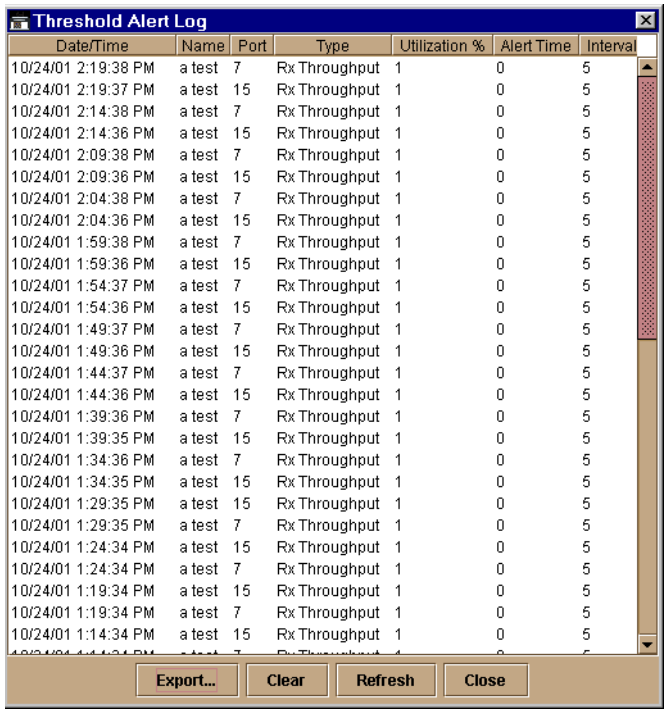


Figure 3–6: Threshold Alert Log

- **Date/Time** - the date and time stamp for when the alert occurred.
- **Name** - the name for the alert as configured through the *Configure Threshold Alerts* dialog box.
- **Port** - the port number where the alert occurred.
- **Type** - the type of alert: transmit (Tx) or receive (Rx).
- **Utilization %** - the 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.

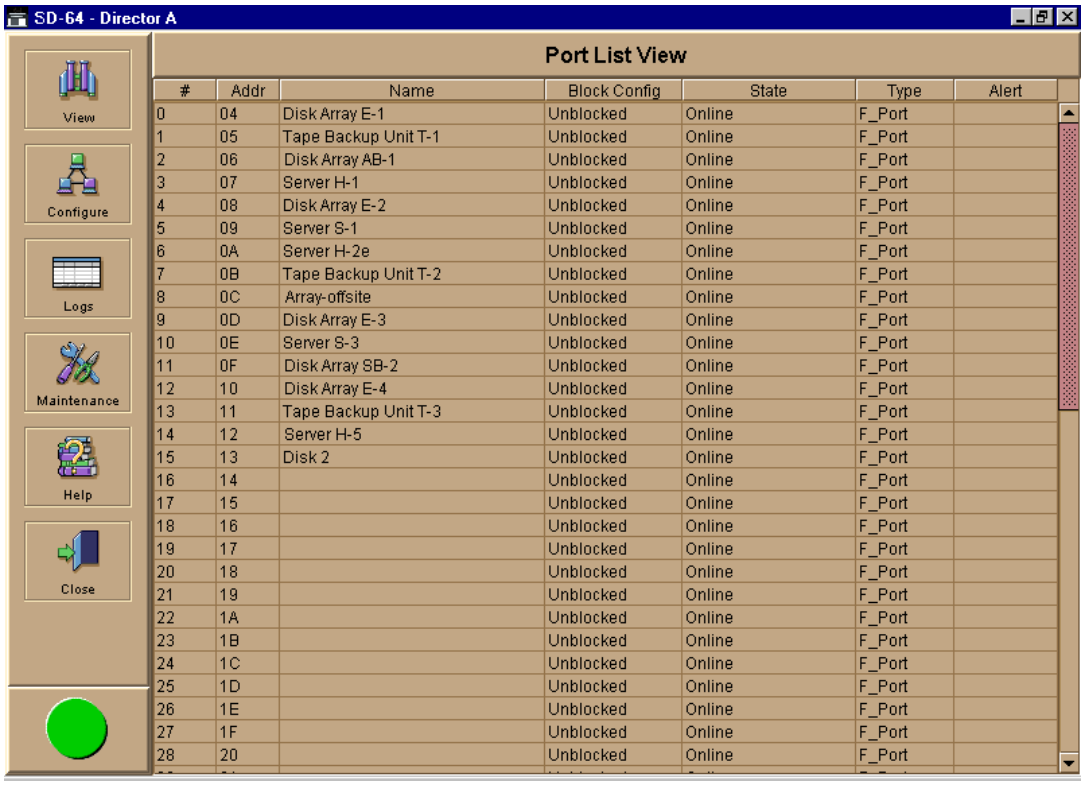
Using Views

In addition to the Hardware View and Topology View, the Product Manager and Fabric Manager applications provide access to a series of views (windows) that provide information for administrators, users, and maintenance personnel. These views are accessed through the Hardware View or Topology View, and include the:

- Port List View.
- FRU List View.
- Node List View.
- Performance View.
- Zoning View.

Port List View

The Port List View (Figure 3–7 on page 3–13) provides status information for all Director ports. The information is useful to maintenance personnel for isolating port problems. To open the Port List View from the Hardware View, select Port List from the View icon on the navigation control panel.



Port List View

#	Addr	Name	Block Config	State	Type	Alert
0	04	Disk Array E-1	Unblocked	Online	F_Port	
1	05	Tape Backup Unit T-1	Unblocked	Online	F_Port	
2	06	Disk Array AB-1	Unblocked	Online	F_Port	
3	07	Server H-1	Unblocked	Online	F_Port	
4	08	Disk Array E-2	Unblocked	Online	F_Port	
5	09	Server S-1	Unblocked	Online	F_Port	
6	0A	Server H-2e	Unblocked	Online	F_Port	
7	0B	Tape Backup Unit T-2	Unblocked	Online	F_Port	
8	0C	Array-offsite	Unblocked	Online	F_Port	
9	0D	Disk Array E-3	Unblocked	Online	F_Port	
10	0E	Server S-3	Unblocked	Online	F_Port	
11	0F	Disk Array SB-2	Unblocked	Online	F_Port	
12	10	Disk Array E-4	Unblocked	Online	F_Port	
13	11	Tape Backup Unit T-3	Unblocked	Online	F_Port	
14	12	Server H-5	Unblocked	Online	F_Port	
15	13	Disk 2	Unblocked	Online	F_Port	
16	14		Unblocked	Online	F_Port	
17	15		Unblocked	Online	F_Port	
18	16		Unblocked	Online	F_Port	
19	17		Unblocked	Online	F_Port	
20	18		Unblocked	Online	F_Port	
21	19		Unblocked	Online	F_Port	
22	1A		Unblocked	Online	F_Port	
23	1B		Unblocked	Online	F_Port	
24	1C		Unblocked	Online	F_Port	
25	1D		Unblocked	Online	F_Port	
26	1E		Unblocked	Online	F_Port	
27	1F		Unblocked	Online	F_Port	
28	20		Unblocked	Online	F_Port	

Figure 3–7: Port List View

The Port List View provides status information in the following columns:

- **#**-the Director port number (**0** through **63** inclusive).
- **Name**-the port name configured through the Configure Ports dialog box.
- **Block Config**-the port status (Blocked or Unblocked).
- **State**-the operating state of the port. Valid states are:
  - Online, offline, or testing.
  - Beaconing.
  - Invalid attachment.
  - Link incident or link reset.
  - No light, not operational, or port failure.
  - Segmented E_Port.

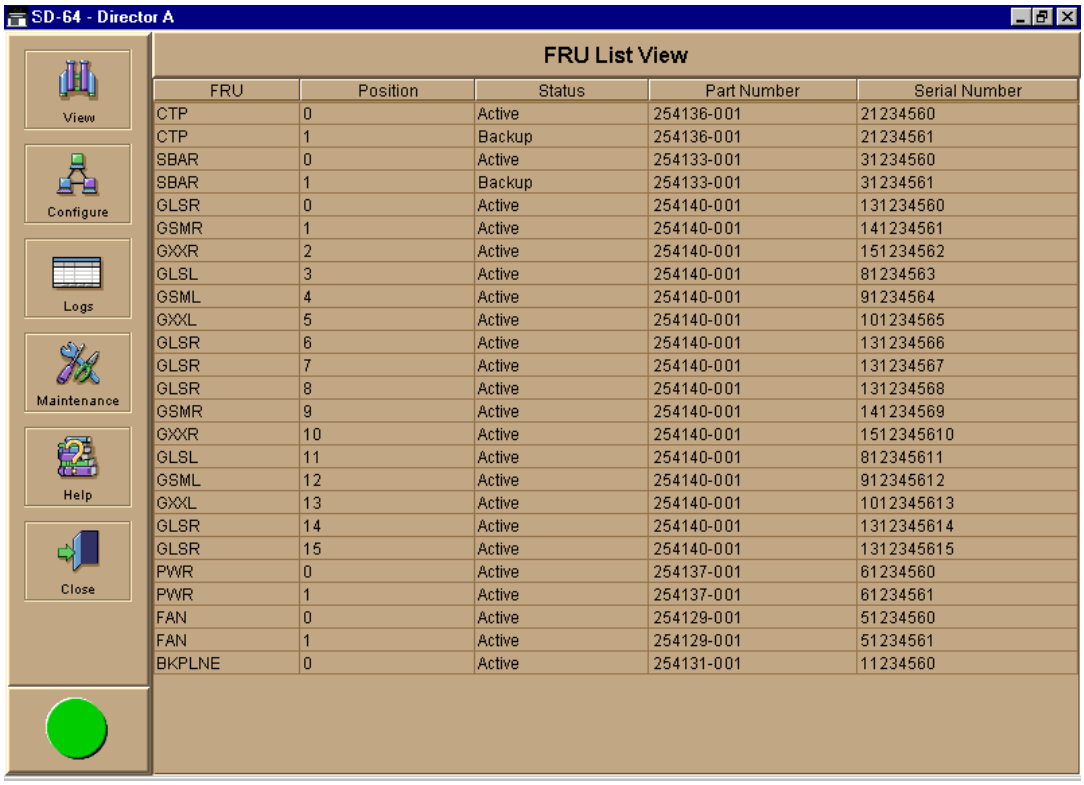
- **Type**-The type of port. Valid port types are a generic port (G_Port) not connected to a Fibre Channel device, Director, or switch (therefore light is not transmitted); a fabric port (F_Port) connected to a device; or an expansion port (E_Port) connected to a Director or switch to form an interswitch link (ISL).
- **Alert-**If Link Incident (LIN) alerts are configured for the port through the Configure Ports dialog box, a yellow triangle appears in the column when a link incident occurs. A yellow triangle also appears if beaconing is enabled for the port. A red and yellow diamond appears if the port fails.

Click anywhere in a row for an installed port to open the Port Properties dialog box. Right-click anywhere in a row for an installed port to open a menu to:

- Open the Port Properties, Node Properties, or Port Technology dialog boxes.
- Block or unblock the port.
- Enable or disable port beaconing.
- Perform port diagnostics.
- Clear link incident alerts.
- Reset the port.

FRU List View

The FRU List View (Figure 3–8 on page 3–15) displays a list of all Director FRUs. The information is useful to maintenance personnel for fault isolation and repair verification.



FRU List View

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 3–8: FRU List View

To open the FRU List View from the Hardware View, select FRU List from the View menu. The FRU List View contains the following columns:

- **FRU**-an acronym representing the FRU type. FRU acronyms are:
  - **BKPLNE**-backplane.
  - **CTP-**CTP card.
  - **SBAR**-SBAR card.
  - **FPM**-FPM card.
  - **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

The Node List View (Figure 3–9 on page 3–17) displays information about all devices attached to the Director through node ports (N_Ports). The information is useful to maintenance personnel for fault isolation and repair verification.

To open the Node List View, select Node List from the View menu. The Node List View contains the following columns:

- **Port #**-the Director port number (**0** through **63** inclusive). Only ports attached to a device are displayed.
- **Node Type**-the type of attached device. This information is supplied by the device (if supported). Node types include:
  - Unknown or other.
  - Hub, switch, gateway, or converter.
  - Host or host bus adapter (HBA).
  - Proxy agent.
  - Storage device or storage subsystem.
  - Module.
  - Software driver.

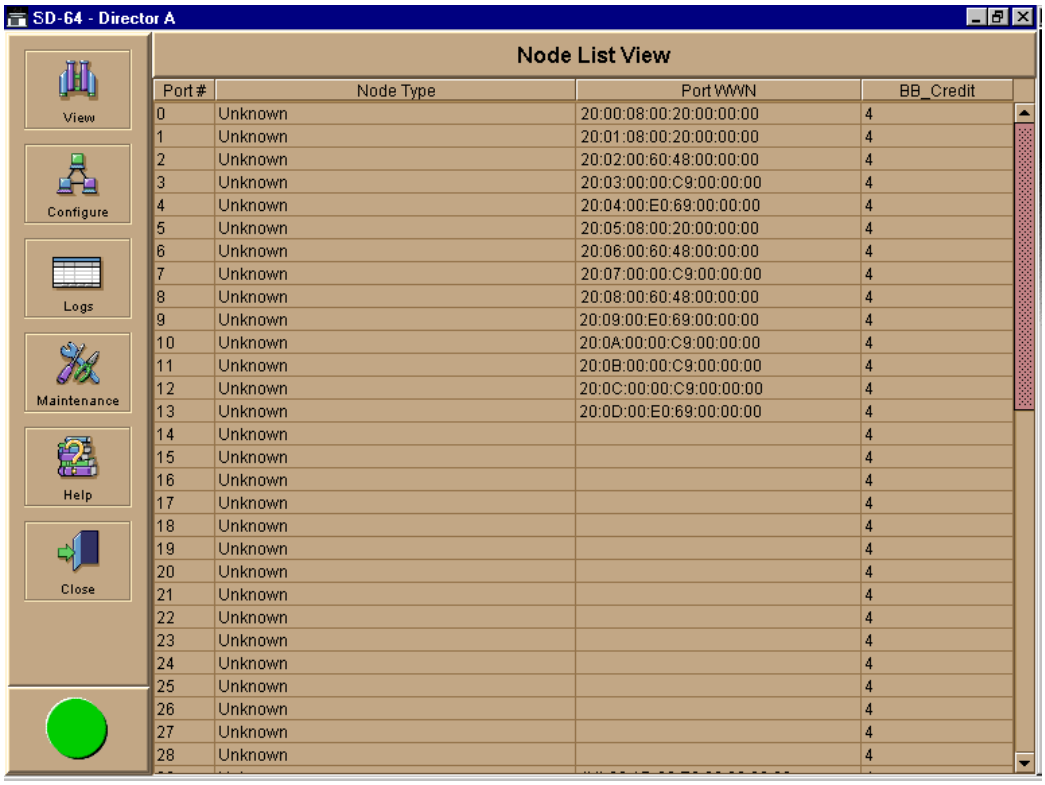


Figure 3–9: Node List View

- **Port WWN**-the 8-byte (16-digit) world-wide name (WWN) assigned to the port or Fibre Channel interface installed on the attached device.
  - ❏ If a nickname is not assigned to the WWN, the WWN is prefixed by the device manufacturer's name.
  - ❏ If a nickname is assigned to the WWN, the nickname appears in place of the WWN.
- **BB_Credit**-the buffer-to-buffer credit (BB_Credit) value assigned to a port attached to a device. The value (normally **1** through **16** inclusive) determines the frame buffers available for the port. Ports configured for extended distance operation are assigned a BB_Credit value of **60**.

Performance View

The Performance View displays statistical information about the performance of ports. The information is useful to maintenance personnel for fault isolating port problems. For information about the Performance View, refer to Performing Port Diagnostics on page 3–19.

Zoning View

The Zoning View (Figure 3–10) displays an expanded (or collapsed) list of the active zone set, including all zones and zone members. The active zone set name appears at the top of the list, followed by zone names, followed by zone members for each zone name. The table at the top of the view indicates if the default zone is enabled or disabled.

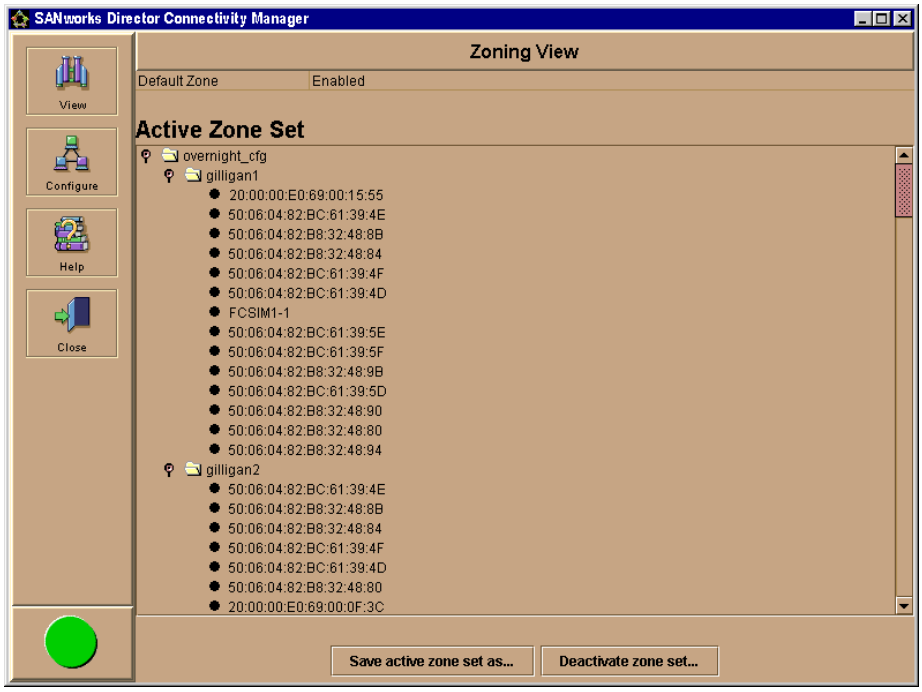


Figure 3–10: Zoning View

Zone members appear as:

- The unique 16-digit WWN identifying the device attached to the port. If a nickname is configured, the nickname appears instead. For example:

  10:00:0206:77:43:B0:1C

- A unique domain ID (**1** through **31** inclusive) and port number (**0** through **63** inclusive). For example:

  Domain 1, Port 7

The information is also useful to maintenance personnel for fault isolating E_Port segmentation problems caused by incompatible zone sets. When forming a multiswitch fabric by connecting Directors with active zone sets, zone names within the active zone sets should not be duplicated. Zone names can be duplicated only if the member WWNs of each zone are identical. If two Directors have a zone name conflict (duplicate zone names exist), the zone sets cannot merge, the connecting E_Port at each Director segments to prevent the creation of an ISL, and the Directors do not form a multiswitch fabric.

To open the Zoning View from the Topology View, select the Zoning option from the View icon on the navigation control panel.

For a description of how to expand or collapse the active zone set list, and an explanation of button functions at the bottom of the Zoning View, refer to the *SANworks by Compaq SAN Director 64 Product Manager User Guide* (AA-RPL9B-TE).

Performing Port Diagnostics

Port and FPM card diagnostics are performed at the Director or SDCM server (Product Manager application). These diagnostics include:

- Inspecting port and FPM card LEDs at the Director.
- Obtaining port degradation or failure information at the Product Manager application's Port Card View.
- Obtaining statistical performance information for ports at the Product Manager application's Performance View.
- Performing internal or external port loopback tests.

FPM card LEDs

To obtain port or FPM card operational information, inspect the FPM card LEDs. The card faceplate contains:

- An amber LED (at the top of the card) that illuminates if any port fails or blinks if FRU beaconing is enabled.
- A bank of amber and green LEDs above the ports. One amber LED and one green LED are associated with each port and indicate port status as follows:
  - The green LED illuminates (or blinks if there is active traffic) and the amber LED extinguishes to indicate normal port operation.
  - The amber LED illuminates and the green LED extinguishes to indicate a port failure.
  - Both LEDs extinguish to indicate a port is operational but not communicating with an N_Port (no cable attached, loss of light, port blocked, or link recovery in process).
  - The amber LED flashes and the green LED either remains on, extinguishes, or flashes to indicate a port is beaconing or running online diagnostics.

Port Card View

The Port Card View (Figure 3–11 on page 3–21) shows a representation and associated information about a specified Director FPM card. The information is useful to maintenance personnel for fault isolation and repair verification of FPM card degradation, FPM card failures, link incidents, and E_Port segmentation problems.

To open an instance of the Port Card View, click the desired FPM card graphic on the front view of the Director.

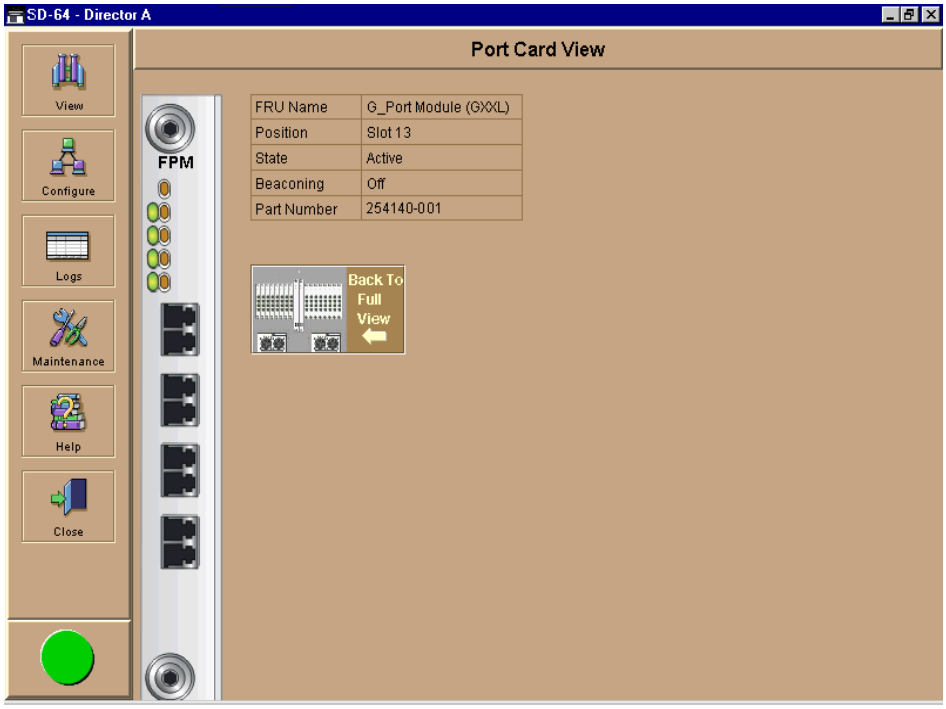


Figure 3–11: Port Card View

The status of the selected FPM card and operational states for all ports are visible on the Port Card View. These port operational states are defined in Table 3–1 on page 3–22.

Table 3–1: Port Operational States

Port State	Green LED	Amber LED	Alert Symbol	Description
Online	On	Off	None	An attached device is connected to the Director and ready to communicate, or is communicating with other attached devices. If the port remains online, the green port LED remains illuminated. At the Director FPM card, the green LED blinks when there is Fibre Channel traffic through the port.
Offline	Off	Off	None	The Director port is blocked and transmitting the offline sequence (OLS) to the attached device.
	Off	Off	Yellow Triangle	The Director port is unblocked and receiving the OLS, indicating the attached device is offline.
Beaconing	Off or On	Blinking	Yellow Triangle	The port is beaconing. The amber port LED blinks once every two seconds to enable users to locate the port.
Invalid Attachment	On	Off	Yellow Triangle	The Director port has an invalid attachment state if: (1) a loopback plug is connected to the port with no diagnostic test running, or (2) the port is cabled to another port on the same Director, or (3) the port connection conflicts with the configured port type.
Link Incident	Off	Off	Yellow Triangle	A link incident occurred on the port. The alert symbol appears at the *Port Card View*, *Port List View*, and *Hardware View*.
Link Reset	Off	Off	Yellow Triangle	The Director and attached device are performing a link reset operation to recover the link connection. This is a transient state that should not persist.

Table 3–1: Port Operational States (Continued)

Port State	Green LED	Amber LED	Alert Symbol	Description
No Light	Off	Off	None	No signal (light) is received by the Director port. This is a normal condition when there is no cable attached to the port or when the attached device is powered off.
Not Operational	Off	Off	Yellow Triangle	The Director port is receiving the not operational sequence (NOS) from an attached device.
Port Failure	Off	On	Red and Yellow Blinking Diamond	The Director port failed and requires service.
Segmented E_Port	On	Off	Yellow Triangle	The E_Port is segmented, preventing two connected Directors from joining and forming a multiswitch fabric.
Testing	Off On	Blinking Blinking	Yellow Triangle Yellow Triangle	The port is performing an internal loopback test. The port is performing an external loopback test.

Right-click the faceplate of the FPM card (away from a port connector) to access a menu to:

- Block all ports. Refer to Block an FPM Card on page 3–41 for information.
- Unblock all ports. Refer to Unblock an FPM Card on page 3–43 for information.
- Perform port diagnostics. Refer to Perform Loopback Tests on page 3–29 for information.

Click a port connector to display the Port Properties dialog box (Figure 3–12 on page 3–24).

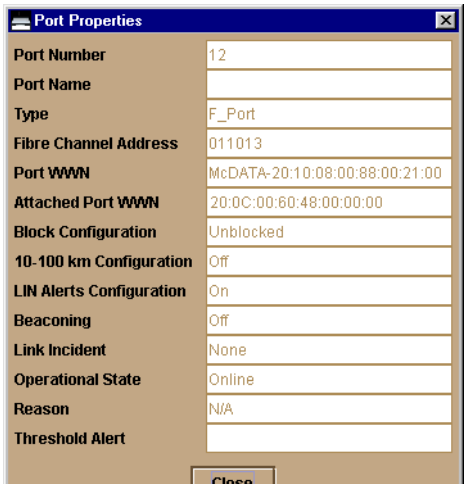


Figure 3–12: Port Properties Dialog Box

The dialog box provides the following information:

- **Port Number**-the Director port number (**0** through **63** inclusive).
- **Port Name**-the user-defined name or description for the port.
- **Type**-the type of port (G_Port if nothing is attached to the port, F_Port if a device is attached to the port, and E_Port if the port is connected to another Director or switch as part of an ISL).
- **Fibre Channel Address**-the Fibre Channel address identifier for the port.
- **Port WWN**-the Fibre Channel WWN for the Director port.
- **Attached Port WWN**-the Fibre Channel WWN for the port of the attached device.
- **Block Configuration-**a user-configured state for the port (Blocked or Unblocked).
- **10-100 km Configuration-**a user-specified state for the port (On or Off), configured through the Configure Ports dialog box.
- **LIN Alerts Configuration**-a user-specified state for the port (On or Off), configured through the Configure Ports dialog box.
- **Beaconing**-user-specified for the port (On or Off). When beaconing is enabled, a yellow triangle appears adjacent to the status field.
- **Link Incident**-If no link incidents are recorded, **None** appears in the status field. If a link incident is recorded, a summary appears describing the incident, and a yellow triangle appears adjacent to the status field. Valid summaries are:

- ❏ Implicit incident.
- ❏ Bit-error threshold exceeded.
- ❏ Link failure-loss of signal or loss of synchronization.
- ❏ Link failure-not-operational primitive sequence received.
- ❏ Link failure-primitive sequence timeout.
- ❏ Link failure-invalid primitive sequence received for the current link state.

- **Operational State-**the state of the port (Online, Offline, Beaconing, Invalid Attachment, Link Incident, Link Reset, No Light, Not Operational, Port Failure, Segmented E_Port, or Testing). A yellow triangle appears adjacent to the status field if the port is in a non-standard state that requires attention. A red and yellow diamond appears adjacent to the status field if the port fails.
- **Reason-**the following messages display in the *Reason* field of the *Port Properties* dialog box if in Invalid Attachment or Segmented E_Port state occurs for the port.

  Invalid Attachment Messages are explained in Table 3–2.

Table 3–2: Invalid Attachment Messages

Message	Explanation
01 Unknown.	Invalid attachment reason cannot be determined.
02 ISL connection not allowed on this port.	Port is configured as an F_Port, but connected to switch or director.
03 ELP rejected by the attached switch.	This director/switch transmitted an exchange link protocol (ELP) frame that was rejected by the switch at the other end of the ISL (Invalid Attachment only).
04 Incompatible switch at the other end of the ISL.	Interop mode for this switch is set to Open Fabric mode and the switch at the other end of the ISL is a switch configured for Homogeneous Fabric mode.
05 External loopback adapter connected to the port.	A loopback plug is connected to the port and there is no diagnostic test running.
06 N_Port connection not allowed on this port.	The port type configuration does not match the actual port use. Port is configured as an E_Port, but attaches to a node device.
07 Non-homogeneous switch at other end of the ISL.	The cable is connected to a non-homogeneous switch and interop mode is set to homogeneous fabric mode.
08 ISL connection not allowed on this port.	This port type configuration does not match the actual port use (the port is configured as an F_Port, but attaches to a switch or director).

Table 3–2: Invalid Attachment Messages

Message	Explanation
10 Port binding violation - unauthorized WWN.	The WWN entered to configure port binding is not valid or a nickname was used that is not configured through the Product or Fabric Manager for the attached device.
11 Unresponsive node connected to port.	Possible causes are: ■ Hardware problem on switch or on a connected node where ELP frames are not delivered, the response is not received, or a fabric login in (FLOGI) cannot be received. There may be problems in switch SBAR. ■ Faulty or dirty cable connection. ■ Faulty host bus adapters that do not send out FLOGI within reasonable timeframe.

Segmented E_Port Messages:

- ❏ Incompatible operating parameters, such as resource allocation time-out values (R_A_TOV) or error-detect time-out values (E_D_TOV) are inconsistent. See "Configure Operating Parameters" in the *StorageWorks by Compaq SAN Director 64 Installation Guide* (AA-RQZQB-TE) for more information.
- ❏ Duplicate domain IDs. See "Configure Operating Parameters" in the *StorageWorks by Compaq SAN Director 64 Installation Guide* (AA-RQZQB-TE) for more information.
- ❏ Incompatible zoning configurations. See MAP 0700: Fabric, ISL, and Segmented Port Problem Determination on page 2–90 for details.
- ❏ Build fabric protocol error.
- ❏ No principal switch (no switch in fabric is capable of being principal switch).
- ❏ No response from an attached switch.

■ **Threshold Alert-** If a threshold alert exists for the port, an alert indicator (yellow triangle) will appear by the *Threshold Alert* field, and the configured name for the last alert received will appear in the field.

Right-click a port connector to access a menu to:

- ■ Open the Port Properties, Node Properties, or Port Technology dialog boxes.
- ■ Block or unblock the port.
- ■ Enable or disable port beaconing.
- ■ Perform port diagnostics.

- Clear link incident alerts.
- Reset the port.
- Configure port binding.

Performance View

The Performance View (Figure 3–13) displays statistical information about the performance of ports. The information is useful to maintenance personnel for isolating port problems. To open the Performance View from the Hardware View, select the Performance option from the View icon on the navigation control panel.

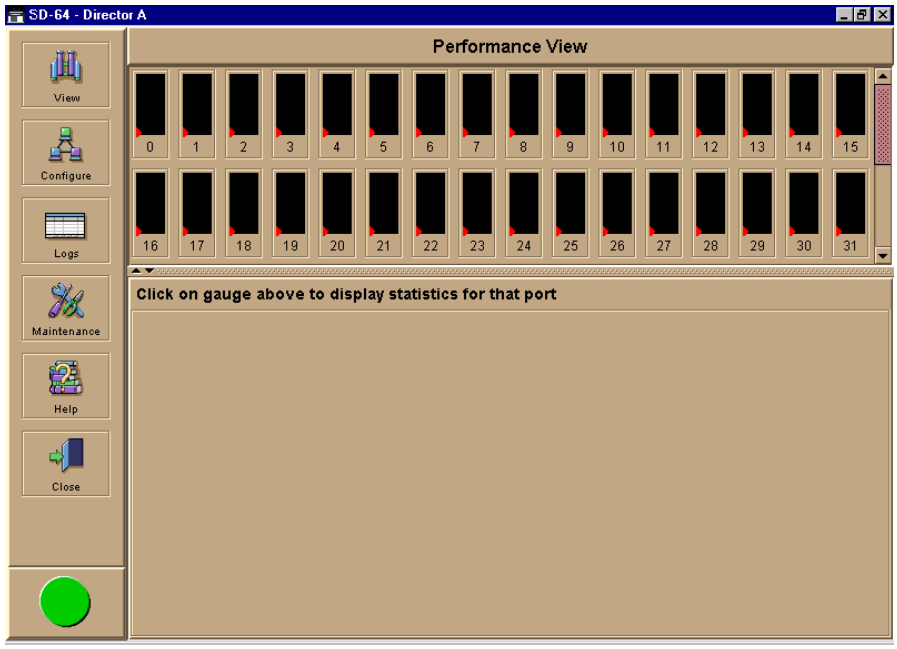


Figure 3–13: Performance View

When the Performance View opens, no port statistics or errors appear. The message **Click on gauge above to display statistics for that port** appears beneath the port bar graphs.

Each port bar graph in the upper portion of the view displays the instantaneous transmit or receive activity level for the port, and is updated every five seconds. The relative value displayed is the greater of either the transmit or receive activity (whichever value is

greatest when sampled). Each port's graph has multiple green-bar level indicators that correspond to a percentage of the maximum Fibre Channel throughput for the port (either transmit or receive). If any activity is detected for a port, at least one green bar appears.

A red indicator on each port bar graph (high-water mark) remains at the highest level the graph has reached since the Performance View was opened. The indicator does not appear if the port is offline, and is reset to the bottom of the graph if the port detects a loss of light.

When the mouse cursor is passed over a port bar graph, the graph highlights with a blue border and an information pop-up displays adjacent to the port as follows:

- If a device is not attached to the port, the pop-up displays the port's current state.
- If a device is attached to the port, the pop-up displays the WWN of the attached device.
- If the port is an E_Port, the pop-up displays **E_Port**.
- If the port is segmented, the pop-up displays **Segmented E_Port**.

Click a port bar graph to display statistics values for the port (bottom half of the Performance View). Right-click a port bar graph to display statistics values for the port (bottom half of the Performance View) and access a menu to:

- Open the Port Properties, Node Properties, or Port Technology dialog boxes.
- Block or unblock the port.
- Enable or disable port beaconing.
- Perform port diagnostics.
- Clear link incident alerts.
- Reset the port.
- Configure port binding.

When a port is selected, the bottom half of the Performance View displays the following tables of cumulative port statistics and error count values. These statistics correspond to values defined in the Fabric Element management information base (MIB).

- Traffic statistics.
- Class 2 statistics.
- Class 3 statistics.
- Error statistics.

Click Refresh to update statistical information displayed on the Performance View for the selected port. Click Clear to reset the cumulative value counts to zero on the Performance View for the selected port. A confirmation dialog box displays before the values are cleared.

Perform Loopback Tests

This section describes the procedures to perform an:

- **Internal loopback test**-an internal loopback test checks FPM card circuitry, but does not check fiber-optic components of a port transceiver. The test is performed with a device attached to the port, but the test momentarily blocks the port and is disruptive to the attached device.
- **External loopback test**-an external loopback test checks FPM card circuitry, including fiber-optic components of a port transceiver. To perform the test, the attached device must be quiesced and disconnected from the port, and a multimode or singlemode loopback plug must be inserted in the port receptacle.

Internal Loopback Test

To perform an internal loopback test for a single port or an FPM card (four ports):

1. Notify the customer a disruptive internal loopback test will be performed on a port or FPM card. Ensure the customer's system administrator quiesces Fibre Channel frame traffic through the port or FPM card, and sets attached devices offline.

   NOTE: At the start of the loopback test, the port or FPM card can be online, offline, blocked, or unblocked.

2. At the SDCM server, open the SDCM application. The Product View displays.
3. Click the icon representing the Director for which the loopback test will be performed. The Hardware View for the selected Director displays.
4. At the Hardware View, verify the location of the port or FPM card to be tested. When the mouse pointer is passed over a graphical FPM card on the front view of the Director, the card highlights with a blue border and a pop-up displays with the following information:
   - ❏ Port card type (FPM).
   - ❏ Chassis slot number (**0** through **15** inclusive).
   - ❏ The four consecutive port numbers on the selected card. Valid port numbers are in the range of **0** through **63** inclusive.

5. Reset each port to be tested:
   a. At the Hardware View, click the FPM card for which ports are to be tested. The Port Card View displays.
   b. At the Port Card View, right-click the tested port. A menu appears.
   c. Select Reset Port. A Reset Port **n** message box displays, where **n** is the port number.
   d. Click OK. The port resets.
   e. Click Back To Full View to return to the Hardware View.
6. At the navigation control panel, select Port Diagnostics from the Maintenance menu. The Port Diagnostics dialog box displays (Figure 3–14).

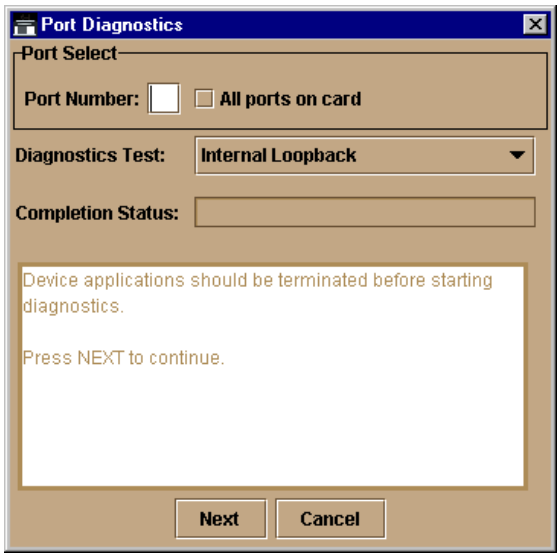


Figure 3–14: Port Diagnostics Dialog Box

7. Select a port or FPM card for test:
   - ❏ To select an individual port for test, type the port number (**0** through **63**) in the Port Number field.
   - ❏ To select an FPM card for test, type the port number of any of the four ports on the card in the Port Number field, then select (check) All Ports On Card.
8. At the Diagnostics Test list box, select Internal Loopback.

9. Click Next. Beaconing initiates for the port or FPM card selected for test. At the Hardware View, a yellow triangle appears at the top of the FPM card. At the Port Diagnostics dialog box, the message **Verify selected ports are beaconing** appears.
10. Verify beaconing is enabled, then click Next. The message **Press START TEST to begin diagnostics** appears, and the Next button changes to a Start Test button.
11. Click Start Test. The test begins and:
    - ❏ The Start Test button changes to a Stop Test button.
    - ❏ The message **Port xx: TEST RUNNING** appears, where **xx** is the port number. If an FPM card is tested, the message appears for all four ports.
    - ❏ A red progress bar (indicating percent completion) travels from left to right across the Completion Status field.

    As a port is tested, the amber LED flashes (beacons) and the green LED extinguishes (indicating the port is blocked).

    NOTE: Click Stop Test at any time to abort the loopback test.
12. When the test completes, test results appear (for each port tested) as **Port *xx*: Passed!** or **Port *xx*: Failed!** in the message area of the dialog box. If a port fails the test, the amber LED for the port remains illuminated.
13. When finished, click Cancel to close the Port Diagnostics dialog box and return to the Hardware View. Beaconing is disabled for the port or FPM card.
14. Reset each tested port:
    a. At the Hardware View, click the FPM card for which ports were tested. The Port Card View displays.
    b. At the Port Card View, right-click the tested port. A menu appears.
    c. Select Reset Port. A Reset Port **n** message box displays, where **n** is the port number.
    d. Click OK. The port resets.

External Loopback Test

To perform an external loopback test for a single port or an FPM card (four ports):

1. Notify the customer a disruptive external loopback test will be performed on a port or FPM card, and the fiber-optic cable or cables will be disconnected. Ensure the customer's system administrator quiesces Fibre Channel frame traffic through the port or FPM card and sets attached devices offline.

NOTE: At the start of the loopback test, the port or FPM card can be online, offline, blocked, or unblocked.

2. At the SDCM server, open the SDCM application. The Product View displays.
3. Click the icon representing the Director for which the loopback test will be performed. The Hardware View for the selected Director displays.
4. At the Hardware View, verify the location of the port or FPM card to be tested. When the mouse cursor is passed over a graphical FPM card on the front view of the Director, the card highlights with a blue border and a pop-up displays with the following information:
   - ❏ Port card type (FPM).
   - ❏ Chassis slot number (**0** through **15** inclusive).
   - ❏ The four consecutive port numbers on the selected card. Valid port numbers are in the range of **0** through **63** inclusive.
5. Reset each port to be tested:
   a. At the Hardware View, click the FPM card for which ports are to be tested. The Port Card View displays.
   b. At the Port Card View, right-click the tested port. A menu appears.
   c. Select Reset Port. A Reset Port **n** message box displays, where **n** is the port number.
   d. Click OK. The port resets.
   e. Click Back To Full View to return to the Hardware View.
6. Disconnect the fiber-optic jumper cable from the port to be tested. If an FPM card will be tested, disconnect all four fiber-optic jumper cables.

CAUTION: If name server zoning is implemented by port number, ensure fiber-optic cables that are disconnected to perform the loopback test are reconnected properly. A cable configuration change disrupts zone operation and may incorrectly include or exclude a device from a zone.

7. If the port to be tested is shortwave laser, insert a multimode loopback plug into the port receptacle. If the port to be tested is longwave laser, insert a singlemode loopback plug into the port receptacle. If an entire FPM card will be tested, insert an appropriate loopback plug in all four port receptacles.
8. At the navigation control panel, select Port Diagnostics from the Maintenance menu. The Port Diagnostics dialog box displays (Figure 3–14 on page 3–30).

9. Select a port or FPM card for test:
   - ❏ To select an individual port for test, type the port number (**0** through **63**) in the Port Number field.
   - ❏ To select an FPM card for test, type the port number of any of the four ports an the card in the Port Number field, then select (check) All Ports On Card.
10. At the Diagnostics Test list box, select External Loopback.
11. Click Next. Beaconing initiates for the port or FPM card selected for test. At the Hardware View, a yellow triangle appears at the top of the FPM card. At the Port Diagnostics dialog box, the message **Loopback plugs must be installed on ports being diagnosed** appears.
12. Verify loopback plugs are installed and click Next. The message **Verify selected ports are beaconing** appears.
13. Verify beaconing is enabled, then click the Next button. The message **Press START TEST to begin diagnostics** appears, and the Next button changes to a Start Test button.
14. Click Start Test. The test begins and:
    - ❏ The Start Test button changes to a Stop Test button.
    - ❏ The message **Port *xx*: TEST RUNNING** appears, where ***xx*** is the port number. If an FPM card is tested, the message appears for all four ports.
    - ❏ A red progress bar (indicating percent completion) travels from left to right across the Completion Status field.

    As an individual port is tested, the amber LED flashes (beacons) and the green LED illuminates (indicating loopback traffic through the port).

    NOTE: Click Stop Test at any time to abort the loopback test.
15. When the test completes, test results appear (for each port tested) as **Port *xx*: Passed!** or **Port *xx*: Failed!** in the message area of the dialog box. If a port fails the test, the amber LED for the port remains illuminated.
16. When finished, click Cancel to close the Port Diagnostics dialog box and return to the Hardware View. Beaconing is disabled for the port or FPM card.
17. Reset each tested port:
    a. At the Hardware View, click the FPM card for which ports were tested. The Port Card View displays.
    b. At the Port Card View, right-click the tested port. A menu appears.

c. Select Reset Port. A Reset Port **n** message box displays, where **n** is the port number.

d. Click OK. The port resets.

18. Remove loopback plugs from the tested ports.

19. Reconnect fiber-optic jumper cables from devices to tested ports.

Collecting Maintenance Data

When Director operational firmware detects a critical error or FRU failure, the Director automatically copies the contents of dynamic random access memory (DRAM) to a dump area in FLASH memory on the active CTP card, then initiates a failover to the operational FRU. The Director then transfers (through the Ethernet connection) the captured dump file from FLASH memory to the SDCM server hard drive.

Perform the maintenance data collection procedure after a firmware fault is corrected or a failed FRU is replaced to capture the data for analysis by third-level support personnel. Maintenance data includes the dump file, hardware log, audit log, and an engineering log viewable only by support personnel. To collect maintenance data:

1. At the SDCM server, open the SDCM application. The Product View displays.
2. Click the icon representing the Director for which the data collection procedure will be performed. The Hardware View for the selected Director displays.
3. At the navigation control panel, select Data Collection from the Maintenance menu. The Save Data Collection dialog box (Figure 3–15) displays.

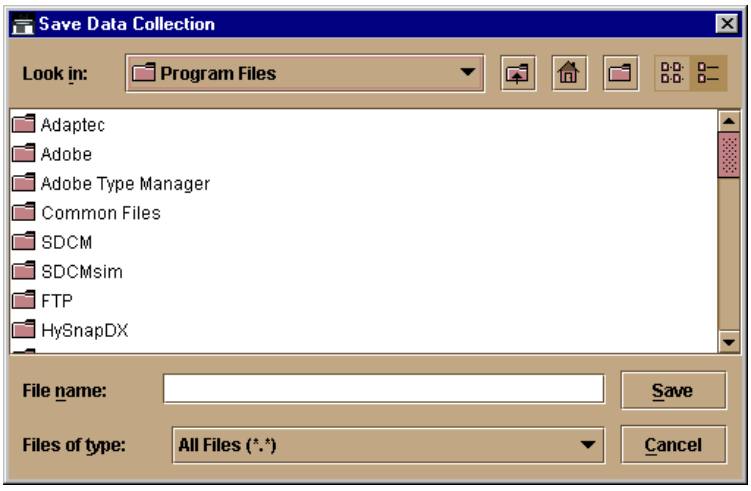


Figure 3–15: Save Data Collection Dialog Box

4. Remove the backup disk from the SDCM server Zip drive and insert a blank Zip disk.
5. At the Save Data Collection dialog box, select the zip drive from the Look in: drop-down menu, then type a descriptive name for the collected maintenance data in the File name field. Ensure the file name has a .zip extension, then click Save.
6. A dialog box (Figure 3–16) displays with a progress bar that shows percent completion of the data collection process. When the process reaches 100%, the Cancel button changes to a Close button.

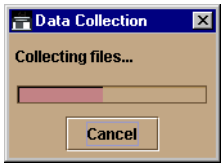


Figure 3–16: Data Collection Dialog Box

7. Click Close to close the dialog box.
8. Remove the Zip disk with the newly-collected maintenance data from the SDCM server Zip drive. Return the Zip disk with the failed FRU to Compaq for failure analysis.
9. To ensure the QuikSync backup application operates normally, replace the original backup disk in the SDCM server Zip drive.

Clean Fiber-Optic Components

Perform this procedure as directed in this publication and when connecting or disconnecting fiber-optic cables from Director FPM card connectors (if necessary). To clean fiber-optic components:

1. Obtain the appropriate tools (portable can of oil-free compressed air and alcohol pads) from the fiber-optic cleaning kit.
2. Disconnect the fiber-optic cable from the port. Use compressed air to blow any contaminants from the connector (❶ of Figure 3–17 on page 3–36).
   a. Keep the air nozzle approximately 50 millimeters (two inches) from the end of the connector and hold the can upright.
   b. Blow compressed air on the surfaces and end of the connector continuously for approximately five seconds.

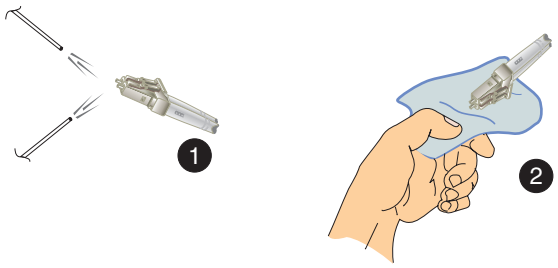


Figure 3–17: Clean Fiber-Optic Components

3. Gently wipe the end-face and other surfaces of the connector with an alcohol pad (❷ of Figure 3–17). Ensure the pad makes full contact with the surface to be cleaned. Wait approximately five seconds for cleaned surfaces to dry.
4. Repeat step 2 and step 3 of this procedure (second cleaning).
5. Repeat step 2 and step 3 of this procedure again (third cleaning), then reconnect the fiber-optic cable to the port.

Power-On Procedure

To power-on the Director:

1. One alternating current (AC) power cord is required for each power supply installed. Ensure power cords connect facility power to the input power module at the bottom rear of the Director. If two power cords are installed for high availability, plug the cords into separate facility power circuits.

WARNING: A Compaq-supplied power cord is provided for each Director power supply. To prevent electric shock when connecting the Director to primary facility power, use only the supplied power cords, and ensure the facility power receptacle is the correct type, supplies the required voltage, and is properly grounded.

2. At the bottom rear of the Director, set the power switch (circuit breaker) to the up position. The Director powers on and performs power-on self-tests (POSTs). During POSTs:
   a. Amber LEDs on both CTP cards and all FPM cards illuminate momentarily.
   b. The green LED on each CTP card (active and backup) illuminates as the card is tested and FPM cards are tested.

c. Green LEDs associated with Fibre Channel ports sequentially illuminate as the ports are tested.

3. After successful POST completion, the green power LED on the front bezel, green LED on the active CTP card, and green **PWR OK** LEDs on both power supplies remain illuminated.
4. If a POST error or other malfunction occurs, go to MAP 0000: Start MAP on page 2–2 to isolate the problem.

NOTE: When powering on the Director after removing and replacing a faulty FRU, the amber system error LED may remain illuminated. Clear the system error LED as part of the replacement procedure.

Power-Off Procedure

Powering the Director off and on (performing a power cycle) resets all logic cards and executes POSTs. When performing a power cycle, wait approximately 30 seconds before switching power on.

NOTE: When the Director is powered off, the operation of attached Fibre Channel devices is disrupted. Do not power off the Director unless directed to do so by a procedural step or the next level of support.

To power-off the Director:

1. Notify the customer the Director will be powered off. Ensure the customer's system administrator quiesces Fibre Channel frame traffic through the Director and sets attached devices offline.
2. Set the Director offline. For instructions, refer to Set Offline State on page 3–40 and return here.
3. At the bottom rear of the Director, set the power switch (circuit breaker) to the down position. The Director powers off.
4. If servicing the Director, disconnect power cords from the input power module at the bottom rear of the Director. This step is not required when performing a power cycle.

IPL the Director

A Director IPL should only be performed if failure of a CTP card is indicated. Do not IPL the Director unless directed to do so by a procedural step or the next level of support. A Director IPL performs the following functions:

- Resets the functional logic for the active CTP card only. An IPL does not reset the backup CTP card, SBAR cards, or FPM cards. All Director switching operations continue unaffected.

  NOTE: An initial machine load (IML) performs essentially the same functions, but resets both CTP cards. A Director IML is initiated by pressing and holding the white IML button (on the faceplate of either CTP card) for three seconds.

- Loads firmware from the CTP card FLASH memory without cycling Director power.
- Resets the Ethernet local area network (LAN) interface on the active CTP card, causing the connection to the SDCM server to drop momentarily until the connection automatically recovers.
- Automatically enables changes to an active zone configuration.
- Keeps all fabric logins, name server registrations, and operating parameters intact.
- Automatically sets the Director online. The blocked or unblocked state of each port remains intact.

To IPL the Director:

1. At the SDCM server, open the SDCM application. The Product View displays.
2. Click the icon representing the Director to be IPLed. The Hardware View for the selected Director displays.
3. At the navigation control panel, select IPL from the Maintenance menu. The Information dialog box (Figure 3–18) displays.

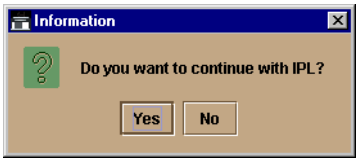


Figure 3–18: Information Dialog Box

4. Click Yes to IPL the Director. During the IPL, the Director-to-SDCM server Ethernet link drops momentarily and the following occur at the Product Manager application:
   - ❏ As the network connection drops, the SD-64 Director Status table turns yellow, the Status field displays **No Link**, and the State field displays a reason message.
   - ❏ The alert panel at the bottom of the navigation control panel displays a grey square, indicating Director status is unknown.
   - ❏ Illustrated FRUs in the Hardware View disappear, and appear again as the connection is reestablished.

Set the Director Online or Offline

This section describes procedures to set the Director online or offline. These operating states are described as follows:

- **Online**-when the Director is set online, an attached device can log in to the Director if the port is not blocked. Attached devices can communicate with each other if they are configured in the same zone.
- **Offline**-when the Director is set offline, all ports are set offline. The Director transmits the offline sequence (OLS) to attached devices, and the devices cannot log in to the Director.

  NOTE: When the Director is set offline, the operation of attached Fibre Channel devices is disrupted. Do not set the Director offline unless directed to do so by a procedural step or the next level of support.

Set Online State

To set the Director online:

1. At the SDCM server, open the SDCM application. The Product View displays.
2. Click the icon representing the Director to be set online. The Hardware View for the selected Director displays.
3. At the navigation control panel, select the Set Online State option from the Maintenance icon. If the Director is offline, the Set Online State dialog box (Figure 3–19) displays, indicating the status is **OFFLINE**.

Figure 3–19: Set Online State Dialog Box (Current State is Offline)

4. Click Set Online. A Warning dialog box displays, indicating the Director will be set online.
5. Click OK. As the Director comes online, observe the Product Manager application. The Status field of the SD-64 Director Status table displays **Online**.

Set Offline State

To set the Director offline:

1. Notify the customer the Director will be set offline. Ensure the customer's system administrator quiesces Fibre Channel frame traffic through the Director and sets attached devices offline.
2. At the SDCM Server, open the SDCM application. The Product View displays.
3. Click the icon representing the Director to be set offline. The Hardware View for the selected Director displays.
4. At the navigation control panel, select the Set Online State option from the Maintenance icon. If the Director is online, the Set Online State dialog box (Figure 3–20) displays, indicating the status is **ONLINE**.

Figure 3–20: Set Online State Dialog Box (Current State is Online)

5. Click Set Offline. A Warning dialog box displays, indicating the Director will be set offline.
6. Click OK. As the Director goes offline:
   - ❏ The OLS sequence is transmitted to all attached devices.
   - ❏ At the Product Manager application, the Status field of the SD-64 Director Status table displays **OFFLINE**.

Block and Unblock Ports

This section describes procedures to block or unblock Director ports. An entire FPM card (four ports) can be blocked or unblocked, or ports can be blocked or unblocked on an individual basis. When a port is blocked, the port is automatically set offline. When a port is unblocked, the port is automatically set online.

> **NOTE:** When a Director port is blocked, the operation of an attached Fibre Channel device is disrupted. Do not block Director ports unless directed to do so by a procedural step or the next level of support.

Block a Port

To block an individual Director port:

1. Notify the customer the port will be blocked. Ensure the customer's system administrator quiesces Fibre Channel frame traffic through the port and sets the attached device offline.
2. At the SDCM Server, open the SDCM application. The Product View displays.
3. Click the icon representing the Director for which a port will be blocked. The Hardware View for the selected Director displays.
4. Click the FPM card for which a port will be blocked. The Port Card View for the selected card displays.
5. Move the cursor over the port to be blocked and right-click the mouse to open a list of menu options.
6. Select Block Port. The Block Port **n** dialog box (Figure 3–21) displays (**n** is the port number).

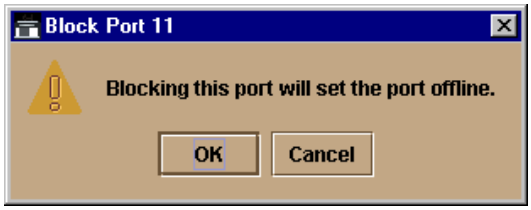


Figure 3–21: Block Port n Dialog Box

7. Click OK. The following occur to indicate the port is blocked (and offline):
   - ❏ The emulated green LED associated with the port extinguishes at the Port Card View.
   - ❏ The green LED associated with the port extinguishes at the Director.
   - ❏ A check mark displays in the check box adjacent to the Block Port menu option.
8. Click Back to Full View to return to the Hardware View.

Block an FPM Card

To block all four ports on a Director FPM card:

1. Notify the customer the FPM card will be blocked. Ensure the customer's system administrator quiesces Fibre Channel frame traffic through the ports and sets attached devices offline.
2. At the SDCM Server, open the SDCM application. The Product View displays.
3. Click the icon representing the Director for which an FPM card will be blocked. The Hardware View for the selected Director displays.
4. Click the FPM card to be blocked. The Port Card View for the selected card displays.
5. Move the cursor over the FPM card to be blocked (but not over an individual port) and right-click the mouse to open a list of menu options.
6. Select Block All Ports. The Block All Ports dialog box (Figure 3–22) displays.

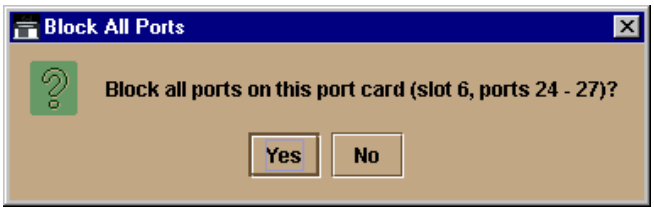


Figure 3–22: Block All Ports Dialog Box

7. Click Yes. The following occur to indicate the FPM card is blocked (and offline):
   - ❏ Emulated green LEDs associated with all four ports extinguish at the Port Card View.
   - ❏ Green LEDs associated with all four ports extinguish at the Director.
8. Click Back to Full View to return to the Hardware View.

Unblock a Port

To unblock an individual Director port:

1. At the SDCM server, open the SDCM application. The Product View displays.
2. Click the icon representing the Director for which a port will be unblocked. The Hardware View for the selected Director displays.
3. Click the FPM card for which a port will be unblocked. The Port Card View for the selected card displays.
4. Move the cursor over the port to be unblocked and right-click the mouse to open a list of menu options.

5. Select the Block Port menu option. Note the check mark in the box adjacent to the menu item, indicating the port is blocked. The Unblock Port **n** dialog box (Figure 3–23) displays (**n** is the port number).

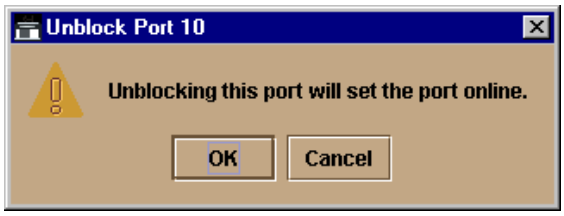


Figure 3–23: Unblock Port n Dialog Box

6. Click OK. The following occur to indicate the port is unblocked (and online):
   - ❏ The emulated green LED associated with the port illuminates at the Port Card View.
   - ❏ The green LED associated with the port illuminates at the Director.
   - ❏ The check box adjacent to the Block Port option becomes blank.
7. Click Back to Full View to return to the Hardware View.

Unblock an FPM Card

To unblock all four ports on a Director FPM card:

1. At the SDCM server, open the SDCM application. The Product View displays.
2. Click the icon representing the Director for which an FPM card will be unblocked. The Hardware View for the selected Director displays.
3. Click the FPM card to be unblocked. The Port Card View for the selected card displays.
4. Move the cursor over the FPM card to be unblocked (but not over an individual port) and right-click the mouse to open a list of menu options.
5. Select Unblock All Ports. The Unblock All Ports dialog box (Figure 3–24) displays.

Figure 3–24: Unblock All Ports Dialog Box

6. Click Yes. The following occur to indicate the FPM card is unblocked (and online):
   - ❏ Emulated green LEDs associated with all four ports illuminate at the Port Card View.
   - ❏ Green LEDs associated with all four ports illuminate at the Director.
7. Click Back to Full View to return to the Hardware View.

Manage Firmware Versions

Firmware is the Director's internal operating code that is downloaded from the SDCM server and stored on a CTP card. Up to eight versions can be stored on the SDCM server hard drive and made available for download to a Director. Service personnel can perform the following firmware management tasks:

- Determine the firmware version active on a Director.
- Add to and maintain a library of up to eight firmware versions on the SDCM server hard drive.
- Modify a firmware description stored on the SDCM server hard drive.
- Delete a firmware version from the SDCM server hard drive.
- Concurrently download a firmware version to a selected Director.

Determine a Director Firmware Version

To determine a Director firmware version:

1. At the SDCM server, open the SDCM application. The Product View displays.
2. Click the icon representing the switch to be inspected for firmware version. The Hardware View for the selected switch displays.
3. At the navigation control panel, select the Firmware Library option from the Maintenance icon. The SD-64 Firmware Library dialog box (Figure 3–25) displays.

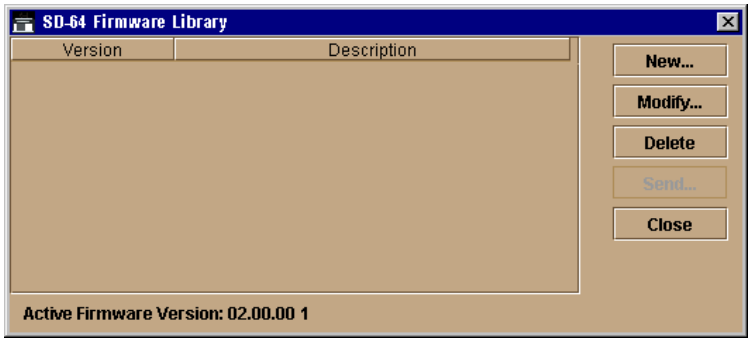


Figure 3–25: Firmware Library Dialog Box

4. The firmware version displays at the lower left corner of the dialog box in **XX.YY.ZZ** format, where **XX** is the version level, **YY** is the release level, and **ZZ** is the patch level.
5. Click Close to return to the Hardware View.

Add a Firmware Version

The firmware version shipped with the Director is provided on the SD-64 documentation kit CD. Subsequent firmware versions to upgrade the Director are provided to customers through the Compaq website.

> **NOTE:** When adding a firmware version, follow procedural information in Release Notes that accompany the firmware version. This information supplements information provided in this general procedure.

To add a Director firmware version to the library stored on the SDCM server hard drive:

1. Obtain the new firmware version from the Compaq website:

   NOTE: The following path is subject to change.

   a. At the SDCM server or other personal computer (PC) with Internet access, open the Compaq website. The uniform resource locator (URL) is http://www.compaq.com/products/storageworks/director64.

   NOTE: If required, obtain the customer-specific member name and password from the customer or next level of support.

   b. Follow links to SDCM software.

   c. Click the SD-64 Firmware Version XX.YY.ZZ entry, where XX.YY.ZZ is the desired version. The Windows NT Save As dialog box appears.

d. Ensure the correct directory path is specified at the Save in field and the correct file is specified in the File name field. Click Save. The new firmware version is downloaded and saved to the SDCM server or PC hard drive.

e. If the new firmware version was downloaded to a PC (not the SDCM server), transfer the firmware version file to the SDCM server by Zip disk, CD-ROM, or other electronic means.

2. At the SDCM server, open the SDCM application. The Product View displays.
3. Click the icon representing the Director to which the firmware version will be added. The Hardware View for the selected Director displays.
4. At the navigation control panel, select Firmware Library from the Maintenance menu. The SD-64 Director Firmware Library dialog box displays.
5. Click New. The New Firmware Version dialog box (Figure 3–26) displays.

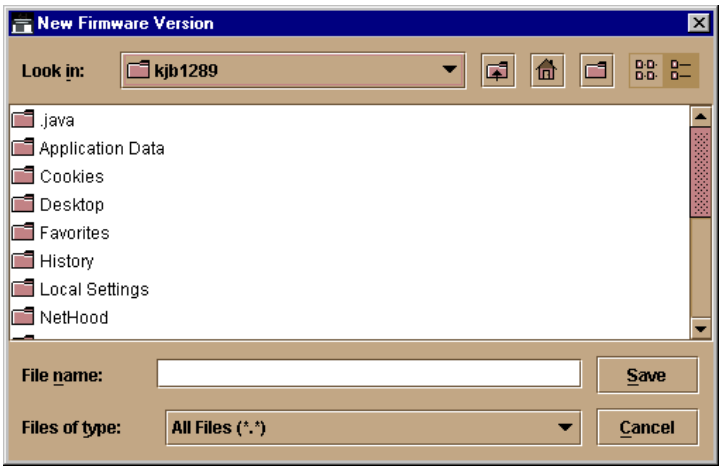


Figure 3–26: New Firmware Version Dialog Box

6. Select the desired firmware version file (downloaded in step 1) from the SDCM server diskette drive or hard drive. Ensure the correct directory path and filename appear in the File name field and click Save. The New Firmware Description dialog box (Figure 3–27) displays.

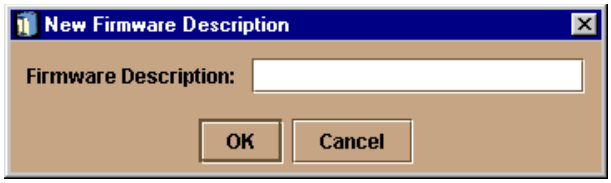


Figure 3–27: New Firmware Description Dialog Box

7. Enter a description (up to 24 characters in length) for the new firmware version and click OK. It is recommended the description include the installation date and text that uniquely identifies the firmware version.
8. A Transfer Complete message box appears indicating the new firmware version is stored on the SDCM server hard drive. Click Close to close the message box.
9. The new firmware version and associated description appear in the SD-64 Director Firmware Library dialog box. Click Close to close the dialog box and return to the Product Manager application.
10. To send the firmware version to a Director, refer to Download a Firmware Version to a Director on page 3–48.

Modify a Firmware Version Description

To modify the description of a Director firmware version in the library stored on the SDCM server hard drive:

1. At the SDCM server, open the SDCM application. The Product View displays.
2. Click the icon representing the Director for which the firmware version description will be modified. The Hardware View for the selected Director displays.
3. At the navigation control panel, select Firmware option from the Maintenance menu. The SD-64 Director Firmware Library dialog box displays.
4. Select the firmware version to be modified and click Modify. The Modify Firmware Description dialog box (Figure 3–28) displays.

Figure 3–28: Modify Firmware Description

5. Enter a modified description (up to 24 characters in length) for the firmware version and click OK. It is recommended the description include the installation date and text that uniquely identifies the firmware version.
6. The new description for the firmware version displays in the SD-64 Director Firmware Library dialog box. Click Close to close the dialog box and return to the Product Manager application.

Delete a Firmware Version

To delete a Director firmware version from the library stored on the SDCM server hard drive:

1. At the SDCM server, open the SDCM application. The Product View displays.
2. Click the icon representing the Director from which the firmware version will be deleted. The Hardware View for the selected Director displays.
3. At the navigation control panel, select the Firmware Library option from the Maintenance icon. The SD-64 Director Firmware Library dialog box displays.
4. Select the firmware version to be deleted and click Delete. A confirmation dialog box displays.
5. Click OK. The selected firmware version is deleted from the SD-64 Director Firmware Library dialog box.
6. Click Close to close the dialog box and return to the Product Manager application.

Download a Firmware Version to a Director

This procedure downloads a selected firmware version from the SDCM server library to a Director managed by the open instance of the Product Manager application. The procedure applies to a Director with two (redundant) CTP cards. The process occurs concurrently without taking the Director offline or disrupting operation. The new firmware version takes effect when control is passed from the active to the backup CTP card. Although Director operation is not affected, name server, alias server, and login server functions are momentarily unavailable during CTP card switchover.

> **NOTE:** When downloading a firmware version, follow procedural information in release notes or EC instructions that accompany the firmware version. This information supplements information provided in this general procedure.

To download a firmware version to a Director:

1. At the SDCM server, open the SDCM application. The Product View displays.

2. Before downloading firmware version **XX.YY.ZZ** to a Director, ensure version **XX.YY.ZZ** of the SDCM application is running on the SDCM server.
   a. Select About from the Help menu. The About dialog box displays and lists the SDCM application version. Click OK to close the dialog box.
   b. If required, install the correct version of the SDCM application. For instructions, refer to Install or Upgrade Software on page 3–54 and return here.
3. Click the icon representing the Director to which the firmware version will be downloaded. The Hardware View for the selected Director displays.
4. As a precaution to preserve Director configuration information, perform the data collection procedure. For instructions, refer to Collecting Maintenance Data on page 3–34 and return here.
5. At the navigation control panel, select Firmware Library from the Maintenance menu. The SD-64 Firmware Library dialog box displays.
6. Select the firmware version to be downloaded and click Send. The send function verifies existence of certain Director conditions before the download process begins. If an error occurs, a message displays indicating the problem must be fixed before firmware is downloaded. Conditions that terminate the process include:
   - ❏ A redundant CTP card failure.
   - ❏ The firmware version is being installed to the Director by another user.
   - ❏ The Director-to-SDCM server link is down.

   If a problem occurs and a corresponding message displays, go to MAP 0000: Start MAP on page 2–2 to isolate the problem. If no error occurs, the Send Firmware confirmation box (Figure 3–29) displays.

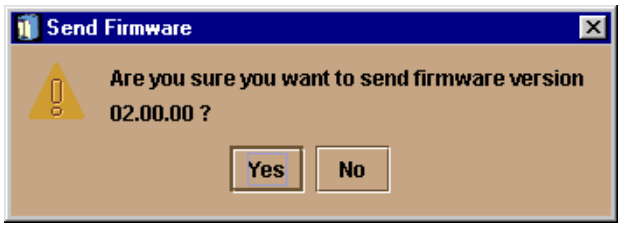


Figure 3–29: Send Firmware Dialog Box

7. Click Yes. The Send Firmware dialog box displays.

   As the download begins, a Writing data to FLASH message displays at the top of the dialog box, followed by a Sending Files message. This message remains as a progress bar travels across the dialog box to show percent completion of the download. The bar progresses to 50% when the last file is transmitted to the first CTP card. The bar

remains at the 50% point until the Director performs an IPL (indicated by an IPLing message). During the IPL, the Director-to-SDCM server link drops momentarily and the following occur at the Product Manager:

- ❏ As the network connection drops, the SD-64 Director Status table turns yellow, the Status field displays No Link, and the State field displays a reason message.
- ❏ The alert panel at the bottom of the navigation control panel displays a grey square, indicating Director status is unknown.
- ❏ Illustrated FRUs in the Hardware View disappear, and appear again as the connection is reestablished.

After the IPL, a Synchronizing CTPs message displays. This message remains as files are transmitted to the second CTP card and the progress bar travels across the dialog box to 100%. When the download reaches 100%, a Send Firmware Complete message displays (Figure 3–30).

Figure 3–30: Send Firmware Complete Dialog Box

8. Click Close to close the dialog box.
9. Click Close to close the SD-64 Firmware Library dialog box and return to the Hardware View.

Manage Configuration Data

The Product Manager application provides maintenance options to back up, restore, or reset the configuration files stored in nonvolatile random-access memory (NV-RAM) on both Director CTP cards. Configuration data in the file include:

- ■ Identification data (Director name, description, and location).
- ■ Port configuration data (port names, blocked states, extended distance settings).
- ■ Operating parameters (buffer-to-buffer credit (BB_Credit) value, error-detect time-out value (E_D_TOV), resource allocation time-out value (R_A_TOV), switch priority, and preferred domain ID).

- Simple network management protocol (SNMP) configuration information, including trap recipients, community names, and write authorizations.
- Zoning configuration information, including the active zone set and default zone state.

The backup file is not required in a redundant Director, however the feature is available and may be useful to save a special-purpose configuration for test. The Director must be set offline prior to restoring or resetting the configuration file.

Back Up the Configuration

To back up the Director configuration file to the SDCM server:

1. At the SDCM server, open the SDCM application. The Product View displays.
2. Click the icon representing the Director for which the configuration file will be backed up. The Hardware View for the selected Director displays.
3. At the navigation control panel, select Backup & Restore Configuration from the Maintenance menu. The Backup and Restore Configuration dialog box (Figure 3–31) displays.

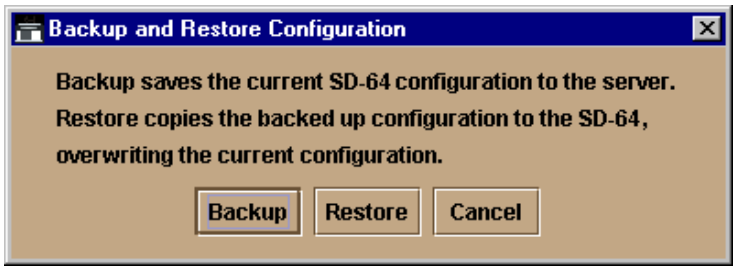


Figure 3–31: Backup and Restore Configuration Dialog Box

4. Click Backup. When the backup process finishes, the Backup Complete dialog box (Figure 3–32) displays.

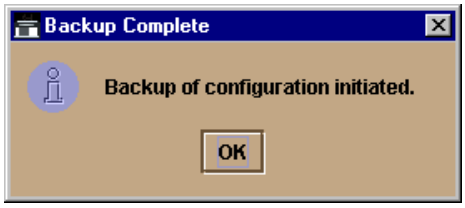


Figure 3–32: Backup Complete Dialog Box

5. Click OK to close the dialog box and return to the Hardware View.

Restore the Configuration

To restore the Director configuration file from the SDCM server:

1. Notify the customer the Director will be set offline. Ensure the customer's system administrator quiesces Fibre Channel frame traffic through the Director and sets attached devices offline.
2. Set the Director offline. For instructions, refer to Set Offline State on page 3–40 and return here.
3. At the SDCM server, open the SDCM application. The Product View displays.
4. Click the icon representing the Director for which the configuration file will be restored. The Hardware View for the selected Director displays.
5. At the navigation control panel, select Backup & Restore Configuration from the Maintenance menu. The Backup and Restore Configuration dialog box (Figure 3–33) displays.

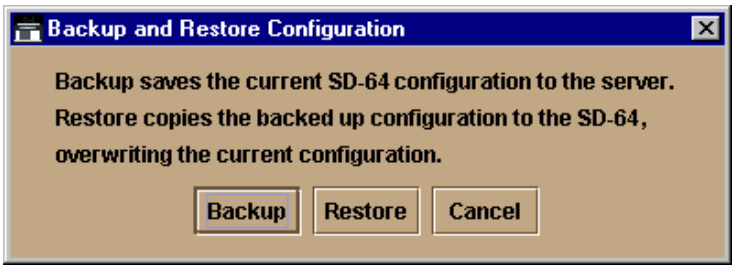


Figure 3–33: Backup and Restore Configuration Dialog Box

6. Click Restore. A Warning message box (Figure 3–34) displays.

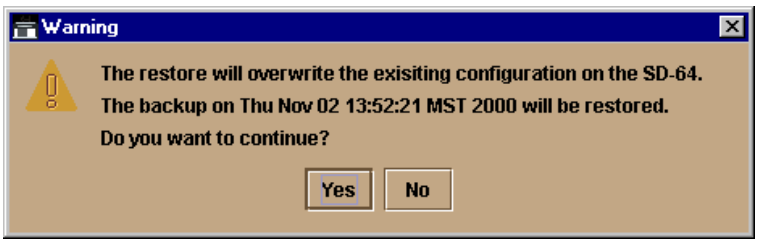


Figure 3–34: Warning Dialog Box

7. Click Yes. When the restore process finishes, the Restore Complete dialog box (Figure 3–35) displays.

Figure 3–35: Restore Complete Dialog Box

8. Click OK to close the dialog box and return to the Hardware View.

Reset Configuration Data

NOTE: This procedure resets the Director IP address to the default value of **10.1.1.10** and may disrupt SDCM server-to-Director communication.

To reset Director data to the factory default settings:

1. Notify the customer the Director will be set offline. Ensure the customer's system administrator quiesces Fibre Channel frame traffic through the Director and sets attached devices offline.
2. Set the Director offline. For instructions, refer to Set Offline State on page 3–40 and return here.
3. At the SDCM server, open the SDCM application. The Product View displays.
4. Click the icon representing the Director for which the configuration file will be reset to factory default settings. The Hardware View for the selected Director displays.
5. At the navigation control panel, select Reset Configuration from the Maintenance menu. The Reset Configuration dialog box (Figure 3–36) displays.

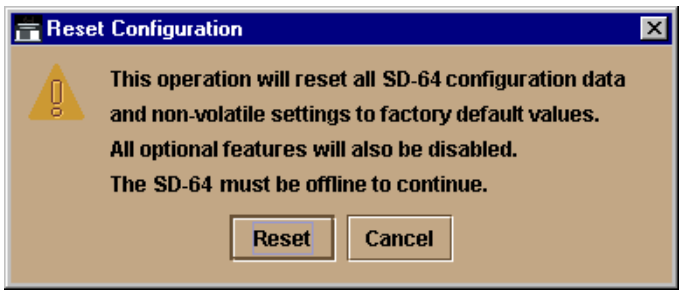


Figure 3–36: Reset Configuration Dialog Box

6. Click Reset. When the process completes, the dialog box closes and the application returns to the Hardware View.

Install or Upgrade Software

This section describes the procedure to install or upgrade the SDCM application to the SDCM server. The SDCM application includes the SD-64 Director Product Manager, Fabric Manager, and SDCM Management Services applications.

The SDCM application shipped with the Director is provided on the *SDCM Management Applications* CD-ROM. Subsequent software versions for upgrading the Director are provided to customers through the *SDCM Applications* CD-ROM or through the Compaq website.

NOTE: When installing or upgrading a software version, follow all procedural information in Release Notes that accompany the software version. This information supplements information provided in this general procedure.

To install or upgrade the SDCM application and associated applications to the SDCM server:

1. Log out of all SDCM application sessions (local and remote).
2. Obtain the new firmware version from the Compaq website:

   NOTE: The following path is subject to change.

   a. At the SDCM server or other personal computer (PC) with Internet access, open the Compaq website. The uniform resource locator (URL) is http://www.compaq.com/products/storageworks/director64

   NOTE: If required, obtain the customer-specific member name and password from the customer or next level of support.

   b. Follow links to SDCM software.

   c. Click the SD-64 Director Firmware Version XX.YY.ZZ entry, where XX.YY.ZZ is the desired version. The Windows NT Save As dialog box appears.

   d. Ensure the correct directory path is specified at the Save in field and the correct file is specified in the File name field. Click Save. The new SDCM version is downloaded and saved to the SDCM server or PC hard drive.

   e. If the new SDCM version was downloaded to a PC (not the SDCM server), transfer the SDCM firmware version file to the SDCM server by diskette or other electronic means.

3. At the SDCM server, click the Windows Start button. The Windows NT Workstation menu displays.
4. At the Windows NT Workstation menu, select Run. The Run dialog box (Figure 3–37) appears.

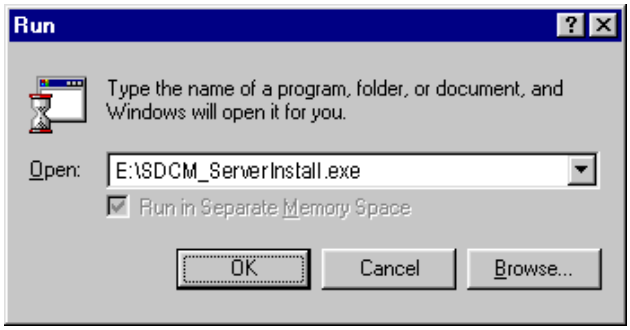


Figure 3–37: Run Dialog box

5. At the Run dialog box, select the directory path (hard drive or CD-ROM drive) and filename of the executable file (SDCM_SERVERINSTALL.EXE) using the Browse button. The directory path and filename display in the Open field.
6. Click OK. A series of message boxes appear as the InstallAnywhere third-party application prepares to install the SDCM application software, followed by the SANworks Director Connectivity Manager dialog box (Figure 3–38).

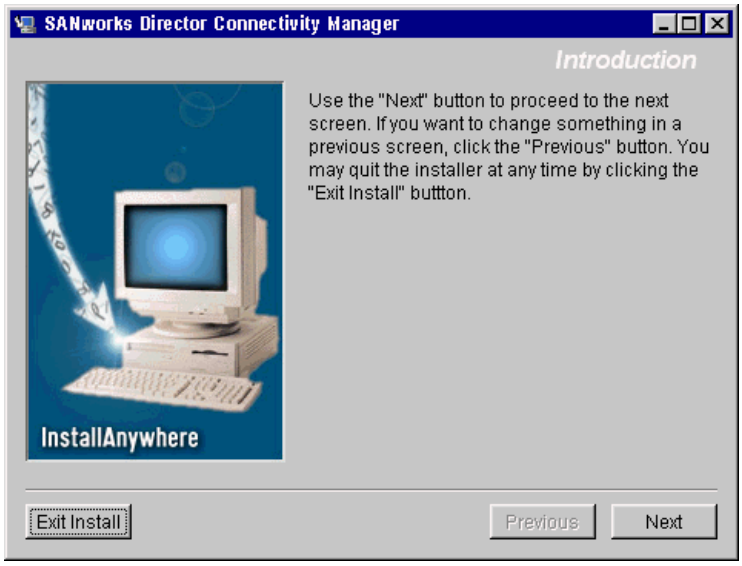


Figure 3–38: SANworks Director Connectivity Manager Dialog Box (Introduction)

7. Follow the online instructions for the InstallAnywhere program. Click Next, Install, or Done as appropriate.
8. Reboot the SDCM server PC.
   a. Simultaneously press the **Ctrl**, **Alt**, + **Delete** keys to display the Windows NT Logon Information dialog box.
   b. Type the user name and password and click OK. The Windows NT desktop displays.

   NOTE: If required, obtain the user name and password from the customer or next level of support.
9. The SDCM application automatically opens. At the SDCM application Login screen, enter a user name, password, and SDCM server name (all are case sensitive), and click Login. The application opens and the Product View displays.

   NOTE: If required, obtain the user name, password, and SDCM server name from the customer or next level of support.

Chapter 4

FRU Removal and Replacement

This chapter describes removal and replacement procedures used by authorized service representatives for all Director field-replaceable units (FRUs). Do not perform a procedure in this chapter until a failure is isolated to a FRU. If fault isolation was not performed, refer to MAP 0000: Start MAP on page 2–2.

Procedural Notes

The following procedural notes are referenced as applicable. The notes do not necessarily apply to all procedures in the chapter.

1. Before performing a FRU repair, read the removal and replacement procedures for that FRU carefully and thoroughly to familiarize yourself with the procedures and reduce the possibility of problems or customer down time.
2. When performing procedures described in this chapter, follow all electrostatic discharge (ESD) procedures, **WARNING** and **CAUTION** statements, and statements listed in the preface of this manual.
3. After completing the steps of a detailed procedure that is referenced from another procedure, return to the initial (referencing) procedure and continue to the next step of that procedure.
4. After completing a replacement procedure, clear the event code reporting the failure and the event code reporting the recovery from the SD-64 Director Event Log (at the SDCM server), and extinguish the amber system error light- emitting diode (LED) at the Director front bezel.

Remove and Replace FRUs

This section describes procedures to remove and replace Director FRUs, along with a list of tools required to perform each procedure. In addition, the section provides:

- ESD information
- A list of concurrent FRUs. Concurrent FRUs can be removed and replaced while the Director is powered on and operational.
- A list of nonconcurrent FRUs. Nonconcurrent FRUs can only be removed and replaced after the Director is powered off.

Refer to Chapter 5, Illustrated Parts Breakdown for FRU locations and part numbers.

ESD Information

When performing procedures described in this section, follow all ESD procedures, **WARNING** statements, and **CAUTION** statements. When removing and replacing FRUs, always connect a grounding cable to the Director chassis and wear an ESD wrist strap.

CAUTION: To avoid causing machine errors or damage while working on the Director, follow ESD procedures by connecting a grounding cable to the Director chassis and wearing an ESD wrist strap.

As shown in Figure 4–1 on page 4–3, the ESD grounding point for the front of the chassis (❶) is located at the bottom center, adjacent to the left power supply. Touch the chassis once before performing any maintenance action, and once each minute while removing or replacing FRUs.

If the Director is not connected to facility power (and therefore not grounded), connect the ESD wrist strap to an approved bench grounding point instead of the chassis.

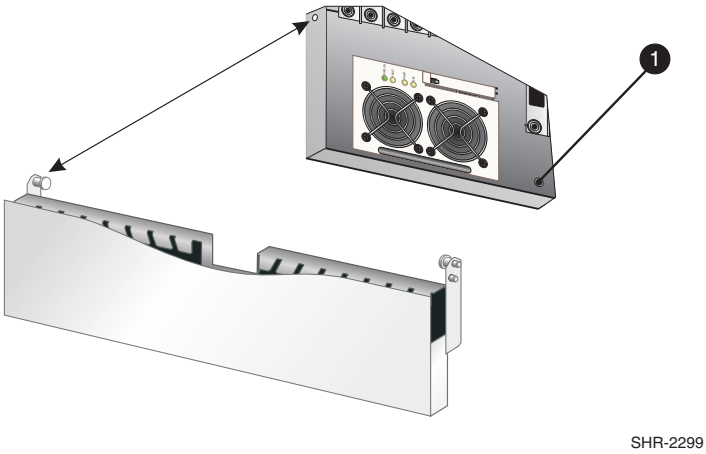


Figure 4–1: ESD Grounding Point (Front)

As shown in Figure 4–2, the ESD grounding point for the rear of the chassis (❶) is located at the bottom center, directly below the maintenance port. Touch the chassis once before performing any maintenance action, and once each minute while removing or replacing FRUs.

Figure 4–2: ESD Grounding Point (Rear)

Concurrent FRUs

Table 4–1 lists concurrent FRUs. Concurrent FRUs are removed and replaced while the Director is powered on and operational. The table also lists ESD precautions (yes or no) for each FRU and provides hyperlinks to the removal and replacement procedure.

Table 4–1: Concurrent FRUs

Concurrent FRU Name	ESD Precaution Requirement
Cable Management Assembly	No
Redundant CTP Card	Yes
Fiber port module (FPM) card (FPM Card)	Yes
Small form factor optical transceiver (SFF Optical Transceiver)	No
FPM Filler Blank	No
Redundant Power Supply	Yes
Redundant serial crossbar assembly (Redundant SBAR Assembly)	Yes
Redundant fan module (Redundant Fan Module)	Yes

Nonconcurrent FRUs

Table 4–2 lists nonconcurrent FRUs. Nonconcurrent FRUs are removed and replaced after the Director is powered off. The table also lists ESD precautions (yes or no) for each FRU, and references the page number of the removal and replacement procedure.

Table 4–2: Nonconcurrent FRUs

Nonconcurrent FRU Name	ESD Precaution Requirement
Power Module Assembly	Yes
Backplane	Yes

Cable Management Assembly

Use the following procedures to remove or replace the cable management assembly at the front of the Director.

Tools Required

None.

Removal

To remove the cable management assembly:

1. If the Director is installed in a stand-alone configuration, go to step 2. If the Director is rack-mounted, unlock and open the cabinet front door as directed by the customer representative.
2. If fiber-optic and Ethernet cables are attached to the Director, disengage the cables from the cable management assembly, then lift the cables up and out of the assembly.
3. Two captive pins secure the assembly to the chassis as shown in Figure 4–3. Pull both pins inward to release the assembly, then pull the assembly away from the front of the Director.

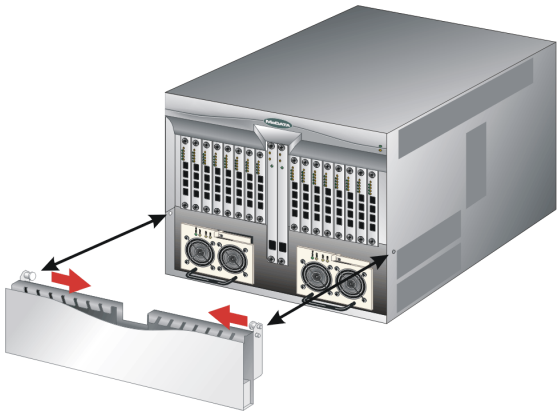


Figure 4–3: Cable Management Assembly Removal and Replacement

Replacement

To replace the cable management assembly:

1. Position the cable management assembly at the front of the Director chassis as shown in Figure 4–3 on page 4–5.
2. Disengage both captive pins by pulling them inward, then push the assembly toward the card cage area.
3. Release the captive pins so they engage in the chassis anchor points.
4. Route fiber-optic and Ethernet cables through the cable management assembly. Dress the cables evenly through the assembly cut-out slots.
5. Close and lock the equipment cabinet door.

Redundant CTP Card

Use the following procedures to remove or replace a redundant CTP card (two cards in the Director) with the backup CTP card operational. A list of tools required is provided.

CAUTION: Do not remove and replace a redundant CTP card if the backup CTP card is not fully operational and Director power is on. The Director IP address, configuration data, and other operating parameters will be lost.

Tools Required

The following tools are required to perform these procedures.

- ESD grounding cable and wrist strap.
- Torque tool and hex adapter (provided with the Director).

Removal

To remove a redundant CTP card:

1. If the Director is installed in a stand-alone configuration, go to step 2. If the Director is rack-mounted, unlock and open the cabinet front door as directed by the customer representative.
2. Follow ESD procedures by attaching a wrist strap to the Director chassis and your wrist (Figure 4–1 on page 4–3).

CAUTION: To avoid causing machine errors or damage while working on the Director, follow ESD procedures by connecting a grounding cable to the Director chassis and wearing an ESD wrist strap.

3. Identify the defective CTP card from the amber LED on the card or failure information at the SDCM Server's Hardware View.
4. Disconnect the Ethernet local area network (LAN) cable from the RJ-45 connector on the card faceplate.
5. The CTP card is secured to the Director chassis with two captive Allen screws. The bottom screw is spring-loaded and locks the CTP card in place. The top screw cams the CTP card into and out of the backplane.

CAUTION: The torque tool supplied with the SD-64 Director is designed to tighten Director logic cards and is set to release at a torque value of six inch-pounds. Do not use an Allen wrench or torque tool designed for use with another Compaq product. Use of the wrong tool may overtighten and damage logic cards.

a. Insert the torque tool into the locking Allen screw at the bottom of the card. Turn the screw counterclockwise until the spring releases and the tool turns freely.

b. Insert the torque tool(❶) into the cam Allen screw at the top of the card(❷). To unseat the CTP card and cam it out of the backplane, turn the screw counterclockwise until the tool turns freely (Figure 4–4).

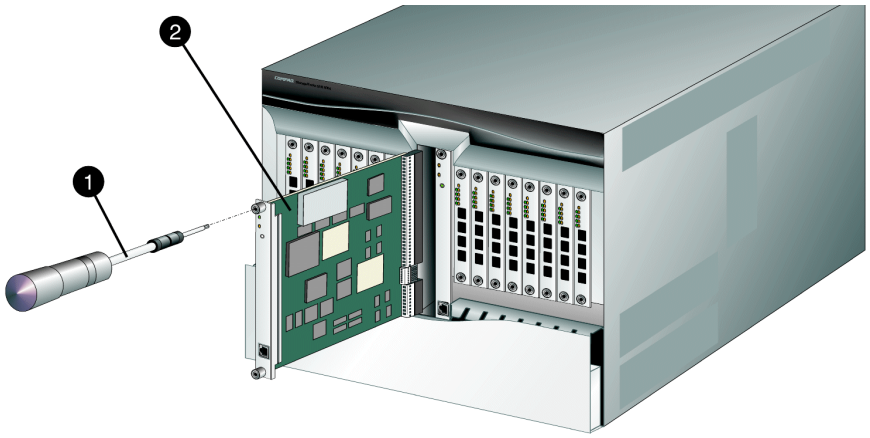


Figure 4–4: CTP Card Removal and Replacement

6. Pull the CTP card from its card track and remove it from the Director chassis. Place the card in an antistatic bag to provide ESD protection.

Replacement

To replace a redundant CTP card:

1. Wait approximately 20 seconds after removal of the failed CTP card to begin this replacement procedure.
2. Remove the replacement card from its protective antistatic bag.
3. Hold the card by its stiffener and insert it in the chassis card track (Figure 4–4). The label identifying the card should be at the top. Verify the card is aligned in the card tracks, then slide it forward until it makes contact with the backplane.

4. Secure the CTP card as follows:
   a. Insert the torque tool into the cam Allen screw at the top of the card. Turn the torque tool clockwise until you feel it release and hear a clicking sound. As the screw turns clockwise, the card cams into the backplane connector.
   b. Insert the torque tool into the locking Allen screw at the bottom of the card. Turn the torque tool clockwise until you feel it release and hear a clicking sound. As the screw turns clockwise, the card locks into place.
   c. Verify the card stiffener is flush with the front of the card cage and even with other Director logic cards.
5. After the replacement CTP card is installed, note the following:
   - ❏ When a CTP card with a different firmware version is installed in a Director with an active CTP card, a synchronization process occurs. This process causes firmware from the active CTP card to be downloaded to the replacement CTP card. The process does not occur if both CTP cards have the same firmware version.
   - ❏ The synchronization process takes approximately eight to ten minutes (depending on Director activity), during which the amber LED on the replacement CTP card remains illuminated. The amber LED extinguishes when the process completes.
   - ❏ Allow the synchronization process to complete. If the process is interrupted by a Director power cycle or initial program load (IPL), or by removing the replacement CTP card, the card may be unusable due to partially-loaded firmware.
   - ❏ If after ten minutes the replacement CTP card does not appear to be operational, perform the data collection procedure and return the failed replacement card to Compaq. Refer to Collecting Maintenance Data on page 3–34 for instructions.
   - ❏ Do do not reinstall the failed replacement CTP card because this can corrupt Director firmware. Obtain a new CTP card and perform this replacement procedure.
6. Connect the Ethernet LAN cable to the RJ-45 connector on the faceplate of the replacement CTP card.
7. Disconnect the ESD wrist strap from the Director chassis and your wrist.
8. Inspect the CTP card to ensure the amber LED is extinguished. If the amber LED is illuminated, go to MAP 0000: Start MAP on page 2–2 to isolate the problem.
9. At the SDCM server's Hardware View, select Event Log from the Logs menu. The Event Log displays. Ensure the following event codes appear in the log:
   - ❏ **410**-CTP card reset.
   - ❏ **416**-Backup CTP installed.

- ❏ **422**-CTP firmware synchronization complete (only if the firmware versions on the two CTP cards are different).

If the event codes do not appear in the log, go to MAP 0000: Start MAP on page 2–2 to isolate the problem.

10. At the Hardware View, observe the graphic representing the replacement card and ensure no alert symbols appear that indicate a failure (yellow triangle or red diamond). If a problem is indicated, go to MAP 0000: Start MAP on page 2–2 to isolate the problem.
11. At the Hardware View, click the graphic representing the replacement card to open the FRU Properties dialog box. Verify that CTP card information (FRU name, position, and state) is correct. If a problem is indicated, go to MAP 0000: Start MAP on page 2–2 to isolate the problem.
12. Close and lock the equipment cabinet door.
13. Perform the data collection procedure. For instructions, refer to Collecting Maintenance Data on page 3–34 and return here.
14. If the customer requests the replacement CTP card be set as the active card, perform a FRU switchover. At the Hardware View, right-click the graphic representing the replacement card to open a menu, then select Switchover.
15. Clear the amber system error LED on the Director bezel as follows:
    a. At the Hardware View, right-click the front panel bezel graphic (away from a FRU) to open a menu.
    b. Click Clear System Error Light.

FPM Card

Use the following procedures to remove or replace an FPM card. A list of tools required is provided.

Tools Required

The following tools are required to perform these procedures.

- ESD grounding cable and wrist strap.
- Torque tool and hex adapter (provided with the Director).
- Fiber-optic protective plugs (provided with the Director).
- Protective caps (provided with fiber-optic jumper cables).

- Fiber-optic cleaning kit.

Removal

To remove an FPM card:

1. Notify the customer that all ports on the defective FPM card will be blocked. Ensure the customer's system administrator quiesces Fibre Channel frame traffic through any operational ports on the card and sets attached devices offline.
2. If the Director is installed in a stand-alone configuration, go to step 3. If the Director is rack-mounted, unlock and open the cabinet front door as directed by the customer representative.
3. Follow ESD procedures by attaching a wrist strap to the Director chassis and your wrist (Figure 4–1 on page 4–3).

CAUTION: To avoid causing machine errors or damage while working on the Director, follow ESD procedures by connecting a grounding cable to the Director chassis and wearing an ESD wrist strap.

4. Identify the defective FPM card from the amber LED on the card or failure information at the SDCM server's Hardware View.
5. Block communication to the defective FPM card. For instructions, refer to Block an FPM Card on page 3–41 and return here.
6. Disconnect the fiber-optic jumper cable from each port on the defective card as follows. Repeat this step for all four ports.
   a. Pull the keyed LC connector free from the port's optical transceiver.
   b. Place a protective cap over the cable connector. If required, label jumper cables to ensure correct connections when the FPM card is replaced.

   NOTE: If name server zoning is implemented by port number, a change to the Director fiber-optic cable configuration disrupts zone operation and may incorrectly include or exclude a device from a zone.

   c. Insert a protective plug into the optical transceiver.

CAUTION: When fiber-optic cables are disconnected from FPM card optical transceivers, ensure protective plugs are inserted into the receptacles. This prevents damage to sensitive components and prevents injury to the eye if the laser is viewed directly.

7. The FPM card is secured to the Director chassis with two captive Allen screws. The bottom screw is spring-loaded and locks the FPM card in place. The top screw cams the FPM card into and out of the backplane.

> **CAUTION:** The torque tool supplied with the SD-64 Director is designed to tighten Director logic cards and is set to release at a torque value of six inch-pounds. Do not use an Allen wrench or torque tool designed for use with another Compaq product. Use of the wrong tool may overtighten and damage logic cards.

   a. Insert the torque tool into the locking Allen screw at the bottom of the card. Turn the screw counterclockwise until the spring releases and the tool turns freely.

   b. Insert the torque tool(❶) into the cam Allen screw at the top of the card (❷). To unseat the FPM card and cam it out of the backplane, turn the screw counterclockwise until the tool turns freely (Figure 4–5).

8. Pull the FPM card from its card track and remove it from the Director chassis. Place the card in an antistatic bag to provide ESD protection.

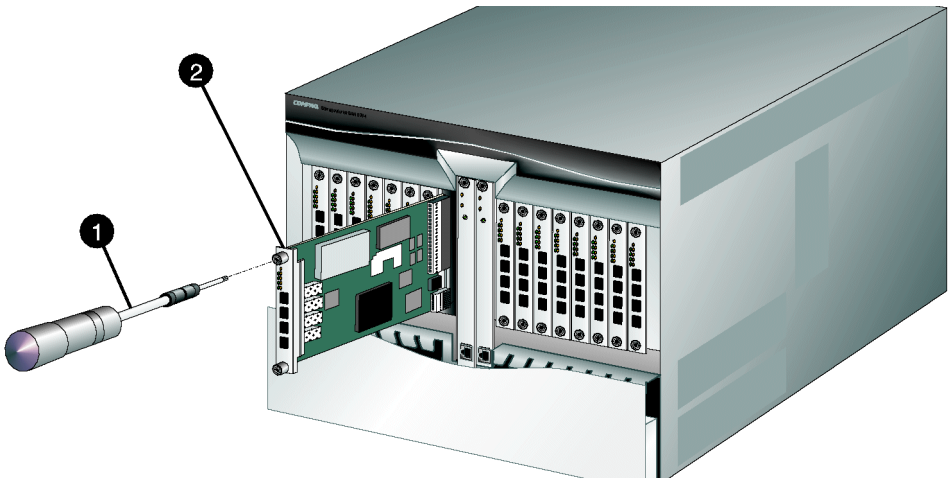


Figure 4–5: FPM Card Removal and Replacement

Replacement

To replace an FPM card:

1. Remove the replacement card from its protective antistatic bag.

2. Hold the card by its stiffener and insert it in the chassis card track (Figure 4–5). The label identifying the card should be at the top. Verify the card is aligned in the card tracks, then slide it forward until it makes contact with the backplane.
3. Secure the FPM card as follows:
   a. Insert the torque tool into the cam Allen screw at the top of the card. Turn the torque tool clockwise until you feel it release and hear a clicking sound. As the screw turns clockwise, the card cams into the backplane connector.
   b. Insert the torque tool into the locking Allen screw at the bottom of the card. Turn the torque tool clockwise until you feel it release and hear a clicking sound. As the screw turns clockwise, the card locks into place.
   c. Verify the card stiffener is flush with the front of the card cage and even with other Director logic cards.
4. Perform an external loopback test for all ports on the replacement FPM card. For instructions, refer to External Loopback Test on page 3–31 and return here. If the test fails, go to MAP 0000: Start MAP on page 2–2 to isolate the problem.
5. Reconnect a fiber-optic jumper cable to each port on the card as follows. Inspect the label on the jumper cable to ensure the correct connection. Repeat this step for all four ports.
   a. Remove the protective cap from the cable connector and the protective plug from the port's optical transceiver. Store the cap and plug in a suitable location for safekeeping.
   b. Clean the cable and port connectors. For instructions, refer to Clean Fiber-Optic Components on page 3–35 and return here.
   c. Insert the keyed LC cable connector into the port's optical transceiver.
6. Disconnect the ESD wrist strap from the Director chassis and your wrist.
7. Inspect the FPM card to ensure all amber LEDs are extinguished. If any amber LEDs are illuminated, go to MAP 0000: Start MAP on page 2–2 to isolate the problem.
8. At the SDCM server's Hardware View, select Event Log from the Logs menu. The Event Log displays. Ensure the following event codes appear in the log:
   - ❏ **500**-FPM card hot-insertion initiated.
   - ❏ **501**-FPM card hot-insertion completed.

   If an event code **501** does not appear in the log, go to MAP 0000: Start MAP on page 2–2 to isolate the problem.
9. At the Hardware View, click the graphic representing the replacement card to open the Port Card View. At the Port Card View:

a. Ensure no alert symbols appear that indicate a failure (yellow triangle or red diamond).

b. Verify FPM card information (FRU name, position, and state) is correct.

If a problem is indicated, go to MAP 0000: Start MAP on page 2–2 to isolate the problem.

10. Close and lock the equipment cabinet door.
11. Restore communication to the replacement FPM card and set the card online as directed by the customer. For instructions, refer to Unblock an FPM Card on page 3–43 and return here. Inform the customer the FPM card is available for use.
12. Perform the data collection procedure. For instructions, refer to Collecting Maintenance Data on page 3–34 and return here.
13. Clear the amber system error LED on the Director bezel as follows:
    a. At the Hardware View, right-click the front panel bezel graphic (away from a FRU) to open a menu.
    b. Click Clear System Error Light.

SFF Optical Transceiver

Use the following procedures to remove or replace an SFF optical transceiver from an FPM card. A list of tools required is provided.

Tools Required

The following tools are required to perform these procedures.

- Fiber-optic protective plug (provided with the Director).
- Protective cap (provided with the fiber-optic jumper cable).
- Fiber-optic cleaning kit.

Removal

To remove an SFF optical transceiver:

1. Notify the customer that the port with the defective transceiver will be blocked. Ensure the customer's system administrator sets the attached device offline.

2. If the Director is installed in a stand-alone configuration, go to step 3. If the Director is rack-mounted, unlock and open the cabinet front door as directed by the customer representative.
3. Identify the defective port transceiver from the amber LED on the FPM card or failure information at the SDCM server's Port Card View.
4. Block communication to the port. For instructions, refer to Block a Port on page 3–41 and return here.
5. Disconnect the fiber-optic jumper cable from the port as follows:
   a. Pull the keyed LC free from the port's optical transceiver.
   b. Place a protective cap over the cable connector.
6. Depending on the manufacturer, the optical transceiver may have a locking mechanism to secure the transceiver in the port receptacle, or the transceiver may have a pull tab to assist in removal.
   a. If required, disengage the locking mechanism (usually at the left side of the transceiver) by squeezing the mechanism or pushing it toward the port receptacle.
   b. Grasp the pull tab or the optical transceiver frame and pull the transceiver (❶) from the port receptacle (Figure 4–6).

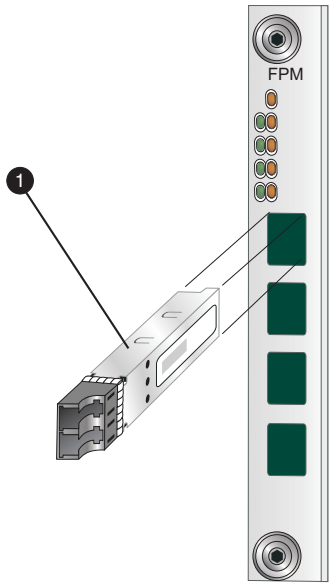


Figure 4–6: SFF Optical Transceiver Removal and Replacement

Replacement

To replace an SFF optical transceiver:

1. Remove the transceiver from its packaging.
2. As shown in Figure 4–6, insert the transceiver into the port receptacle.
3. Perform an external loopback test for the port. For instructions, refer to External Loopback Test on page 3–31 and return here. If the test fails, go to MAP 0000: Start MAP on page 2–2 to isolate the problem.
4. Reconnect the fiber-optic jumper cable as follows:
   a. Remove the protective cap from the cable connector and the protective plug from the port's optical transceiver. Store the cap and plug in a suitable location for safekeeping.
   b. Clean the cable and port connectors.
   c. Insert the keyed LC cable connector into port's optical transceiver.
5. Inspect the FPM card with the replacement port transceiver to ensure all amber LEDs are extinguished. If any amber LEDs are illuminated, go to MAP 0000: Start MAP on page 2–2 to isolate the problem.
6. At the SDCM server's Hardware View, select Event Log from the Logs menu. The Event Log displays. Ensure an event code **510** (SFF optics card hot-insertion initiated) appears in the log.

   If an event code **510** does not appear in the log, go to MAP 0000: Start MAP on page 2–2 to isolate the problem.
7. At the Hardware View, click the graphic representing the FPM card with the replacement transceiver to open the Port Card View. At the Port Card View:
   a. Ensure no alert symbols appear that indicate a port failure (yellow triangle or red diamond).
   b. Click the port with the replacement transceiver to open the Port Properties dialog box. Verify port information is correct.
   c. Right-click the port with the replacement transceiver and select Port Technology option the menu. The Port Technology dialog box displays. Verify port technology information is correct.

   If a problem is indicated, go to MAP 0000: Start MAP on page 2–2 to isolate the problem.
8. Close and lock the equipment cabinet door.

9. Restore communication to the port with the replacement transceiver as directed by the customer. For instructions, refer to Unblock a Port on page 3–42 and return here. Inform the customer the port is available for use.
10. Clear the amber system error LED on the Director bezel as follows:
    a. At the Hardware View, right-click the front panel bezel graphic (away from a FRU) to open a menu.
    b. Click Clear System Error Light.

FPM Filler Blank

Use the following procedures to remove or replace an FPM filler blank. Filler blanks cover and protect unused FPM card slots in the Director chassis. A list of tools required is provided.

Tools Required

The following tool is required to perform these procedures.

- Torque tool and hex adapter (provided with the Director).

Removal

To remove a filler blank:

1. If the Director is installed in a stand-alone configuration, go to step 2. If the Director is rack-mounted, unlock and open the cabinet front door as directed by the customer representative.
2. Identify the filler blank to be removed.
3. The filler blank is secured to the Director chassis with two captive Allen screws. Both screws are spring-loaded to lock the filler blank in place.
4. Insert the torque tool (❶) into each locking Allen screw in the filler blank (❷). Turn each screw counterclockwise until the spring releases and the tool turns freely (Figure 4–7).

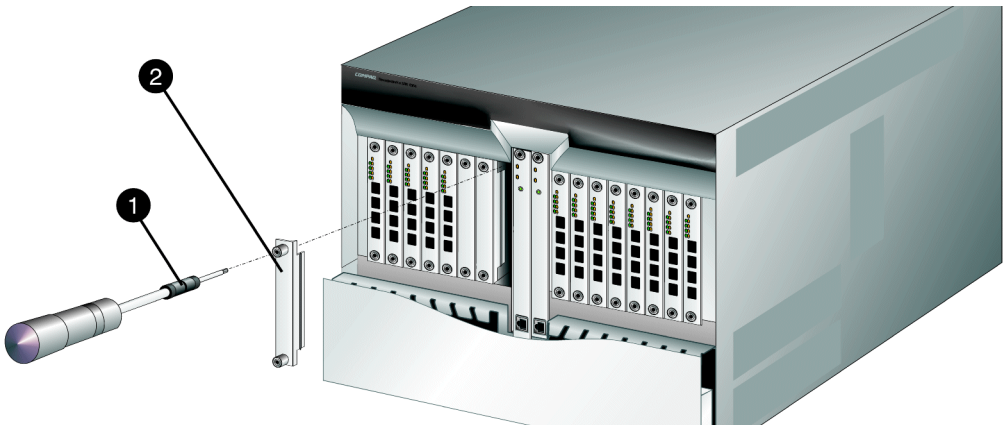


Figure 4–7: FPM Filler Blank Removal and Replacement

5. Pull the filler blank out and remove it from the Director chassis.

Replacement

To replace a filler blank:

1. Remove the filler blank from its packaging.
2. Hold the filler blank by its stiffener and insert it in the chassis card track (Figure 4–7 on page 4–17).
3. To secure the filler blank, sequentially insert the torque tool into each locking Allen screw. Turn each screw clockwise until you feel the torque tool release and hear a clicking sound. As each screw turns clockwise, the filler blank locks into place.
4. Verify the filler blank stiffener is flush with the front of the card cage and even with other Director logic cards.
5. Close and lock the equipment cabinet door.

Redundant Power Supply

Use the following procedures to remove or replace a redundant power supply. A list of tools required is provided.

Tools Required

The following tool is required to perform these procedures.

- ESD grounding cable and wrist strap.

Removal

To remove a redundant power supply:

1. If the Director is installed in a stand-alone configuration, go to step 2. If the Director is rack-mounted, unlock and open the cabinet front door as directed by the customer representative.
2. Follow ESD procedures by attaching a wrist strap to the Director chassis and your wrist (Figure 4–1 on page 4–3).

> **CAUTION:** To avoid causing machine errors or damage while working on the Director, follow ESD procedures by connecting a grounding cable to the Director chassis and wearing an ESD wrist strap.

3. For power supply access, rotate the cable management assembly 90^0 upward until the right-side captive pin engages, locking the cable management assembly in the up position.
4. Identify the defective power supply from the extinguished green **PWR OK** LED on the supply or failure information at the SDCM Server's Hardware View.
5. Push the locking pin to the left **(❶)** to release the cam lever at the top of the power supply (Figure 4–8).
6. Pull the cam lever out and to the right **(❷)** to cam the power supply out of the Director chassis.

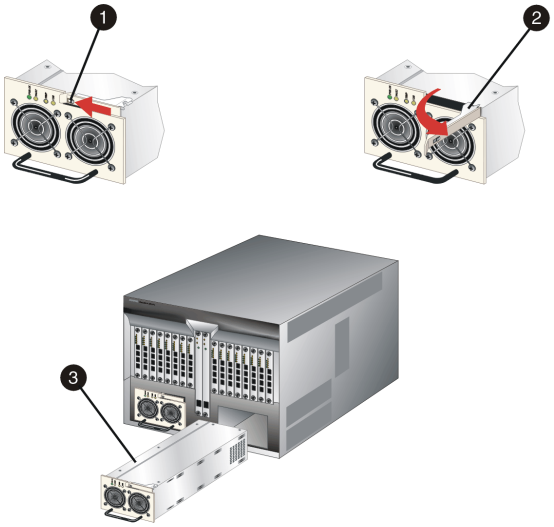


Figure 4–8: Redundant Power Supply Removal and Replacement

7. Pull the power supply (❸) from the Director. Support the power supply with one hand when performing this step.
8. Place the power supply in an antistatic bag to provide ESD protection.

Replacement

To replace a redundant power supply:

1. Remove the replacement power supply from its protective antistatic bag.
2. Inspect the rear of the power supply for bent or broken connector pins that may have been damaged during shipping. If any pins are damaged, obtain a new power supply.
3. Orient the power supply as shown in Figure 4–8 with the cam lever disengaged and pulled out.
   a. Insert the power supply into the Director chassis guide, then push the power supply toward the backplane to engage the connector pins.
   b. Push the cam lever in and to the left to cam the power supply into the Director chassis. Ensure the locking pin is engaged in the cam lever.
4. Disconnect the ESD wrist strap from the Director chassis and your wrist.

5. Inspect the power supply to ensure the green **PWR OK** LED is illuminated and all amber LEDs are extinguished. If a problem is indicated, go to MAP 0000: Start MAP on page 2–2 to isolate the problem.
6. Disengage the right-side captive pin of the cable management assembly, then rotate the assembly 90° downward.
7. At the SDCM server's Hardware View, select Event Log from the Logs menu. The Event Log displays. Ensure an event code **207** (power supply installed) appears in the log.

   If an event code **207** does not appear in the log, go to MAP 0000: Start MAP on page 2–2 to isolate the problem.
8. At the Hardware View, observe the graphic representing the replacement power supply and ensure no alert symbols appear that indicate a failure (yellow triangle or red diamond). If a problem is indicated, go to MAP 0000: Start MAP on page 2–2 to isolate the problem.
9. At the Hardware View, click the graphic representing the replacement power supply to open the FRU Properties dialog box. Verify that information (FRU name, position, and state) is correct. If a problem is indicated, go to MAP 0000: Start MAP on page 2–2 to isolate the problem.
10. Close and lock the equipment cabinet door.
11. Perform the data collection procedure. For instructions, refer to Collecting Maintenance Data on page 3–34 and return here.
12. Clear the amber system error LED on the Director bezel as follows:
    a. At the Hardware View, right-click the front panel bezel graphic (away from a FRU) to open a menu.
    b. Click Clear System Error Light.

Redundant SBAR Assembly

Use the following procedures to remove or replace a redundant SBAR assembly (two assemblies in the Director) with the backup SBAR assembly operational. A list of tools required is provided.

Tools Required

The following tools are required to perform these procedures.

- Standard flat-tip screwdriver.
- ESD grounding cable and wrist strap.
- Torque tool and hex adapter (provided with the Director).

Removal

To remove a redundant SBAR assembly:

1. If the Director is installed in a stand-alone configuration, go to step 2. If the Director is rack-mounted, unlock and open the cabinet rear door as directed by the customer representative.
2. Follow ESD procedures by attaching a wrist strap to the Director chassis and your wrist (Figure 4–2 on page 4–3).

> **CAUTION:** To avoid causing machine errors or damage while working on the Director, follow ESD procedures by connecting a grounding cable to the Director chassis and wearing an ESD wrist strap.

3. Remove the RFI shield.
4. Identify the defective SBAR assembly from the amber LED on the assembly or failure information at the SDCM Server's Hardware View.
5. The SBAR assembly is secured to the Director backplane with two brass Allen screws. Both screws cam the assembly into and out of the backplane. Disconnect the SBAR assembly from the Director backplane as follows:

> **CAUTION:** The torque tool supplied with the SD-64 Director is designed to tighten Director logic cards and is set to release at a torque value of six inch-pounds. Do not use an Allen wrench or torque tool designed for use with another Compaq product. Use of the wrong tool may overtighten and damage logic cards.

   a. Insert the tip of the torque tool **(❶)** into either brass Allen screw of the SBAR assembly **(❷)**. Turn the screw one or two turns counterclockwise (Figure 4–9).

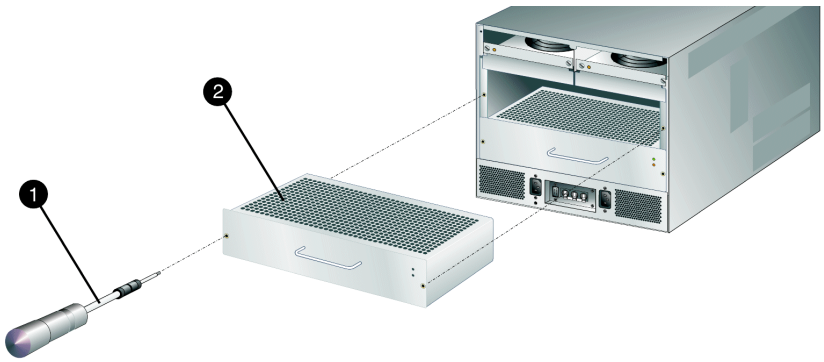


Figure 4–9: SBAR Assembly Removal and Replacement

b. Insert the tip of the torque tool into the other brass Allen screw. Turn the screw one or two turns counterclockwise.

c. Alternately loosen each Allen screw one or two turns until the torque tool turns freely.

6. Using the handle, pull the SBAR assembly out of the Director chassis. Support the assembly with one hand when performing this step.

7. Place the SBAR assembly in an antistatic bag to provide ESD protection.

Replacement

To replace a redundant SBAR assembly:

1. Remove the replacement SBAR assembly from its protective antistatic bag.

2. Inspect the printed wiring assembly (PWA) side of the SBAR assembly for bent or broken connector pins that may have been damaged during shipping. If any pins are damaged, obtain a new assembly.

3. Orient the SBAR assembly as shown in Figure 4–9. Insert the assembly into the Director chassis guide, then push the assembly toward the backplane to engage the connector pins.

4. Tighten the brass Allen screws that secure the SBAR assembly to the backplane as follows. Tighten the screws alternately to prevent binding and damage to the connector pins.

a. Insert the tip of the torque tool into either brass Allen screw (right or left side of the assembly). Turn the screw one or two turns clockwise. As the screw turns, that side of the assembly pulls into the backplane connector.

b. Insert the tip of the torque tool into the other brass Allen screw. Turn the screw one or two turns clockwise. As the screw turns, the alternate side of the assembly pulls into the backplane connector.

c. Alternately tighten each Allen screw one or two turns until you feel the torque tool release and hear a clicking sound.

d. Verify the assembly is flush and even with the other SBAR assembly in the Director.

5. Disconnect the ESD wrist strap from the Director chassis and your wrist.
6. Inspect the assembly to ensure the amber LED is extinguished. If the amber LED is illuminated, go to MAP 0000: Start MAP on page 2–2 to isolate the problem.
7. At the SDCM server's Hardware View, select the Event Log option from the Logs icon. The Event Log displays. Ensure the following event codes appear in the log:

   ❏ **600**-SBAR card hot-insertion initiated.

   ❏ **601**-SBAR card hot-insertion completed.

   If an event code **601** does not appear in the log, go to MAP 0000: Start MAP on page 2–2 to isolate the problem.
8. At the Hardware View, observe the graphic representing the replacement SBAR assembly and ensure no alert symbols appear that indicate a failure (yellow triangle or red diamond). If a problem is indicated, go to MAP 0000: Start MAP on page 2–2 to isolate the problem.
9. At the Hardware View, click the graphic representing the replacement SBAR assembly to open the FRU Properties dialog box. Verify that information (FRU name, position, and state) is correct. If a problem is indicated, go to MAP 0000: Start MAP on page 2–2 to isolate the problem.
10. Replace the RFI shield.
11. Close and lock the equipment cabinet door.
12. Perform the data collection procedure. For instructions, refer to Collecting Maintenance Data on page 3–34 and return here.
13. If the customer requests the replacement SBAR assembly be set as the active SBAR, perform a FRU switchover. At the Hardware View, right-click the graphic representing the replacement assembly to open a menu, then select Switchover.
14. Clear the amber system error LED on the Director bezel as follows:

    a. At the Hardware View, right-click the front panel bezel graphic (away from a FRU) to open a menu.

    b. Click Clear System Error Light.

Redundant Fan Module

Use the following procedures to remove or replace a redundant cooling fan module. A list of tools required is provided.

Tools Required

The following tools are required to perform these procedures.

- Standard flat-tip screwdriver.
- ESD grounding cable and wrist strap.

Removal

To remove a redundant fan module:

1. If the Director is installed in a stand-alone configuration, go to step 2. If the Director is rack-mounted, unlock and open the cabinet rear door as directed by the customer representative.
2. Follow ESD procedures by attaching a wrist strap to the Director chassis and your wrist (Figure 4–2 on page 4–3).

CAUTION: To avoid causing machine errors or damage while working on the Director, follow ESD procedures by connecting a grounding cable to the Director chassis and wearing an ESD wrist strap.

3. Remove the RFI shield.
4. Identify the defective fan module from the amber LED on the module or failure information at the SDCM Server's Hardware View.
5. Two captive screws secure the fan module (❶) to the Director chassis (Figure 4–10). Using a standard flat-tip screwdriver, loosen the captive screws.

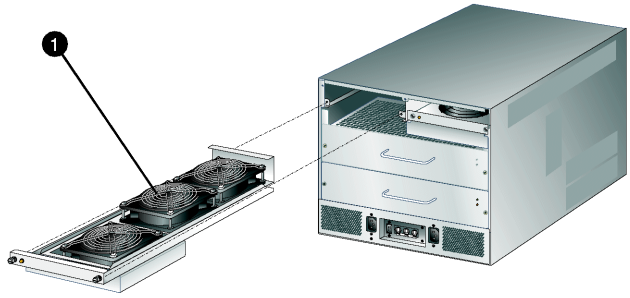


Figure 4–10: Fan Module Removal and Replacement

6. Using the rear of the fan module as a handle, pull the module from the Director. Support the fan module with one hand when performing this step.

> **CAUTION:** Do not remove a fan module unless the replacement module is available. Operation of the Director with only one fan module for an extended period may cause one or more thermal sensors to post event codes.

7. Place the fan module in an antistatic bag to provide ESD protection.

Replacement

To replace the fan module:

1. Remove the replacement fan module from its protective antistatic bag.
2. Inspect the PWA on the underside of the fan module for bent or broken connector pins that may have been damaged during shipping. If any pins are damaged, obtain a new fan module.
3. Position the fan module at the rear of the Director chassis as shown in Figure 4–10. Using the rear of the fan module as a handle, push the module toward the backplane to engage the connector pins. Support the fan module with one hand when performing this step.
4. Using a standard flat-tip screwdriver, tighten the two captive screws that secure the fan module to the Director chassis.
5. Disconnect the ESD wrist strap from the Director chassis and your wrist.
6. Inspect the fan module to ensure the amber LED is extinguished. If the LED is illuminated, go to MAP 0000: Start MAP on page 2–2 to isolate the problem.

7. At the SDCM server's Hardware View, select Event Log from the Logs menu. The Event Log displays. Ensure an event code **321** (fan FRU inserted) appears in the log.

   If an event code **321** does not appear in the log, go to MAP 0000: Start MAP on page 2–2 to isolate the problem.

8. At the Hardware View, observe the graphic representing the replacement fan module and ensure no alert symbols appear that indicate a failure (yellow triangle or red diamond). If a problem is indicated, go to MAP 0000: Start MAP on page 2–2 to isolate the problem.

9. At the Hardware View, click the graphic representing the replacement fan module to open the FRU Properties dialog box. Verify that information (FRU name, position, and state) is correct. If a problem is indicated, go to MAP 0000: Start MAP on page 2–2 to isolate the problem.

10. Replace the RFI shield.

11. Close and lock the equipment cabinet door.

12. Perform the data collection procedure. For instructions, refer to Collecting Maintenance Data on page 3–34 and return here.

13. Clear the amber system error LED on the Director bezel as follows:

    a. At the Hardware View, right-click the front panel bezel graphic (away from a FRU) to open a menu.

    b. Click Clear System Error Light.

Power Module Assembly

Use the following procedures to remove or replace the power module assembly. A list of tools required is provided.

Tools Required

The following tools are required to perform these procedures.

- Standard flat-tip screwdriver.
- Standard cross-tip (Phillips) screwdriver.
- ESD grounding cable and wrist strap.

Removal

To remove the power module assembly:

1. Notify the customer the Director will be powered off. Ensure the customer's system administrator quiesces Fibre Channel frame traffic through the Director and sets attached devices offline.
2. If the Director is installed in a stand-alone configuration, go to step 3. If the Director is rack-mounted, unlock and open the cabinet front and rear doors as directed by the customer representative.
3. Power off and unplug the Director. For instructions, refer to Power-Off Procedure on page 3–37 and return here.

> **WARNING:** Ensure both power cords are disconnected from the power module assembly prior to removal or replacement.

4. Follow ESD procedures by attaching a wrist strap to an approved bench grounding point and your wrist.

> **CAUTION:** To avoid causing machine errors or damage while working on the Director, follow ESD procedures by connecting a grounding cable to an approved bench grounding point and wearing an ESD wrist strap.

5. Unseat and disconnect (but do not remove) both power supplies. For instructions, refer to Redundant Power Supply on page 4–17 and return here.
6. Remove the RFI shield.
7. Remove both SBAR assemblies. For instructions, refer to Redundant SBAR Assembly on page 4–20 and return here.
8. Six panhead Phillips screws (two at the top and four at the bottom) secure the power module assembly (❶) to the Director chassis (Figure 4–11). Using a standard Phillips screwdriver, loosen and remove the screws.

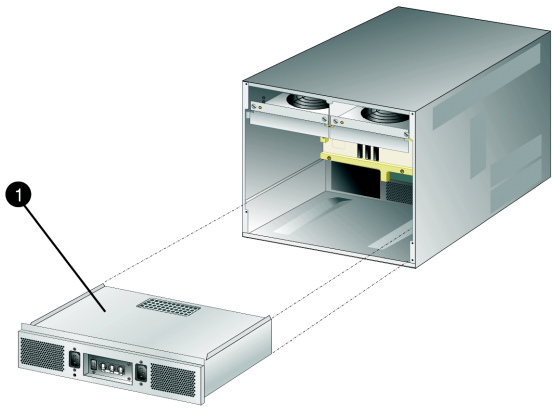


Figure 4–11: Power Module Assembly Removal and Replacement

9. Pull the power module assembly (with the SBAR assembly support shelf) out of the Director chassis. Support the assembly with one hand when performing this step.
10. Place the power module assembly in an antistatic bag to provide ESD protection.

Replacement

To replace the power module assembly:

1. Remove the replacement power module assembly from its protective antistatic bag.
2. Inspect the PWA side of the power module assembly for bent or broken connector pins that may have been damaged during shipping. If any pins are damaged, obtain a new assembly.
3. Position the power module assembly at the rear of the Director chassis as shown in Figure 4–11. Push the module toward the backplane to engage the connector pins. Support the fan module with one hand when performing this step.
4. Using a standard Phillips screwdriver, insert and tighten the six panhead Phillips screws that secure the power module assembly.
5. Replace both SBAR assemblies. For instructions, refer to Redundant SBAR Assembly on page 4–20 and return here.
6. Replace the RFI shield.
7. Seat and connect both power supplies. For instructions, refer to Redundant Power Supply on page 4–17 and return here.

8. Disconnect the ESD wrist strap from the Director chassis and your wrist.
9. Power on the Director. For instructions, refer to Power-On Procedure on page 3–36.
10. Verify that power-on self-tests (POSTs) complete and the green power LED on the front bezel, green LED on the active CTP card, and green **PWR OK** LEDs on both power supplies remain illuminated. If a problem is indicated, go to MAP 0000: Start MAP on page 2–2 to isolate the problem.
11. At the SDCM server's Hardware View, observe all FRU graphics and ensure no alert symbols appear that indicate a failure (yellow triangle or red diamond). If a problem is indicated, go to MAP 0000: Start MAP on page 2–2 to isolate the problem.
12. Close and lock the equipment cabinet doors.
13. Perform the data collection procedure. For instructions, refer to Collecting Maintenance Data on page 3–34 and return here.
14. If required, clear the amber system error LED on the Director bezel as follows:
    a. At the Hardware View, right-click the front panel bezel graphic (away from a FRU) to open a menu.
    b. Click Clear System Error Light.

Backplane

Use the following procedures to remove or replace the backplane. A list of tools required is provided.

Tools Required

The following tools are required to perform these procedures.

- Torque tool and hex adapter (provided with the Director).
- Standard flat-tip screwdriver.
- Standard cross-tip (Phillips) screwdriver.
- ESD grounding cable and wrist strap.
- Maintenance terminal (desktop or notebook PC) with:
  - The Microsoft Windows 98, Windows 2000, Windows Millennium Edition, or Windows NT 4.0 operating system.
  - RS-232 serial communication software (such as ProComm Plus or HyperTerminal). HyperTerminal is provided with Windows operating systems.

- Asynchronous RS-232 modem cable (provided with the Director).

Removal

To remove the backplane:

1. At the Hardware View, click the graphic representing the Director bezel (do not click a graphical FRU) to open the Director Properties dialog box. Record the Director serial number. This number must be programmed into the replacement backplane.

   If the Director is not communicating with the SDCM server (Director Properties dialog box is not available), obtain the serial number while performing step 5.

2. Notify the customer the Director will be powered off. Ensure the customer's system administrator quiesces Fibre Channel frame traffic through the Director and sets attached devices offline.
3. If the Director is installed in a stand-alone configuration, go to step 4. If the Director is rack-mounted, unlock and open the cabinet front and rear doors as directed by the customer representative.
4. Power off and unplug the Director. For instructions, refer to Power-Off Procedure on page 3–37 and return here.

WARNING: Ensure both power cords are disconnected from the power module assembly prior to removal or replacement.

5. If necessary, record the Director serial number from the silver label at the bottom front of the chassis (under the CTP cards).
6. Follow ESD procedures by attaching a wrist strap to an approved bench grounding point and your wrist.

CAUTION: To avoid causing machine errors or damage while working on the Director, follow ESD procedures by connecting a grounding cable to an approved bench grounding point and wearing an ESD wrist strap.

7. Unseat and disconnect all logic cards (CTP and FPM cards) from the backplane. Unseat the cards only, do not remove them from the Director chassis. In addition, do not disconnect the Ethernet or fiber-optic cables. For each logic card:

   a. Insert the torque tool into the locking Allen screw at the bottom of the card. Turn the screw counterclockwise until the spring releases and the tool turns freely.

b. Insert the torque tool into the Allen screw at the top of the card. To unseat the card and cam it out of the backplane, turn the screw counterclockwise until the tool turns freely.

c. Disconnect the card from the backplane by pulling it out of the card track approximately two inches.

8. Unseat and disconnect (but do not remove) both power supplies. For instructions, refer to Redundant Power Supply on page 4–17 and return here.
9. Remove the RFI shield.
10. Remove both fan modules. For instructions, refer to Redundant Fan Module on page 4–24 and return here.
11. Remove both SBAR assemblies. For instructions, refer to Redundant SBAR Assembly on page 4–20 and return here.
12. Remove the power module assembly. For instructions, refer to Power Module Assembly on page 4–26 and return here.
13. The backplane (❶) is secured to the Director chassis with 11 panhead Phillips screws (Figure 4–12).

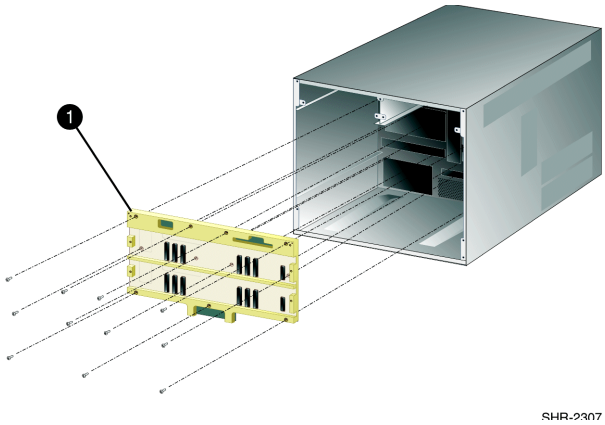


Figure 4–12: Backplane Removal and Replacement

Remove the backplane as follows:

a. Using a standard Phillips screwdriver, loosen and remove ten of the 11 screws that secure the backplane to the chassis. Loosen the screws alternately from bottom to top and from side to side. Leave one of the top center screws in place until ready to remove the backplane.

b. While holding the backplane in place, loosen and remove the top center screw.

c. Tilt the top of the backplane away from the Director chassis.

d. Remove the backplane (PWA and frame as one FRU) from the chassis. Place the backplane in an antistatic bag to provide ESD protection.

Replacement

To replace the backplane and all FRUs disconnected from the backplane:

1. Replace the backplane:
   a. Remove the replacement backplane from its protective antistatic bag. Inspect the backplane PWA to ensure no connector pins are damaged.
   b. As shown in Figure 4–12, align the guide pins on the back of the backplane with the alignment holes in the Director chassis.
   c. While holding the backplane in place, insert and hand tighten one of the top center panhead Phillips screws.
   d. Insert and hand tighten the remaining ten panhead Phillips screws. Tighten the screws alternately from bottom to top and from side to side.
   e. Using a standard Phillips screwdriver, tighten the 11 panhead screws that secure the backplane to the chassis. Tighten the screws alternately from bottom to top and from side to side.
2. Replace the power module assembly. For instructions, refer to Power Module Assembly on page 4–26 and return here.
3. Replace both SBAR assemblies. For instructions, refer to Redundant SBAR Assembly on page 4–20 and return here.
4. Replace both fan modules. For instructions, refer to Redundant Fan Module on page 4–24 and return here.
5. Replace the RFI shield.
6. Seat and connect both power supplies. For instructions, refer to Redundant Power Supply on page 4–17 and return here.
7. Seat all logic cards (CTP and FPM cards) into the backplane. For each logic card:
   a. Slide the card forward until it makes contact with the backplane.
   b. Insert the torque tool into the Allen screw at the top of the card. Turn the torque tool clockwise until you feel it release and hear a clicking sound. As the screw turns clockwise, the card cams into the backplane connector.

c. Insert the torque tool into the locking Allen screw at the bottom of the card. Turn the torque tool clockwise until you feel it release and hear a clicking sound. As the screw turns clockwise, the card locks into place.

d. Verify the card stiffener is flush with the front of the card cage and even with other Director logic cards.

8. Disconnect the ESD wrist strap from the Director chassis and your wrist.
9. Power on the Director. For instructions, refer to Power-On Procedure on page 3–36.
10. Verify that POSTs complete and the green power LED on the front bezel, green LED on the active CTP card, and green **PWR OK** LEDs on both power supplies remain illuminated. If a problem is indicated, go to MAP 0000: Start MAP on page 2–2 to isolate the problem.
11. Reprogram the replacement backplane with the original Director serial number as follows:

a. Connect the 9-pin end of the RS-232 modem cable to the 9-pin maintenance port on the Director.

b. Connect the other cable end to a 9-pin communication port (**COM1** or **COM2**) at the rear of the maintenance terminal PC.

c. Power on the maintenance terminal and establish a hyperterminal connection. Use the following settings:

- ❏ Bits per second-**57600**.
- ❏ Data bits-**8**.
- ❏ Parity-**None**.
- ❏ Stop bits-**1**.
- ❏ Flow control-**Hardware**.

When the parameters are set, click OK. The HyperTerminal window displays.

d. At the **>** prompt, type the maintenance-level password (the default is **level-2**) and press **Enter**. The password is case sensitive. The HyperTerminal window displays with an **SSP0>** prompt at the top of the window.

e. Type the command **oem nnnnnnnn**, where **nnnnnnnn** is the original Director serial number recorded in step 1 or step 5 of the removal procedure.

f. Select Exit from the File menu to close the HyperTerminal application.

12. Initial machine load (IML) the Director. At the front of the Director, press and hold the white IML button on the faceplate of the active CTP card (green LED illuminated) for three seconds.

13. At the SDCM server's Hardware View, observe all FRU graphics and ensure no alert symbols appear that indicate a failure (yellow triangle or red diamond). If a problem is indicated, go to MAP 0000: Start MAP on page 2–2 to isolate the problem.
14. Close and lock the equipment cabinet doors.
15. Perform the data collection procedure. For instructions, refer to Collecting Maintenance Data on page 3–34 and return here.
16. If required, clear the amber system error LED on the Director bezel as follows:
    a. At the Hardware View, right-click the front panel bezel graphic (away from a FRU) to open a menu.
    b. Click Clear System Error Light.

Chapter 5

Illustrated Parts Breakdown

This chapter provides an illustrated parts breakdown for all SD-64 Director field-replaceable units (FRUs). Exploded-view assembly drawings are provided for:

- Front-accessible FRUs.
- Rear-accessible FRUs.
- Power plugs and receptacles.

Exploded-view illustrations portray the Director disassembly sequence for clarity. Illustrated FRUs are numerically keyed to associated tabular parts lists. The parts lists also include Compaq part numbers, descriptions, and quantities.

An (*ESD*) symbol precedes the description of a FRU containing electrostatic discharge (ESD) sensitive components. Handle ESD-labelled FRUs in accordance with caution statements in this manual.

Front-Accessible FRUs

Figure 5–1 on page 5–2 illustrates front-accessible FRUs. Table 5–1 on page 5–2 is the front- accessible FRU parts lists. The table includes reference numbers to Figure 5–1 on page 5–2, FRU part numbers, descriptions, and quantities.

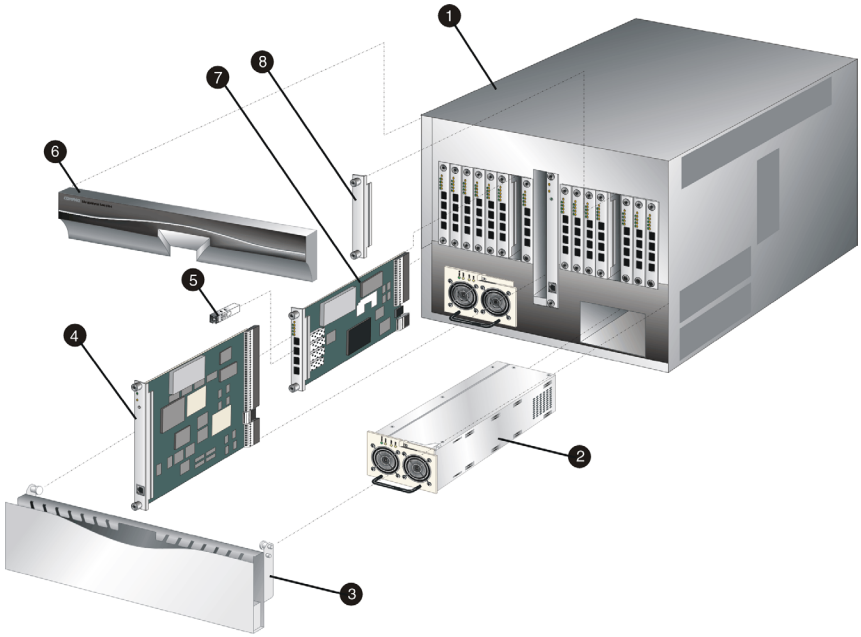


Figure 5–1: Front-Accessible FRUs

Table 5–1: Front-Accessible FRU Parts List

Ref.	Part Number	Description	Qty.
Ref		Base assembly, SD-64 Director	
❶	not procurable	Chassis assembly	1
❷	254137-001	(*ESD*) Power supply, 85-264 VAC, 48 VDC	2
❸	not procurable	Cable management assembly	1
❹	254136-001	(*ESD*) Printed wiring assembly, control processor (CTP)	2
❺	254141-001	Transceiver, optical, shortwave laser, 1.0625 Gb/s, 850 nm, LC	0 to 64
	254142-001	Transceiver, optical, longwave laser, 1.0625 Gb/s, 1300 nm, LC	0 to 64
❻	not procurable	Bezel assembly	1

Table 5–1: Front-Accessible FRU Parts List (Continued)

Ref.	Part Number	Description	Qty.
❼	254140-001	(*ESD*) Printed wiring assembly, fiber port module (FPM), 4-port, LC (w/o optics)	8 to 16
❽	254130-001	Filler blank, FPM	0 to 8

Rear-Accessible FRUs

Figure 5–2 and Figure 5–3 on page 5–4 illustrate rear-accessible FRUs. Table 5–2 on page 5–4 and Table 5–3 on page 5–4 are the rear-accessible FRU parts lists. The tables include reference numbers to Figure 5–2 and Figure 5–3 on page 5–4, FRU part numbers, descriptions, and quantities.

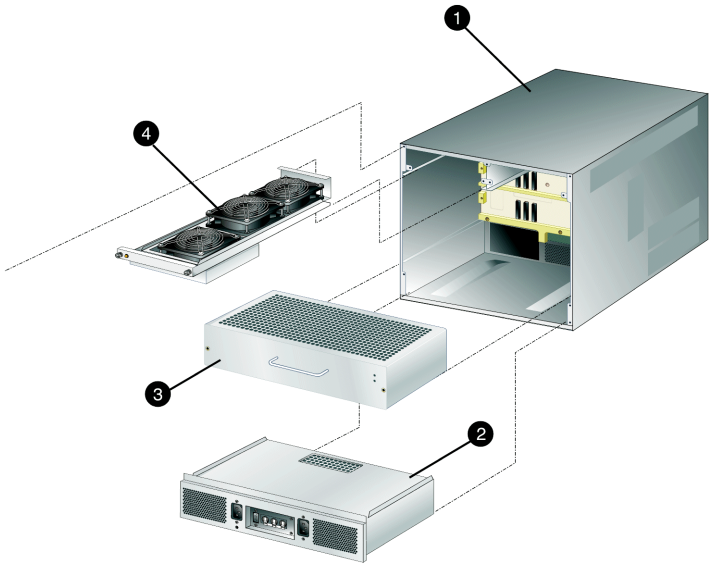


Figure 5–2: Rear-Accessible FRUs (Part 1)

Table 5–2: Rear-Accessible FRU Parts List (Part 1)

Ref.	Part Number	Description	Qty.
Ref		Base assembly, SD-64 Director	
❶	not procurable	Chassis assembly	1
❷	254128-001	(*ESD*) Power module assembly	1
❸	254133-001	(*ESD*) Printed wiring assembly, serial crossbar (SBAR)	2
❹	254129-001	(*ESD*) Fan module	2

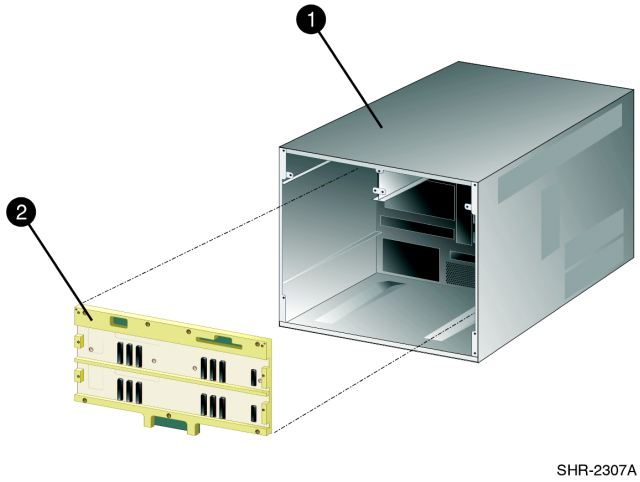


Figure 5–3: Rear-Accessible FRUs (Part 2)

Table 5–3: Rear-Accessible FRU Parts List (Part 2)

Ref.	Part Number	Description	Qty.
Ref		Base assembly, SD-64 Director	
❶	not procurable	Chassis assembly	1
❷	254131-001	(*ESD*) Printed wiring assembly, backplane	1

Table 5–4: Miscellaneous Parts

Ref.	Part Number	Description	Qty.
Ref	254138-001	Power cord, 120V, United States	
Ref	254139-001	Cable, power cord adapter	
Ref	254143-001	Cable, Ethernet, 10 ft	
Ref	254144-001	Cable, null modem, 10 ft	
Ref	254145-001	Plug, loopback, shortwave	
Ref	254146-001	Plug, loopback, longwave	
Ref	254135-001	Screwdriver, with bit	
Ref	254147-001	Rackmount kit, 9000 series	
Ref	254148-001	Rackmount kit, M series	

Appendix A

Messages

This appendix lists information and error messages that appear in pop-up message boxes at the SANworks Director Connectivity Manager (SDCM), SD-64 Director Product Manager, and Fabric Manager applications.

The first section of the appendix lists SDCM Manager 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 Application and Fabric Manager Messages

This section lists SDCM application and Fabric Manager information and error messages in alphabetical order.

Table A–1: SDCM Messages

Message	Description	Action
A zone must have at least one zone member.	When creating a new zone, one or more zone members must be added.	Add one or more zone members to the new zone.
A zone set must have at least one zone.	When creating a new zone set, one or more zones must be added.	Add one or more zones to the new zone set.
All alias, zone, and zone set names must be unique.	When creating a new alias, zone, or zone set, the name must be unique.	Choose a unique name for the new alias, zone, or zone set.
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.
An instance of the Fabric Manager is already open.	Only one open instance of the Fabric Manager application is allowed per workstation.	Close all but one Fabric management session.
Are you sure you want to delete this network address?	The currently- selected network address will be deleted.	Click *Yes* to delete or *No* to cancel.
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.

Table A–1: SDCM Messages (Continued)

Message	Description	Action
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 overwrite this zone set?	The selected zone set will be overwritten in the zoning library.	Click *Yes* to overwrite or *No* to cancel.
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.
Cannot delete product.	The selected product cannot be deleted.	Verify the SDCM server-to-product link is up. ■ If the link is up, the SDCM server may be busy. ■ Another Product Manager instance may be open. ■ The user may not have permission to delete the product.
Cannot display route. No active zone enabled.	You cannot show the route through a fabric with no active zone.	Enable the default zone or activate a zone set before attempting to show the route.
Cannot display route. All switches in route must be managed by the same server.	You cannot show the route through a fabric that has switches or directors that are managed by a different SDCM Server.	This route cannot be shown unless all switches and directors in the route are managed by this SDCM Server.
Cannot display route. All switches in route must support routing.	You cannot show the route through a fabric that has switches or directors which do not support routing.	The route must contain only ES-3016 or ES-3032 switches, or SD-64 directors.

Table A–1: SDCM Messages (Continued)

Message	Description	Action
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 a zone set with an invalid name. Rename zone set and try again.	A zone set must have a valid name to be modified.	Assign a valid name to the zone set, then click *Modify*.
Cannot modify a zone with an invalid name. Rename zone and try again.	A zone must have a valid name to be modified.	Assign a valid name to the zone, then click *Modify*.
Cannot modify product.	The selected product cannot be modified.	Verify the SDCM server-to-product link is up. ■ If the link is up, the SDCM server may be busy. ■ Another Product Manager instance may be open. ■ 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.
Cannot perform operation. Fabric is unknown.	This message appears if no switches in the fabric are connected to the SDCM Server.	Ensure at least one fabric-attached switch or director has an Ethernet connection to the SDCM Server and retry the operation.
Cannot perform operation. The list of attached nodes is unavailable.	This message appears when attached nodes are unavailable and the user attempts to modify a zone or create a new zone.	Verify an attached node is available and retry the operation.
Cannot retrieve current SNMP configuration.	The current SNMP configuration could not be retrieved.	Try again. If the problem persists, contact the next level of support.
Cannot save current SNMP configuration.	The current SNMP configuration could not be saved.	Try again. If the problem persists, contact the next level of support.

Table A–1: SDCM Messages (Continued)

Message	Description	Action
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 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.
Default zoning is not supported in Open Fabric Mode.	A default zone cannot be enabled when the directors in a fabric are set to Open Fabric mode.	Change the setting from Open Fabric mode to Homogeneous mode and retry the default zoning operation.
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 community names require identical write authorizations.	If configuring two communities with identical names, they must also have identical write authorizations.	Verify that both communities with the same name have the same write authorizations.
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.

Table A–1: SDCM Messages (Continued)

Message	Description	Action
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.
Error connecting to switch.	While viewing routes, the SDCM Server was unable to connect to the switch. The switch failed or the switch-to-SDCM Server Ethernet link failed.	Try the operation again. If the problem persists, contact the next level of support.
Error creating zone.	The SDC Manager application encountered an internal error.	Try the operation again. If the problem persists, contact the next level of support.
Error creating zone set.	The SDC Manager application encountered an internal error.	Try the operation again. If the problem persists, contact the next level of support.
Error deleting zone.	The SDC Manager application encountered an internal error.	Try the operation again. If the problem persists, contact the next level of support.
Error deleting zone set.	The SDC Manager application encountered an internal error.	Try the operation again. If the problem persists, contact the next level of support.
Error reading log file.	The SDC Manager application encountered an error while trying to read the log.	Try the operation again. If the problem persists, contact the next level of support.
Error removing zone or zone member.	The SDC Manager application encountered an internal error.	Try the operation again. If the problem persists, contact the next level of support.
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.

Table A–1: SDCM Messages (Continued)

Message	Description	Action
Fabric member could not be found.	A fabric member does not exist when the Fabric Manager application prepared to find a route, find a route node, or gather route information on that fabric member.	Ensure the product is incorporated into the fabric and retry the operation. 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.
File transfer aborted.	The user aborted the file transfer process.	Verify the file transfer is to be aborted, then click *OK* to continue.
Invalid character in field.	An invalid character was entered in the data field.	Remove invalid characters from the entry.
Invalid name.	One of the following invalid names was used: CON, AUX, COM1, COM2, COM3, COM4, COM5, COM6, COM7, COM8, COM9, LPT1, LPT2, LPT3, LPT4, LPT5, LPT6, LPT7, LPT8, LPT9, NUL, or PRN.	Select a valid name 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 product selection.	At the New Product dialog box, an invalid product was selected.	Select a valid product and retry the operation.
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–1: SDCM 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 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.
Management session is already active from this workstation.	An instance of the SDC Manager application is already open at this workstation.	Close the previous session of the SDC Manager application before starting a new one.
No attached nodes selected.	An operation was attempted without an attached node selected.	Select an attached node and try the operation again.
No nickname selected.	No nickname was selected when the command was attempted.	Select a nickname and try again.
No Product Managers installed.	No director or switch Product Manager application is installed on this workstation.	Install the appropriate Product Manager to this workstation.
No routing information available.	No information is available for the route selected.	Select a different route 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 user selected.	A user was not selected when the command was attempted.	Select a user and try again.

Table A–1: SDCM Messages (Continued)

Message	Description	Action
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 selected or zone no longer exists.	A zoning operation was attempted without a zone selected, or the zone selected no longer exists in the fabric.	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.
No zone set selected or zone set no longer exists.	A zoning operation was attempted without a zone set selected, or the zone set you selected no longer exists in the fabric.	Select a zone set and try the operation again.
Only attached nodes can be displayed in this mode.	Users cannot display unused ports when adding ports by world-wide name.	Change the add criteria to *Add by Port*.
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.

Table A–1: SDCM Messages (Continued)

Message	Description	Action
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.
Route data corrupted.	The information for this route is corrupt.	Try the operation again. If the problem persists, contact the next level of support.
Route request timeout.	The *Show Route* request timed out.	Try the operation again. If the problem persists, contact the next level of support.
Routing is not supported by the switch.	This switch (or director) does not support the *Show Routes* feature.	Select a different switch (or director) to show the route.
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.
SDCM server 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.

Table A–1: SDCM Messages (Continued)

Message	Description	Action
Select alias to add to zone.	An alias was not selected before clicking *Add*.	Select an alias before clicking *Add*.
Selection is not a World-Wide Name.	The selection made is not a world-wide name.	Select a valid world-wide name before performing this 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.
Switch is not managed by SDCM.	The selected switch or director is not managed by the SDC Manager application.	Select a different switch or director.
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.
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 aliases has already been configured.	The maximum number of aliases allowed was reached.	Delete an existing alias before adding a new alias.
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.

Table A–1: SDCM Messages (Continued)

Message	Description	Action
The maximum number of open products has already been reached.	The maximum number of open products allowed was reached.	Close a Product Manager session (existing open product) before opening a new session.
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.
The maximum number of SDCM application sessions has been reached.	A maximum of eight 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 zones allowed has already been configured.	The maximum number of zones that can be defined to the Fabric Manager application was reached.	Delete an existing zone before adding a new zone.

Table A–1: SDCM Messages (Continued)

Message	Description	Action
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 nickname does not exist.	The entered nickname does not exist in the fabric.	Configure the nickname to the appropriate product or select an existing nickname.
The nickname is already assigned. Either use a different name or do not save the name as a nickname.	The entered nickname already exists in the fabric. Each nickname must be unique.	Define a different nickname.
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.
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.
The zoning library conversion must be completed before continuing.	The zoning library conversion is incomplete and the requested operation cannot continue.	Complete the zoning library conversion, then retry the operation.

Table A–1: SDCM Messages (Continued)

Message	Description	Action
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 product is not managed by this SDCM Server.	The product selected is not managed by this SDCM Server.	Select a product managed by this SDCM Server or go to the SDCM Server that manages the affected product.
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.
Too many members defined.	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.
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.
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.

Table A–1: SDCM Messages (Continued)

Message	Description	Action
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.
Zones configured with port numbers are ignored in Open Fabric Mode.	While in Open Fabric mode, zones configured using port numbers are enforced through world-wide names.	Informational message only - no action is required.
Zoning by port number is ignored in Open Fabric Mode.	While in Open Fabric mode, zones configured using port numbers are enforced through world-wide names.	Informational message only - no action is required.
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.

SD-64 Director Product Manager Messages

This section lists SD-64 Director 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.
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.

Table A–2: Product Manager Messages (Continued)

Message	Description	Action
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.
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.

Table A–2: Product Manager Messages (Continued)

Message	Description	Action
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.
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.

Table A–2: Product Manager Messages (Continued)

Message	Description	Action
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.
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.

Table A–2: Product Manager Messages (Continued)

Message	Description	Action
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.
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 CTP 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.
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.

Table A–2: Product Manager Messages (Continued)

Message	Description	Action
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.
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.
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.

Table A–2: Product Manager Messages (Continued)

Message	Description	Action
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.
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.

Table A–2: Product Manager Messages (Continued)

Message	Description	Action
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.
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 file was selected.	Action requires the selection of a file.	Select a file.
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.
No firmware version was selected.	A file was not selected in the *Firmware Library* dialog box before an action, such as *modify* or *send,* was performed.	Click on a firmware version in the dialog box to select it, then perform the action again.
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 action will overwrite the date/time on the director.	Warning that occurs when configuring the date and time through the Configure Date and Time dialog box, that the new time or date will overwrite the existing time or date set for the director.	Verify that you want to overwrite the current date or time.
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.

Table A–2: Product Manager Messages (Continued)

Message	Description	Action
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.
Periodic Date/Time synchronization must be cleared.	Action cannot be performed because *Periodic Date/Time Synchronization* option is active.	Click *Periodic Date/Time Synchronization* check box in *Configure Date and Time* dialog box (*Configure* menu) to clear check mark and disable periodic date/time synchronization.
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.
Product Manager instance is currently open.	A Product Manager window is open.	Informational message only.
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.
Start diagnostics failed. The test is currently running.	Diagnostics for the port was already started from the Port Diagnostics dialog box	Informational message.
Stop diagnostics failed. The test is already running.	Diagnostics for the port was not running and the *Stop* was selected on the *Port Diagnostics* dialog box. Diagnostics quit for the port, but *Stop* button remains enabled.	Verify port operation. Retry diagnostics for port and select *Stop* from the dialog box. If problem persists, contact your service representative.
System diagnostics cannot run. The Operational Status is invalid.	System diagnostics cannot run on directors or switches with failed ports.	Replace failed ports.

Table A–2: Product Manager Messages (Continued)

Message	Description	Action
The add firmware process has been aborted.	The user aborted the process to add a firmware version to the SDCM Server's firmware library.	Verify the firmware addition is to be aborted, then click *OK* to continue.
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.
The director must be offline to configure.	This configuration task requires the director to be offline.	Take the director offline and retry the 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.

Table A–2: Product Manager Messages (Continued)

Message	Description	Action
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.
Threshold alerts are not supported.	Threshold alerts are not supported in firmware releases before 1.03.00.	Informational message.
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.

Appendix B

Event Code Tables

An event is an occurrence (state change, problem detection, or problem correction) that requires user attention or that should be reported to a system administrator or service representative. An event usually indicates a switch operational state transition, but may also indicate an impending state change (threshold violation). An event may also provide information only, and not indicate an operational state change. Events are reported as event codes.

This appendix lists all three-digit SD-64 Director event codes and provides detailed information about each code. Event codes are listed in numerical order and in tabular format, and are grouped as follows:

- **000** through **199**-system events.
- **200** through **299**-power supply events.
- **300** through **399**-fan module events.
- **400** through **499**-control processor (CTP) card events.
- **500** through **599**-fiber port module (FPM) card events.
- **600** through **699**-serial crossbar (SBAR) assembly events.
- **800** through **899**-thermal events.

Events are recorded in the SD-64 Director Event Log at the SDCM server, in the event log of the embedded web server interface, at a remote workstation if e-mail and call-home features are enabled, at a simple network management protocol (SNMP) workstation, or at a host console if inband management is enabled. An event may also illuminate the system error light-emitting diode (LED) on the Director front bezel.

In addition to numerical event codes, the tables in this appendix also provide:

- **Message-**a brief text string that describes the event.
- **Severity-**a severity level that indicates event criticality as follows:
  - **0-**informational.
  - **2-**minor.
  - **3-**major.
  - **4-**severe (not operational).
- **Explanation-**a complete explanation of what caused the event.
- **Action-**the recommended course of action (if any) to resolve the problem.
- **Event Data-**supplementary event data (if any) that appears in the event log in hexadecimal format.
- **Distribution-**check marks in associated fields indicate where the event code is reported (operator panel or SDCM Server).

System Events (000 through 199)

Event Code: 001							
Message:	System power-down.						
Severity:	Informational.						
Explanation:	The Director was powered off or disconnected from the facility AC power source. The event code is distributed the next time the Director powers on, but the date and time of the code reflect the power-off time.						
Action:	No action required.						
Event Data:	No supplementary data included with the event.						
Distribution:	Director		SDCM Server			Host	
	EWS Event Log	System Error LED	Event Log	E-Mail	Call-Home	Sense Info	Link Incident
	✔		✔				

Event Code: 010							
Message:	Login Server unable to synchronize databases.						
Severity:	Minor.						
Explanation:	Following a CTP card reset or replacement, the Login Server attempted to acquire an up-to-date copy of its databases from the other CTP card, but failed. All Fabric Services databases are initialized to an empty state, resulting in an implicit Fabric logout of all attached devices.						
Action:	Perform the data collection procedure and return the Zip disk to Compaq support personnel.						
Event Data:	No supplementary data included with this event.						
Distribution:	Director		SDCM Server			Host	
	EWS Event Log	System Error LED	Event Log	E-Mail	Call-Home	Sense Info	Link Incident
	✔	✔	✔	✔	✔		

Event Code: 011							
Message:	Login Server database invalid.						
Severity:	Minor.						
Explanation:	Following a CTP card failover or replacement, initial machine load (IML), or firmware download, the Login Server database failed its cyclic redundancy check (CRC) validation. All Fabric Services databases are initialized to an empty state, resulting in an implicit Fabric logout of all attached devices.						
Action:	Perform the data collection procedure and return the Zip disk to Compaq support personnel.						
Event Data:	No supplementary data included with this event.						
Distribution:	Director		SDCM Server			Host	
	EWS Event Log	System Error LED	Event Log	E-Mail	Call-Home	Sense Info	Link Incident
	✔	✔	✔	✔	✔		

Event Code: 020							
Message:	Name Server unable to synchronize databases.						
Severity:	Minor.						
Explanation:	Following a CTP card reset or replacement, the Name Server attempted to acquire an up-to-date copy of its databases from the other CTP card, but failed. All Fabric Services databases are initialized to an empty state, resulting in an implicit Fabric logout of all attached devices.						
Action:	Perform the data collection procedure and return the Zip disk to Compaq support personnel.						
Event Data:	No supplementary data included with this event.						
Distribution:	Director		SDCM Server			Host	
	EWS Event Log	System Error LED	Event Log	E-Mail	Call-Home	Sense Info	Link Incident
	✔	✔	✔	✔	✔		

Event Code: 021							
Message:	Name Server database invalid.						
Severity:	Minor.						
Explanation:	Following a CTP card failover or replacement, IML, or firmware download, the Name Server database failed its CRC validation. All Fabric Services databases are initialized to an empty, state resulting in an implicit Fabric logout of all attached devices.						
Action:	Perform the data collection procedure and return the Zip disk to Compaq support personnel.						
Event Data:	No supplementary data included with this event.						
Distribution:	Director		SDCM Server			Host	
	EWS Event Log	System Error LED	Event Log	E-Mail	Call-Home	Sense Info	Link Incident
	✔	✔	✔	✔	✔		

Event Code: 031							
Message:	SNMP request received from unauthorized community.						
Severity:	Informational.						
Explanation:	An SNMP request containing an unauthorized community name was received and rejected with an error. Only requests containing authorized SNMP community names as configured through the SD-64 Director Product Manager application are allowed.						
Action:	Add the community name to the SNMP configuration using the SD-64 Director Product Manager application.						
Event Data:	No supplementary data included with this event.						
Distribution:	Director		SDCM Server			Host	
	EWS Event Log	System Error LED	Event Log	E-Mail	Call-Home	Sense Info	Link Incident
	✔		✔				

Event Code: 050							
Message:	Management Server unable to synchronize databases.						
Severity:	Minor.						
Explanation:	Following a CTP card reset or replacement, the Management Server attempted to acquire an up-to-date copy of its databases from the other CTP card, but failed. All Management Services databases are initialized to an empty state, resulting in an implicit logout of all devices logged in to the Management Server.						
Action:	Perform the data collection procedure and return the Zip disk to Compaq support personnel.						
Event Data:	No supplementary data included with this event.						
Distribution:	Director		SDCM Server			Host	
	EWS Event Log	System Error LED	Event Log	E-Mail	Call-Home	Sense Info	Link Incident
	✔	✔	✔	✔	✔		

Event Code: 051							
Message:	Management Server database invalid.						
Severity:	Minor.						
Explanation:	Following a CTP card failover or replacement, IML, or firmware download, the Management Server database failed its CRC validation. All Management Services databases are initialized to an empty state, resulting in an implicit logout of all devices logged in to the Management Server.						
Action:	Perform the data collection procedure and return the Zip disk to Compaq support personnel.						
Event Data:	No supplementary data included with this event.						
Distribution:	Director		SDCM Server			Host	
	EWS Event Log	System Error LED	Event Log	E-Mail	Call-Home	Sense Info	Link Incident
	✔	✔	✔	✔	✔		

Event Code: 052							
Message:	Management Server internal error.						
Severity:	Informational.						
Explanation:	An operating error (internal to the Director) was detected by the Management Server subsystem.						
Action:	Perform the data collection procedure and return the Zip disk to Compaq support personnel.						
Event Data:	No supplementary data included with this event.						
Distribution:	Director		SDCM Server			Host	
	EWS Event Log	System Error LED	Event Log	E-Mail	Call-Home	Sense Info	Link Incident
	✔		✔				

Event Code: 060							
Message:	Fabric Controller unable to synchronize databases.						
Severity:	Minor.						
Explanation:	Following a CTP card reset or replacement, the Fabric Controller attempted to acquire an up-to-date copy of its databases from the other CTP card, but failed. All Fabric Controller databases are initialized to an empty state, resulting in a momentary loss of interswitch communication capability.						
Action:	Perform the data collection procedure and return the Zip disk to Compaq support personnel.						
Event Data:	No supplementary data included with this event.						
Distribution:	Director		SDCM Server			Host	
	EWS Event Log	System Error LED	Event Log	E-Mail	Call-Home	Sense Info	Link Incident
	✔	✔	✔	✔	✔		

Event Code: 061							
Message:	Fabric Controller database invalid.						
Severity:	Minor.						
Explanation:	Following a CTP card failover or replacement, IML, or firmware download, the Fabric Controller database failed its CRC validation. All Fabric Controller databases are initialized to an empty state, resulting in a momentary loss of interswitch communication capability.						
Action:	Perform the data collection procedure and return the Zip disk to Compaq support personnel.						
Event Data:	No supplementary data included with this event.						
Distribution:	Director		SDCM Server			Host	
	EWS Event Log	System Error LED	Event Log	E-Mail	Call-Home	Sense Info	Link Incident
	✔	✔	✔	✔	✔		

Event Code: 062							
Message:	Maximum interswitch hop count exceeded.						
Severity:	Informational.						
Explanation:	The fabric controller software detected that a path to another fabric element (Director or switch) traverses more than three interswitch links (ISLs or hops). This may result in Fibre Channel frames persisting in the fabric longer than standard timeout values allow.						
Action:	If possible, reconfigure the fabric so the path between any two Directors or switches traverses no more than three ISLs.						
Event Data:	No supplementary data included with this event.						
Distribution:	Director		SDCM Server			Host	
	EWS Event Log	System Error LED	Event Log	E-Mail	Call-Home	Sense Info	Link Incident
	✔		✔				

Event Code: 063							
Message:	Received link state record too large.						
Severity:	Major.						
Explanation:	A fabric element (Director or switch) in the same fabric as the SD-64 Director has more than 32 ISLs attached. Allowing this condition to persist may create fabric routing problems and result in Fibre Channel frames being lost or routed in loops. Refer to the event data for the affected fabric element.						
Action:	Reconfigure the fabric so the path between any two Directors or switches is comprised of no more than 32 ISLs.						
Event Data:	The first byte of event data (byte **0**) specifies the domain ID of the fabric element (Director or switch) with more than 32 ISLs.						
Distribution:	Director		SDCM Server			Host	
	EWS Event Log	System Error LED	Event Log	E-Mail	Call-Home	Sense Info	Link Incident
	✔		✔				

Event Code: 070	
Message:	E_Port is segmented.
Severity:	Informational.
Explanation:	A Director E_Port recognized an incompatibility with an attached fabric element (Director or switch), preventing the Director from participating in the fabric. A segmented port does not transmit Class 2 or Class 3 traffic (data from attached devices), but transmits Class F traffic (management and control data from the attached Director or switch). Refer to the event data for the segmentation reason.
Action:	Action depends on the segmentation reason specified in the event data.
Event Data:	The first byte of event data (byte **0**) specifies the E_Port number. The fifth byte (byte **4**) specifies the segmentation reason as follows: **1 = Incompatible operating parameters.** Ether the resource allocation time out value (R_A_TOV) or error detect time out value (E_D_TOV) is inconsistent between the SD-64 Director and another fabric element (Director or switch). Modify the R_A_TOV and E_D_TOV to make the values consistent for all fabric Directors and switches. **2 = Duplicate domain ID.** The SD-64 Director has the same preferred domain ID as another fabric element (Director or switch). Modify the Director's Domain ID to make it unique. **3 = Incompatible zoning configurations.** The same name is applied to a zone for the SD-64 Director and another fabric element (Director or switch), but the zones contain different zone members. Modify the zone name to make it unique, or ensure zones with the same name contain identical zone members. **4 = Build fabric protocol error.** A protocol error was detected during incorporation of the SD-64 Director into the fabric. Disconnect the E_Port link, reconnect the link, and initial program load (IPL) the Director. If the condition persists, perform the data collection procedure and return the Zip disk to Compaq support personnel. **5 = No principal switch.** No Director or switch in the fabric can become the principal switch. Modify the switch priority to any value other than 255. **6 = No response from attached switch (hello timeout).** The SD-64 Director periodically verifies operation of attached fabric elements (Directors or switches). The Director E_Port (at the operational Director) times out and segments if the attached device does not respond. Check the status of the attached Director or switch. If the condition persists, perform the data collection procedure (at the attached device) and return the Zip disk to Compaq support personnel.

Event Code: 070 (continued)							
Event Data (continued):	**7 = ELP retransmission failure timeout.** An SD-64 Director that exhibits a hardware or link failure attempted to join a fabric and transmitted multiple exchange link protocol (ELP) frames to a fabric element (Director or switch). However, because of the problem, the Director did not receive responses to the ELP frames, and did not receive a fabric login (FLOGI) frame. After five ELP transmission attempts, the Director E_Port (failed Director) times out and segments. Refer to MAP 0000: Start MAP to perform hardware fault isolation at the failed Director.						
Distribution:	Director		SDCM Server			Host	
	EWS Event Log	System Error LED	Event Log	E-Mail	Call-Home	Sense Info	Link Incident
	✔		✔				

Event Code: 071	
Message:	Director is isolated.
Severity:	Informational.
Explanation:	The Director is isolated from other fabric elements (Directors or switches). This event code is accompanied by one or more **070** event codes. Refer to the event data for the segmentation reason.
Action:	Action depends on the segmentation reason specified in the event data.
Event Data:	The first byte of event data (byte **0**) specifies the E_Port number. The fifth byte (byte **4**) specifies the segmentation reason as follows: **1 = Incompatible operating parameters.** Ether the resource allocation time out value (R_A_TOV) or error detect time out value (E_D_TOV) is inconsistent between the SD-64 Director and another fabric element (Director or switch). Modify the R_A_TOV and E_D_TOV to make the values consistent for all fabric Directors and switches. **2 = Duplicate domain ID.** The SD-64 Director has the same preferred domain ID as another fabric element (Director or switch). Modify the Director's Domain ID to make it unique. **3 = Incompatible zoning configurations.** The same name is applied to a zone for the SD-64 Director and another fabric element (Director or switch), but the zones contain different zone members. Modify the zone name to make it unique, or ensure zones with the same name contain identical zone members.

Event Code: 071 (continued)							
Event Data (continued):	**4 = Build fabric protocol error.** A protocol error was detected during incorporation of the SD-64 Director into the fabric. Disconnect the E_Port link, reconnect the link, and IPL the Director. If the condition persists, perform the data collection procedure and return the Zip disk to Compaq support personnel. **5 = No principal switch.** No Director or switch in the fabric can become the principal switch. Modify the switch priority to any value other than 255. **6 = No response from attached switch (hello timeout).** The SD-64 Director periodically verifies operation of attached fabric elements (Directors or switches). The Director E_Port (at the operational Director) times out and segments if the attached device does not respond. Check the status of the attached Director or switch. If the condition persists, perform the data collection procedure (at the attached device) and return the Zip disk to Compaq support personnel. **7 = ELP retransmission failure timeout.** An SD-64 Director that exhibits a hardware or link failure attempted to join a fabric and transmitted multiple ELP frames to a fabric element (Director or switch). However, because of the problem, the Director did not receive responses to the ELP frames, and did not receive an FLOGI frame. After five ELP transmission attempts, the Director E_Port (failed Director) times out and segments. Refer to MAP 0000: Start MAP to perform hardware fault isolation at the failed Director.						
Distribution:	Director		SDCM Server			Host	
	EWS Event Log	System Error LED	Event Log	E-Mail	Call-Home	Sense Info	Link Incident
	✔		✔				

Event Code: 072							
Message:	E_Port connected to unsupported switch.						
Severity:	Informational.						
Explanation:	The Director is attached (through an ISL) to an incompatible fabric element (Director or switch).						
Action:	Disconnect the ISL.						
Event Data:	No supplementary data included with this event.						
Distribution:	Director		SDCM Server			Host	
	EWS Event Log	System Error LED	Event Log	E-Mail	Call-Home	Sense Info	Link Incident
	✔		✔				

Event Code: 080							
Message:	Unauthorized world-wide name.						
Severity:	Informational.						
Explanation:	The world-wide name of the device or switch plugged in the indicated port is not authorized for that port.						
Action:	Change the port binding definition or plug the correct device or switch into this port.						
Event Data:	Byte 0 = failing port number.						
Distribution:	Director		SDCM Server			Host	
	EWS Event Log	System Error LED	Event Log	E-Mail	Call-Home	Sense Info	Link Incident
	✔		✔	✔		✔	

Event Code: 090							
Message:	Database replication time out.						
Severity:	Minor						
Explanation:	Replication of a Fabric Services database from master CTP to backup has timed out. The backup CTP has been dumped and IPLed. After the backup CTP completes the IPL, its databases will be brought up to date and replication will resume.						
Action:	Perform a data collection for this switch using the SDC Manager, saving the data file to the SDCM Server Zip drive, and return the Zip disk to the manufacturer for analysis.						
Event Data:	Bytes 0-3: Type of replication operation that timed out.						
Distribution:	Director		SDCM Server			Host	
	EWS Event Log	System Error Light	Event Log	E-Mail	Call-Home	Sense Info	Link Incident
	✔	✔	✔	✔	✔		

Event Code: 091							
Message:	Database replication discontinued.						
Severity:	Informational						
Explanation:	Replication of Fabric Services databases from master CTP to backup has been discontinued because the backup CTP has failed or been removed.						
Action:	This Event will occur any time the backup CTP fails or is removed and does not require any additional action; when the backup CTP is recovered/replaced, its databases will be brought up to date and replication will resume. If this Event occurs without the backup CTP failing or being removed, perform a data collection operation for this switch using the SCD Manager, saving the data file to the SDCM Server Zip drive, and return the Zip disk to the manufacturer for analysis.						
Event Data:	None						
Distribution:	Director		SDCM Server			Host	
	EWS Event Log	System Error LED	Event Log	E-Mail	Call-Home	Sense Info	Link Incident
	✔		✔				

Power Supply Events (200 through 299)

Event Code: 200							
Message:	Power supply AC voltage failure.						
Severity:	Major.						
Explanation:	Alternating current (AC) input to the indicated power supply is disconnected or AC circuitry in the power supply failed. The second power supply assumes the full operating load for the Director.						
Action:	Ensure the power supply is connected to facility AC power, and verify operation of the facility power source. If the AC voltage does not recover (indicated by event code **203**), replace the failed power supply. Perform the data collection procedure and return the Zip disk and failed power supply to Compaq support personnel.						
Event Data:	No supplementary data included with this event.						
Distribution:	Director		SDCM Server			Host	
	EWS Event Log	System Error LED	Event Log	E-Mail	Call-Home	Sense Info	Link Incident
	✔	✔	✔	✔	✔	✔	

Event Code: 201							
Message:	Power supply DC voltage failure.						
Severity:	Major.						
Explanation:	Direct current (DC) circuitry in the power supply failed. The second power supply assumes the full operating load for the Director.						
Action:	Replace the failed power supply. Perform the data collection procedure and return the Zip disk and failed power supply to Compaq support personnel.						
Event Data:	No supplementary data included with this event.						
Distribution:	Director		SDCM Server			Host	
	EWS Event Log	System Error LED	Event Log	E-Mail	Call-Home	Sense Info	Link Incident
	✔	✔	✔	✔	✔	✔	

Event Code: 202							
Message:	Power supply thermal failure.						
Severity:	Major.						
Explanation:	The thermal sensor associated with a power supply indicates an overheat condition that shut down the power supply. The second power supply assumes the full operating load for the Director.						
Action:	Replace the failed power supply. Perform the data collection procedure and return the Zip disk and failed power supply to Compaq support personnel.						
Event Data:	No supplementary data included with this event.						
Distribution:	Director		SDCM Server			Host	
	EWS Event Log	System Error LED	Event Log	E-Mail	Call-Home	Sense Info	Link Incident
	✔	✔	✔	✔	✔	✔	

Event Code: 203							
Message:	Power supply AC voltage recovery.						
Severity:	Informational.						
Explanation:	AC voltage recovered for the power supply. Both power supplies adjust to share operating load for the Director.						
Action:	No action required.						
Event Data:	No supplementary data included with the event.						
Distribution:	Director		SDCM Server			Host	
	EWS Event Log	System Error LED	Event Log	E-Mail	Call-Home	Sense Info	Link Incident
	✔		✔				

Event Code: 204							
Message:	Power supply DC voltage recovery.						
Severity:	Informational.						
Explanation:	DC voltage recovered for the power supply. Both power supplies adjust to share operating load for the Director.						
Action:	No action required.						
Event Data:	No supplementary data included with the event.						
Distribution:	Director		SDCM Server			Host	
	EWS Event Log	System Error LED	Event Log	E-Mail	Call-Home	Sense Info	Link Incident
	✔		✔				

Event Code: 206							
Message:	Power supply removed.						
Severity:	Informational.						
Explanation:	A power supply was removed while the Director was powered on and operational. The second power supply assumes the full operating load for the Director.						
Action:	No action required or install an operational power supply.						
Event Data:	No supplementary data included with this event.						
Distribution:	Director		SDCM Server			Host	
	EWS Event Log	System Error LED	Event Log	E-Mail	Call-Home	Sense Info	Link Incident
	✔		✔				

Event Code: 207							
Message:	Power supply installed.						
Severity:	Informational.						
Explanation:	A redundant power supply was installed with the Director powered on and operational. Both power supplies adjust to share operating load for the Director.						
Action:	No action required.						
Event Data:	No supplementary data included with the event.						
Distribution:	Director		SDCM Server			Host	
	EWS Event Log	System Error LED	Event Log	E-Mail	Call-Home	Sense Info	Link Incident
	✔		✔				

Event Code: 208							
Message:	Power supply false shutdown.						
Severity:	Major.						
Explanation:	Director operational firmware nearly shut down the indicated power supply as a result of failure or facility power loss or voltage fluctuation.						
Action:	Confirm operation of facility power. If subsequent power loss events occur, replace the failed power supply. Perform the data collection procedure and return the Zip disk and failed power supply to Compaq support personnel.						
Event Data:	No supplementary data included with this event.						
Distribution:	Director		SDCM Server			Host	
	EWS Event Log	System Error LED	Event Log	E-Mail	Call-Home	Sense Info	Link Incident
	✔	✔	✔	✔	✔	✔	

Fan Module Events (300 through 399)

Event Code: 300							
Message:	Cooling fan propeller failed.						
Severity:	Major.						
Explanation:	One cooling fan (out of six) failed or is rotating at insufficient angular velocity. The remaining fans are operational. The amber LED illuminates at the rear of the fan module associated with the failed fan.						
Action:	Replace the indicated fan module.						
Event Data:	The first byte of event data (byte **0**) specifies the failed fan number.						
Distribution:	Director		SDCM Server			Host	
	EWS Event Log	System Error LED	Event Log	E-Mail	Call-Home	Sense Info	Link Incident
	✔	✔	✔	✔	✔	✔	

Event Code: 301							
Message:	Cooling fan propeller failed.						
Severity:	Major.						
Explanation:	Two cooling fans (out of six) failed or are rotating at insufficient angular velocity. The remaining fans are operational. The amber LED illuminates at the rear of the fan modules associated with the failed fans.						
Action:	Replace the indicated fan modules.						
Event Data:	The first byte of event data (byte **0**) specifies the failed fan numbers.						
Distribution:	Director		SDCM Server			Host	
	EWS Event Log	System Error LED	Event Log	E-Mail	Call-Home	Sense Info	Link Incident
	✔	✔	✔	✔	✔	✔	

Event Code: 302							
Message:	Cooling fan propeller failed.						
Severity:	Major.						
Explanation:	Three cooling fans (out of six) failed or are rotating at insufficient angular velocity. The remaining fans are operational. The amber LED illuminates at the rear of the fan modules associated with the failed fans.						
Action:	Replace the indicated fan modules.						
Event Data:	The first byte of event data (byte **0**) specifies the failed fan numbers.						
Distribution:	Director		SDCM Server			Host	
	EWS Event Log	System Error LED	Event Log	E-Mail	Call-Home	Sense Info	Link Incident
	✔	✔	✔	✔	✔	✔	

Event Code: 303							
Message:	Cooling fan propeller failed.						
Severity:	Major.						
Explanation:	Four cooling fans (out of six) failed or are rotating at insufficient angular velocity. The remaining fans are operational. The amber LED illuminates at the rear of both fan modules.						
Action:	Replace both fan modules						
Event Data:	The first byte of event data (byte **0**) specifies the failed fan numbers.						
Distribution:	Director		SDCM Server			Host	
	EWS Event Log	System Error LED	Event Log	E-Mail	Call-Home	Sense Info	Link Incident
	✔	✔	✔	✔	✔	✔	

Event Code: 304							
Message:	Cooling fan propeller failed.						
Severity:	Major.						
Explanation:	Five cooling fans (out of six) failed or are rotating at insufficient angular velocity. The remaining fan is operational. The amber LED illuminates at the rear of both fan modules.						
Action:	Replace both fan modules						
Event Data:	The first byte of event data (byte **0**) specifies the failed fan numbers.						
Distribution:	Director		SDCM Server			Host	
	EWS Event Log	System Error LED	Event Log	E-Mail	Call-Home	Sense Info	Link Incident
	✔	✔	✔	✔	✔	✔	

Event Code: 305							
Message:	Cooling fan propeller failed.						
Severity:	Major.						
Explanation:	All six cooling fans failed or are rotating at insufficient angular velocity. The amber LED illuminates at the rear of both fan modules.						
Action:	Replace both fan modules						
Event Data:	The first byte of event data (byte **0**) specifies the failed fan numbers.						
Distribution:	Director		SDCM Server			Host	
	EWS Event Log	System Error LED	Event Log	E-Mail	Call-Home	Sense Info	Link Incident
	✔	✔	✔	✔	✔	✔	

Event Code: 310							
Message:	Cooling fan propeller recovered.						
Severity:	Informational.						
Explanation:	One cooling fan (out of six) recovered or the associated fan module was replaced. All fans are operational.						
Action:	No action required.						
Event Data:	The first byte of event data (byte **0**) specifies the recovered fan number.						
Distribution:	Director		SDCM Server			Host	
	EWS Event Log	System Error LED	Event Log	E-Mail	Call-Home	Sense Info	Link Incident
	✔		✔				

Event Code: 311							
Message:	Cooling fan propeller recovered.						
Severity:	Informational.						
Explanation:	Two cooling fans (out of six) recovered or the associated fan modules were replaced. All fans are operational.						
Action:	No action required.						
Event Data:	The first byte of event data (byte **0**) specifies the recovered fan numbers.						
Distribution:	Director		SDCM Server			Host	
	EWS Event Log	System Error Indicator	Event Log	E-Mail	Call-Home	Sense Info	Link Incident
	✔		✔				

Event Code: 312							
Message:	Cooling fan propeller recovered.						
Severity:	Informational.						
Explanation:	Three cooling fans (out of six) recovered or the associated fan modules were replaced. All fans are operational.						
Action:	No action required.						
Event Data:	The first byte of event data (byte **0**) specifies the recovered fan numbers.						
Distribution:	Director		SDCM Server			Host	
	EWS Event Log	System Error LED	Event Log	E-Mail	Call-Home	Sense Info	Link Incident
	✔		✔				

Event Code: 313							
Message:	Cooling fan propeller recovered.						
Severity:	Informational.						
Explanation:	Four cooling fans (out of six) recovered or the associated fan modules were replaced. All fans are operational.						
Action:	No action required.						
Event Data:	The first byte of event data (byte **0**) specifies the recovered fan numbers.						
Distribution:	Director		SDCMSDCM Server			Host	
	EWS Event Log	System Error LED	Event Log	E-Mail	Call-Home	Sense Info	Link Incident
	✔		✔				

Event Code: 314							
Message:	Cooling fan propeller recovered.						
Severity:	Informational.						
Explanation:	Five cooling fans (out of six) recovered or the associated fan modules were replaced. All fans are operational.						
Action:	No action required.						
Event Data:	The first byte of event data (byte **0**) specifies the recovered fan numbers.						
Distribution:	Director		SDCM Server			Host	
	EWS Event Log	System Error LED	Event Log	E-Mail	Call-Home	Sense Info	Link Incident
	✔		✔				

Event Code: 315							
Message:	Cooling fan propeller recovered.						
Severity:	Informational.						
Explanation:	All six cooling fans recovered or the associated fan modules were replaced. All fans are operational.						
Action:	No action required.						
Event Data:	The first byte of event data (byte **0**) specifies the recovered fan numbers.						
Distribution:	Director		SDCM Server			Host	
	EWS Event Log	System Error LED	Event Log	E-Mail	Call-Home	Sense Info	Link Incident
	✔		✔				

Event Code: 320							
Message:	Fan module removed.						
Severity:	Major.						
Explanation:	A fan module was removed with the Director powered on and operational.						
Action:	Replace the indicated fan module.						
Event Data:	No supplementary data included with the event.						
Distribution:	Director		SDCM Server			Host	
	EWS Event Log	System Error LED	Event Log	E-Mail	Call-Home	Sense Info	Link Incident
	✔	✔	✔				

Event Code: 321							
Message:	Fan module installed.						
Severity:	Informational.						
Explanation:	A fan module was installed with the Director powered on and operational.						
Action:	No action required.						
Event Data:	No supplementary data included with the event.						
Distribution:	Director		SDCM Server			Host	
	EWS Event Log	System Error LED	Event Log	E-Mail	Call-Home	Sense Info	Link Incident
	✔		✔				

CTP Card Events (400 through 499)

Event Code: 400							
Message:	Power-up diagnostics failure.						
Severity:	Major.						
Explanation:	Power-on self tests (POSTs) detected a faulty field-replaceable unit (FRU) as indicated by the event data.						
Action:	Replace the failed FRU with a functional FRU. Perform the data collection procedure and return the Zip disk and faulty FRU to Compaq support personnel.						
Event Data:	Byte **0** = FRU code as follows: **01** = backplane, **02** = CTP card, **03** = SBAR assembly, **05** = fan module, **06** = power supply, and **08** through **0F** = FPM cards. Byte **1** = FRU slot number.						
Distribution:	Director		SDCM Server			Host	
	EWS Event Log	System Error LED	Event Log	E-Mail	Call-Home	Sense Info	Link Incident
	✔	✔	✔	✔	✔	✔	

Event Code: 410							
Message:	CTP card reset.						
Severity:	Informational.						
Explanation:	The indicated CTP card reset after a Director power-on, CTP card installation, hardware IML (CTP card faceplate), or software IPL. An IPL can be user-initiated at the SD-64 Director Product Manager application, or occur automatically after a firmware fault (event code **411**). The event data indicates the type of reset.						
Action:	No action required.						
Event Data:	Byte **0** = reset type as follows: **00** = power-on or single CTP card hot-insert, **02** = IML, **04** = IPL, **08** = reset by other CTP card, **40** = partition switch, or **80** = dual CTP card hot-insert.						
Distribution:	Director		SDCM Server			Host	
	EWS Event Log	System Error LED	Event Log	E-Mail	Call-Home	Sense Info	Link Incident
	✔		✔				

Event Code: 411							
Message:	Firmware fault.						
Severity:	Major.						
Explanation:	Firmware executing on the indicated CTP card encountered an unexpected operating condition and dumped the operating state to FLASH memory for retrieval and analysis. The dump file is automatically transferred from the Director to the SDCM Server, where it is stored for retrieval through the data collection procedure. In a single CTP card configuration, all Fibre Channel port connections reset after the fault and subsequent IPL. Attached devices must login to the Director to resume operations. In a dual CTP card configuration, a non-disruptive failover to the backup CTP card occurs. When the dump and subsequent IPL complete, the faulty CTP card reinitializes to become a the backup.						
Action:	Perform the data collection procedure and return the Zip disk to Compaq support personnel.						
Event Data:	Bytes 0 through 3 = fault identifier, least significant byte first.						
Distribution:	Director		SDCM Server			Host	
	EWS Event Log	System Error LED	Event Log	E-Mail	Call-Home	Sense Info	Link Incident
	✔	✔	✔	✔	✔	✔	

Event Code: 413							
Message:	Backup CTP card POST failure.						
Severity:	Major.						
Explanation:	A backup CTP card was installed in the Director and failed POSTs.						
Action:	Replace the indicated CTP card with a functional card. Perform the data collection procedure and return the Zip disk and faulty card to Compaq support personnel.						
Event Data:	No supplementary data included with this event.						
Distribution:	Director		SDCM Server			Host	
	EWS Event Log	System Error LED	Event Log	E-Mail	Call-Home	Sense Info	Link Incident
	✔	✔	✔	✔	✔	✔	

Event Code: 414							
Message:	Backup CTP card failure.						
Severity:	Major.						
Explanation:	The backup CTP card failed.						
Action:	Replace the indicated CTP card with a functional card. Perform the data collection procedure and return the Zip disk and faulty card to Compaq support personnel.						
Event Data:	No supplementary data included with this event.						
Distribution:	Director		SDCM Server			Host	
	EWS Event Log	System Error LED	Event Log	E-Mail	Call-Home	Sense Info	Link Incident
	✔	✔	✔	✔	✔	✔	

Event Code: 415							
Message:	Backup CTP card removed.						
Severity:	Informational.						
Explanation:	The backup CTP card was removed while the Director was powered on and operational.						
Action:	No action required or install an operational backup CTP card.						
Event Data:	No supplementary data included with this event.						
Distribution:	Director		SDCM Server			Host	
	EWS Event Log	System Error LED	Event Log	E-Mail	Call-Home	Sense Info	Link Incident
	✔		✔				

Event Code: 416							
Message:	Backup CTP card installed.						
Severity:	Informational.						
Explanation:	A backup CTP card was installed while the Director was powered on and operational.						
Action:	No action required.						
Event Data:	No supplementary data included with this event.						
Distribution:	Director		SDCM Server			Host	
	EWS Event Log	System Error LED	Event Log	E-Mail	Call-Home	Sense Info	Link Incident
	✔		✔				

Event Code: 417							
Message:	CTP card firmware synchronization initiated.						
Severity:	Informational.						
Explanation:	The active CTP card initiated a firmware synchronization with the backup CTP card.						
Action:	No action required.						
Event Data:	No supplementary data included with this event.						
Distribution:	Director		SDCM Server			Host	
	EWS Event Log	System Error LED	Event Log	E-Mail	Call-Home	Sense Info	Link Incident
	✔		✔				

Event Code: 418							
Message:	User-initiated CTP card switchover.						
Severity:	Informational.						
Explanation:	The backup CTP card became the active CTP card after a user-initiated switchover. The previously active CTP card is now the backup CTP card.						
Action:	No action required.						
Event Data:	No supplementary data included with this event.						
Distribution:	Director		SDCM Server			Host	
	EWS Event Log	System Error LED	Event Log	E-Mail	Call-Home	Sense Info	Link Incident
	✔		✔				

Event Code: 420							
Message:	Backup CTP card non-volatile memory failure.						
Severity:	Major.						
Explanation:	The backup CTP card detected a non-volatile memory failure. The failure has no impact on the active CTP card.						
Action:	Replace the indicated CTP card with a functional card. Perform the data collection procedure and return the Zip disk and faulty card to Compaq support personnel.						
Event Data:	Byte **0** = non-volatile memory area identifier.						
Distribution:	Director		SDCM Server			Host	
	EWS Event Log	System Error LED	Event Log	E-Mail	Call-Home	Sense Info	Link Incident
	✔	✔	✔	✔	✔	✔	

Event Code: 421							
Message:	Firmware download complete.						
Severity:	Informational.						
Explanation:	A Director firmware version was downloaded from the SDCM Server or embedded web server. The event data indicates the firmware version in hexadecimal format ***xx.yy.zz bbbb***, where *xx* is the release level, ***yy*** is the maintenance level, ***zz*** is the interim release level, and ***bbbb*** is the build ID.						
Action:	No action required.						
Event Data:	Bytes **0** and **1** = ASCII pair indicating release level (**30 31** indicates release **01**). Byte **2** = ASCII value for a period (**2E**). Bytes **3** and **4** = ASCII pair indicating maintenance level (**30 34** indicates maintenance release **04**). Byte **5** = ASCII value for a period (**2E**). Bytes **6** and **7** = ASCII pair indicating interim release level (**30 30** indicates interim release **00**). Byte **8** = ASCII value for a period (**2E**). Bytes **9** through **12** = Four ASCII values indicating build ID (**30 30 34 38** indicates build ID **0048**).						
Distribution:	Director		SDCM Server			Host	
	EWS Event Log	System Error LED	Event Log	E-Mail	Call-Home	Sense Info	Link Incident
	✔		✔				

Event Code: 422							
Message:	CTP firmware synchronization complete.						
Severity:	Informational.						
Explanation:	Active CTP card synchronization with the backup CTP card complete.						
Action:	No action required.						
Event Data:	No supplementary data included with this event.						
Distribution:	Director		SDCM Server			Host	
	EWS Event Log	System Error LED	Event Log	E-Mail	Call-Home	Sense Info	Link Incident
	✔		✔				

Event Code: 423							
Message:	CTP firmware download initiated.						
Severity:	Informational.						
Explanation:	The SDCM Server initiated download of a new firmware version to the Director.						
Action:	No action required.						
Event Data:	No supplementary data included with this event.						
Distribution:	Director		SDCM Server			Host	
	EWS Event Log	System Error LED	Event Log	E-Mail	Call-Home	Sense Info	Link Incident
	✔		✔				

Event Code: 430							
Message:	Excessive Ethernet transmit errors.						
Severity:	Informational.						
Explanation:	Transmit error counters for the active CTP card Ethernet adapter (sum of all counters) exceeded a threshold. This does not indicate a CTP card failure; it indicates a problem with the Ethernet cable, hub, or device on the same Ethernet segment. Event data counters are represented in hexadecimal format with the least significant byte first.						
Action:	Verify the Ethernet cable, hub, and other devices are properly connected and operational.						
Event Data:	Bytes **0** through **3** = sum of all transmit errors (**total_xmit_error**). Bytes **4** through **7** = frame count where Ethernet adapter does not detect carrier sense at preamble end (**loss_of_CRSs_cnt**). Bytes **8** through **11** = frame count where Ethernet adapter does not detect a collision within 64 bit times at transmission end (**SQE_error_cnt**). Bytes **12** through **15** = frame count where Ethernet adapter detects a collision more than 512 bit times after first preamble bit (**out_of_window_cnt**). Frame not transmitted. Bytes **16** through **19** = frame count where transmission is more than 26 ms (**jabber_cnt**). Frame not transmitted. Bytes **20** through **23** = frame count where Ethernet adapter encounters 16 collisions while attempting to transmit a frame (**16coll_cnt**). Frame not transmitted.						
Distribution:	Director		SDCM Server			Host	
	EWS Event Log	System Error LED	Event Log	E-Mail	Call-Home	Sense Info	Link Incident
	✔		✔				

<table>
<tr><th colspan="8">Event Code: 431</th></tr>
<tr><td>Message:</td><td colspan="7">Excessive Ethernet receive errors.</td></tr>
<tr><td>Severity:</td><td colspan="7">Informational.</td></tr>
<tr><td>Explanation:</td><td colspan="7">Receive error counters for the active CTP card Ethernet adapter (sum of all counters) exceeded a threshold. This does not indicate a CTP card failure; it indicates a problem with the Ethernet cable, hub, or device on the same Ethernet segment. Event data counters are represented in hexadecimal format with the least significant byte first.</td></tr>
<tr><td>Action:</td><td colspan="7">Verify the Ethernet cable, hub, and other devices are properly connected and operational.</td></tr>
<tr><td>Event Data:</td><td colspan="7">Bytes 0 through 3 = sum of all receive errors (total_recv_error).
Bytes 4 through 7 = frame count where received frame had from 1 to 7 bits after last received full byte (dribble_bits_cnt). CRC error counter updated but frame not processed.
Bytes 8 through 11 = frame count where received frame had bad CRC (CRC_error_cnt). Frame not processed.
Bytes 12 through 15 = frame count received with less than 64 bytes (runt_cnt). Broadcast frames count but do not contribute to threshold. Frame not processed.
Bytes 16 through 19 = frame count received with more than 1518 bytes (extra_data_cnt). Broadcast frames count but do not contribute to threshold. Frame not processed.</td></tr>
<tr><td rowspan="3">Distribution:</td><td colspan="2">Director</td><td colspan="3">SDCM Server</td><td colspan="2">Host</td></tr>
<tr><td>EWS Event Log</td><td>System Error LED</td><td>Event Log</td><td>E-Mail</td><td>Call-Home</td><td>Sense Info</td><td>Link Incident</td></tr>
<tr><td>✔</td><td></td><td>✔</td><td></td><td></td><td></td><td></td></tr>
</table>

Event Code: 432							
Message:	Ethernet adapter reset.						
Severity:	Minor.						
Explanation:	The active CTP card Ethernet adapter was reset in response to an internally detected error. A card failure is not indicated. The Director-to-SDCM Server connection terminates, but automatically recovers after the reset.						
Action:	Perform the data collection procedure and return the Zip disk to Compaq support personnel.						
Event Data:	Bytes **0** through **3** = reason for adapter reset, least significant byte first (**reset_error_type**) **1** = completion notification for timed-out frame transmission.						
Distribution:	Director		SDCM Server			Host	
	EWS Event Log	System Error LED	Event Log	E-Mail	Call-Home	Sense Info	Link Incident
	✔		✔				

Event Code: 433							
Message:	Non-recoverable Ethernet fault.						
Severity:	Major.						
Explanation:	A non-recoverable error was detected on the CTP card Ethernet adapter and the LAN connection to the SDCM Server terminated. All Fibre Channel switching functions remain unaffected. This event only occurs on a Director with a single CTP card. Because Ethernet communication is lost, no failure indication is externally reported.						
Action:	Replace the CTP card with a functional card. Perform the data collection procedure and return the Zip disk and faulty card to Compaq support personnel.						
Event Data:	Bytes **0** through **3** = LAN error type, where **01** = hard failure and **04** = registered fault. Bytes **4** through **7** = LAN error subtype. Bytes **8** through **11** = fault identifier.						
Distribution:	Director		SDCM Server			Host	
	EWS Event Log	System Error LED	Event Log	E-Mail	Call-Home	Sense Info	Link Incident
	✔	✔				✔	

Event Code: 440							
Message:	Embedded port hardware failed.						
Severity:	Major.						
Explanation:	The embedded port hardware detected a fatal CTP card error.						
Action:	Replace the indicated CTP card with a functional card. Perform the data collection procedure and return the Zip disk and faulty card to Compaq support personnel.						
Event Data:	Byte **0** = CTP slot position (**00** or **01**). Byte **1** = engineering reason code Bytes **4** through **7** = elapsed millisecond tick count.						
Distribution:	Director		SDCM Server			Host	
	EWS Event Log	System Error LED	Event Log	E-Mail	Call-Home	Sense Info	Link Incident
	✔	✔	✔	✔	✔	✔	

Event Code: 442							
Message:	Embedded port anomaly detected.						
Severity:	Informational.						
Explanation:	The CTP card detected a deviation in the normal operating mode or status of the embedded port.						
Action:	No action required. An additional event code is generated if this incident exceeds an error threshold or results in a port failure.						
Event Data:	Byte **0** = port number. Byte **1** = engineering reason code.port. Bytes **4** through **7** = elapsed millisecond tick count. Bytes **8** and **9** = high-availability error callout #1. Bytes **10** and **11** = high-availability error callout #2.				Byte **12** = detecting port. Byte **13** = connected port. Byte **14** = participating SBAR assembly. Bytes **16** and **17** = high-availability error callout #3. Bytes **18** and **19** = high-availability error callout #4.		
Distribution:	Director		SDCM Server			Host	
	EWS Event Log	System Error LED	Event Log	E-Mail	Call-Home	Sense Info	Link Incident
	✔		✔				

Event Code: 450							
Message:	Serial Number mismatch detected.						
Severity:	Informational						
Explanation:	This event occurs when the Sequence Number or OEM Serial Number in the System VPD (read from the backplane) does not match the Sequence Number and Serial Number that was saved in NVRAM the last time the Switch was IPLed. This event will occur normally when a CTP is moved from one Switch to the master position of another Switch. This event may occur abnormally when a hardware problem is causing a problem reading the System VPD from the backplane.						
Action:	None — any configured Feature Keys will be cleared, configuration information will be synched with the backplane VPD and the CTP will automatically be IPLed.						
Event Data:	Bytes 0-12 are the Sequence Number from the System VPD. Bytes 13-31 are the OEM Serial Number obtained from the System VPD.						
Distribution:	Director		SDCM Server			Host	
	EWS Event Log	System Error LED	Event Log	E-Mail	Call-Home	Sense Info	Link Incident
	✔		✔				

Event Code: 451							
Message:	Switch speed incompatibility detected.						
Severity:	Informational						
Explanation:	The event occurs when the configured switch speed saved in NVRAM conflicts with the speed capability of the switch. This event may occur when backup CTP hardware running an early version of software (below 1.3) is improperly synchronized with a CTP operating at greater than 1Gb/s.						
Action:	None — Switch speed configuration and port speed configuration data will be set to a level that is compatible with the CTP and the CTP will automatically be IPLed.						
Event Data:	None						
Distribution:	Director		SDCM Server			Host	
	EWS Event Log	System Error LED	Event Log	E-Mail	Call-Home	Sense Info	Link Incident
	✔		✔				

Event Code: 452							
Message:	Backup CTP incompatible with configured systems settings.						
Severity:	Informational						
Explanation:	This event occurs when the backup CTP is failed as a result of being incompatible with current system settings. Normally this event will be generated following a hot-plug or power on reset. (This event usually occurs when a CTP is installed into a system operating at a switch speed not supported by the CTP). This event should be followed by a 414 event.						
Action:	Replace the backup CTP with a version of hardware capable of supporting the user-configured settings or adjust the user settings to be compatible with the backup CTP and reseat the backup CTP.						
Event Data:	None						
Distribution:	Director		SDCM Server			Host	
	EWS Event Log	System Error LED	Event Log	E-Mail	Call-Home	Sense Info	Link Incident
	✔		✔				

Event Code: 460							
Message:	Management request out of range.						
Severity:	Informational						
Explanation:	This event occurs when requests passed from the managing tool (generally SDCM) to the switch do not meet data boundary specifications. This event is most likely to be triggered if a user attempt to activate a zone set that is larger than the maximum defined zone set size.						
Action:	The Director found request data from the management tool to be larger or smaller than expected. The connection to the management tool will be temporarily lost. After the link is re-established, verify that all information changed in the managing tool is within the specified ranges. For example, verify that the zones and zone members in a zone set fall within the limits stated in the user manual. Try sending the request again.						
Event Data:	None						
Distribution:	Director		SDCM Server			Host	
	EWS Event Log	System Error LED	Event Log	E-Mail	Call-Home	Sense Info	Link Incident
	✔		✔				

FPM Card Events (500 through 599)

Event Code: 500							
Message:	FPM card hot-insertion initiated.						
Severity:	Informational						
Explanation:	Installation of an FPM card was initiated with the Director powered on and operational. The event indicates that operational firmware detected the presence of the FPM card, but the card is not seated. When the card is seated in the Director chassis and identified by firmware, an event code **501** is generated.						
Action:	If event code **501** follows this event and the amber LED on the FPM card extinguishes, the replacement card is installed and no additional action is required. If event code **501** does not follow this event, re-seat the FPM card. If event code **501** still does not appear, replace the FPM card.						
Event Data:	Byte **0** = FPM slot position (**00** through **0F**), bytes **4** through **7** = elapsed millisecond tick count.						
Distribution:	Director		SDCM Server			Host	
	EWS Event Log	System Error LED	Event Log	E-Mail	Call-Home	Sense Info	Link Incident
	✔		✔				

Event Code: 501							
Message:	FPM card recognized.						
Severity:	Informational.						
Explanation:	An FPM card is installed and recognized by Director operational firmware.						
Action:	No action required.						
Event Data:	Byte **0** = FPM slot position (**00** through **0F**), bytes **4** through **7** = elapsed millisecond tick count.						
Distribution:	Director		SDCM Server			Host	
	EWS Event Log	System Error LED	Event Log	E-Mail	Call-Home	Sense Info	Link Incident
	✔		✔				

Event Code: 502							
Message:	FPM card anomaly detected.						
Severity:	Informational.						
Explanation:	The CTP card detected a deviation in the normal operating mode or status of the indicated four-port FPM card.						
Action:	No action required. An event code 504 is generated if the FPM card fails.						
Event Data:	Byte 0 = FPM slot position (00 through 0F). Byte 1 = engineering reason code. Bytes 4 through 7 = elapsed millisecond tick count. Bytes 8 and 9 = high-availability error callout #1. Bytes 10 and 11 = high-availability error callout #2.		Byte 12 = detecting port. Byte 13 = connected port. Byte 14 = participating SBAR assembly. Bytes 16 and 17 = high-availability error callout #3. Bytes 18 and 19 = high-availability error callout #4.				
Distribution:	Director		SDCM Server			Host	
	EWS Event Log	System Error LED	Event Log	E-Mail	Call-Home	Sense Info	Link Incident
	✔		✔				

Event Code: 503							
Message:	FPM card hot-removal completed.						
Severity:	Informational.						
Explanation:	An FPM card was removed with the Director powered on and operational.						
Action:	No action required.						
Event Data:	Byte **0** = FPM slot position (**00** through **0F**), bytes **4** through **7** = elapsed millisecond tick count.						
Distribution:	Director		SDCM Server			Host	
	EWS Event Log	System Error LED	Event Log	E-Mail	Call-Home	Sense Info	Link Incident
	✔		✔				

Event Code: 504							
Message:	FPM card failure.						
Severity:	Major.						
Explanation:	The indicated FPM card failed.						
Action:	Replace the indicated FPM card with a functional FPM card of the same type. Perform the data collection procedure and return the Zip disk and faulty card to Compaq support personnel.						
Event Data:	Byte **0** = FPM slot position (**00** through **0F**). Bytes **4** through **7** = elapsed millisecond tick count. Byte **1** = engineering reason code. Bytes **8** through **11** = reason code specific data.						
Distribution:	Director		SDCM Server			Host	
	EWS Event Log	System Error LED	Event Log	E-Mail	Call-Home	Sense Info	Link Incident
	✔	✔	✔	✔	✔	✔	

Event Code: 505							
Message:	FPM card revision not supported.						
Severity:	Minor.						
Explanation:	The indicated FPM card is not recognized and the four ports appear uninstalled to the Director firmware.						
Action:	Ensure the Director model supports the operating firmware version. If the firmware version is supported, replace the FPM card with a functional card. Perform the data collection procedure and return the Zip disk and faulty card to Compaq support personnel.						
Event Data:	Byte **0** = FPM slot position (**00** through **0F**). Bytes **4** through **7** = elapsed millisecond tick count. Bytes **8** and **9** = detected module identifier.						
Distribution:	Director		SDCM Server			Host	
	EWS Event Log	System Error LED	Event Log	E-Mail	Call-Home	Sense Info	Link Incident
	✔		✔				

Event Code: 506							
Message:	Fibre Channel port failure.						
Severity:	Major.						
Explanation:	A Fibre channel port on an FPM card failed. The amber LED corresponding to the port illuminates to indicate the failure. Other ports remain operational if their LEDs are extinguished.						
Action:	Replace the indicated FPM card with a functional FPM card of the same type. Perform the data collection procedure and return the Zip disk and faulty card to Compaq support personnel.						
Event Data:	Byte **0** = port number (**00** through **63**). Byte **1** = engineering reason code. Bytes **4** through **7** = elapsed millisecond tick count. Bytes **8** through **11** = reason code specific. Byte **16** = connector type.				Bytes **17** and **18** = transmitter technology. Byte **19** = distance capabilities. Byte **20** = supported transmission media. Byte **21** = speed capabilities.		
Distribution:	Director		SDCM Server			Host	
	EWS Event Log	System Error LED	Event Log	E-Mail	Call-Home	Sense Info	Link Incident
	✔	✔	✔	✔	✔	✔	

Event Code: 507							
Message:	Loopback diagnostics port failure.						
Severity:	Informational.						
Explanation:	A loopback diagnostic test detected a Fibre Channel port failure.						
Action:	No action required. An event code **506** is generated if this diagnostic failure results in a hard port failure.						
Event Data:	Byte **0** = port number (**00** through **63**). Byte **1** = engineering reason code. Bytes **4** through **7** = elapsed millisecond tick count.				Bytes **8** through **11** = reason code specific. Byte **12** = test type.		
Distribution:	Director		SDCM Server			Host	
	EWS Event Log	System Error LED	Event Log	E-Mail	Call-Home	Sense Info	Link Incident
	✔		✔				

Event Code: 508							
Message:	Fibre Channel port anomaly detected.						
Severity:	Informational.						
Explanation:	The CTP card detected a deviation in the normal operating mode or status of the indicated Fibre Channel port.						
Action:	No action required. An event code **506** is generated if this anomaly results in a hard port failure.						
Event Data:	Byte **0** = port number (**00** through **63**). Byte **12** = detecting port. Byte **1** = anomaly reason code. Byte **13** = connected port. Bytes **4** through **7** = elapsed millisecond tick count. Byte **14** = participating SBAR assembly. Bytes **8** and **9** = high-availability error callout #1. Bytes **16** and **17** = high-availability error callout #3. Bytes **10** and **11** = high-availability error callout #2. Bytes **18** and **19** = high-availability error callout #4.						
Distribution:	Director		SDCM Server			Host	
	EWS Event Log	System Error LED	Event Log	E-Mail	Call-Home	Sense Info	Link Incident
	✔		✔				

Event Code: 510							
Message:	SFF optical transceiver hot-insertion initiated.						
Severity:	Informational.						
Explanation:	Installation of a pluggable small form factor (SFF) optical transceiver was initiated with the Director powered on and operational. The event indicates that operational firmware detected the presence of the transceiver.						
Action:	No action required.						
Event Data:	Byte **0** = port number (**00** through **63**), bytes **4** through **7** = elapsed millisecond tick count.						
Distribution:	Director		SDCM Server			Host	
	EWS Event Log	System Error LED	Event Log	E-Mail	Call-Home	Sense Info	Link Incident
	✔		✔				

Event Code: 512							
Message:	SFF optical transceiver nonfatal error.						
Severity:	Minor.						
Explanation:	Director firmware detected a pluggable SFF optical transceiver non-fatal error.						
Action:	Replace the failed transceiver with a functional transceiver of the same type.						
Event Data:	Byte **0** = port number (**00** through **63**). Byte **1** = engineering reason code. Bytes **4** through **7** = elapsed millisecond tick count.						
Distribution:	Director		SDCM Server			Host	
	EWS Event Log	System Error LED	Event Log	E-Mail	Call-Home	Sense Info	Link Incident
	✔		✔				

Event Code: 513							
Message:	SFF optical transceiver hot-removal completed.						
Severity:	Informational.						
Explanation:	A pluggable SFF optical transceiver was removed while the Director was powered on and operational.						
Action:	No action required.						
Event Data:	Byte **0** = port number (**00** through **63**), bytes **4** through **7** = elapsed millisecond tick count.						
Distribution:	Director		SDCM Server			Host	
	EWS Event Log	System Error LED	Event Log	E-Mail	Call-Home	Sense Info	Link Incident
	✔		✔				

Event Code: 514							
Message:	SFF optical transceiver failure.						
Severity:	Major.						
Explanation:	A pluggable SFF optical transceiver in an FPM card failed. The amber LED corresponding to the port illuminates to indicate the failure. Other ports remain operational if their LEDs are extinguished.						
Action:	Replace the failed transceiver with a functional transceiver of the same type.						
Event Data:	Byte **0** = port number (**00** through **63**). Byte **1** = engineering reason code. Bytes **4** through **7** = elapsed millisecond tick count.						
Distribution:	Director		SDCM Server			Host	
	EWS Event Log	System Error LED	Event Log	E-Mail	Call-Home	Sense Info	Link Incident
	✔	✔	✔	✔	✔	✔	

SBAR Assembly Events (600 through 699)

Event Code: 600							
Message:	SBAR assembly hot-insertion initiated.						
Severity:	Informational						
Explanation:	Installation of a backup SBAR was initiated with the Director powered on and operational. The event indicates that operational firmware detected the presence of the SBAR, but the SBAR is not seated. When the SBAR is seated in the Director chassis and identified by firmware, an event code **601** is generated.						
Action:	If event code **601** follows this event and the amber LED on the SBAR assembly extinguishes, the replacement SBAR assembly is installed and no additional action is required. If event code **601** does not follow this event, re-seat the SBAR assembly. If event code **601** still does not appear, replace the SBAR assembly.						
Event Data:	Byte **0** = SBAR slot position (**00** or **01**), bytes **4** through **7** = elapsed millisecond tick count.						
Distribution:	Director		SDCM Server			Host	
	EWS Event Log	System Error LED	Event Log	E-Mail	Call-Home	Sense Info	Link Incident
	✔		✔				

Event Code: 601							
Message:	SBAR assembly recognized.						
Severity:	Informational.						
Explanation:	An SBAR assembly is installed and recognized by Director operational firmware.						
Action:	No action required.						
Event Data:	Byte **0** = SBAR slot position (**00** or **01**), bytes **4** through **7** = elapsed millisecond tick count.						
Distribution:	Director		SDCM Server			Host	
	EWS Event Log	System Error LED	Event Log	E-Mail	Call-Home	Sense Info	Link Incident
	✔		✔				

Event Code: 602							
Message:	SBAR assembly anomaly detected.						
Severity:	Informational.						
Explanation:	Director operational firmware detected a deviation in the normal operating mode or operating status of the indicated SBAR assembly.						
Action:	No action required. An event code **604** is generated if the SBAR assembly fails.						
Event Data:	Byte **0** = SBAR slot position (**00** or **01**).			Byte **12** = detecting port.			
	Byte **1** = anomaly reason code.			Byte **13** = connected port.			
	Bytes **4** through **7** = elapsed millisecond tick count.			Byte **14** = participating SBAR assembly.			
	Bytes **8** and **9** = high-availability error callout #1.			Bytes **16** and **17** = high-availability error callout #3.			
	Bytes **10** and **11** = high-availability error callout #2.			Bytes **18** and **19** = high-availability error callout #4.			
Distribution:	Director		SDCM Server			Host	
	EWS Event Log	System Error LED	Event Log	E-Mail	Call-Home	Sense Info	Link Incident
	✔		✔				

Event Code: 603							
Message:	SBAR assembly hot-removal completed.						
Severity:	Informational.						
Explanation:	An SBAR assembly was removed with the Director powered on and operational.						
Action:	No action required.						
Event Data:	Byte **0** = SBAR slot position (**00** or **01**), bytes **4** through **7** = elapsed millisecond tick count.						
Distribution:	Director		SDCM Server			Host	
	EWS Event Log	System Error LED	Event Log	E-Mail	Call-Home	Sense Info	Link Incident
	✔		✔				

Event Code: 604							
Message:	SBAR assembly failure.						
Severity:	Major.						
Explanation:	The indicated SBAR assembly failed. If the active SBAR assembly fails, the backup SBAR takes over operation. If the backup SBAR assembly fails, the active SBAR is not impacted.						
Action:	Replace the failed SBAR assembly with a functional assembly. Perform the data collection procedure and return the Zip disk and faulty assembly to Compaq support personnel.						
Event Data:	Byte **0** = SBAR slot position (**00** or **01**). Byte **1** = engineering failure reason code.			Bytes **4** through **7** = elapsed millisecond tick count. Bytes **8** through **11** = event code specific data.			
Distribution:	Director		SDCM Server			Host	
	EWS Event Log	System Error LED	Event Log	E-Mail	Call-Home	Sense Info	Link Incident
	✔	✔	✔	✔	✔	✔	

Event Code: 605							
Message:	SBAR assembly revision not supported.						
Severity:	Minor.						
Explanation:	The indicated SBAR assembly is not recognized and appears uninstalled to the Director firmware.						
Action:	Ensure the Director model supports the operating firmware version. If the firmware version is supported, replace the SBAR assembly with a functional assembly. Perform the data collection procedure and return the Zip disk and faulty assembly to Compaq support personnel.						
Event Data:	Byte **0** = SBAR slot position (**00** or **01**). Bytes **4** through **7** = elapsed millisecond tick count. Bytes **8** and **9** = detected module identifier.						
Distribution:	Director		SDCM Server			Host	
	EWS Event Log	System Error LED	Event Log	E-Mail	Call-Home	Sense Info	Link Incident
	✔		✔				

Event Code: 607							
Message:	Director contains no operational SBAR assemblies.						
Severity:	Severe.						
Explanation:	The Director firmware does not recognize an installed SBAR assembly.						
Action:	Install at least one functional SBAR assembly and power-on reset (POR) the Director.						
Event Data:	Bytes **4** through **7** = elapsed millisecond tick count.						
Distribution:	Director		SDCM Server			Host	
	EWS Event Log	System Error LED	Event Log	E-Mail	Call-Home	Sense Info	Link Incident
	✔	✔	✔	✔	✔		

Event Code: 608							
Message:	User initiated SBAR switch-over.						
Severity:	Informational						
Explanation:	The backup SBAR has become the active SBAR at a user's request. The previously active SBAR is now functioning as a backup.						
Action:	No action required.						
Event Data:	No supplementary data included with this event.						
Distribution:	Director		SDCM Server			Host	
	EWS Event Log	System Error LED	Event Log	E-Mail	Call-Home	Sense Info	Link Incident
	✔		✔				

Thermal Events (800 through 899)

Event Code: 800							
Message:	High temperature warning (FPM card thermal sensor).						
Severity:	Major.						
Explanation:	The thermal sensor associated with an FPM card indicates the warm temperature threshold was reached or exceeded.						
Action:	Replace the indicated FPM card with a functional FPM card of the same type. Perform the data collection procedure and return the Zip disk and faulty card to Compaq support personnel.						
Event Data:	No supplementary data included with this event.						
Distribution:	Director		SDCM Server			Host	
	EWS Event Log	System Error LED	Event Log	E-Mail	Call-Home	Sense Info	Link Incident
	✔	✔	✔	✔	✔	✔	

Event Code: 801							
Message:	Critically hot temperature warning (FPM card thermal sensor).						
Severity:	Major.						
Explanation:	The thermal sensor associated with an FPM card indicates the hot temperature threshold was reached or exceeded.						
Action:	Replace the indicated FPM card with a functional FPM card of the same type. Perform the data collection procedure and return the Zip disk and faulty card to Compaq support personnel.						
Event Data:	No supplementary data included with this event.						
Distribution:	Director		SDCM Server			Host	
	EWS Event Log	System Error LED	Event Log	E-Mail	Call-Home	Sense Info	Link Incident
	✔	✔	✔	✔	✔	✔	

Event Code: 802							
Message:	FPM card shutdown due to thermal violation.						
Severity:	Major.						
Explanation:	An FPM card failed and was powered off because of excessive heat. This event follows an indication that the hot temperature threshold was reached or exceeded (event code **801**).						
Action:	Replace the failed FPM card with a functional FPM card of the same type. Perform the data collection procedure and return the Zip disk and faulty card to Compaq support personnel.						
Event Data:	No supplementary data included with this event.						
Distribution:	Director		SDCM Server			Host	
	EWS Event Log	System Error LED	Event Log	E-Mail	Call-Home	Sense Info	Link Incident
	✔	✔	✔	✔	✔	✔	

Event Code: 805							
Message:	High temperature warning (SBAR assembly thermal sensor).						
Severity:	Major.						
Explanation:	The thermal sensor associated with an SBAR assembly indicates the warm temperature threshold was reached or exceeded.						
Action:	Replace the indicated SBAR assembly with a functional assembly. Perform the data collection procedure and return the Zip disk and faulty assembly to Compaq support personnel.						
Event Data:	No supplementary data included with this event.						
Distribution:	Director		SDCM Server			Host	
	EWS Event Log	System Error LED	Event Log	E-Mail	Call-Home	Sense Info	Link Incident
	✔	✔	✔	✔	✔	✔	

Event Code: 806							
Message:	Critically hot temperature warning (SBAR assembly thermal sensor).						
Severity:	Major.						
Explanation:	The thermal sensor associated with an SBAR assembly indicates the hot temperature threshold was reached or exceeded.						
Action:	Replace the indicated SBAR assembly with a functional assembly. Perform the data collection procedure and return the Zip disk and faulty assembly to Compaq support personnel.						
Event Data:	No supplementary data included with this event.						
Distribution:	Director		SDCM Server			Host	
	EWS Event Log	System Error LED	Event Log	E-Mail	Call-Home	Sense Info	Link Incident
	✔	✔	✔	✔	✔	✔	

Event Code: 807							
Message:	SBAR assembly shutdown due to thermal violation.						
Severity:	Major.						
Explanation:	An SBAR assembly failed and was powered off because of excessive heat. This event follows an indication that the hot temperature threshold was reached or exceeded (event code **806**). If the active SBAR assembly fails, the backup SBAR takes over operation. If the backup SBAR assembly fails, the active SBAR is not impacted.						
Action:	Replace the failed SBAR assembly with a functional assembly. Perform the data collection procedure and return the Zip disk and faulty assembly to Compaq support personnel.						
Event Data:	No supplementary data included with this event.						
Distribution:	Director		SDCM Server			Host	
	EWS Event Log	System Error LED	Event Log	E-Mail	Call-Home	Sense Info	Link Incident
	✔	✔	✔	✔	✔	✔	

Event Code: 810							
Message:	High temperature warning (CTP card thermal sensor).						
Severity:	Major.						
Explanation:	The thermal sensor associated with a CTP card indicates the warm temperature threshold was reached or exceeded.						
Action:	Replace the indicated CTP card with a functional card. Perform the data collection procedure and return the Zip disk and faulty card to Compaq support personnel.						
Event Data:	No supplementary data included with this event.						
Distribution:	Director		SDCM Server			Host	
	EWS Event Log	System Error Indicator	Event Log	E-Mail	Call-Home	Sense Info	Link Incident
	✔	✔	✔	✔	✔	✔	

Event Code: 811							
Message:	Critically hot temperature warning (CTP card thermal sensor).						
Severity:	Major.						
Explanation:	The thermal sensor associated with a CTP card indicates the hot temperature threshold was reached or exceeded.						
Action:	Replace the indicated CTP card with a functional card. Perform the data collection procedure and return the Zip disk and faulty card to Compaq support personnel.						
Event Data:	No supplementary data included with this event.						
Distribution:	Director		SDCM Server			Host	
	EWS Event Log	System Error LED	Event Log	E-Mail	Call-Home	Sense Info	Link Incident
	✔	✔	✔	✔	✔	✔	

Event Code: 812							
Message:	CTP card shutdown due to thermal violation.						
Severity:	Major.						
Explanation:	A CTP card failed and was powered off because of excessive heat. This event follows an indication that the hot temperature threshold was reached or exceeded (event code **811**). If the active CTP card fails, the backup card takes over operation. If the backup CTP card fails, the active card is not impacted.						
Action:	Replace the failed CTP card with a functional card. Perform the data collection procedure and return the Zip disk and faulty card to Compaq support personnel.						
Event Data:	No supplementary data included with this event.						
Distribution:	Director		SDCM Server			Host	
	EWS Event Log	System Error LED	Event Log	E-Mail	Call-Home	Sense Info	Link Incident
	✔	✔	✔	✔	✔	✔	

Event Code: 850							
Message:	System shutdown due to CTP card thermal violations.						
Severity:	Severe.						
Explanation:	The Director powered off because of excessive thermal violations on the last operational CTP card.						
Action:	Replace the failed CTP card with a functional card. Perform the data collection procedure and return the Zip disk and faulty card to Compaq support personnel.						
Event Data:	No supplementary data included with this event.						
Distribution:	Director		SDCM Server			Host	
	EWS Event Log	System Error LED	Event Log	E-Mail	Call-Home	Sense Info	Link Incident
	✔	✔	✔	✔	✔	✔	

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 enables the SDCM server to automatically contact a support center and report system problems. The 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

10/100 BaseT ethernet hub 1–2
10/100 Mbps ethernet adapters 1–12
10/100 Mbps ethernet port 1–19
10/100 Mbps LAN connectors 1–12

A

AC filter module
  removal 4–27
  replacement 4–28
AC system harness 1–22
acoustical noise, SD-64 1–9
active zone set, zoning view 3–18
airflow clearances, SD-64 1–9
AIX operating system 1–16
altitude
  operating environment 1–10
  shipping and storage environment 1–10
angular velocity, of fans 1–22
applications
  management services 1–24
ASN.1 format 1–28
asynchronous RS-232 null modem cable 1–30
audit logs
  SD-64 3–6
  SDCM 3–3

B

backing up, SD-64 configuration file 3–51
backplane 1–23
  removing and replacing 4–29
bar graph 3–27
bb_credit
  node list view 3–17
beaconing
  fault isolation 1–14
  LED 1–18
bezel 1–18
blocking
  FPM card 3–41
  port 3–41

C

cable management assembly
  description 1–18
  removing and replacing 4–4
call-home notification
  information, use of 3–3
CD-ROM drive 1–12
Celeron processor 1–12
CFR, laser compliance 1–19
circuit breaker 1–22
class 1 laser transceivers 1–19
class F processing 1–19
cleaning fiber-optic components 3–35
clear system error light function 1–18
clock speed, processor 1–16
Code of Federal Regulations 1–19
Compaq
  firmware versions 3–45

home page 3–45
technical support xvi
concurrent FRUs table 4–4
configuration changes, audit log 3–6
configuration data
managing 3–50
configure panel 1–27
configure SNMP dialog box 1–28
configuring
network addresses, maintenance port 1–22
connectivity failures, causes of 1–7
console PC, MAP 2–103
CTP cards
description 1–19
event codes tables B–25
failover 1–19
firmware, managing 3–44
FLASH memory 3–34
LEDs 1–19
MAP 2–64
NV-RAM, backing up 3–50
redundant
caution 4–6
removing and replacing 4–6
resetting 1–19
customer checklist for fault isolation 2–2

D

data collection, procedure 3–34
default settings, resetting 3–53
degraded fabric performance, causes of 1–7
diagnostic features, software 1–23
diagnostic functions, list of 1–27
diagnostics
embedded web server 1–27
MAPs 2–1
port diagnostics 3–19
SDCM server 1–23
dimensions, SD-64 1–9
disk drive 1–12
domain ID 1–7
zone member 3–19
DRAM 3–34
duplex LC connectors 1–21

E

E_port segmentation
causes of 1–8
link incident log 3–9
MAP 2–90
multiswitch fabrics 1–7
reasons for 3–25
zoning view 3–19
E_ports
FPM card 1–20
electric shock, warning 3–36
electrostatic discharge (ESD)
information 4–2
repair procedures, caution 3–2
embedded port subsystem 1–19
embedded web server 1–11, 1–27
ethernet link, MAP 2–51
fault isolation 2–2
interface 1–13
EP subsystem 1–19
equipment rack
9000 series 1–2
M series 1–2
service clearances 1–11
ESD
FRUs 5–1
FRUs, removing and replacing 4–1
grounding point
front 4–3
rear 4–3
information 4–2
repair procedures, caution 3–2
wrist strap 1–31
ethernet adapters 1–12
ethernet communication link, MAP 2–51
ethernet hubs 1–12
ethernet LAN connectors 1–12
ethernet network adapter 1–16
event codes

CTP card events B–25
description B–1
fan module events B–18
FPM card events B–37
power supply events B–14
SBAR assembly events B–43
system events B–2
thermal events B–47
event codes table, fault isolation 2–24
event logs
SD-64 3–6
clearing 3–7
refreshing 3–7
SDCM 3–3
SDCM server B–1
exception frame processing 1–19

F

F_ports
FPM card 1–20
zoning 1–7
fabric element MIB, performance view 3–28
fabric logout, MAP 2–90
fabric manager
FRU list view 3–14
logs, list of 3–2
MAP 2–45
messages A–2, A–16
node list view 3–16
performance view 3–18
port list view 3–12
zoning view 3–18
fabric, definition of 1–7
factory default settings, resetting 3–53
failover, SBAR assembly 1–22
failure analysis 3–35
fan module events, event codes tables B–18
fan modules
description 1–22
MAP 2–64
redundant, removing and replacing 4–24
fault isolation
customer checklist 2–2
diagnostics 2–1
event codes table 2–24
FRU list view 3–14
logs 3–2
maintenance approach 1–13
MAPs 2–1
SNMP traps 1–28
zoning view 3–19
FC fabric element MIB, version 1–6
FC-PH 4.3 1–3
Fiber Channel link incidents, MAP 2–72
fiber-optic cleaning kit 1–31
fiber-optic protective plug 1–30
fiber-optic transceivers, types of 1–21
fiber-optic wrap plug 1–29
Fibre Alliance MIB 1–6
Fibre Channel address, port properties dialog box 3–24
Fibre Channel FE MIB 1–28
Fibre Channel physical and signalling interface 1–3
field-replaceable units (FRUs), description 1–16
firmware
adding version 3–45
deleting version 3–48
determining version 3–44
downloading version 3–48
modifying description 3–47
release notes 3–45
versions, managing 3–44
firmware library 3–44
FLASH memory 3–34
FPM card events, event codes tables B–37
FPM cards
blocking 3–41
description 1–19
heat dissipation 1–9
inband management 1–4
LEDs 3–20
loopback tests, performing 3–29
MAP 2–72

port card view 3–20
ports, blocking or unblocking 3–40
removing and replacing 4–9
unblocking 3–43
FPM filler blank, removing and replacing 4–16
front bezel 1–18
front-accessible FRUs, parts list 5–2
FRU list view 3–14
FRUs
backplane 1–23
cable management assembly 1–18
concurrent 4–3
CTP card 1–19
description 1–16
diagnostic features 1–23
ESD precautions 4–1
fan module 1–22
FPM card 1–19
front bezel 1–18
front-accessible 5–1
parts list 5–2
illustration 5–1
illustrations 5–1
list of 1–16
nonconcurrent 4–4
power module assembly 1–22
power supply 1–21
rear-accessible 5–3
parts list 5–4
removals and replacements, hardware log 3–7
removing and replacing 4–2
SBAR assembly 1–22
serial number, hardware log 3–8

G

G_ports
FPM card 1–19, 1–20
getting help xvi
grounding point
front 4–3
rear 4–3

H

HA PA-RISC processor 1–16
hard drives
capacity 1–12
remote workstation 1–16
hardware log 3–7
hardware, MAP 2–103
HBA, zoning 1–7
heat dissipation, SD-64 1–9
help xvi
online user documentation 1–28
hexagonal adapter 1–29
HP-UX operating system 1–16
humidity
operating environment 1–10
shipping and storage environment 1–10
HyperTerminal 1–31, 2–59

I

illustrated parts breakdown 5–1
IML button 1–19
IML, compared to IPL 3–38
inclination, SD-64 1–9
initial machine load button 1–19
initial machine load, compared to IPL 3–38
initial program load, MAP 2–40
input filter 1–22
installing software 3–54
Intel Celeron processor 1–12
Intel Pentium processor 1–16
Internet Explorer 1–16
version 1–27
interswitch link
G_port 1–20
MAP 2–90
IPL
MAP 2–40
procedure 3–37
ISL
G_port 1–20
MAP 2–90

L

LAN segments 1–14
laser transceivers 1–19
LC connectors 1–21
LEDs
  beaconing 1–14, 1–18
  CTP card 1–19
  fan module 1–22
  FPM card 3–20
  front bezel 1–18
  power supplies 1–21
  SBAR assembly 1–23
  system error 1–18
LIN alerts 3–14
link incident alerts 3–14
link incident log
  clearing 3–10
  description 3–9
  refreshing 3–10
link incident, problem descriptions, list of 3–9
Linux operating system, version 1–16
logs
  audit
    SD-64 3–6
    SDCM 3–3
  event
    SD-64 3–6, 3–7
    SDCM 3–3
  hardware 3–7
  link incident 3–9
  list of 3–2
  product status 3–4
  session 3–4
longwave laser transceivers 1–21
  MAP 2–72
loopback tests
  external 3–31
  internal 3–29
  performing 3–29

M

maintenance analysis procedures
  MAP 0000-Start Map 2–2
  MAP 0100-Power Distribution Analysis 2–30
  MAP 0200-POST or IML Failure Analysis 2–40
  MAP 0300-Console Application Problem Determination 2–45
  MAP 0400-Loss of Console Communication 2–51
  MAP 0500-FRU Failure Analysis 2–64
  MAP 0600-Port Card Failure and Link Incident Analysis 2–72
  MAP 0700-Fabric, ISL, and Segmented Port Problem Determination 2–90
  MAP 0800-Console PC Problem Determination 2–103
maintenance analysis procedures (MAPs) 2–1
  definition 1–13
maintenance approach 1–13
maintenance data, collecting 3–34
maintenance functions, list of 1–27
maintenance port 1–22
management access methods,out-of-band 1–4
management services application
  description 1–24
managing, configuration data 3–50
MAP 0000-Start Map 2–2
MAP 0100-Power Distribution Analysis 2–30
MAP 0200-POST or IML Failure Analysis 2–40
MAP 0300-Console Application Problem Determination 2–45
MAP 0400-Loss of Console Communication 2–51
MAP 0500-FRU Failure Analysis 2–64
MAP 0600-Port Card Failure and Link Incident Analysis 2–72
MAP 0700-Fabric, ISL, and Segmented Port Problem Determination 2–90
MAP 0800-Console PC Problem Determination 2–103
MAPs, definition 1–13
memory, remote workstation 1–16

messages
fabric manager A–2, A–16
product manager A–16
SDCM application A–2
MIBs 1–6
Microsoft Internet Explorer
hardware specification 1–16
version 1–27
monitor panel 1–27
MPC card
redundant removal 4–21
redundant replacement 4–22
multiswitch fabric
connectivity failures, causes of 1–7
degraded performance, causes of 1–7
description 1–7
domain IDs 1–7
E_port segmentation
causes of 1–8
reasons for 3–25
E_ports 1–20
zone set, definition 1–7
zoning 1–7

N

N_ports
FPM card 1–20
zoning 1–7
name server zoning feature 1–6
Netscape Navigator 1–16
version 1–27
network addresses, product status log 3–5
node list view 3–16
nodes, types, list of 3–16
nonconcurrent FRUs table 4–4
notebook PC 1–11
null modem cable 1–30
NV-RAM, backing up 3–50

O

OFC class 1 laser transceivers 1–19
offline state, setting 3–40
online state, setting 3–39
online user documentation 1–28
operating environment, SD-64 1–10
operations panel 1–27
optic transceivers 1–21
optical transceivers, SFF
MAP 2–72
removing and replacing 4–13
out-of-band, management access methods 1–4

P

part numbers
front-accessible FRUs 5–1
rear-accessible FRUs 5–3
PCMCIA slots 1–12
performance view 3–18
personal computer, SDCM server 1–11
physical characteristics, SD-64 1–9
port card
external loopback test 3–31
internal loopback test 3–29
operational states 3–22
removing 4–10, 4–13
replacing 4–11, 4–15
port card view 3–20
port list view 3–12
port loopback diagnostic tests, fiber-optic wrap plug 1–29
port number, zoning 1–7
port operational states table 3–22
port properties dialog box 3–14, 3–24
ports
bar graph 3–27
bb_credit, node list view 3–17
blocking 3–41
diagnostics, performing 3–19
operational states, list of 3–22
statistic information, performance view 3–18
unblocking 3–42
WWN, node list view 2–82, 3–17
POSTs
MAP 2–40

power distribution system MAP 2–30
power module assembly 1–22
removing and replacing 4–26
power requirements, SD-64 1–9
power supplies 1–21
LEDs 1–21
redundant
accessing 1–18
removing and replacing 4–17
power supply events, event codes tables B–14
power switch 1–22
POWER3 microprocessor 1–16
power-off procedure 3–37
power-on procedure 3–36
power-on self-tests, MAP 2–40
PowerPC microprocessor 1–16
preventive maintenance, cleaning fiber-optic components 3–35
procedural notes 3–2, 4–1
procedures
blocking ports 3–41
data collection 3–34
external loopback test 3–31
FRU removal 4–2
FRU replacement 4–2
installing software 3–54
internal loopback test 3–29
IPL 3–37
managing configuration data 3–50
managing firmware versions 3–44
MAPs 2–1
power-off 3–37
power-on 3–36
setting offline 3–39
setting online 3–39
unblocking ports 3–42
upgrading software 3–54
ProComm Plus 1–31
product manager
FRU list view 3–14
logs, list of 3–2
MAP 2–45
messages A–16
MIB variable, modifying 1–28
node list view 3–16
performance view 3–18, 3–27
port card view 3–20
port list view 3–12
SNMP agent 1–4
zoning view 3–18
product status log 3–4
protective plug 1–30

R

rack stability xv
RAM, capacity 1–12
rear-accessible FRUs, parts list 5–4
redundant power supplies
accessing 1–18
description 1–21
relative humidity
operating environment 1–10
shipping and storage environment 1–10
reloading firmware 1–19
remote user workstations
configurations 1–14
LAN segment 1–14
minimum specifications 1–15
repair procedures, notes 3–2
resetting
CTP card 1–19
SD-64 configuration data 3–53
restoring
SD-64 configuration file 3–52
RFC 1213 1–28
definition 1–6
RJ-45
connectors 1–12
twisted pair connector 1–19
RS-232
maintenance port 1–19
null modem cable 1–30

S

safety
- basic ESD note 4–1
- electric shock, warning 3–36
- ESD
  - information 4–2
  - repair procedures 3–2
- ESD grounding cable with wrist strap 1–31
- fiber-optic protective plug 1–30

SBAR assemblies
- description 1–22
- frame transmission 1–19
- LEDs 1–23
- MAP 2–64
- redundant, removing and replacing 4–20

SBAR assembly events, event codes tables B–43

SD-64
- audit log 3–6
- cable management assembly 1–18
- circuit breaker 1–22
- CTP card 1–19
- diagnostic features, software 1–23
- embedded web server 1–27
- ethernet link, MAP 2–51
- event codes B–1
- event log
  - clearing 3–7
  - description 3–6
  - recording events B–1
  - refreshing 3–7
- fan module 1–22
- fault isolation 1–13, 2–2
- features
  - serviceability
    - SD-64
      - features
        - error detection 1–5
- firmware 1–27
  - version 1–13
- firmware library dialog box 3–44
- firmware, release notes 3–45
- FRUs, list of 1–16
- general description 1–2
- illustrated parts breakdown 5–1
- IPL procedure 3–37
- management access methods 1–4
- MAPs 2–1
- ports
  - blocking or unblocking 3–40
  - port list view 3–12
- power module assembly 1–22
- power requirements 1–9
- power supplies 1–21
- power-off procedure 3–37
- power-on procedure 3–36
- product manager
  - messages A–16
- product status log 3–4
- SBAR assembly 1–22
- setting online or offline 3–39
- SNMP traps 1–28
- specifications 1–9
- status table 1–24
- weight 1–9
- zoning features 1–6

SD-64 features, reporting 1–5

SDCM application 1–14
- audit log 3–3
- general description 1–4
- logs, list of 3–2
- MAP 2–45
- messages A–2
- sessions, maximum active 1–14

SDCM audit log 3–3

SDCM event log 3–3

SDCM server
- description 1–11
- diagnostic features 1–23
- ethernet link, MAP 2–51
- event log B–1
- fault isolation 1–13
  - MAP 2–2
- Fibre Alliance MIB 1–6
- firmware versions, storing 3–44

MAP 2–45, 2–103
remote workstation 1–4
session log 3–4
specifications 1–12
segmentation
causes of 1–8
MAP 2–90
serial numbers, FRUs, hardware log 3–8
service
maintenance and diagnostic functions 1–27
session log 3–4
sessions, SDCM application, maximum active 1–14
setting
offline state 3–40
online state 3–39
SFF optical transceiver, removing and replacing 4–13
SFF pluggable optic transceivers 1–21
shipping environment, SD-64 1–10
shock tolerance, SD-64 1–9
shortwave laser transceivers 1–21
MAP 2–72
small form factor optical transceivers, MAP 2–72
small form factor pluggable optic transceivers 1–21
SNMP agent
general description 1–4
SNMP trap messages
maximum recipients 1–6
reporting 1–28
SNMP traps, list of 1–28
software
diagnostic features 1–23
installing 3–54
management services application 1–24
upgrading 3–54
Solaris operating system 1–16
spacer card
removal 4–16
replacement 4–17
specifications, remote workstations 1–15
specifications, SD-64 1–9
SSP subsystem 1–19
statistical information, performance view 3–27
status table
SD-64 1–24
storage environment, SD-64 1–10
SunOS operating system 1–16
symbols
equipment xiv
text xiv
system error LED 1–18
system events 1–13
event codes tables B–2
system services processor 1–19

T

TCP/IP MIB-II 1–28
definition 1–6
temperature
operating environment 1–10
shipping and storage environment 1–10
text conventions xiii
thermal events, event codes tables B–47
tools
backplane 4–29
cable management assembly 4–4
CTP cards 4–6
fan modules 4–24
FPM card 4–9
FPM filler blank 4–16
power module assembly 4–26
redundant power supply 4–17
SBAR assemblies 4–20
SFF optical transceiver 4–13
supplied by service personnel 1–31
supplied with SD-64 1–29
torque tool 1–29
trap messages
maximum recipients 1–6

U

UltraSPARC-II processor 1–16
unblocking
  FPM card 3–43
  port 3–42
UNIX workstation, specifications 1–16
upgrading software 3–54

V

velocity, angular, of fans 1–22
versions
  AIX operating system 1–16
  Celeron processor 1–12
  FC fabric element MIB 1–6
  firmware
    adding 3–45
    deleting 3–48
    determining 3–44
    downloading 3–48
    managing 3–44
    modifying description 3–47
  HP-UX operating system 1–16
  Internet Explorer 1–16, 1–27
  Linux operating system 1–16
  Netscape Navigator 1–16, 1–27
  SD-64 firmware 1–4, 1–13, 1–27
  Solaris operating system 1–16
  SunOS operating system 1–16
  Windows 2000 operating system 1–4
  Windows NT operating system 1–4, 1–12
  Windows operating systems 1–16, 1–31
vibration tolerance, SD-64 1–9
video card, remote workstation 1–16
view panel 1–27
views
  FRU list 3–14
  node list 3–16
  performance 3–18, 3–27
  port card 3–20
  port list 3–12
  zoning 3–18
voltage
  AC power connectors 1–22
  backplane 1–23
  power supplies 1–21
  SD-64 1–9

W

web server, embedded 1–11
  interface 1–13
web server, overview 1–4
website xvi
weight, SD-64 1–9
wet-bulb temperature
  operating environment 1–10
  shipping and storage environment 1–10
Windows NT operating system 1–12
  MAP 2–45
Windows operating systems, versions 1–16, 1–31
workstation, UNIX 1–16
world wide name, caution, zoning 1–7
wrap plug
  multimode 1–29
  singlemode 1–29
WWN
  node list view 2–82, 3–17
  port properties dialog box 3–24
  zone member 3–19
  zoning, caution 1–7

Z

Zip drive 1–12
zone set
  definition 1–7
  zoning view 3–18
zones, definition of 1–6
zoning
  joining, rules of 1–7
zoning features 1–6
zoning view 3–18