

# hp StorageWorks

---

## director product manager user guide

Part Number: AA-RTDUA-TE

First Edition (January 2003)

This guide provides an introduction and an overview of the HP StorageWorks Director 2/64 Product Manager and Director 2/140 Product Managers. It also explains how to use Product Manager features to monitor, manage, and configure a director. Finally it describes how to use Director 2/64 and Director 2/140 logs and maintenance features.



© Hewlett-Packard Company, 2003. All rights reserved.

Hewlett-Packard Company makes no warranty of any kind with regard to this material, including, but not limited to, the implied warranties of merchantability and fitness for a particular purpose. Hewlett-Packard shall not be liable for errors contained herein or for incidental or consequential damages in connection with the furnishing, performance, or use of this material.

This document contains proprietary information, which is protected by copyright. No part of this document may be photocopied, reproduced, or translated into another language without the prior written consent of Hewlett-Packard. The information contained in this document is subject to change without notice.

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

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

Hewlett-Packard Company 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 Hewlett-Packard Company 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.

director product manager user guide  
First Edition (January 2003)  
Part Number: AA-RTDUA-TE

---

# Contents

## About This Guide

Intended Audience . . . . .	xi
Related Documentation . . . . .	xi
Document Conventions . . . . .	xii
Symbols in Text . . . . .	xii
Symbols on Equipment . . . . .	xiii
Rack Stability . . . . .	xiv
Getting Help . . . . .	xiv
HP Technical Support . . . . .	xiv
HP Website . . . . .	xv
HP Authorized Reseller . . . . .	xv

## 1 Product Manager Overview

Managing the StorageWorks Director 2/64 and Director 2/140 . . . . .	1-1
HAFM Management Menu Options . . . . .	1-2
HAFM . . . . .	1-2
View Tabs . . . . .	1-2
Product Menu . . . . .	1-2
Fabrics Menu . . . . .	1-3
View Menu . . . . .	1-3
Configure Menu . . . . .	1-4
Logs Menu . . . . .	1-4
Maintenance Menu . . . . .	1-4
Help . . . . .	1-4
Product Manager . . . . .	1-5
View Tabs . . . . .	1-5
Product Menu . . . . .	1-5
Configure Menu . . . . .	1-6
Logs Menu . . . . .	1-7
Maintenance Menu . . . . .	1-7

Help Menu . . . . .	1-7
Product Manager Description . . . . .	1-8
Using the Product Manager . . . . .	1-10
Using Dialog Boxes . . . . .	1-10
Keyboard Navigation . . . . .	1-11
Illustrations Used in This Manual . . . . .	1-11
Logging in to the HAFM Application . . . . .	1-11
Opening the Product Manager . . . . .	1-13
Window Layout and Function . . . . .	1-15
Menu Bar . . . . .	1-15
Product Menu . . . . .	1-16
Configure Menu . . . . .	1-17
Logs . . . . .	1-20
Maintenance . . . . .	1-21
Help . . . . .	1-23
View Tabs . . . . .	1-23
Status Bar . . . . .	1-24
Hardware View . . . . .	1-26
Director Menu . . . . .	1-28
Port Card Menu . . . . .	1-28
CTP Card Menu . . . . .	1-29
Cooling Fan Module . . . . .	1-29
SBAR Card Menu . . . . .	1-29
Port Card View . . . . .	1-29
Port List View . . . . .	1-31
FRU List View . . . . .	1-32
Node List View . . . . .	1-33
Performance View . . . . .	1-34
Closing the Product Manager . . . . .	1-36
User Rights . . . . .	1-37
User Rights for Specific Functions . . . . .	1-37
Backing Up and Restoring Product Manager Data . . . . .	1-40
Restoring Data to the HAFM Server . . . . .	1-41

## **2 Monitoring and Managing the Director**

Hardware View . . . . .	2-1
Identifying FRUs . . . . .	2-1
Monitoring Director Operation . . . . .	2-2

Director Status Table . . . . .	2-2
Status . . . . .	2-2
State . . . . .	2-3
No Link Status . . . . .	2-3
Status Bar Indicator . . . . .	2-4
Monitoring Hardware Operation . . . . .	2-4
Obtaining Hardware Information . . . . .	2-8
Displaying FRU Information . . . . .	2-8
Displaying Director Information . . . . .	2-9
Using Menu Options . . . . .	2-10
Director Menu . . . . .	2-10
Director Properties . . . . .	2-11
Enable Unit Beacons . . . . .	2-11
Clear System Error Light . . . . .	2-11
IPL Director . . . . .	2-11
Setting Director Date and Time . . . . .	2-11
Setting Director Online State . . . . .	2-13
Port Card Menu . . . . .	2-13
Port Menu . . . . .	2-14
CTP Card Menu . . . . .	2-14
Fan Module . . . . .	2-15
SBAR Card Menu . . . . .	2-15
Using the Port Card View . . . . .	2-16
Symbols and Indicators . . . . .	2-16
Displaying Port Information . . . . .	2-17
Port Card Menu . . . . .	2-21
Port Menu . . . . .	2-21
Port Properties . . . . .	2-21
Node Properties . . . . .	2-21
Port Technology . . . . .	2-21
Block Port . . . . .	2-22
Enable Beacons . . . . .	2-22
Diagnostics . . . . .	2-22
Channel Wrap (S/390 mode only) . . . . .	2-22
Swap Ports (S/390 mode only) . . . . .	2-23
Clear Link Incident Alerts . . . . .	2-23
Reset Port . . . . .	2-23
Port Binding . . . . .	2-23

Clear Threshold Alerts . . . . .	2–25
Port List View . . . . .	2–25
Menu Options . . . . .	2–28
FRU List View . . . . .	2–29
Node List View . . . . .	2–30
Menu Options . . . . .	2–32
Displaying Node Properties . . . . .	2–33
Performance View . . . . .	2–35
Menu Options . . . . .	2–36
Bar Graph Display . . . . .	2–37
Port Statistics . . . . .	2–37
Statistics Description . . . . .	2–38
Traffic Statistics with Receive and Transmit Values . . . . .	2–38
Class 2 Statistics . . . . .	2–38
Class 3 Statistics . . . . .	2–39
Error Statistics . . . . .	2–39
Operational Statistics . . . . .	2–40
Troubleshooting Tips . . . . .	2–41
Button Functions . . . . .	2–41
Port Operational States . . . . .	2–41
Link Incident Alerts . . . . .	2–45
Threshold Alerts . . . . .	2–46

### 3 Configuring the Director

Configuring Director Identification . . . . .	3–1
Configuring Switch Operating Parameters . . . . .	3–2
Switch Parameters . . . . .	3–3
Domain ID . . . . .	3–3
Preferred . . . . .	3–4
Insistent . . . . .	3–4
Rerouting Delay . . . . .	3–5
Domain RSCNs . . . . .	3–5
Director Speed . . . . .	3–5
Operating Mode . . . . .	3–6
Configuring Fabric Operating Parameters . . . . .	3–6
Fabric Parameters . . . . .	3–7
BB_Credit . . . . .	3–7
R_A_TOV . . . . .	3–8

---

E_D_TOV .....	3-8
Switch Priority .....	3-8
Interop Mode .....	3-9
Configuring Switch Binding .....	3-9
Configuring Ports .....	3-9
Warning and Error Messages .....	3-12
Menu Options .....	3-13
Configuring Ports in the Open Systems Mode .....	3-15
Configuring Ports in the S/390 Mode .....	3-17
Configuring Port Addresses .....	3-18
Parameters .....	3-18
Managing Stored Address Configurations .....	3-21
Configuring SNMP Trap Message Recipients .....	3-22
Configuring Open Systems Management Server .....	3-24
Configuring FICON Management Server .....	3-25
Configuring Feature Key .....	3-25
Configuring Director Date and Time .....	3-27
Setting Date and Time Manually .....	3-28
Synchronizing Date and Time .....	3-29
Configuring Threshold Alerts .....	3-29
Creating New Alerts .....	3-30
Modifying Alerts .....	3-36
Activating or Deactivating Alerts .....	3-37
Deleting Alerts .....	3-37
Exporting the Configuration Report .....	3-38
Enabling Embedded Web Server .....	3-39
Enabling Telnet .....	3-39
Backing Up and Restoring Configuration Data .....	3-39
<b>4 Using Logs</b>	
Using Logs .....	4-1
Button Functions .....	4-1
Expanding Columns .....	4-2
Sorting Entries .....	4-2
Audit Log .....	4-3
Event Log .....	4-4
Hardware Log .....	4-6
Link Incident Log .....	4-7

Threshold Alert Log . . . . . 4–9

**5 Using Maintenance Features**

Port Diagnostics . . . . . 5–1

Swap Ports . . . . . 5–1

    Notes . . . . . 5–2

Collect Maintenance Data. . . . . 5–3

Execute an IPL . . . . . 5–3

Set Online State . . . . . 5–4

Manage Firmware Versions . . . . . 5–5

Enable E-Mail Notification. . . . . 5–5

Enable Call-Home Notification . . . . . 5–6

    Notes . . . . . 5–6

Backup and Restore Configuration. . . . . 5–6

Reset Configuration . . . . . 5–8

**6 Optional Features**

FICON Management Server. . . . . 6–1

    Installation . . . . . 6–1

    Configuring the FICON Management Server . . . . . 6–2

Open Systems Management Server . . . . . 6–5

    Installation . . . . . 6–5

    Configuring the Open Systems Management Server. . . . . 6–5

SANtegrity Features . . . . . 6–6

    Fabric Binding . . . . . 6–6

        Enable/Disable and Online State Functions . . . . . 6–6

    Switch Binding. . . . . 6–7

        Configuring Switch Binding—Overview . . . . . 6–7

        Notes . . . . . 6–8

        Enable/Disable Switch Binding. . . . . 6–8

        Editing the Switch Membership List. . . . . 6–9

        Enable/Disable and Online State Functions . . . . . 6–11

        Zoning with Switch Binding Enabled . . . . . 6–12

    Enterprise Fabric Mode . . . . . 6–12

        Features and Parameters Enabled . . . . . 6–13

            Fabric Binding. . . . . 6–13

            Switch Binding . . . . . 6–13

            Rerouting Delay . . . . . 6–13



Domain RSCNs . . . . .	6–13
Insistent Domain Identification (ID) . . . . .	6–14

## A Information and Error Messages

StorageWorks Director 2/64 Product Manager Messages . . . . .	A–1
---	-----

## Glossary

## Index

## Figures

1–1	Typical network configuration . . . . .	1–10
1–2	HAFM application icon . . . . .	1–12
1–3	Main HAFM window . . . . .	1–13
1–4	StorageWorks Director 2/64 and Director 2/140 icons. . . . .	1–14
1–5	StorageWorks Director 2/64 Product Manager window. . . . .	1–14
1–6	StorageWorks Director 2/140 Product Manager window. . . . .	1–15
1–7	Hardware View . . . . .	1–27
1–8	Port Card View . . . . .	1–30
1–9	Port List View . . . . .	1–31
1–10	FRU List View . . . . .	1–33
1–11	Node List View . . . . .	1–34
1–12	Performance View. . . . .	1–35
2–1	Monitoring hardware operation—Director 2/64 Hardware View. . . . .	2–5
2–2	Monitoring hardware operation—Director 2/140 Hardware View. . . . .	2–6
2–3	FRU Properties dialog box . . . . .	2–8
2–4	Port Card FRU Properties dialog box . . . . .	2–9
2–5	Director Properties dialog box . . . . .	2–9
2–6	Configure Date and Time Periodic Synchronization dialog box . . . . .	2–12
2–7	Configure date and time (manually) . . . . .	2–12
2–8	Set Online State dialog box (Online) . . . . .	2–13
2–9	Switchover CTP dialog box . . . . .	2–14
2–10	Port Card View . . . . .	2–16
2–11	Port Properties dialog box. . . . .	2–17
2–12	Port Binding dialog box . . . . .	2–24
2–13	Clear Threshold Alerts dialog box . . . . .	2–25
2–14	Port List View . . . . .	2–26
2–15	FRU List View . . . . .	2–29

2-16	Node List View . . . . .	2-31
2-17	Node Properties dialog box . . . . .	2-34
2-18	Performance View . . . . .	2-36
3-1	Configure Identification dialog box . . . . .	3-1
3-2	Configure Switch Parameters dialog box . . . . .	3-3
3-3	Configure Fabric Parameters dialog box . . . . .	3-7
3-4	Warning! dialog box . . . . .	3-13
3-5	Configure Ports dialog box (Open Systems Mode). . . . .	3-16
3-6	Configure Ports dialog box (S/390 Mode) . . . . .	3-17
3-7	Prohibited Port Connection symbol. . . . .	3-19
3-8	Configure Addresses - “Active” dialog box . . . . .	3-20
3-9	Address Configuration Library dialog box . . . . .	3-21
3-10	Configure SNMP dialog box . . . . .	3-24
3-11	Configure Feature Key dialog box . . . . .	3-26
3-12	New Feature Key dialog box . . . . .	3-26
3-13	Configure Date and Time dialog box . . . . .	3-28
3-14	Configure Threshold Alerts dialog box . . . . .	3-31
3-15	New Threshold Alerts dialog box—first screen . . . . .	3-32
3-16	New Threshold Alerts dialog box—second screen . . . . .	3-33
3-17	New Threshold Alerts dialog box—third screen. . . . .	3-34
3-18	New Threshold Alerts dialog box—summary screen . . . . .	3-35
3-19	Configure Threshold Alerts dialog box—alert activated . . . . .	3-36
3-20	Export Configuration Report dialog box . . . . .	3-38
4-1	Save dialog box—log windows. . . . .	4-2
4-2	Audit Log. . . . .	4-3
4-3	Event Log . . . . .	4-4
4-4	Hardware Log . . . . .	4-6
4-5	Link Incident Log . . . . .	4-8
4-6	Threshold Alert Log . . . . .	4-9
5-1	Swap Ports dialog box . . . . .	5-2
5-2	IPL Confirmation dialog box. . . . .	5-3
5-3	Backup and Restore Configuration dialog box . . . . .	5-7
6-1	Configure FICON Management Server dialog box. . . . .	6-4
6-2	Configure Open Systems Management Server dialog box . . . . .	6-5
6-3	Switch Binding State Change dialog box . . . . .	6-8
6-4	Switch Binding Membership List dialog box . . . . .	6-10

---

**Tables**

1	Document Conventions . . . . .	xii
1-1	Operating Status—Status Bar and Director Status . . . . .	1-25
1-2	User Rights for Product Manager . . . . .	1-38
2-1	Port States and Indicators . . . . .	2-42
4-1	Event Codes . . . . .	4-5
4-2	FRU Names . . . . .	4-7
5-1	Data Default Values . . . . .	5-9
6-1	Available Code Pages . . . . .	6-3
A-1	Product Manager Messages . . . . .	A-1



---

## About This Guide

This reference guide provides information to use when planning to acquire and install one or more of the following Hewlett-Packard (HP) StorageWorks products:

- Director 2/64.
- Director 2/140.
- *High Availability Fabric Manager* (HAFM) application.

The Director 2/64 is a 64-port director, while the Director 2/140 is a 140-port director. Functions and options available through the *Product Manager* applications for these products are nearly identical. When there are differences, this guide will contain notes such as **Director 2/64 only** or **Director 2/140 only**.

## Intended Audience

This publication is intended for use by configuration and installation planners; however, information is also provided for system administrators, customer engineers, and project managers.

## Related Documentation

For a list of corresponding documentation included with this product, see the Related Documents section of the *hp StorageWorks director release notes*.

For the latest information, documentation, and firmware releases, please visit the HP StorageWorks website:

<http://h18006.www1.hp.com/storage/saninfrastructure.html>

For information about Fibre Channel standards, visit the Fibre Channel Industry Association website, located at <http://www.fibrechannel.org>.

## Document Conventions

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

**Table 1: Document Conventions**

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

## 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 data.

---

**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



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

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

---



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

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

---



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

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

---



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

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

---



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

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

---

## Rack Stability



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

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

## Getting Help

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

## HP Technical Support

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

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

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

Be sure to have the following information available before calling:

- Technical support registration number (if applicable)



- Product serial numbers
- Product model names and numbers
- Applicable error messages
- Operating system type and revision level
- Detailed, specific questions

## HP Website

The HP website has the latest information on this product, as well as the latest drivers. Access storage at: <http://thenew.hp.com/country/us/eng/prodserv/storage.html>. From this website, choose the appropriate product or solution.

## HP Authorized Reseller

For the name of your nearest HP Authorized Reseller:

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



---

# Product Manager Overview

This chapter provides an introduction and overview of the HP StorageWorks Director 2/64 Product Manager and Director 2/140 Product Manager. It is intended as a quick reference for using features available through the main Product Manager window.

## Managing the StorageWorks Director 2/64 and Director 2/140

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

- The *Product Manager* application installed on a StorageWorks High Availability Fabric Manager (HAFM) server. Access to the Product Manager must be through the HAFM. The *HAFM* and *Product Manager* applications are installed on the HAFM server.

The *Product Manager* application installs automatically with the HAFM on remote workstations using any standard web browser. For instructions, refer to the appropriate appendix that pertains to the operating system for your workstation in the *hp StorageWorks ha-fabric manager user guide*.

- The Embedded Web Server (EWS) interface. Using a browser-capable PC with an internet connection to the director, you can monitor and manage the director through the web server interface embedded in the director firmware. The interface provides a GUI similar to the *Product Manager* application, and supports director configuration, statistics monitoring, and basic operation. (The EWS online help provides additional information regarding zoning, zone sets, and SAN management.)

To launch the web server interface, enter the director's IP address as the internet uniform resource locator (URL) into any standard browser. Enter a user name and password at the **HAFM Login** dialog box. The browser then becomes a management console. Refer to the web server interface online help for details on use. Refer to the *hp StorageWorks embedded web server user guide* for more details on the Embedded Web Server.

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

- The command line interface (CLI). The CLI allows you to access many HAFM 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 *hp StorageWorks CLI reference guide for directors and edge switches*.

This guide provides details on the *Product Manager* applications for the HP StorageWorks Director 2/64 and Director 2/140.

## HAFM Management Menu Options

This user’s guide provides information on the StorageWorks Director 2/64 *Product Manager* and Director 2/140 *Product Manager* application only. Information on the *HAFM* application is provided in the *hp StorageWorks ha-fabric manager user guide*. Following are lists of options available on the menu bar in the applications. References are provided to the correct publication for detailed information on these options.

### HAFM

Following are options available through the HAFM. For more information, refer to “Using the HAFM” in Chapter 2 of the *hp StorageWorks ha-fabric manager user guide*.

#### View Tabs

- Products
- Fabrics

#### Product Menu

- New
- Open
- Delete
- Modify

- Properties
- Logout
- Exit

## **Fabrics Menu**

- Rename
- Persist Fabric Technology
- Unpersist Fabric Technology
- Export Fabric Topology
- Show Route
- Hide Route
- Show Zone Members
- Show View Port
- Show Fabric Tree
- Enterprise Fabrics Mode (active if SANtegrity is installed)
- Fabric Binding (active if SANtegrity is installed)

## **View Menu**

- User Sessions
- Zoom
  - In
  - Out
  - Default
  - Fit in View
- Layout Icons
- Circular
- Spring
- Center in Topology
- Clear ISL Alerts

- Clear All ISL Alerts
- Enable Fly Over Display

## **Configure Menu**

- Users
- Nicknames
- Sessions
- SNMP Agent
- Activate Zone Set
- Zoning Library
- Advanced Zoning
- Deactivate Zone Set
- Configure Default Zone

## **Logs Menu**

- Audit Log
- Event Log
- Session Log
- Product Status Log
- Fabric Log

## **Maintenance Menu**

- Configure E-Mail
- Test Remote Notification
- Configure Ethernet Events
- Configure Enable Call Home Event Notification

## **Help**

- Contents
- About

## Product Manager

Following are options available through the *Product Manager* application for your director. For more information on these options, refer to “[Configure Menu](#)” on [page 1–17](#) in this manual.

### View Tabs

- Hardware
- Node List
- Port List
- Performance
- FRU List

### Product Menu

- Port (options available when port is selected)
  - Port Properties
  - Node Properties
  - Port Technology
  - Block Port
  - Enable Beaconing
  - Port Diagnostics
  - Channel Wrap
  - Swap Ports
  - Clear Link Incidents Alert(s)
  - Reset Port
  - Port Binding
  - Clear Threshold Alert(s)
  - Display Options (Nickname and Worldwide Name)
- FRU (options available when FRU is selected)
  - Open Port Card View

- FRU Properties
- Switchover
- Enable Beaconing
- Block All Ports
- Unblock All Ports
- Diagnostics
- Clear Error System Light
- Enable Unit Beaconing
- Properties
- Close

## **Configure Menu**

- Identification
- Operating Parameters
  - Switch
  - Fabric
- Switch Binding
  - Change State (active if SANtegrity is installed)
  - Edit Membership List (active if SANtegrity is installed)
- Ports
- Addresses (S/390 mode only)
  - Active
  - Stored
- SNMP Agent
- Management Server
- Features
- Date/Time
- Threshold Alerts



- Export Configuration Report
- Enable Embedded Web Server
- Enable Telnet

## **Logs Menu**

- Audit Log
- Event Log
- Hardware Log
- Link Incident Log
- Threshold Alerts Log

## **Maintenance Menu**

- Port Diagnostics
- Swap Ports (S/390 mode only)
- Data Collection
- IPL
- Set Online State
- Firmware Library
- Configure Enable E-Mail Notification
- Configure Enable Call Home
- Backup and Restore Configuration
- Reset Configuration

## **Help Menu**

- Contents
- About

## Product Manager Description

The Product Manager for the HP StorageWorks Director 2/64 and Director 2/140 has a Java-based graphical user interface (GUI) that provides in-depth management, configuration, and monitoring functions for individual directors and their field-replaceable units (FRUs).

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

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

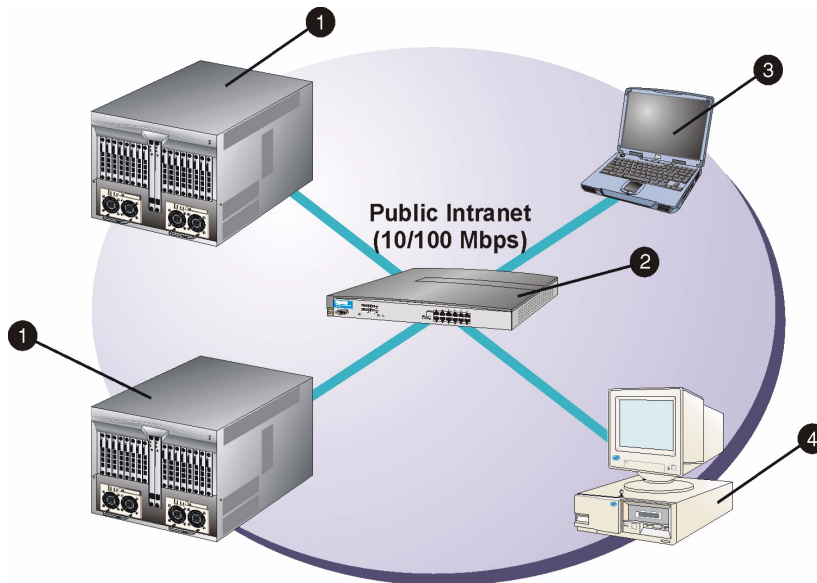
Using the Product Manager, you can:

- Back up and restore configuration data.
- Clear the system error indicator.
- Configure extended distance buffering for ports.
- Configure Fibre Channel operating parameters for the director such as BB\_Credit, R\_A\_TOV, E\_D\_TOV, preferred domain ID, insistent domain ID, domain RSCNs, switch priority, director speed (Director 2/64 only), and rerouting delay.
- Configure individual ports with a port name describing the node attached to the port.
- Configure LIN alerts.
- Configure interoperability mode for multiswitch fabrics.
- Configure a nickname to display instead of WWN for the director and for attached node devices.
- Configure port binding.
- Configure port address configurations (S/390 mode only).
- Configure the FICON and Open Systems Management Server features if installed.
- Configure Switch Binding if optional SANtegrity feature is installed.
- Configure the operating mode between open systems and S/390 functions.

- Configure the data speed for the director (Director 2/64 only) and for individual ports.
- Configure threshold alerts for ports.
- Configure SNMP trap recipients and community names.
- Configure the director name, location, description, and contact person.
- Control individual Fibre Channel ports by blocking/unblocking operation, enabling LIN alerts, Port Binding, setting data speeds, and running internal and external loopback diagnostics.
- Display FRU properties, such as the FRU name, physical position in the director (chassis slot number), active or failed state, part number, and serial number.
- Display information for individual Fibre Channel ports, such as the port name, port number, Fibre Channel address, operational state, type of port, and login data.
- Display information on nodes attached to ports.
- Display port performance and statistics.
- Display vital product data for the director, such as the system name, description, contact person, location, status, model number, firmware and Engineering Change (EC) level, and manufacturer.
- Enable beaconing for ports and the director unit.
- Enable channel wrap mode (S/390 mode only).
- Maintain a port address library (S/390 mode only).
- Monitor the operational status of the director and each of its hardware FRUs.
- Perform an initial program load (IPL).
- Perform maintenance tasks for the director, including maintaining firmware levels, administering the call-home feature, accessing the director logs, and collecting data to support failure analysis.
- Reset port operation.
- Run port diagnostics.
- Set the date and time on the director.
- Swap addresses between ports (S/390 mode only).

Access the Director Product Manager when you click a director product icon on the *HAFM* application's **Product View** or **Topology View**.

Figure 1-1 illustrates director management components on a public network. The figure shows the following elements:



SHR-2368

- ❶ Two Director 2/64s
- ❷ HP Ethernet hub
- ❸ HAFM server
- ❹ Remote user workstation

Figure 1-1: Typical network configuration

## Using the Product Manager

This section provides a general overview of the StorageWorks Director 2/64 and Director 2/140 *Product Manager* application and its functions. For details on performing specific tasks and using specific dialog boxes, refer to the appropriate chapters in this guide.

## Using Dialog Boxes

Buttons, such as **OK**, **Activate**, **Close**, and **Cancel**, initiate functions in a dialog box. Click a button to perform its labeled function. Note the difference between the **OK** and **Activate** buttons. The **OK** button saves the data you entered and closes the dialog

box. The **Activate** button saves the data you entered without closing the dialog box. There is also a difference between the **Close** and **Cancel** buttons. The **Close** button closes the dialog box and saves the data you entered. The **Cancel** button cancels the operation and closes the dialog box without saving the information you entered.

## Keyboard Navigation

Keyboard navigation is an alternative to mouse navigation. The *Product Manager* and *HAFM* applications support standard keyboard navigation.

## Illustrations Used in This Manual

Illustrations of windows and dialog boxes are included for illustrative purposes only. These illustrations may not match exactly what you see through your server or workstation. Title bars have been removed from the illustrations, and fields in the illustrations may contain different data than in fields displayed on your screen.

## Logging in to the HAFM Application

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

1. Perform one of the following steps:
  - If you are using the HAFM server, the *HAFM* application automatically starts when you power on or reboot the HAFM server. If you reboot the HAFM server and the **HAFM login** dialog box displays, skip to step 3 to log in.
  - If you are using a remote user workstation, follow steps 2 through 5.
  - If the *HAFM* application window is displayed, skip to [page 1–13](#).
2. Perform one of the following steps if you are using a remote user workstation (a network PC with a remote client previously installed), and the **HAFM login** dialog box or *HAFM* application window is not displayed.

**NOTE:** Install the *Product Manager* application with the *HAFM* application on remote workstations using any standard web browser. For instructions, refer to the appropriate appendix that pertains to the operating system for your workstation in the *hp StorageWorks ha-fabric manager user guide*.

- If the **HAFM Login** dialog box is displayed, go to step 3.
- Start the *HAFM* application and display the **HAFM Login** dialog box when you double-click the *HAFM* application icon on the desktop as shown in [Figure 1–2](#). Note that this icon only displays on a remote workstation running the *HAFM* application remote client software.



**Figure 1–2: HAFM application icon**

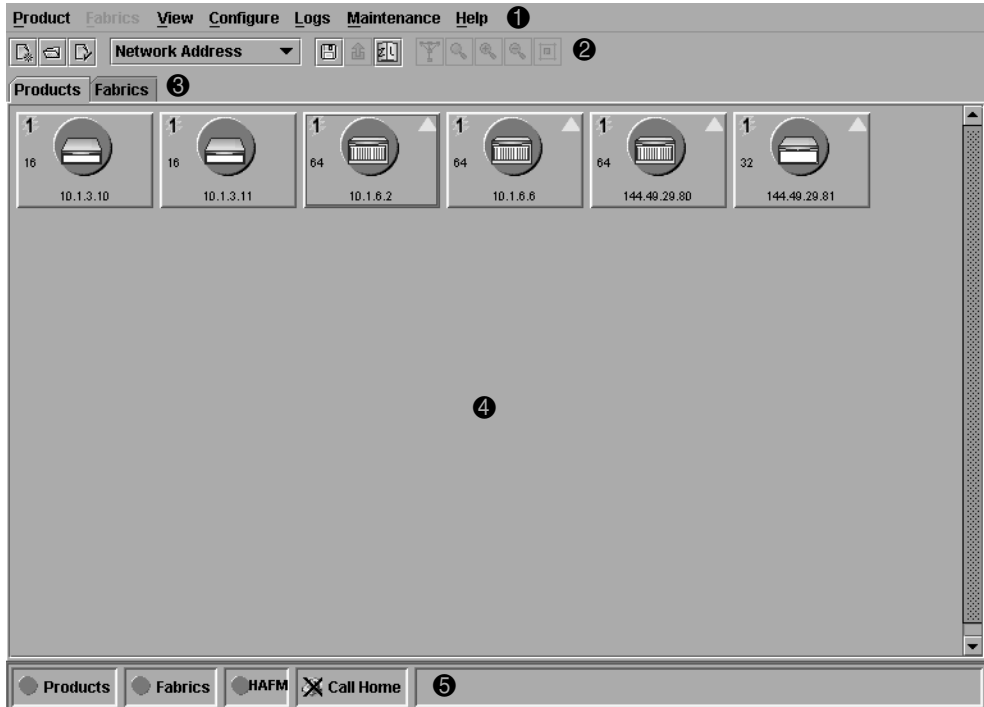
The **HAFM login** dialog box displays.

Go to step 3.

- If the *HAFM* application window is open ([Figure 1–3](#)) and you need to log in as another user or access a different HAFM server, choose **Logout** from the **Product** menu on the menu bar to display the **HAFM Login** dialog box. Go to step 3.
- 3. When the **HAFM login** dialog box displays, enter your user name and password. The default user name is Administrator, and password is password unless changed by your system administrator.

**NOTE:** The default user name for the right to view status and other information is “operator.” The default user name for the right to modify configuration data, perform maintenance tasks, or perform other options is “administrator.” The default password for both user names is “password.”
- 4. From the drop-down list on the **HAFM Login** dialog box, choose the HAFM server to which you wish to connect. Note that if you are logging into a server locally, localhost is the server name. Type in the network address of the server if it is not in the list.
- 5. Click **Activate** or press the **Enter** key on your keyboard.

The main *HAFM* application window displays showing the **Product View**.



- ❶ Menu Bar
- ❷ Tool Bar
- ❸ View Tabs
- ❹ Main Panel
- ❺ Status Panel

Figure 1–3: Main HAFM window

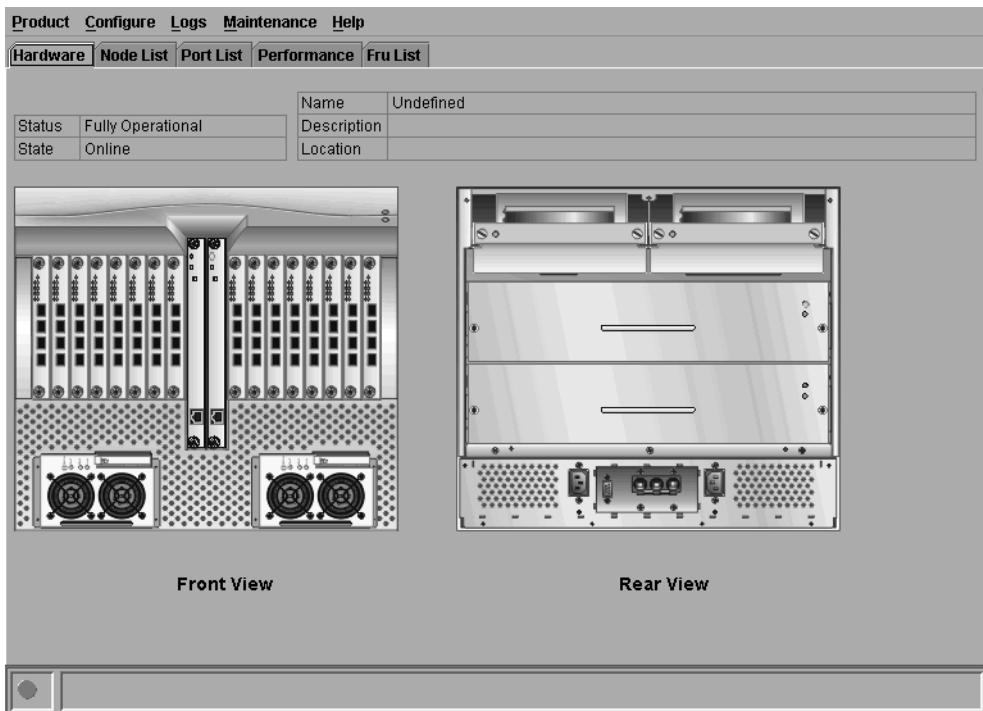
## Opening the Product Manager

To open the Product Manager, double-click the product icon in the **Product View** or right-click the icon and choose **Open**. The Director icons are shown in [Figure 1–4](#)



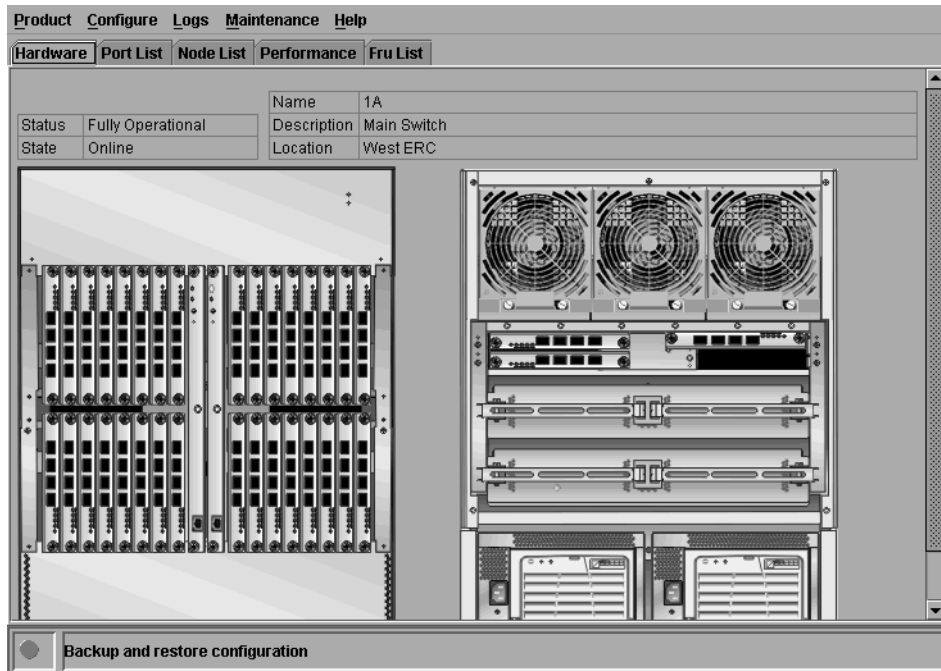
**Figure 1-4: StorageWorks Director 2/64 and Director 2/140 icons**

The Product Manager displays showing the default **Hardware View**. Refer to [Figure 1-5](#) below for the Director 2/64 and to [Figure 1-6](#) for the Director 2/140.



**Figure 1-5: StorageWorks Director 2/64 Product Manager window**





**Figure 1–6: StorageWorks Director 2/140 Product Manager window**

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

## Window Layout and Function

The main Product Manager window is divided into four main areas shown in [Figure 1–5](#) and [Figure 1–6](#): menu bar, view tabs, view panel, and status bar. Use features in these panels to configure director operation, monitor performance, and access maintenance features.

### Menu Bar

The menu bar on the Product Manager window displays tabs for the following menus:

- Product
- Configure

- Logs
- Maintenance
- Help

## Product Menu

Choose one of the following options from the **Product** menu:

### **Port**

This provides a secondary port menu only when the **Port Card View**, **Port List View**, or **Performance View** displays in the view panel. To use this menu for a specific port, click a port in the **Port Card View**, a port's row in the **Port List View**, or a port's bar graph in the **Performance View**. The menu contains options which are identical to those that display when you right-click the port, port row, or port bar graph in those views. For detail on these options refer to “[Using the Port Card View](#)” on [page 2–15](#).

### **FRU**

Click an SBAR card, CTP card, port card, power supply module, or cooling fan module in the **Hardware View** only and choose **FRU** from the **Product** menu to display a menu of specific options for that FRU. These are the same menu option as when you right-click these components in the **Hardware View**. For details on these options refer to the following sections in “[Menu Options](#)” on [page 2–36](#):

- Port Card Menu
- CTP Card Menu
- SBAR Card Menu
- Cooling Fan and Power Supply

### **Clear System Error Light**

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

### **Enable Unit Beaconing**

Click the check box to toggle unit beaconing on or off. When the check box has a check mark, unit beaconing is on, and the amber system error light on the director front bezel blinks to help users locate the actual unit in an equipment room. When

you click the check box to remove the check mark, unit beaconing is disabled and the amber LED goes out. You can only enable beaconing if there are no system errors (the system error light is off).

## **Properties**

Click to display the **Director Properties** dialog box. This dialog box contains the director name, description, location, and contact person configured through the **Configure Identification** dialog box. Also included is other product information as detailed in **Director Properties**. You can also display this dialog box when you double-click an area on the illustration in the **Hardware View**, away from a hardware component.

## **Close**

Choose this option to close the Product Manager window.

## **Configure Menu**

Click the **Configure** menu on the menu bar to display a menu that lists the following options. For detailed information on using these dialog boxes, refer to [Chapter 3, “Configuring the Director.”](#)

- **Identification**—Choose this option to display the **Configure Identification** dialog box. Enter the following information in this dialog box:
  - **Name**—Assign a product name. Note that you can set this name as the nickname for the director’s WWN, using the **Set Name As Nickname** check box. The nickname then displays instead of the WWN in Product Manager views.
  - **Description**—Assign a unique product description.
  - **Location**—Describe the product’s location.
  - **Contact**—Assign a contact either by name, phone number, or e-mail address.

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

- **Switch Operating Parameters**—Choose this option to display the **Configure Switch Parameters** dialog box for setting Fibre Channel operating parameters. In this dialog box, you can set the preferred domain identification (1 to 31), and also make it insistent if SANtegrity feature is installed. You can also enable rerouting delay, and domain register for state change notifications (RSCNs). In addition,

you can also set the director data speed (Director 2/64 only) and set the director operating mode to **S/390** or **Open Systems** modes. The director must be offline to configure director speed, preferred domain ID, and operating mode.

- **Fabric Operating Parameters**—Choose this option to display the **Configure Fabric Parameters** dialog box for setting fabric operating parameters. In this dialog box, you can set buffer-to-buffer credit (BB\_Credit) from 1 to 60 (default is 16) and the resource allocation time-out value (R\_A\_TOV) and error detect time-out value (E\_D\_TOV) in tenth-of-a-second increments. In addition, you can set the switch priority level (**Principal**, **Default**, or **Never Principal**) and the interoperability modes between **Homogeneous**, and **Open Fabric 1.0**. Refer to [“Configuring Fabric Operating Parameters”](#) on page 3–6 for more information on configuring these parameters for the director. The director must be offline to configure any fabric operating parameter.
- **Switch Binding**—This submenu provides two options: **Change State** and **Edit Membership List**. Choosing **Change State** displays the **Switch Binding State Change** dialog box where you can activate Switch Binding according to a specific connection policy (Restrict E\_Ports, Restrict F\_Ports, or All Ports). **Edit Membership List** allows you to create a list of switches and devices that you want to allow exclusively to attach to director ports. **Switch Binding** is an optional feature that requires the SANtegrity Feature key. The feature can be installed through the **Configure Feature Key** dialog box. For details, refer to [“SANtegrity Features”](#) on page 6–6.
- **Ports**—Choose this option to display the **Configure Ports** dialog box. This dialog has different functions in S/390 versus open systems mode.
  - In S/390 mode**, use the dialog box to enable extended distance buffering for 10 to 100km, link incident (LIN) alerts, and port binding for each port.
  - In open systems mode**, for each port you can provide a name, block or unblock operation, configure extended distance buffering for 10 to 100km, enable LIN alerts for each port, define a type (G, F, and E), and enable port binding.

**NOTE:** Ports are automatically configured as G\_Ports if no device is connected, F\_Ports if a device is connected, and E\_Ports if a director is connected.

In both modes, you can enable the rerouting delay feature and for the Director 2/64, you can set the director data speed.

**NOTE:** Your director model and firmware may not allow variable data speeds.
- **Addresses**—S/390 mode only. Choose from two suboptions for active and stored addresses.

- **Active Addresses**—Displays the **Configure-Addresses - “Active”** dialog box. Use this dialog box to configure a name, blocked or unblocked state, and prohibited and allowed connection attributes for a port.
- **Stored Addresses**—Displays the **Address Configuration Library**. Use this dialog box to activate, modify, delete, and modify existing address configurations created through the **Active Addresses** dialog box.
- **SNMP Agent**— Choose this option to display the **Configure SNMP** dialog box. Use this dialog box to configure network addresses and community names for up to six SNMP trap recipients. Also authorize write permissions to enable SNMP management stations to modify writable MIB variables. In addition, you can enable authorization traps to be sent to management stations when unauthorized stations request access to director SNMP data.
- **Management Server**—Choose this option to display either the **Configure Open Systems Management Server** or **Configure FICON Management Server** dialog box, depending on which feature (if any) is enabled for the director. Use this to configure a FICON or open systems inband management program to function with the director. To use these procedures, you must have enabled either the **FICON Management Server** or **Open Systems Management Server** through the **Configure Feature Key** dialog box.
- **Features**—Displays the **Configure Feature Key** dialog box. Use this dialog box to enter a feature key to enable optional features that you have purchased for the director.
- **Date/Time**—Choose this option to display the **Configure Date and Time** dialog box. Use this option to set the current date and time in the director. When the **Periodic Date/Time Synchronization** check box is checked in the dialog box, the Date and Time fields are grayed out (disabled), and the HAFM server date and time periodically synchronizes the director date and time. If the **Periodic Date/Time Synchronization** check box is not checked, you can set the date and time in the dialog box fields manually.
- **Threshold Alerts**—Choose this option to configure threshold alerts for ports. A threshold alert notifies users when the transmit (Tx) or receive (Rx) throughput reaches specified values for specific director ports or port types (E\_Ports or F\_Ports). Using this option, you can configure:
  - A name for the alert.
  - A threshold type for the alert (Rx, Tx, or either).
  - Active or inactive state of the alert.

- Threshold criteria. This includes configuring the threshold as the percent of port traffic capacity utilized (**% utilization**), the time interval for measuring throughput and sending notification, and the amount of cumulative minutes that the **% utilization** should exist before an alert is generated.
- **Export Configuration Report**—Choose this option to display the **Export Configuration Report** dialog box, which enables you to specify a file name in which to save an ASCII text file containing all current user-definable configuration options in a printable format. Note that this file cannot be read back into the Product Manager in order to set configuration parameters.
- **Enable Embedded Web Server**—Choose this option by placing a check mark in the check box to enable the Embedded Web Server Interface on the director. Choose the option again to remove the check mark and disable the Embedded Web Server Interface. When disabled, users at remote workstations cannot access the interface.

If enabled, HP recommends changing the user names and/or passwords from their default values to prevent unauthorized access.

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

## Logs

The Logs menu on the menu bar displays the following options. For detailed information on using these dialog boxes, refer to [Chapter 4](#), “Using Logs.”

- **Audit Log**—This log provides a record of all configuration changes made on the director. Each entry displays the date and time of the change, a description of the change, the source of the change (such as the HAFM server or SNMP management station), and an identifier for the source, such as the IP address of the HAFM server or SNMP management station.
- **Event Log**—Choose this option to display the director event log. This log provides a record of significant events that have occurred on the director, such as hardware failures, degraded operation, and port problems. Each entry includes the date and time of the event, a reason code for the event, the severity level, a brief description, and up to 32 bytes of supplementary event data. Refer to the *hp StorageWorks director 2/64 service manual* or *hp StorageWorks director 2/140 service manual* for more information.

- **Hardware Log**—This log displays information on FRUs inserted and removed from the director. Each log entry includes the name of the FRU inserted or removed, the slot position relative to identical FRUs installed, whether the FRU was inserted or removed, the FRU part number and serial number, and the date and time the FRU was inserted or removed.
- **Link Incident Log**—The link incident (LIN) log displays the most recent incidents with the date and time, port number, and description of the incident. A link incident can be one of several conditions detected on a fiber optic link. For a list of events that may cause a link incident to be written to the log, refer to “[Link Incident Log](#)” on [page 4–8](#).
- **Threshold Alert Log**—This log provides notifications of threshold alerts. Besides the date and time that the alert occurred, it also displays information that was configured through the **Configure Threshold Alerts** option under the **Configure** menu. This includes the alert name, port for which the alert is configured, the type of alert (transmit throughput, receive throughput, or both), threshold utilization of traffic capacity, minutes the threshold was configured for, and the configured time interval for the threshold. For more detail on this log, refer to “[Threshold Alert Log](#)” on [page 4–9](#).

## Maintenance

The **Maintenance** menu on the menu bar displays the following options. For detailed information on using these dialog boxes, refer to [Chapter 5](#), “[Using Maintenance Features](#).”

- **Port Diagnostics**—This option displays the **Port Diagnostics** dialog box. Use this dialog box to run internal and external loopback tests on ports. Refer to the *hp StorageWorks director 2/64 service manual* or *hp StorageWorks director 2/140 service manual* for instructions.
- **Swap Ports**—S/390 mode only. Choose this option to display the **Swap Ports** dialog box. Use this dialog box to swap one port address for another.
- **Data Collection**—This option displays the **Save Data Collection** dialog box. Use this dialog box to collect maintenance data into a file. This file is used by support personnel to diagnose system problems. Refer to the *hp StorageWorks director 2/64 service manual* or *hp StorageWorks director 2/140 service manual* for instructions.
- **IPL**—Choose this option to initiate an initial program load on the director. A dialog box displays to allow you to confirm the IPL. Note that an IPL does not affect any configuration settings done through the Product Manager. Port

operation is interrupted during the IPL. Refer to the *hp StorageWorks director 2/64 service manual* or *hp StorageWorks director 2/140 service manual* for more information.

- **Set Online State**—Choose this option to display the **Set Online State** dialog box. Use this dialog box to change the online state of the director to offline or online.
- **Firmware Library**—Choose this option to display the **Firmware Library** dialog box. This dialog box displays all firmware versions currently installed on the HAFM server that can be downloaded to directors. Use this dialog box to add a new firmware version to the HAFM server hard disk, modify the description displayed for an existing version, delete a version from the PC, or download (send) a version for operation on a director. For additional information on using this option, refer to the *hp StorageWorks director 2/64 service manual* or *hp StorageWorks director 2/140 service manual*.
- **Enable E-Mail Notification**—The Simple Mail Transfer Protocol (SMTP) server and e-mail recipient addresses are configured in the *HAFM* application (not in the Director's Product Manager). E-mail notification is also initially enabled in the HAFM for all directors managed by the HAFM. Note, however, that the E-Mail Notification option on the Product Manager's **Maintenance** menu must be enabled (checked) for e-mail notification to occur for the specific director.

The default setting for the **Enable E-Mail Notification** function is enabled (checked). To disable the function, choose **Enable E-Mail Notification** from the **Maintenance** menu to clear the check box. For additional information on using this option, refer to “[Enable E-Mail Notification](#)” on [page 5–5](#).

- **Enable Call Home Notification**—Choose **Enable Call Home Notification** from the **Maintenance** menu to enable the call-home function for the director.

For directors and switches installed in some legacy environments, call-home notification requires installation of HP Proactive Service software. This service is offered at no additional charge for subsystems covered under an on-site warranty or on-site storage hardware support contract. To register or order Proactive Service software, contact your HP customer service representative.

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

- **Backup & Restore Configuration**—Choose this option to save the product configuration stored on the director to the HAFM server hard disk or to restore the product configuration from the HAFM server. Only a single copy of the configuration is kept on the server.



This backup is primarily for single-CTP systems, where a backup is needed to restore the configuration data to a replacement CTP card. You cannot modify the location or the file name of the saved configuration. For additional information on using this option, refer to [“Backing Up and Restoring Configuration Data”](#) on page 3–36.

**NOTE:** You can only restore the configuration to a director with the same IP address.

- **Reset Configuration**—Choose this option to reset all director configuration data back to the factory defaults. A confirmation dialog box displays with a warning upon choosing the option. For additional information on using this option, refer to [“Reset Configuration”](#) on page 5–8.



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

---

## Help

Choose the Help menu on the menu bar to display the following options.

- **Contents**—Choose this option to display the **Help** window. The **Help** window contains **Contents**, **Index**, and **Glossary** buttons and hypertext linked items to help you quickly navigate through information. Use the forward (>) and back (<) buttons to scroll forward and backward through the displayed help frames. Exit the help feature at any time when you click the **Close** icon at the top of the **Help** window.
- **About**—Choose this option to display the version number for the Product Manager and copyright information.

## View Tabs

Click one of the view tabs across the top of the Product Manager window to display the following views in the view panel:

- **Hardware**—The **Hardware View** is the Product Manager default view. The **Hardware View** is a dynamic illustration of all hardware components installed in the front and back of the director. Operational status of the director and hardware components is indicated by simulated light emitting diodes (LEDs) and colored status symbols displayed in the graphics. Refer to [Figure 1–5](#) for an example of the Director 2/64 **Hardware View** and [Figure 1–6](#) for an example of the Director 2/140 **Hardware View**. For additional information on this view, refer to [“Hardware View”](#) on page 2–1.




- **Port List**—The **Port List View** is a table of data on all Fibre Channel ports in the director. This data includes the port number, port name, blocked configuration state, operational state (such as online or failed), type of port (G\_Port, F\_Port, or E\_Port), operating speed, and any link incident alerts. For additional information on this view, refer to “[Port List View](#)” on [page 2–25](#).
- **FRU List**—The **FRU List View** is a table of detailed information on all FRUs installed in the director. (A FRU is a hardware component that can be replaced as an assembly if it fails.) Information includes the FRU name, slot position in the chassis relative to identical FRUs in the director, operational status (active or failed), part number, and serial number. For additional information on this view, refer to “[FRU List View](#)” on [page 2–28](#).
- **Node List**—The **Node List View** is a table of information about the node attachments to existing F\_Ports, sorted by port number. Information includes the director's port number, node type, port World Wide Name, and the buffer-to-buffer credit (BB\_Credit) allocated to the port. To find out more about the attached node, right-click on a port's row and choose **Node Properties** from the menu. The **Node Properties** dialog box displays. For additional information on this view, refer to “[Node List View](#)” on [page 2–30](#).
- **Performance**—The **Performance View** contains a bar graph for each of the director ports. Each graph shows the current throughput percentage for each port and marks the highest throughput achieved. When you click a bar graph for a port, you can display cumulative port statistics and error count values for the port, including traffic statistics, class 2 and 3 accounting statistics, and error statistics. For additional information on this view, refer to “[Performance View](#)” on [page 2–35](#).

## Status Bar


The status bar displays a status symbol that indicates the current state of the director. Refer to [Table 1–1](#) for the meaning of these status symbols. The status bar is located along the bottom of the Product Manager window. The status symbol displays on the left side of the bar and messages display in the panel to the right of the symbol.

If a gray square displays in the status bar (no Ethernet connection), a reason for the status displays in the **Status** table at the top of the **Hardware View**. Refer to “[No Link Status](#)” on [page 2–3](#) for details.

Table 1–1: Operating Status—Status Bar and Director Status

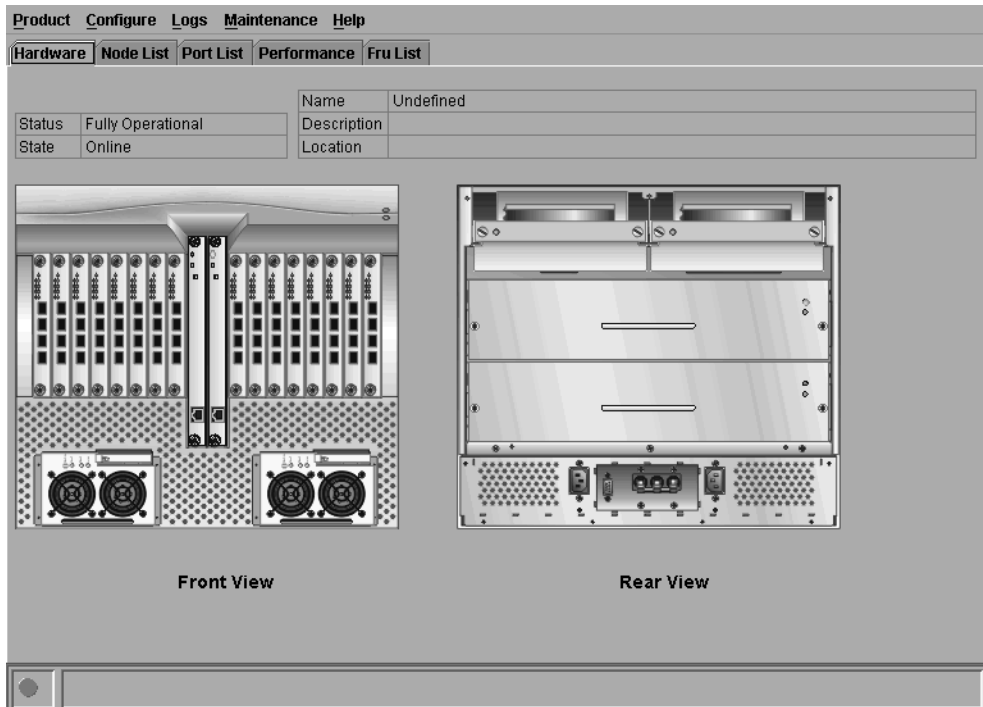
Symbol	Alert Panel	Director Status Table Text	Meaning
	Green Circle	Fully Operational	All components and installed ports are operational; no failures.
	Yellow Triangle	Redundant Failure	A redundant component has failed, such as a power supply, and the backup component has taken over operation.
		Minor Failure	<p>A failure occurred which has decreased the director operational ability. Normal switching operations are not affected.</p> <ul style="list-style-type: none"> <li>• One or more port cards failed, but at least one port card is still operational.</li> <li>• A fan has failed or is not rotating sufficiently.</li> <li>• One of two CTP cards failed.</li> <li>• One of two SBAR cards failed.</li> </ul>
	Blinking Red Diamond with Yellow Background	Not Operational	<p>A critical failure prevents the director from performing fundamental switching operations.</p> <ul style="list-style-type: none"> <li>• All fans fail.</li> <li>• Both SBAR cards fail.</li> <li>• All installed port cards fail.</li> </ul>

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

Symbol	Alert Panel	Director Status Table Text	Meaning
	Gray Square	Never Connected Link Timeout Protocol Mismatch Duplicate Session Unknown Network Address Incorrect Product Type	Director status is unknown. This occurs if the Ethernet network connection between the HAFM server and the director cannot be established or if the CTP fails. Refer to “ <a href="#">No Link Status</a> ” on <a href="#">page 2–3</a> for details on the status table text.

### Hardware View

The **Hardware View** is the default view that displays in the main panel when you open the Director Product Manager. Refer to [Figure 1–7](#) for an example of this view.



**Figure 1–7: Hardware View**

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

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

For details on navigating and monitoring via the **Hardware View**, refer to [Chapter 2](#), “[Monitoring and Managing the Director](#).”

## Director Menu

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

- **Director Properties**
- **Enable Unit Beaconing**
- **Clear System Error Light**
- **IPL Director**
- **Set Director Date and Time**
- **Set Director Online State**

For details on menu options, refer to “[Director Menu](#)” on [page 2–10](#).

For details on navigating and monitoring via the **Hardware View**, refer to [Chapter 2](#), “[Monitoring and Managing the Director](#).”

## Port Card Menu

Double-click on a port card to display the **Port Card View**. Refer to “[Using the Port Card View](#)” on [page 2–15](#). Right-click the port card to display the following options:

- **Open Port Card View**
- **FRU Properties**
- **Enable Port Card Beaconing**
- **Block All Ports**
- **Unblock All Ports**
- **Diagnostics**

Note that these same options are available when you click the port card and choose the FRU secondary menu from the **Product** menu on the menu bar.

## CTP Card Menu

Double-click on a CTP card to display the **Properties** dialog box for the card.

Right-click a CTP card to display the following options. For details refer to “[Using the Port Card View](#)” on [page 2–15](#).

- **FRU Properties**
- **Enable Card Beaconing**
- **Switchover**

Note that these same options are available when you click the CTP card and choose the FRU secondary menu from the **Product** menu on the menu bar.

## Cooling Fan Module

Double-click a Fan Module on the Rear View to display the **FRU Properties** dialog box for the card. For details refer to “[Fan Module](#)” on [page 2–15](#).

Note that these same options are available when you click the fan module and choose the FRU secondary menu from the **Product** menu on the menu bar.

## SBAR Card Menu

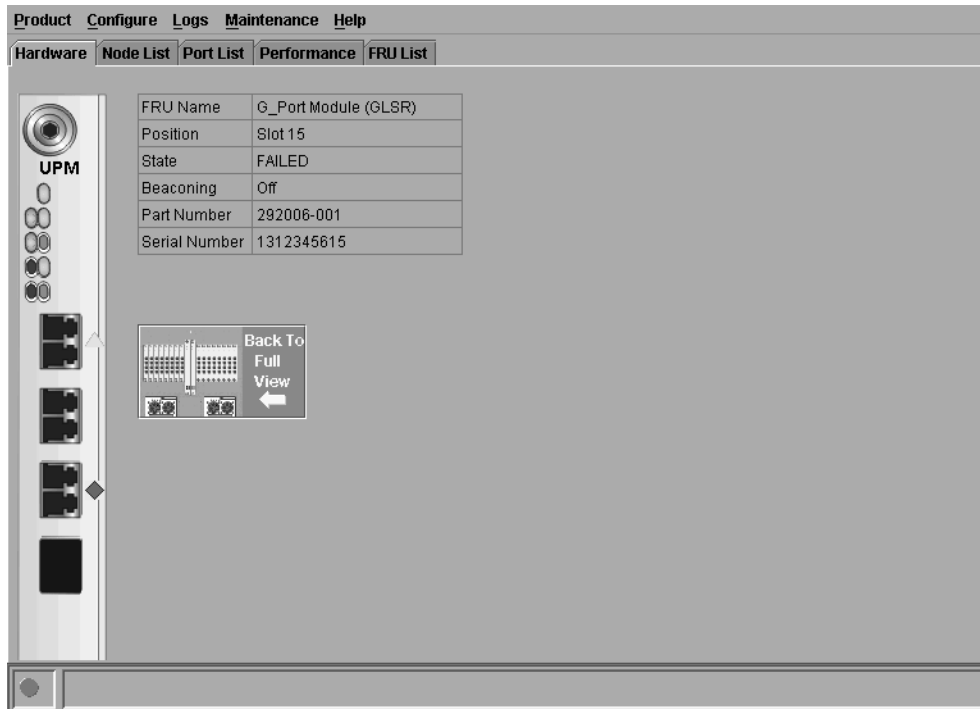
Double-click an SBAR card to display the **FRU Properties** dialog box for the card. Right-click on an SBAR card to display the following options. For details refer to “[SBAR Card Menu](#)” on [page 2–15](#).

- **FRU Properties**
- **Enable Card Beaconing**
- **Switchover**

Note that these same options are available when you click the SBAR card and choose the FRU secondary menu from the **Product** menu on the menu bar.

## Port Card View

Double-click on a port card in the **Hardware View** or right-click on a port card and choose **Port Card View** from the menu to display the **Port Card View** for that port ([Figure 1–8](#)).



**Figure 1–8: Port Card View**

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

- Determine port card status by amber LED at the top of the card. A table also displays on the **Port Card View** that provides the FRU name, position, operating state, beaconing state, and part number.
- Determine port status and operation by the status symbols that display next to the port connectors and simulated LED indicators above the connectors.
- Right-click on the port card to display a menu with **Block All Ports**, **Unblock All Ports**, and **Diagnostics** options.
- Right-click the port connector to display a menu with **Port Properties**, **Node Properties**, **Port Technology**, **Block Port**, **Enable Beaconing**, **Port Diagnostics**, **Channel Wrap** (S/390 mode only), **Swap Ports** (S/390 mode only), **Clear Link Incident Alerts**, **Reset Port**, **Port Binding**, and **Clear Threshold Alerts** options.

Note that these same options also display when you click a port connector and choose the **Port** secondary menu from the **Product** menu on the menu bar.



- Double-click on a port connector to display the **Port Properties** dialog box.
- Click **Back To Full View** to return to the **Hardware View**.  
Refer to “[Using the Port Card View](#)” on [page 2–15](#) for detailed information on this view.

## Port List View

Choose the **Port List View** from the **View** menu. A table listing the port number, port name, port address (S/390 mode only), the block/unblock configuration, operating state, port type, operating speed, and status condition displays in the main panel. [Figure 1–9](#) shows an example of the **Port List View**.

Product Configure Logs Maintenance Help							
Hardware <b>Port List</b> Node List Performance FRU List							
#	Name	Block Config	State	Type	Operating Speed	Alert	
0	Redhat AS 2.1	Unblocked	Offline	G Port	Not Established		
1		Unblocked	Online	E Port	2 Gb/sec		
2		Unblocked	No Light	G Port	Not Established		
3	MSA A1 Linux/Netware	Unblocked	Online	F Port	2 Gb/sec		
4	Redhat 7.2	Unblocked	Offline	G Port	Not Established		
5		Unblocked	Online	E Port	2 Gb/sec		
6		Unblocked	No Light	G Port	Not Established		
7	MSA A2 Linux/Netware	Unblocked	No Light	G Port	Not Established		
8	SUSE SLES v7	Unblocked	Online	F Port	2 Gb/sec		
9		Unblocked	Online	E Port	2 Gb/sec		
10		Unblocked	No Light	G Port	Not Established		
11		Unblocked	Online	E Port	2 Gb/sec		
12		Unblocked	No Light	G Port	Not Established		
13		Unblocked	Online	E Port	2 Gb/sec		
14		Unblocked	No Light	G Port	Not Established		
15		Unblocked	Online	E Port	2 Gb/sec		
16		Unblocked	No Light	G Port	Not Established		
17		Unblocked	No Light	G Port	Not Established		
18		Unblocked	No Light	G Port	Not Established		
19		Unblocked	No Light	G Port	Not Established		
20		Unblocked	No Light	G Port	Not Established		
21		Unblocked	No Light	G Port	Not Established		
22		Unblocked	No Light	G Port	Not Established		
23		Unblocked	No Light	G Port	Not Established		
24		Unblocked	No Light	G Port	Not Established		
25		Unblocked	No Light	G Port	Not Established		
26		Unblocked	No Light	G Port	Not Established		
27		Unblocked	Online	E Port	1 Gb/sec		
28		Unblocked	No Light	G Port	Not Established		

**Figure 1–9: Port List View**

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

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

- **Port Properties**
- **Node Properties**
- **Port Technology**
- **Block Port**
- **Enable Beaconing**
- **Port Diagnostics**
- **Channel Wrap** (S/390 mode only)
- **Swap Ports** (S/390 mode only)
- **Clear Link Incident Alerts**
- **Reset Port**
- **Port Binding**
- **Clear Threshold Alerts**

Note that these same options also display when you click a port row and choose the **Port** secondary menu from the **Product** menu on the menu bar.

For details on these menu options, refer to “[Port Menu](#)” on [page 2–14](#).

For details on navigating and monitoring using the **Port List View**, refer to “[Port List View](#)” on [page 2–25](#).

## **FRU List View**

Choose **FRU List** from the **View** menu. A table with information about each of the FRUs installed in the director displays in the main panel. All data is dynamic and updates automatically. [Figure 1–10](#) shows an example of the **FRU List View**.

Product Configure Logs Maintenance Help				
Hardware	Port List	Node List	Performance	FRU List
FRU	Position	Status	Part Number	Serial Number
BKPLNE	0	Active	316143-001	
CTP	0	Active	316145-001	82372257
CTP	1	Backup	316145-001	82372253
SBAR	0	Active	316144-001	82380004
SBAR	1	Backup	316144-001	82202000
FAN	0	Active	316142-001	82222222
FAN	1	Active	316142-001	82222223
FAN	2	Active	316142-001	82222224
PWR	0	Active	316141-001	52074128
PWR	1	Active	316141-001	52074155
UPM	0	Active	292006-001	82301030
UPM	1	Active	292006-001	82300772
UPM	6	Active	292006-001	82301895
UPM	7	Active	292006-001	82250602
UPM	8	Active	292006-001	32320072
UPM	9	Active	292006-001	82342010
UPM	14	Active	292006-001	82270485
UPM	15	Active	292006-001	82300773
UPM	16	Active	292006-001	82321780
UPM	17	Active	292006-001	82230786
UPM	22	Active	292006-001	82201012
UPM	23	Active	292006-001	82221024
UPM	24	Active	292006-001	82192979
UPM	25	Active	292006-001	82222273
UPM	30	Active	292006-001	82151832
UPM	31	Active	292006-001	82220907
UPM	33	Active	292006-001	82370367
UPM	34	Active	292006-001	82341868
UPM	35	Active	292006-001	82321410

**Figure 1–10: FRU List View**

Click on a FRU row to select it, then choose **FRU Properties** from the **Product** menu on the menu bar. The **FRU Properties** dialog box displays.

For details on navigating and monitoring via the **FRU List View**, refer to “[FRU List View](#)” on [page 2–28](#).

## Node List View

Choose **Node List** from the **View** menu. [Figure 1–11](#) shows an example of the **Node List View**. This view displays a table with information about all node attachments or N\_Ports that have logged in to existing F\_Ports on the director. Only N\_Ports display in the **Node List View** after nodes have logged in to the fabric. The columns that display in the table include port number where the node is attached, the port’s address, unit type, WWN of the attached node’s port, and BB\_Credit used by the attached node.

Double-click on a port row to highlight it and display the **Node Properties** dialog box for that port.

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

- **Port Properties**—Displays the **Port Properties** dialog box.
- **Node Properties**—Displays the **Node Properties** dialog box.
- **Define Nickname**—Displays the **Define Nickname** dialog box, where you can define a nickname to display for the attached device instead of the device’s 8-byte WWN.
- **Display options**—Allows you to display attached devices listed under the **Port WWN** column in the **Node List View** by the device’s nickname configured through the **Define Nickname** menu option or the device’s WWN.

Port #	Address	Port WWN	Unit Type	BB_Credit
29	752113	XP128 6213	Unspecified	7
32	752413	XP128 6202	Unspecified	7

**Figure 1–11: Node List View**

Note that these same options also display when you click a port row and choose the **Port** secondary menu from the **Product** menu on the menu bar.

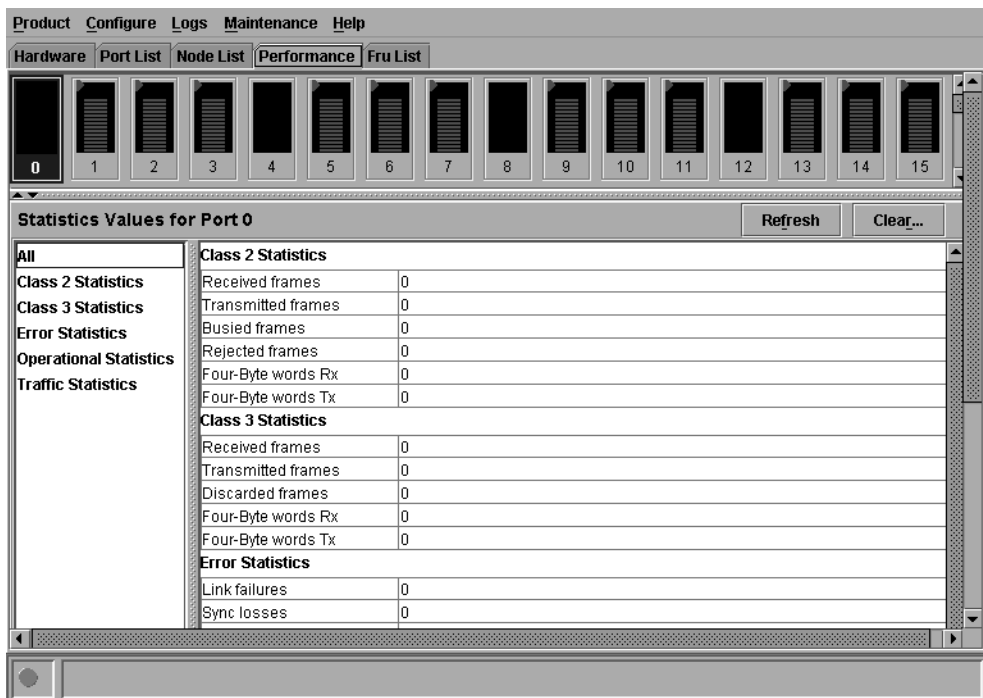
For details on navigating and monitoring via the **Node List View**, refer to “[Node List View](#)” on [page 2–30](#).

## Performance View

Choose **Performance** from the view tabs. [Figure 1–12](#) shows an example of the **Performance View**. This view provides a graphical display of performance for all ports. The top portion of the **Performance View** displays bar graphs that show the level of transmit/receive activity for each port. This information updates every five seconds. Each bar graph also shows the percentage link utilization for the port. A red

arrow marks the highest utilization level reached since the **Performance View** was opened. If the system detects activity on a port, it represents minimal activity with at least one bar.

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



**Figure 1–12: Performance View**

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

- **Port Properties**
- **Node Properties**

- **Port Technology**
- **Block Port**
- **Enable Beaconing**
- **Diagnostics**
- **Channel Wrap** (S/390 mode only)
- **Swap Ports** (S/390 mode only)
- **Clear Link Incident Alerts**
- **Reset Port**
- **Port Binding**
- **Clear Threshold Alerts**

Note that these same options also display when you click a port graph and choose the **Port** secondary menu from the **Product** menu on the menu bar.

For details on port menu options, refer to “[Port Menu](#)” on [page 2–14](#).

The bottom portion of the **Performance View** displays cumulative statistical information for the port selected in the bar graph. Values are displayed for transmit and receive traffic, class 2 and 3 statistics, operational statistics, and error categories. Click a category in the left side of the statistics area to display only statistics in that category or click **All** to display values for all categories. Click **Refresh** to update the data with current data from the port.

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

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

For more information about the **Performance View**, including statistics descriptions, refer to “[Performance View](#)” on [page 2–35](#).

## Closing the Product Manager

To close the Product Manager, choose **Close** from the **Product** menu on the menu bar.

To logout of all *HAFM* applications, choose **Logout** or **Exit** from the **Product** menu on the **Product View** window.

- If you choose **Logout**, the **HAFM Login** dialog box displays. You can now log in again using a user name and password. Log into a different HAFM server by choosing a different server from the **HAFM Server** field.

- If you choose **Exit**, the **Product View** window closes.

## User Rights

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

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

Detailed instructions concerning the assignment of user rights for the *HAFM* and *Product Manager* applications display in Chapter 5 of the *hp StorageWorks ha-fabric manager user guide*.

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

- System Administrator
- Product Administrator
- Operator
- Maintenance
- View

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

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

## User Rights for Specific Functions

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

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

<b>Product Manager Rights</b>	<b>Product Administrator</b>	<b>Operator</b>	<b>Maintenance</b>
Backup and Restore Configuration	X	X	X
Channel Wrap (S/390 Mode)	X		X
Clear Audit Log	X		
Clear Event Log			X
Clear Hardware Log	X		X
Clear LIN Alert	X	X	X
Clear LIN Log	X		
Clear System Error Light			X
Clear Threshold Alerts	X		
Clear Threshold Event Log	X		
Configure Addresses - "Active" (S/390 Mode)	X	X	
Configure Addresses - "Stored" (S/390 Mode)	X		
Configure Date/Time	X	X	X
Configure Feature Key	X		
Configure Identification	X		
Configure Management Server	X		
Configure Switch Parameters	X		
Configure Fabric Parameters	X		
Configure Ports	X	X	
Configure SNMP	X		
Configure Switch Binding	X		



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

Product Manager Rights	Product Administrator	Operator	Maintenance
Configure Threshold Alerts	X		
Configure Zoning	X		
Data Collection			X
Date/Time Sync Configuration	X	X	X
Enable Call Home Notification	X		
Enable E-Mail Notification	X		
Enable Telnet	X		
Enable Web Server	X		
Export Configuration Report	X	X	X
FRU Beaconing			X
FRU Switchover			X
IPL	X	X	X
Manage Firmware			X
Modify Port Binding	X		
Port Diagnostics			X
Port Beaconing	X	X	X
Set Online State	X	X	X
Swap Ports (S/390 Mode)	X		X
Reset Configuration			X
Reset Statistics Counters ( <b>Performance View</b> )	X	X	
Reset Port	X		X
Unit Beaconing	X	X	X

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

<b>Product Manager Rights</b>	<b>Product Administrator</b>	<b>Operator</b>	<b>Maintenance</b>
View Event Log	X	X	X
View Firmware			X
View Hardware Log	X	X	X
View LIN Log	X	X	X
View SNMP	X		X
View Threshold Alert Log	X	X	X

## Backing Up and Restoring Product Manager Data

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

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

The mirroring operation occurs only while a user is logged in to Windows on the HAFM server PC (independent of the **HAFM login**).

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

- All *HAFM* application configuration including:
  - Product definitions.
  - User names, encrypted passwords, and user rights.
  - Nicknames.
  - Session options.
  - *HAFM* application SNMP configurations.
  - E-mail configuration.

- All log files (both *HAFM* application log files and individual Product Manager log files).
- Zoning library (all zone sets and zone definitions).
- Firmware library.
- Call-home configuration (including phone numbers and dialing options).
- Configuration data saved to the `HafmData` directory through the **Backup & Restore Configuration** option on the Product Manager **Maintenance** menu.

The *QuikSync* application will not back up certain Windows configuration information and files that need to be reconfigured on a newly restored HAFM server, which includes the following:

- Windows user names and passwords.
- TCP/IP network configuration (such as IP address, gateway address, and DNS names.)

The *QuikSync* application will be included on the *HAFM* applications CD. It automatically installs on the HAFM server during the HAFM server install process. A blank Zip disk is required for each HAFM server and is included with the HAFM server deliverables.

For more information on using QuikSync refer to the *hp StorageWorks ha-fabric manager user guide*.

## Restoring Data to the HAFM Server

To restore data to the HAFM server, copy the `HafmData` directory from the Zip disk to `c:\HafmData`.



---

## Monitoring and Managing the Director

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

### Hardware View

The **Hardware View** is the default view that is shown when you open the Product Manager. If another view displays, you can display the **Hardware View** by choosing the **Hardware View** tabs. Using this graphical view of the director, you can view status symbols and simulated light emitting diode (LED) indicators, display data, and use mouse functions to monitor status and obtain vital product information for the director and its hardware components.

### Identifying FRUs

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

- Port cards.
  - The Director 2/64 contains up to 16 port cards, slot positions 15 through 0 (left to right).
  - The Director 2/140 contains up to 32 port cards in the front of the unit and up to three additional port cards in the rear.

As you move the cursor over each card, labels display, identifying the card's slot number and port technology. Acronyms that may display to identify port technology, such as **UPM**, **GSML**, **GXXL**, **FPM**, **GLSR**, **GSMR**, **GLSL**, and **GXXR** also display in the **FRU** column of the **FRU List View**. Refer to “[FRU List View](#)” on [page 2–28](#) for details.

- Control processor (CTP) cards. Two CTP cards are installed, slot positions 1 and 0 (left to right).
- Power supply modules.
  - The Director 2/64 contains two modules in slot positions 1 and 0 (left to right).
  - The Director 2/140 contains two modules in slot positions 1 and 0 (left to right).
- Cooling fan modules.
  - The Director 2/64 contains two modules in slot positions 1 and 0 (left to right).
  - The Director 2/140 contains three modules in slot positions 2, 1, and 0 (left to right).
- Serial Crossbars (SBAR).
  - The Director 2/64 contains two SBARs in slot positions 1 (bottom) and 0 (top).
  - The Director 2/140 contains two SBARs in slot positions 1 (bottom) and 0 (top).

## Monitoring Director Operation

Monitor the operating status of the director using the Director **Status** table on the **Hardware View** and the status symbol on the status bar.

### Director Status Table

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

### Status

Refer to [Table 2-1](#) for the meaning of the text that displays in the Director **Status** table and the corresponding status symbols that display on the status bar.

## State

The **State** field displays one of the following:

- **Offline**—When the director is OFFLINE, all ports are offline. The ports cannot accept a login from an attached device or cannot connect to other directors. You can configure this state through the **Set Online State** dialog box. Refer to “[Set Online State](#)” on [page 5–4](#) for instructions.
- **Online**—All unblocked ports are able to connect with devices. You can configure this state through the **Set Online State** dialog box. Refer to “[Set Online State](#)” on [page 5–4](#) for instructions. Note that the director automatically goes online after a power-up or an initial machine load (IML) or initial program load (IPL).
- **Coming online**—This is a transitional state that occurs just before the director goes online. This state normally only happens briefly, unless there is a problem reaching the online state.
- **Going offline**—This is a transitional state that occurs just before the director goes offline. This state normally only happens briefly, unless there is a problem reaching the offline state.

## No Link Status

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

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

- **Never Connected**—A network connection was never established between the director and the HAFM server or the CTP card failed. Check the IP addresses, the Ethernet local area network (LAN) physical connection between the director and HAFM server, and other network connection conditions.
- **Link Timeout**—The network connection that was established between the director and server has been lost. Check the IP addresses, the Ethernet LAN physical connection between the director and HAFM server, IP addresses, and other network components.
- **Protocol Mismatch**—The director and the server are not at compatible software release levels. Update the *HAFM* application software version.

- **Duplicate Session**—A link has previously been established between the director and another instance of the HAFM server. Connect to the previously established server from the **HAFM login** dialog box.
- **Unknown Network Address**—The address defined for the director in the *HAFM* application could not be found in the domain name server (DNS). Either the name was mistyped when the director was added to the *HAFM* application, or the name was not available from the DNS. Check the network IP address for the director definition in the *HAFM* application when you right-click the product icon and choose **Properties**. The IP address displays in the **Network Address** field.
- **Incorrect Product Type**—The product at the configured network address is not a director. Verify address, configuration, and product type.

## Status Bar Indicator

The status bar displays a colored status symbol that indicates the overall operating status of the director unit. The operating status depends on hardware component failures, which are indicated by status symbols that display over component graphics in the **Hardware View**. Refer to “[View Tabs](#)” on [page 1–23](#) for the meanings of status symbols in the status bar.

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

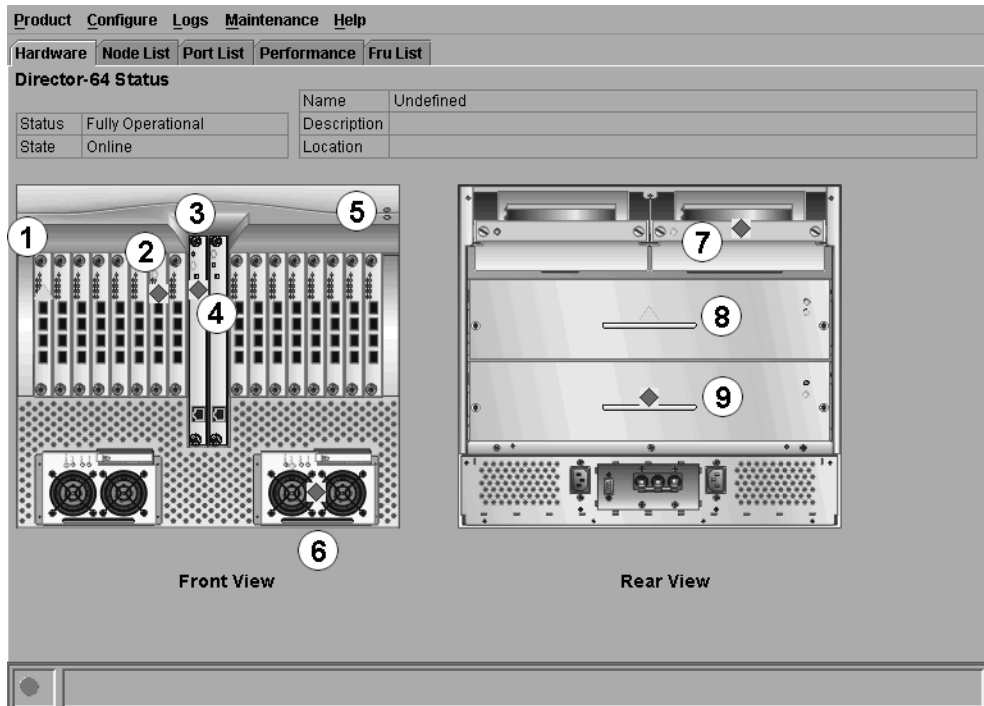
## Monitoring Hardware Operation

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

- Green and amber indicators illuminate on each FRU to indicate either an operational or degraded state respectively. LEDs for individual ports do not illuminate on port cards in the **Hardware View**, but do illuminate in the **Port Card View** for each port (refer to “[Using the Port Card View](#)” on [page 2–15](#)).
- Alert symbols, such as flashing red and yellow diamonds and yellow triangles, display on FRUs to reflect the overall state of the hardware as changes occur.
- Corresponding or additional descriptions of hardware status and states also display when you click on components to display **Properties** dialog boxes.

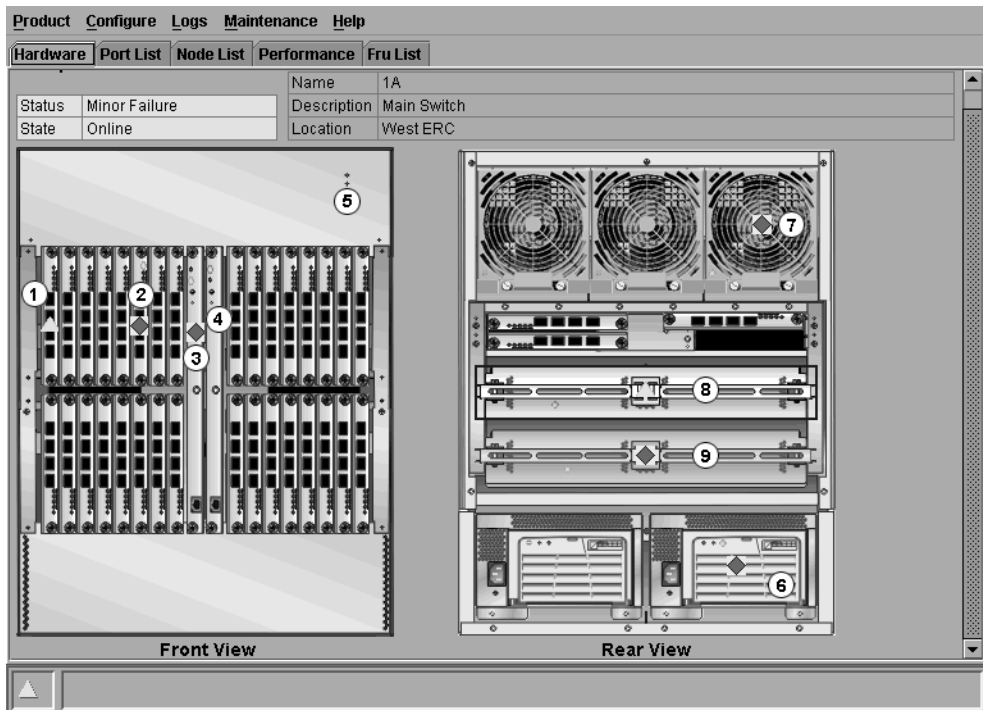


Figure 2–1 illustrates the Director 2/64 **Hardware View** and Figure 2–2 illustrates the Director 2/140 **Hardware View** with examples of symbols and simulated LED indicators that can help you monitor hardware operation.



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

**Figure 2–1: Monitoring hardware operation—Director 2/64 Hardware View**



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

**Figure 2–2: Monitoring hardware operation—Director 2/140 Hardware View**

- **Port card attention indicator**—The yellow triangle status symbol (▲) indicates that the port card is in a degraded state. This could indicate a problem with an individual port, such as a link failure or service-required status. A yellow triangle could also indicate that a port is in beaoning state. Click the port card to open the **Port Card View** to examine individual port status. Refer to “[Using the Port Card View](#)” on [page 2–15](#) for details.

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

Refer to “[Using the Port Card View](#)” on [page 2–15](#) for details on using the **Port Card View**. Refer to [Table 2–1](#) for details on port operating states and the status symbol and indicator operation.

- **CTP card failure indicator**—The blinking red and yellow diamond (🔴🟡) on the CTP card with the amber LED illuminated indicates that the card has failed.
- **Active CTP card indicator**—The green LED on a CTP card illuminates to indicate that the card is active. Since the redundant CTP card on the left has failed, this CTP card has become the active card. If both CTP cards are operational, no LEDs illuminate on the backup card, while the green LED illuminates on the active CTP card.
- **Power, system error, and unit beaconing indicators**—The green and amber indicators on the far right of the front bezel simulate the power and system error LEDs on the actual director bezel.

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

- **System Error Indicator**—The amber system error light indicator (illuminated in [Figure 2–1](#)) simulates the system error light on the actual director. When this indicator illuminates, an event has occurred requiring immediate attention, such as a system, fan, power supply, or port failure. View details of system errors by choosing **Event Log** from the **Logs** menu on the menu bar. The indicator in the **Hardware View** and the LED on the actual unit remains illuminated until you right-click on the director graphic, away from a FRU, and choose **Clear System Error Light** from the menu.

**NOTE:** If the amber LED flashes, this indicates that unit beaconing has been enabled for the director. You can enable or disable unit beaconing when you right-click on the director graphic, away from a FRU, and choose **Enable Unit Beaconing** from the menu.

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

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

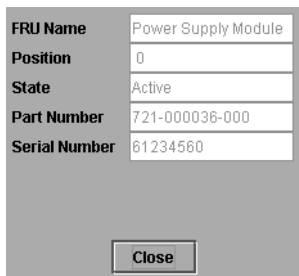
- **Cooling fan module failure indicator**—When a blinking red and yellow diamond (◆) displays on a fan module with the amber LED indicator illuminated, the module has failed or is rotating insufficiently.
- **SBAR card beaoning indicator**—The yellow triangle status symbol (▲) displaying on the SBAR card with the amber LED illuminated indicates that beaoning has been enabled.
- **SBAR failure indicator**—The blinking red and yellow diamond (◆) displaying on the SBAR card with the amber LED illuminated indicates a card failure.

## Obtaining Hardware Information

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

### Displaying FRU Information

Double-click a CTP card, power supply, cooling fan module, or SBAR card in the **Hardware View** to display a **FRU Properties** dialog box. This dialog box displays the FRU name, slot position relative to identical FRUs installed in the chassis, active or failed state, beaoning state (CTP card, fan module, SBAR card), part number, and serial number. For the **CTP's card** dialog box, the **Speed Capability** of the card displays as either 1 Gb/sec or 2 Gb/sec.



**Figure 2–3: FRU Properties dialog box**

**NOTE:** You can display a **Properties** dialog box for all FRUs when you right-click on the FRU and choose **FRU Properties** from the menu that displays.

Display a **Properties** dialog box for a port card when you right-click on a card and choose **FRU Properties** from the menu that displays. To display a **Properties** dialog box for an individual port, you must be in the **Port Card View**. Refer to “[Using the Port Card View](#)” on [page 2–15](#) for details.

FRU Name	G_Port Module (GSF2)
Position	Slot 6
State	Active
Beaconing	Off
Part Number	470-000396-201
Serial Number	121234566
<input type="button" value="Close"/>	

**Figure 2–4: Port Card FRU Properties dialog box**

## Displaying Director Information

Double-click on the director illustration, away from a hardware component, to display the **Director Properties** dialog box as shown in [Figure 2–5](#).

Name	Switch 1A
Description	
Location	
Contact	
World Wide Name	
Type Number	1
Model Number	1
Manufacturer	
Serial Number	a
EC Level	
Firmware Level	04.00.00 1
Operating Mode	Open Systems
Preferred Domain ID	1
Active Domain ID	1
Director Speed	2 Gb/sec
Switch Binding	Disabled
<input type="button" value="Close"/>	

**Figure 2–5: Director Properties dialog box**

The following displays in this dialog box:

- Director name, description, location, and contact configured through the **Configure Identification** dialog box.
- Fibre Channel World Wide Name (WWN) identifier for the director.
- Product type number.
- Product model number.
- Product manufacturer.
- Product serial number.
- Engineering change (EC) level.
- Firmware level.
- Operating Mode. Open Systems or S/390 mode.
- Preferred Domain ID. This is set using the **Configure Switch Parameters** dialog box.
- Active Domain ID. The actual domain ID assigned to the director.
- Director Speed (Director 2/64 only). This is set using the **Configure Switch Parameters** dialog box and is either 1 Gb/sec or 2 Gb/sec.  
**NOTE:** The director model and firmware may not support 2 Gb/sec data speeds.
- Switch Binding. Enabled if the optional SANtegrity features are installed and enabled, otherwise Disabled displays.  
**NOTE:** You can also display the **Director Properties** dialog box when you right-click the director illustration away from a FRU and choose **Properties** from the menu.

## Using Menu Options

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

### Director Menu

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

## Director Properties

Click to display the **Director Properties** dialog box. This dialog box contains the director name, description, location, director data speed, and contact person configured through the **Configure Identification** dialog box. Also included is other product information as detailed in “[Displaying Director Information](#)” on [page 2–9](#). You can also display this dialog box when you click an area on the illustration away from a hardware component.

## Enable Unit Beaconing

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

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

## Clear System Error Light

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

## IPL Director

Choose this option to initiate an IPL on the director. When the dialog box displays confirming the IPL, click **Yes**.

Refer to the *hp StorageWorks director 2/64 service manual* or *hp StorageWorks director 2/140 service manual* for details.

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

## Setting Director Date and Time

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

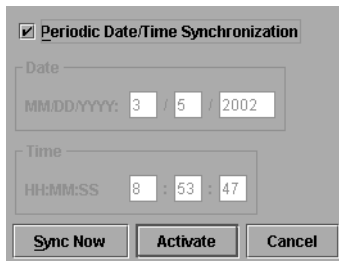
1. Click to display the **Configure Date and Time** dialog box.

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

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

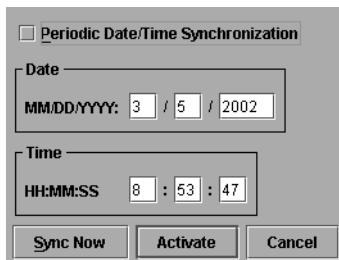
To enable and disable **Periodic Date/Time Synchronization**, click the check box and then click **Activate**.

**S/390 mode only.** An error will result if periodic synchronization and clock alert mode are enabled.



**Figure 2–6: Configure Date and Time Periodic Synchronization dialog box**

2. Perform one of the following steps:
    - To immediately synchronize the director date and time with the HAFM server, be sure the **Periodic Date/Time Synchronization** option is enabled and then click **Sync Now**.
- NOTE:** If you enable the **Periodic Date/Time Synchronization** feature and click **Activate**, the time will synchronize at the next update period.
- To set the director with a specific date and time, make sure that the **Periodic Date/Time Synchronization** field is not selected. Refer to [Figure 2–7](#). Enter the date and time, and then click **Activate**.



**Figure 2–7: Configure date and time (manually)**

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



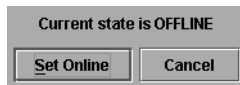
## Setting Director Online State

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



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

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



**Figure 2–8: Set Online State dialog box (Online)**

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

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

## Port Card Menu

Right-click a port card in the **Hardware View** to display the following menu options.

- **Open Port Card View**—Choose this option to open the **Port Card View**. You can also click on the port card to open the **Port Card View**. Refer to “[Using the Port Card View](#)” on [page 2–15](#) for detailed information.
- **FRU Properties**—Choose this option to display the **Properties** dialog box for the port card. This dialog box includes the FRU name, position (slot number in backplane), state (active or failed), beaconing state (on or off), part number, and serial number (refer to [Figure 2–3](#)).
- **Enable Beaconing**—Choose this option to add a check mark to the check box and to enable beaconing for the card. This causes the amber LED on the card to flash to help you locate the card in the unit.
- **Block All Ports**—Choose this option to display the **Block All Ports** dialog box. Click **Yes** to block all ports on the selected card or click **No** to cancel.

- **Unblock All Ports**—Choose this option to display the **Unblock All Ports** dialog box. Click **Yes** to unblock all ports on the selected card or **No** to cancel.
- **Diagnostics**—Choose this option to display the **Port Diagnostics** dialog box. Use this dialog box to run internal loopback and external loopback tests on any port or all ports on the port card.

## Port Menu

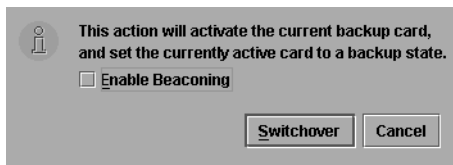
Double-click on a port on the **Port Card View** to display the a menu of options for a port. Refer to “[Port Menu](#)” on [page 2–21](#) for details on displaying and using the port menu.

## CTP Card Menu

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

- **FRU Properties**—Choose this option to display a **FRU Properties** dialog box for the CTP card. [Figure 2–3](#) is an example for the power supply module. The **FRU Properties** dialog box includes the FRU name, position (slot number in the backplane), state (active, backup, or failed), part number, serial number, and speed capability.
- **Beaconing**—Choose this option to add a check mark to the check box and enable beaconing for the CTP card. This causes the amber LED on the card to flash to help you locate it in the unit.
- **Switchover**—Choose this option to display the **Switchover CTP** dialog box, as shown in [Figure 2–9](#). Click **Switchover** to switch operation from the active card to the backup card. When switchover occurs, the green LED illuminates on the backup CTP card to indicate that it is now the active card.

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



**Figure 2–9: Switchover CTP dialog box**

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

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

## Fan Module

Double-click a cooling fan module card in the **Hardware View** to display the **FRU Properties** dialog box with the following option:

- **FRU Properties**—This option displays a **FRU Properties** dialog box for the module. [Figure 2–3](#) is an example for the power supply module. The **FRU Properties** dialog box includes the FRU name, position (slot number in the backplane), state (active, backup, or failed), part number, and serial number.

## SBAR Card Menu

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

- **FRU Properties**—Choose this option to display a **FRU Properties** dialog box for the card. [Figure 2–3](#) is an example for the power supply module. The **FRU Properties** dialog box includes the FRU name, position (slot number in the backplane), state (active, backup, or failed), part number, and serial number.
- **Enable Beacons**—Choose this option to add a check mark to the check box and enable beacons for the SBAR card. This causes the amber LED on the card to flash to help you locate it in the unit.
- **Switchover**—Choose this option to display the **Switchover SBAR** dialog box, which is similar to the **Switchover CTP** dialog box (refer to [Figure 2–9](#)). Click **Switchover** to switch operation from the active card to the backup card. When switchover occurs, the green LED illuminates on the backup SBAR card to indicate that it is now the active card.

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

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

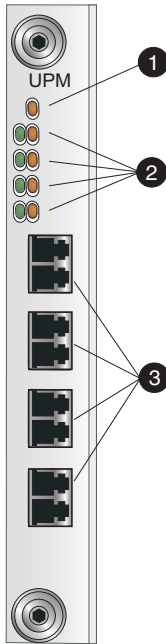
## Using the Port Card View

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

## Symbols and Indicators

The following figure illustrates the status symbols and LED indicators that may display on a port card in the **Port Card View**.

**Figure 2–10: Port Card View**



- 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

Refer to the following numbered list for the meaning of the status symbols and LED indicators shown on the **Port Card View** in [Figure 2–10](#). Port states are described in detail under “[Port Operational States](#)” on [page 2–41](#).

## Displaying Port Information

Double-click a port or right-click on a port and choose **Port Properties** from the menu to display the port’s **Properties** dialog box, as shown in [Figure 2–11](#). Also display this dialog box by:

- When you double-click on a row in the **Port List View** or right-click on a row and choosing **Port Properties** from the pop-up menu.

- When you double-click on a port's bar graph in the **Performance View** or right-click on the bar graph and choosing **Port Properties** from the menu.
- When you right-click on a port's row in the **Node List View** and choose **Port Properties** from the menu.
- When you click on a port, port row, or port bar graph in the preceding views and choose **Port Properties** from the secondary **Port** menu in the **Product** menu on the menu bar.

Port Number	28
Port Name	
Type	F_Port
Operating Speed	2 Gb/sec
Fibre Channel Address	000000
Port WWN	
Attached Port WWN	Not logged in
Block Configuration	Unblocked
10-100 km Configuration	Off
LIN Alerts Configuration	On
Beaconing	Off
Link Incident	None
Operational State	◆ Port Failure
Reason	
Threshold Alert	

Close

**Figure 2–11: Port Properties dialog box**

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

- **Port Number**—The physical port number.
- **Port Name**—User-defined port name or description. Refer to “[Configuring Ports](#)” on [page 3–9](#) for instructions.
- **Type**—The type of port.
  - G\_Port. This displays if nothing is logged into the port.
  - F\_Port. This displays if a device is logged into the port.
  - E\_Port. This displays if the port is connected to another director's E\_Port via an ISL.

- **Operating Speed**—This field displays the current data speed for the port as 1 Gb/sec, 2 Gb/sec, or Not Established. Not established displays if **Negotiate** was set for the port through the **Configure Ports** dialog box and the data speed has not been resolved between the port and the attached device, or if the port and device are not communicating.
- **Fibre Channel Address**—The port’s Fibre Channel address identifier.
- **Port WWN**—The port’s 16-digit World Wide Name (WWN).
- **Attached Port WWN**—The WWN of the node logged into the port.
- **Block Configuration**—Blocked or unblocked. Operation can be blocked or unblocked through the **Configure Ports** dialog box or through the block ports options on right-click menus in the **Port Card View**. Refer to “[Configuring Ports](#)” on [page 3–9](#) and “[Using the Port Card View](#)” on [page 2–15](#) for details.
- **10–100 km Configuration**—Extended distance buffering. This can be enabled or disabled for the port through the **Configure Ports** dialog box. Refer to “[Configuring Ports](#)” on [page 3–9](#) for instructions.
- **LIN Alerts Configuration**—This field indicates whether link incident (LIN) alerts are enabled or disabled. LIN alerts can be configured through the **Configure Ports** dialog box. The default is for the LIN alerts to be enabled.
- **Beaconing**—This field indicates the beaconing status for the port. To enable or disable beaconing, right-click the port and choose **Enable Beaconing**.
- **Link Incident**—Description of the last link incident that occurred on the port.
- **Operational State**—Beaconing, inactive, invalid attachment, link incident, link reset, no light, not operational, online, offline, port failure, segmented E-Port, and testing. Refer to [Table 2–1](#) for definitions of operational states.
- **Reason**—Lists the reason for a segmented E\_Port operating state or invalid attachment, or inactive operating state for the port. An E\_Port segmentation occurs only when the director is connected to another director or a switch. This field displays “NA” if a segmented E\_Port or invalid attachment operating state has not occurred.

Refer to the section on joining zoned fabrics in the *hp StorageWorks SAN high availability planning guide*.

The following messages display in the **Reason** field of the **Port** dialog box if an Invalid Attachment, Segmented E\_Port, or Inactive State occurs for the port. Reason messages for segmentation can include:

- Incompatible operating parameters. Operating parameters, such as resource allocation time-out values (R\_A\_TOV) or error-detect time-out values (E\_D\_TOV), are inconsistent. Refer to “[Configuring Fabric Operating Parameters](#)” on [page 3–6](#) for more information.
- Duplicate domain IDs. Identical preferred domain IDs are configured for two or more directors or switches. Refer to “[Configuring Switch Operating Parameters](#)” on [page 3–2](#) for more information.
- Incompatible zoning configurations. Refer to the *hp StorageWorks ha-fabric manager user guide* and the *hp StorageWorks director 2/64 service manual* for more information on zoning.
- Build fabric protocol error.
- No principal switch. A principle director or switch is not defined for the fabric.
- No response from the attached switch.
- ELP retransmission failure timeout. A director or switch with a hardware or link failure attempted to join the fabric and transmitted multiple exchange link protocol (ELP) frames to another director or switch. Because of the failure, the failed director or switch did not receive responses to the ELP frames and did not receive a FLOGI frame. The failed director or switch times out.

A port binding error may be due to an invalid WWN or nickname entry in the **Configure Ports** dialog box in the **Bound WWN** column. Refer to “[Configuring Ports](#)” on [page 3–9](#) for a description of the **Configure Ports** dialog box.

Reasons messages for an invalid attachment can include:

- 01 Unknown. The reason is not known.
- 02 ISL connection not allowed on this port. ISL is connected to a port configured as an F\_Port.
- 03 ELP rejected by the attached switch. This director or switch transmitted an exchange link protocol (ELP) frame that was rejected by the switch at the other end of the ISL.
- 04 Incompatible switch at other end of the ISL. The switch is configured for Open Fabric mode, and the switch at the other end of the ISL is an HP switch configured for Homogeneous mode.
- 05 External loopback adapter connected to the port. A loopback plug is connected to the port, and no diagnostic test running.

- 06 N\_Port connection not allowed on this port. The port type configuration does not match the actual port use (the port is configured as an E\_Port, but attaches to a node device).
- Non-HP switch at other end of the ISL. The cable is connected to a non-HP switch, and Interop mode is set to Homogeneous mode.
- 08 ISL connection not allowed on this port. The port type configuration does not match the actual port use (the port is configured as an F\_Port, but attaches to a director or switch).
- 10 Port binding violation—Unauthorized WWN. The WWN that was entered to configure port binding for this port is not valid, or a nickname was used that was not configured for the attached device in the Product Manager.
- 11 Unresponsive node connected to port. Possible causes are: (1) a hardware problem on a switch or connected node where ELP frames are not delivered; the response is not received, or a fabric login (FLOGI) cannot be received (there may be problem in the switch SBAR); (2) a faulty or dirty cable connection; (3) faulty host bus adapters that do not send out a FLOGI within a reasonable timeframe.

Reason messages for an inactive state include:

- 1 Switch speed conflict (Director 2/64 only). The director data speed was set to 2 Gb/sec, but the port only supports 1 Gb/sec operation because it is on an FPM port card. (All ports on all installed FPM cards will go inactive if the director data speed is set to 2 Gb/sec.) To activate the port, either set the director data speed to 1 Gb/sec using the **Configure Switch Parameters** dialog box, or replace the FPM card with a UPM card.
- 2 Optics speed conflict (Director 2/64 only). The port data speed was set to 2 Gb/sec, but the director data speed was set to 1 Gb/sec. To activate the port, set the director data speed to 2 Gb/sec using the **Configure Switch Parameters** dialog box. Note that a port could also be inactive if the card is an FPM card and the port data speed was set to 2 Gb/sec. To activate the port in this case, set director data speed to 1 Gb/sec, or replace the FPM card with a UPM card.

**NOTE:** Your director model and firmware may not allow variable data speed settings.

- Threshold Alert—If a threshold alert exists for the port, an alert indicator (yellow triangle) displays by the **Threshold Alert** field, and the configured name for the last alert received displays in the field.



## Port Card Menu

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

- **Block All Ports**—Choose this option to display the **Block All Ports** dialog box. Click **Yes** to block all ports on the selected card or **No** to cancel.
- **Unblock All Ports**—Choose this option to display the **Unblock All Ports** dialog box. Click **Yes** to unblock all ports on the selected card or click **No** to cancel.
- **Diagnostics**—Choose this option to display the **Port Diagnostics** dialog box. Use this dialog box to run internal loopback and external loopback tests on any port or all ports on the port card. Refer to the *hp StorageWorks director 2/64 service manual* for instructions on using these diagnostics.

## Port Menu

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

### Port Properties

Click this to display the **Port Properties** dialog box. This dialog box displays information about the port. See “[Displaying Port Information](#)” on [page 2–16](#) for more information.

### Node Properties

Click this to display the **Node Properties** dialog box. Note that if a node is not logged into the port, a message displays indicating that node information is not available. For details on information that displays in this dialog box, refer to “[Displaying Node Properties](#)” on [page 2–33](#).

### Port Technology

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

- **Port number.**
- **Connector type**—Always LC.
- **Transceiver type**—Longwave laser LC or shortwave laser LC.

- **Distance**—General distance range for port transmission. This can be either short-to-long distances for the longwave laser LC transceiver or short distances for the shortwave laser LC transceivers.
- **Media**—The Fibre Channel mode and optic size. For the longwave laser LC transceiver, this would be single mode 9 micron. For the shortwave laser LC transceiver, this would be multimode 50 micron or 62.5 micron.
- **Speed**—This will be set to either 1 Gbit per second or 1 Gbit, 2 Gbit per second.

## Block Port

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

## Enable Beaconing

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

## Diagnostics

Click this option to display the **Port Diagnostics** dialog box. Use this dialog box to run an internal loopback and external loopback test on the port. The **Port Diagnostics** option enables you to run internal and external loopback tests on any port or all ports on a port card. To use this option, follow the detailed steps in the *hp StorageWorks director 2/64 service manual*.

## Channel Wrap (S/390 mode only)

Click this while in S/390 mode to display a check mark and allow a channel wrap test to be initiated from an attached host or device. In this test, frames are sent to the director port, then the director echoes the frames back to the sending device to test the channel. The director remains in channel wrap mode until the option is disabled. While in channel wrap mode, the port can only accept echo commands from the host and display as to be blocked to all other communication. Click the check box to remove the check mark and disable channel wrap.

## Swap Ports (S/390 mode only)

Click this while in S/390 mode to display the **Swap Ports** dialog box. Use this dialog box to swap addresses between ports.

## Clear Link Incident Alerts

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

## Reset Port

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

## Port Binding

Click to display the **Port Binding** dialog box. Click the **Port Binding** check box to enable port binding. Either choose the **Attached WWN** option to bind to the attached device listed, or choose **Detached WWN** to enter the WWN or nickname of the device to bind.

**Figure 2–12: Port Binding dialog box**

**Port Binding** dialog box parameters:

- **Port Binding**—Click this check box to place check mark in the box and enable WWN binding for the port. When enabled, only a specific device can communicate through the port. This device is specified by the WWN or nickname entered into the **Bound WWN** field (either the **Attached WWN** or **Detached WWN** options). With the check box cleared, any device can communicate through the port, even if a WWN or nickname is specified in the **Bound WWN** field.
- **Attached WWN**—Click this option if a device is logged into the port, the device's WWN will display in the field. The device with this WWN or nickname will have exclusive communication privileges to the port if **Port Binding** is enabled.

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

- **Detached WWN**—Click this option and enter a World Wide Name (WWN) in the proper format (xx.xx.xx.xx.xx.xx.xx.xx) or a nickname configured through the *Product Manager* application. The device with this WWN or nickname will have exclusive communication privileges through the port if **Port Binding** is enabled.

Note the following:

- If you do not enter valid WWN or nickname in this field, but the **Port Binding** check box is checked (enabled), then no devices can communicate over the port.
  - If you enter a WWN or nickname in this field and do not place a check in the **Port Binding** check box, the WWN or nickname will be stored, and all devices can communicate over the port.
- **Activate**—Click this button to activate settings in this dialog box.

Warning and error message display:

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

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

## Clear Threshold Alerts

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



Figure 2–13: Clear Threshold Alerts dialog box

## Port List View

Display the **Port List View** by choosing **Port List** from the **View** menu. [Figure 2–14](#) is an example of the **Port List View**.

Product Configure Logs Maintenance Help							
Hardware Port List Node List Performance FRU List							
#	Name	Block Config	State	Type	Operating Speed	Alert	
0	Redhat AS 2.1	Unblocked	Offline	G Port	Not Established	▲	
1		Unblocked	Online	E Port	2 Gb/sec		
2		Unblocked	No Light	G Port	Not Established		
3	MSA A1 Linux/Netware	Unblocked	Online	F Port	2 Gb/sec		
4	Redhat 7.2	Unblocked	Offline	G Port	Not Established	▲	
5		Unblocked	Online	E Port	2 Gb/sec		
6		Unblocked	No Light	G Port	Not Established		
7	MSA A2 Linux/Netware	Unblocked	No Light	G Port	Not Established		
8	SUSE SLES v7	Unblocked	Online	F Port	2 Gb/sec		
9		Unblocked	Online	E Port	2 Gb/sec		
10		Unblocked	No Light	G Port	Not Established		
11		Unblocked	Online	E Port	2 Gb/sec		
12		Unblocked	No Light	G Port	Not Established		
13		Unblocked	Online	E Port	2 Gb/sec		
14		Unblocked	No Light	G Port	Not Established		
15		Unblocked	Online	E Port	2 Gb/sec		
16		Unblocked	No Light	G Port	Not Established		
17		Unblocked	No Light	G Port	Not Established		

Figure 2–14: Port List View

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

- **#**—The physical port number, from **0-63** on the Director 2/64, and **0-127** and **132-143** on the Director 2/140. Note that for the Director 2/140, ports **128-131** are internal ports and not available for external connections.
- **Addr (S/390 mode only)**—Displays the logical address of the port. The address equals the port number, plus 4. For example, the address for port 0 is 4 (0+4). If port addresses have been swapped, those addresses will be followed by an asterisk (\*).

**NOTE:** This column applies during S/390 mode only and does not display during Open Systems mode.

- **Name**—Displays the port name as configured through the **Configure Ports** dialog box.
- **Block Config**—Indicates the blocked or unblocked configuration of the port as set through:
  - The **Configure Ports** dialog box.
  - The **Block Port** option is available through port right-click menus in the **Port Card View** and the **Block All Ports** option on the port card's right-click menus in the **Port Card View** and **Hardware View**.
  - The **Block Port** option is also available on the port row right-click menus in the **Port List View**, the port bar graph right-click menus in the **Performance View**, and the **Port** secondary menu of the **Product** menu on the menu bar.

Blocked states are:

- **Blocked:** Devices communicating with the port are prevented from logging into the director or communicating with other devices attached to director ports. A blocked port continuously transmits OLS.
- **Unblocked:** Devices communicating with the port can log into the director and communicate with devices attached to any other unblocked port in the same zone.
- **State**—The following port operational states may display in this table. For more information on these states and corresponding status symbol and LED indicator operations in the **Hardware View**, see [“Port Operational States”](#) on page 2-41.
  - No Light
  - Online
  - Offline

- Beaconing
  - Link Reset
  - Not Operational
  - Not Installed
  - Invalid Attachment
  - Port Failure
  - Segmented E\_Port
  - Link Incident
  - Testing
  - Inactive.
- **Type**—The type of port. F\_Port displays if an N\_Port is attached. E\_Port displays if another E\_Port is attached. G\_Port displays if the port can function as either an F\_Port or an E\_Port, but nothing is currently attached.
  - **Alert**—This column displays a yellow triangle if a link incident occurs on the port or if the port's LED is beaconing. Blinking red and yellow diamonds display for port failures or for ports requiring service. Double-click on the row to display the reason for the status in the **Port Properties** dialog box.

Double-click a row to choose it, highlight it, and display the **Port Properties** dialog box. For an explanation of the fields on the **Port Properties** dialog box, refer to “[Displaying Port Information](#)” on [page 2–16](#).

## Menu Options

Right-click a row to choose it, highlight it, and display a menu with the following port-related action options. These are the same menu options that display when you right-click a port in the **Port Card View** and a port's bar graph in the **Performance View**. You can also click a port or bar graph in the preceding views and choose the Port option from the **Product** menu on the menu bar. Refer to “[Port Menu](#)” on [page 2–21](#) for an explanation of these pop-up menu options.

- **Port Properties**
- **Node Properties**
- **Port Technology**
- **Block Port**

- **Enable Beaconing**
- **Port Diagnostics**
- **Channel Wrap** (S/390 mode only)
- **Swap Ports** (S/390 mode only)
- **Clear Link Incident Alert**
- **Reset Port**
- **Port Binding**
- **Clear Threshold Alerts**

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

## FRU List View

Display the **FRU List** in the **View** panel by choosing the **FRU List** option from the **View** tabs. This **View** displays information about all installed FRUs on the director. All data is dynamic and updates automatically as the software detects changes.



Product Configure Logs Maintenance Help					
Hardware		Port List	Node List	Performance	FRU List
FRU	Position	Status	Part Number	Serial Number	
BKPLNE	0	Active	316143-001		
CTP	0	Active	316145-001	82372257	
CTP	1	Backup	316145-001	82372253	
SBAR	0	Active	316144-001	82380004	
SBAR	1	Backup	316144-001	82202000	
FAN	0	Active	316142-001	82222222	
FAN	1	Active	316142-001	82222223	
FAN	2	Active	316142-001	82222224	
PWR	0	Active	316141-001	52074128	
PWR	1	Active	316141-001	52074155	
UPM	0	Active	292006-001	82301030	
UPM	1	Active	292006-001	82300772	
UPM	6	Active	292006-001	82301895	
UPM	7	Active	292006-001	82250602	
UPM	8	Active	292006-001	32320072	
UPM	9	Active	292006-001	82342010	
UPM	14	Active	292006-001	82270485	
UPM	15	Active	292006-001	82300773	
UPM	16	Active	292006-001	82321780	
UPM	17	Active	292006-001	82230786	
UPM	22	Active	292006-001	82201012	
UPM	23	Active	292006-001	82221024	
UPM	24	Active	292006-001	82192979	
UPM	25	Active	292006-001	82222273	
UPM	30	Active	292006-001	82151832	
UPM	31	Active	292006-001	82220907	
UPM	33	Active	292006-001	82370367	
UPM	34	Active	292006-001	82341868	
UPM	35	Active	292006-001	82321410	

**Figure 2–15: FRU List View**

You can display the **FRU Properties** dialog box for FRU when you click the FRU's row to select it, then choose **FRU Properties** from the **FRU** submenu on the menu bar's **Product** menu.

Information on the **FRU List View** for each FRU includes:

- **FRU**—An acronym representing the FRU type. The meanings of FRU acronyms are:
  - **BKPLNE**—Backplane.
  - **CTP**—CTP card.
  - **SBAR**—SBAR card.
  - **Port Card**—The following acronyms may display to indicate the card's port technology:
    - **GLSL**—G\_Port, long wave, single mode LC connector, 1 Gigabit

- **GSML**—G\_Port, short wave, multimode, LC connector, 1 Gigabit
- **GXXL**—G\_Port, mixed mode, LC connector, 1 Gigabit
- **FPM**—G\_Port, small form factor optics (SFO) pluggable, FICON port module, 1 Gigabit.
- **UPM**—G\_Port, small form factor optics (SFP) pluggable, FICON port module, 2 Gigabit.
- **GSFM**—G\_Port, short wave, single mode, MT-RJ connector, 1 Gigabit
- **GLSR**—G\_Port, short wave, single mode, MT-RJ connector, 1 Gigabit
- **GXXR**—G\_Port, mixed mode, MT-RJ connector, 1 Gigabit
- **GXXL**—G\_Port, mixed mode, LC connector, 1 Gigabit
- **FAN**—Fan module.
- **PWR**—Power supply.
- **Position**—A number representing the FRU chassis position. The chassis (slot) position for a nonredundant FRU is **0**. The chassis positions for redundant FRUs are **0** and **1**. The chassis positions for port cards are from **0-63** on the Director 2/64, and **0-127** and **132-143** on the Director 2/140. Note that for the Director 2/140, ports **128-131** are internal ports and not available for external connections.
- **Status**—The FRU status (Active or Backup).
- **Part Number**—The FRU part number.
- **Serial Number**— The FRU serial number.

## Node List View

Display the **Node List View** in the **View** panel by choosing **Node List** from the view tabs. This view displays information about all node attachments to any F\_Ports on the director sorted by port number. All data is dynamic and updates automatically as devices log in and log out.

Product Configure Logs Maintenance Help				
Hardware Port List Node List Performance FRU List				
Port #	Address	Port WWN	Unit Type	BB_Credit
29	752113	XP128 6213	Unspecified	7
32	752413	XP128 6202	Unspecified	7

**Figure 2–16: Node List View**

Information that displays for each node includes:

- **Port #**—The physical port number, from **0-63** on the Director 2/64, and **0-127** and **132-143** on the Director 2/140. Note that for the Director 2/140, ports **128-131** are internal ports and not available for external connections.
- **Addr**—For S/390 mode, displays the logical port address (port number plus 4). For Open Systems mode, displays the node's Fibre Channel address.
- **Unit Type**—The following information, if supported, is supplied by the attached device:
  - Converter
  - Channel path ##, where ## will be replaced with the Channel Path Identifier (2 hex digits)
  - Communications controller
  - Converter
  - Direct access storage
  - Gateway
  - HBA
  - Host
  - Hub
  - Integrated CTC adapter
  - Magnetic tape

- Module
  - Other
  - Printer
  - Proxy-agent
  - Reserved
  - Software driver
  - Stand-alone CTC adapter
  - Storage device
  - Storage subsystem
  - Switch
  - Terminal (full screen)
  - Terminal (line mode)
  - Unit Record (input)
  - Unit Record (output)
  - Unknown
  - Unspecified
- **Port WWN**—The port WWN of the attached node (N\_Port). The 16-digit WWN is a set of unique numbers assigned to the device attached to the port. The WWN is prefixed by the manufacturer’s name of the host bus adapter that attaches to the device. If there is a nickname assigned, the nickname displays instead of the WWN.
  - **BB\_Credit**—The buffer-to-buffer credit that the attached node has available. Double-click a row to choose it and display the **Node Properties** dialog box. For an explanation of the fields on the **Node Properties** dialog box, refer to [“Displaying Node Properties”](#) on page 2–33.

## Menu Options

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

- **Node Properties**—Choose this option to display the **Node Properties** dialog box.

- **Port Properties**—Choose this option to display the **Port Properties** dialog box (refer to [Figure 2–11](#)).
- **Define Nickname**—Choose this option to display the **Define Nickname** dialog box, where you can define a nickname to display for the attached device instead of the device’s 8-byte WWN.

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

- **Display Options**—Choose **Nickname** or **Worldwide Name** from the submenu. Choosing **Nickname** displays attached devices in the **Port WWN** column by the nickname configured through the **Define Nickname** menu option. Choosing **Worldwide Name** displays attached devices in the **Port WWN** column by the device’s WWN.

## Displaying Node Properties

To open the **Node Properties** dialog box as shown in [Figure 2–17](#), double-click a row in the **Node List View** or right-click a row and choose **Node Properties** from the menu. You can also right-click on a port in the **Port Card View**, right-click a port’s row in the **Port List View**, and right-click on a port’s bar graph in the **Performance View** and choose **Node Properties** from the menu that displays. In addition, you can display this dialog box when you click a port, port row, or bar graph in the preceding views and choose **Node Properties** from the secondary **Port** menu under the **Product** menu on the menu bar. Note that if a node is not logged in, a message displays indicating that node information is not available.

Port Number	8
Fibre Channel Address	7B0C13
Port WWN	DEC-50:00:1F:E1:00:0C:33:34
Port Nickname	ESA-Unit1-CntlA-port2
Node WWN	DEC-50:00:1F:E1:00:0C:33:30
Node Nickname	
Unit Type	Unspecified
Buffer to Buffer Credit	2
Class of Service	Class 3
Data Field Size	2048
Type	
Model	
Serial #	
Tag	0

**Figure 2–17: Node Properties dialog box**

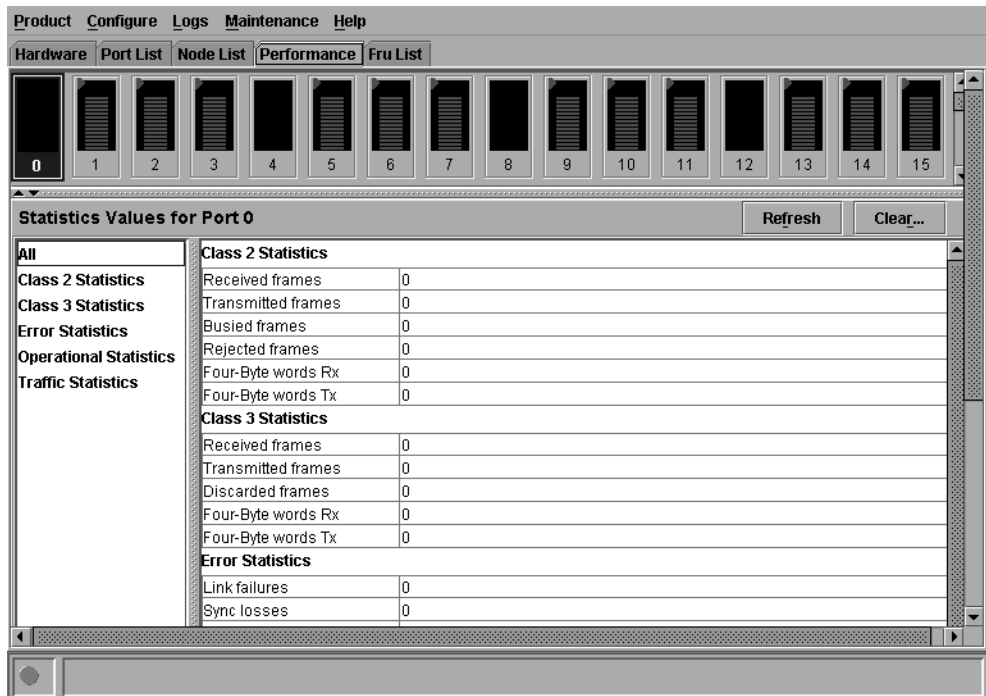
- **Port Number**—The physical port number on the director to which the node is connected.
- **Fibre Channel Address** (Open Systems mode only)—Displays the three-byte Fibre Channel address of the node.
- **Port Address** (S/390 mode only)—Each port in the director has a corresponding port address which equals the physical port number plus four. Therefore, the address for port 0 is 4 (0+4).
- **Port WWN**—Port World Wide Name of the attached device.
- **Port Nickname**—Nickname for the port WWN. Must be configured to display.
- **Node WWN**—Node World Wide Name of the attached device. Must be configured to display.
- **Node Nickname**—Nickname for the node WWN. Must be configured to display.
- **Unit Type**—Provided by attached device, if supported. Refer to “Node Type” under “[Node List View](#)” on [page 2–30](#).
- **Buffer-to-Buffer Credit**—The buffer-to-buffer credit that the attached node has available.
- **Class of Service**—Class of service. This can be class 2, class 3, or both.
- **Data Field Size**—Data field size. This is the largest size of Fibre Channel frame the node will process. The size is negotiated with the attached device.
- **Node Port Number**—The physical port number field of the node port that is attached to the director port (should be two nodes only).

- **Type**—The type of node.
- **Model**—The model of node.
- **Serial #**—The Serial number of the node.
- **Tag**—The tag identifier of the node.

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

## Performance View

Display the **Performance View** in the main panel by choosing **Performance** from the view tabs. This view displays a bar graph at the top of the view for all ports. The lower portion of the view displays statistical values for the specific port's bar graph that you chose.



**Figure 2–18: Performance View**

## Menu Options

Right-click any of the port bar graphs to display a pop-up menu with the following port-related action options. These are the same menu options that display when you right-click on a row in the **Port List View** or a port in the **Port Card View**. You can also display these options when you click a port, port row, or bar graph in the preceding views and choose the secondary **Port** menu from the **Product** menu on the menu bar. Refer to “[Port Menu](#)” on [page 2–21](#) for an explanation of these pop-up menu options.

- **Port Properties**
- **Node Properties.**
- **Port Technology**
- **Block Port**
- **Enable Beaconing**
- **Port Diagnostics**
- **Channel Wrap** (S/390 mode only)
- **Swap Ports** (S/390 mode only)
- **Clear Link Incident Alerts**
- **Reset Port**
- **Port Binding**
- **Clear Threshold Alerts**

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

## Bar Graph Display

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



When a port is logged in, moving the cursor over its bar graph displays a message with the attached port's WWN. If the port is an E\_Port, the message reads, E\_Port and if the port is not logged in, the message displays the port's current operational state (refer to [Table 2-1](#)).

## Port Statistics

To choose and display more detailed performance information for a port, click the port's bar graph. The bar graph for that port highlights with a darker background, and the lower portion of the **Performance View** panel displays the statistics values for the port's number and the WWN decoding. The **Statistics Values** tables contain cumulative port statistics and error statistics for transmit and receive traffic, class 2 and class 3 statistics, operational statistics, and error categories. Click a category in the left side of the statistics area to display only statistics for that category or click **All** to display values for all categories. For a description of the **Refresh** and **Clear** buttons, refer to "[Button Functions](#)" on [page 2-41](#).

**NOTE:** There are not thresholds for these values. You may determine that a problem exists by the rate that the value changes. For example, BB\_Credit starvation can occur if data is sent to a device faster than it can consume the frames. This can back up into ISLs causing degraded performance.

## Statistics Description

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

### Traffic Statistics with Receive and Transmit Values

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

- **Link utilization %**—There is a separate value for transmit and receive link utilization. The larger of these two values displays on the bar graph. The current link utilization for the port is expressed as a percentage. Each port can transmit or receive data at 200 megabytes (MB) per second. This statistic shows the percentage of the maximum link utilization currently being used. Link utilization is calculated over one-second intervals. The maximum link utilization is 100%.
- **Frames**—The number of frames that the port has received or transmitted.
- **Four byte words**—The number of words that the port has received or transmitted.

## Class 2 Statistics

The Class 2 Statistics table includes:

- **Received Frames**—The number of Class 2 frames received by this F\_Port from its attached N\_Port.
- **Transmitted Frames**—The number of Class 2 frames transmitted by this F\_Port to its attached N\_Port.
- **Busy Frames**—The number of F\_BSY frames generated by this F\_Port against Class 2 frames. This can occur if frames are received before the switch completes initialization or if the switch is servicing so many requests that it cannot process a new request. The port generates frames if the switch is not ready to accept commands. This may indicate temporary congestion.
- **Rejected Frames**—The number of F\_RJT frames generated by this F\_Port against Class 2 frames. These frames usually occur because of attached device errors. The device is expected to correct the error based on the reject code, then retry its request. If the device is able to recover, there is no cause for concern. If not, further troubleshooting may be necessary. There are no thresholds for this value. Typically, this occurs because the destination is not available due to the device's action.
- **Four Byte Words Received**—The number of four-byte words received.
- **Four Byte Words Transmitted**—The number of four-byte words transmitted.

## Class 3 Statistics

The Class 3 Statistics table includes:

- **Received Frames**—The number of Class 3 frames received by this F\_Port from its attached N\_Port.
- **Transmitted Frames**—The number of Class 3 frames transmitted by this F\_Port to its attached N\_Port.
- **Discarded Frames**—The number of Class 3 frames discarded, including multicast frames with bad D\_IDs. The director increments this count when it discards a frame that cannot be routed. This occurs most frequently when a destination becomes unavailable without the source realizing the destination is unavailable. There are no thresholds for this value. Typically, this occurs when the destination is not available due to the destination device's action.
- **Four Byte Words Received**—The number of four-byte words received.
- **Four Byte Words Transmitted**—The number of four-byte words transmitted.

## Error Statistics

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

- **Link failures**—A link failure was recorded in response to a not operational sequence (NOS), protocol timeout, or port failure. At the **Port Card View**, a yellow triangle displays to indicate a link incident, or a blinking red and yellow diamond displays to indicate a port failure.
- **Sync losses**—A loss of synchronization was detected because the attached device was reset or disconnected from the port. At the **Port Card View**, a yellow triangle displays to indicate a link incident.
- **Signal losses**—A loss of signal was detected because the attached device was reset or disconnected from the port. At the **Port Card View**, a yellow triangle displays to indicate a link incident.
- **Primitive sequence errors**—An incorrect primitive sequence was received from the attached device, indicating a Fibre Channel link-level protocol violation. At the **Port Card View**, a yellow triangle displays to indicate a link incident.
- **Discarded frames**—A received frame could not be routed and was discarded because the frame timed out (insufficient buffer-to-buffer credit) or the destination device was not logged into the director.
- **Invalid transmission words**—The number of times that the director detected invalid transmission words from the attached device. This indicates that a frame or primitive sequence arrived at the director's port corrupted. This corruption can be due to the attached device performing a reset, plugging or unplugging the link, bad optics at either end of the cable, bad cable, or a dirty or poor connection. Moving the connection around or replacing cables can isolate the problem.

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

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

- **Delimiter errors**—The number of times that the director detected an unrecognized start-of-frame (SOF) delimiter, an unrecognized end-of-frame (EOF) delimiter, or an invalid class of service. This indicates that the frame arrived at the director's port corrupted. This corruption can be due to plugging/unplugging the link, bad optics at either end of the cable, bad cable, or dirty or poor connections. Moving the connection around or replacing cables can isolate the problem.
- **Address ID errors**—A received frame had an unavailable or invalid Fibre Channel destination address, or an invalid Fibre Channel source address. This typically indicates the destination device is unavailable.
- **Frames too short**—A received frame exceeded the Fibre Channel frame maximum size or was less than the Fibre Channel minimum size, indicating the frame arrived at the director's port corrupted. Frame corruption may be caused by device disconnection, an optical transceiver failure at the device, a bad fiber-optic cable, or a poor cable connection.

## Operational Statistics

The following describes the Operational Statistics that display for a selected port

- **Offline sequences**—The number of offline sequence that the port has received or transmitted.
- **Link resets**—The number of link reset protocol frames received/transmitted by this port from/to the attached device. The director transmits a link reset to initiate the link reset protocol or recover from a link timeout. This occurs normally to establish BB\_Credit or on any port in order to recover lost BB\_Credit. The director receives a link reset from an attached device if the device wishes to initiate the link reset or recover from a link timeout.

## Troubleshooting Tips

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

## Button Functions

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

- **Clear**—The **Clear** button clears all counters to zero. Choosing this button displays a **Clear Request Confirmation** dialog box. Confirming the request clears the statistics in the hardware at the physical port. Note that this also clears counters for other Product Manager users. An entry identifying when the statistics were cleared and by whom is saved in the Audit Log.
- **Refresh**—The **Refresh** button updates the data in the statistics tables and enables you to compare values at any given time. Note that you can also refresh data when you click the port's bar graph.

## Port Operational States

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

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

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

Port State	Port Indicators		Alert Indicator	Description
	Green	Amber		
Beaconing	Off or On	Blink	Yellow Triangle	The port is beaconing. The amber port LED blinks once every two seconds to enable users to find a specific port. Enable beaconing through the port's menu on the <b>Port Card View</b> , <b>Port List View</b> , or <b>Performance View</b> .
Inactive	Off	Off	Yellow Triangle	The port is inactive. Reasons for this state are in the <b>Reason</b> field of the <b>Port Properties</b> dialog box. Note that if the port optics have also failed, the amber LED will be on.

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

Port State	Port Indicators		Alert Indicator	Description
	Green	Amber		
Invalid Attachment	On	Off	Yellow Triangle	The director port is in an invalid attachment state in either of five cases: (1) a loopback plug is connected to the port and there is no diagnostic test running, (2) the fiber-optic cable is connected to another port on the same director, (3) the port type is configured as an F_Port and it is connected to another director (E_Port), (4) the port type is configured as an E_Port and is connected to an N_Port, or (5) a port binding violation has occurred due to an invalid entry in the <b>Bound WWN</b> column in the <b>Configure Ports</b> dialog box. Note: Ports can be configured as G_Ports, F_Ports, and E_Ports through the <b>Configure Ports</b> dialog box.
Link Incident	Off	Off	Yellow Triangle	A link incident occurred on the port. The status symbol displays in the <b>Port List View</b> , <b>Port Card View</b> , and <b>Hardware View</b> .
Link Reset	Off	Off	Yellow Triangle	The director and the attached device are performing a link reset operation to recover the link connection. Ordinarily, this is a transient state that should not persist.
No Light	Off	Off	None	No signal (light) is being received on the director port. This is a normal condition when there is no cable plugged into the port or when the power of the device attached to the other end of the link is off.
Not Operational	Off	Off	Yellow Triangle	The director port is receiving the Fibre Channel not operational sequence (NOS) indicating that the attached device is not operational.

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

Port State	Port Indicators		Alert Indicator	Description
	Green	Amber		
Online	On	Off	None	The attached device has successfully connected to the director and is ready to communicate or is in the process of communicating with other attached devices. As long as the port remains in the online state, the green port LED remains illuminated. Note that on the actual port in the unit, the green LED blinks when there is active Fibre Channel traffic through the port.
Offline	Off	Off	None	The director port was configured as “blocked” and is transmitting the Fibre Channel OLS to the attached device.
	Off	Off	Yellow Triangle	The director port was configured as “Unblocked” and is receiving the Fibre Channel OLS indicating that the attached device is offline.
Port Failure	Off	On	Red and Yellow Blinking Diamond	The director port has failed and requires service. The amber LED for the port remains illuminated.
Segmented E_Port	On	Off	Yellow Triangle	The E_Port is segmented preventing the two fabrics from joining (this only occurs when two directors are connected to each other). Display the <b>Port Properties</b> dialog box to view the segmentation reason.
Testing	Off	Blink	Yellow Triangle	Port is executing an internal loopback test.
	On	Blink	Yellow Triangle	Port is executing an external loopback test. Note: For any loopback test, the amber LED blinks (beacons) to help users locate the port under test.
Not Installed	Off	Off	Yellow Triangle	The port optics are not installed or the feature that provides additional port function is not enabled.

## Link Incident Alerts

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

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

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

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

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

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

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



## Threshold Alerts

A threshold alert notifies Product Manager users when the transmit (Tx) or receive (Rx) throughput reaches specific values for director ports or port type (E\_Ports or F\_Ports).

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

Threshold alerts occur as the following in the Product Manager:

- An attention indicator (yellow triangle) that displays on the port in the **Port Card View**.
- An attention indicator (yellow triangle) that displays on the port card in the **Hardware View**.
- An attention indicator (yellow triangle) that displays in the **Alert** column of the **Port List View**.
- An attention indicator (yellow triangle) that displays by the **Threshold Alerts** field in the **Port Properties** dialog box.
- Detailed threshold alert data recorded in the **Threshold Alert Log**.

For detailed procedures to configure threshold alerts, refer to “[Configuring Threshold Alerts](#)” on [page 3–27](#).



---

## Configuring the Director

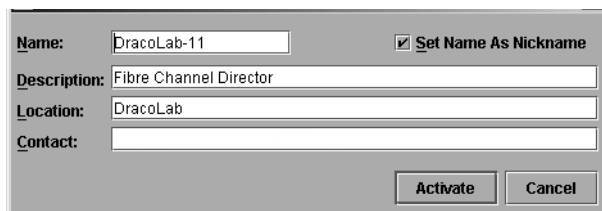
This chapter describes how to use the options that display on the menu when you choose the **Configure** menu on the menu bar. Each of these options is explained in the following sections.

### Configuring Director Identification

Perform this procedure to configure the director name, description, location, and contact person for HAFM. The information displays in multiple dialog boxes throughout the application. In addition, the **Name**, **Location**, and **Contact** variables configured in the **Configure Identification** dialog box correspond respectively to the SNMP variables **sysName**, **sysLocation**, and **sysContact**. These variables are used by SNMP management workstations when obtaining data from managed directors.

Follow these steps to configure the director identification.

1. At the **Hardware View** page, choose **Configure > Identification**. The **Configure Identification** dialog box displays, as shown in [Figure 3–1](#).



The screenshot shows a dialog box titled "Configure Identification". It has a grey background and contains the following fields and controls:

- Name:** A text input field containing "DracoLab-11". To its right is a checked checkbox labeled "Set Name As Nickname".
- Description:** A text input field containing "Fibre Channel Director".
- Location:** A text input field containing "DracoLab".
- Contact:** An empty text input field.
- At the bottom right, there are two buttons: "Activate" and "Cancel".

**Figure 3–1: Configure Identification dialog box**

- a. Type a director name of 24 or fewer alphanumeric characters in the **Name** field. Each director should be configured with a unique name.  
  
If the director is installed on a public LAN, the name should reflect the director's Ethernet network DNS host name. For example, if the DNS host name is SAN140.hp.com, the name entered in this dialog box is SAN140.
  - b. Type a director description of 255 or fewer alphanumeric characters in the **Description** field.
  - c. Type the director's physical location (255 or fewer alphanumeric characters) in the **Location** field.
  - d. Type the name of a contact person (255 or fewer alphanumeric characters) in the **Contact** field.
2. Click **Activate** to save the information and close the dialog box.

## Configuring Switch Operating Parameters

Use the procedures in this section to set parameters on the director for fabric operation through the **Configure Switch Parameters** dialog box. These operating parameters are stored in NV-RAM on the director.

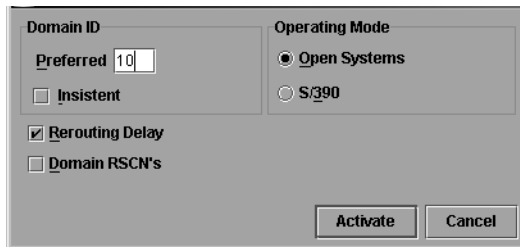
1. The director must be offline to change **Preferred Domain ID** and **Operating Mode** parameters. Verify that the director is set offline. For instructions, refer to the “[Setting Director Online State](#)” on [page 2–13](#).



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

---

2. Choose **Configure > Operating Parameters > Switch Parameters**. The **Configure Switch Parameters** dialog box displays, as shown in [Figure 3–2](#).



**Figure 3–2: Configure Switch Parameters dialog box**

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

1. Use information under “[Switch Parameters](#)” to change settings as required for parameters in this dialog box.
2. After you change settings, click the **Activate** button.
3. Set the director online. For instructions, see “[Setting Director Online State](#)” on [page 2–13](#).

## Switch Parameters

Configure the following parameters as required by your fabric.

### Domain ID

The domain identification is a value between 1 and 31 that provides a unique identification for the director in a fabric. A fabric director cannot contain the same domain ID as another director or their E\_Ports will segment when they try to join.

In the **Configure Switch Parameters** dialog box, a field is provided to enter a preferred domain ID and a check box is provided to enable this ID as an insistent domain ID.

### Preferred

**NOTE:** To change this value, you must first set the director offline. Choose **Set Online State** from the **Maintenance** menu to display the **Set Online State** dialog box, then click **Set Offline**. Be sure to set the director back online after you change this value.

Use this field to set the a unique domain ID for the director. The default value is 1. Set a value between 1 and 31. When a director comes online with a preferred ID, it requests an ID from the fabric’s principal director (indicating its preferred value as

part of the request). If the requested domain ID is not allocated to the fabric, the domain ID is assigned to the requesting director. If the requested domain ID is already allocated, an unused domain ID is assigned. Note that you must set the director offline before you can change to the preferred domain ID.

The preferred domain ID must be unique for each director and switch in a fabric. If two switches or directors have the same preferred domain ID, the E\_Ports segment, causing the fabric to segment.

For more information on domain ID, refer to the section on domain ID assignment for multiswitch fabrics in the *hp StorageWorks high availability planning guide* for details.

## Insistent

This option is not supported unless the SANtegrity binding feature is installed. Click the check box to remove or add a check mark. The default state is disabled (no check mark).

When a check mark displays, the domain ID configured in the **Preferred Domain ID** field will become the active domain identification when the fabric initializes. See the following notes:

- This option is required if Enterprise Fabric Mode (optional SANtegrity binding feature) is enabled.
- If you enable Insistent Domain while the switch or director is online, the Preferred Domain ID will change to the current active domain ID if the IDs are different.



**CAUTION:** If a director with a duplicate domain ID exists in the fabric, both directors' E\_Ports will segment when they try to join.

---

## Rerouting Delay

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

Enabling the rerouting delay ensures that frames are delivered in order through the fabric to their destination. If there is a change to the fabric topology that creates a new path (for example, a new director is added to the fabric), frames may be routed over this new path if its hop count is less than a previous path with a minimum hop count.

This may result in frames being delivered to a destination out of order since frames sent over the new, shorter path may arrive ahead of older frames still in route over the older path.

If rerouting delay is enabled, traffic ceases in the fabric for the time specified in the **E\_D\_TOV** field of the **Configure Fabric Parameters** dialog box. This delay allows frames sent on the old path to exit to their destination before new frames begin traversing the new path.

**NOTE:** This option is required if Enterprise Fabric Mode (optional SANtegrity binding feature) is enabled.

## Domain RSCNs

Domain register for state change notifications (domain RSCNs) are sent between end devices in a fabric to provide additional connection information to host bus adapters (HBA) and storage devices. As an example, this information might be that a logical path has been broken because of a physical event, such as a fiber optic cable being disconnected from a port. Consult with your HBA and storage device vendor to determine if enabling Domain RSCNs will cause problems with your HBA or storage products. Note that this option is required if Enterprise Fabric Mode (optional SANtegrity binding feature) is enabled.

## Director Speed

At the **Director Speed** field, choose **1 Gb/sec** or **2 Gb/sec** to select the speed of Fibre Channel operation.

**NOTE:** Changing the director speed to 2 Gb/sec with any 1 Gb/s FPM cards installed will cause the following warning/confirmation message to display: "All FPM ports will be held inactive while the director is configured to 2 Gb/sec speed. Do you want to continue?"

## Operating Mode

**NOTE:** To change this value, you must first set the director offline. Choose **Set Online State** from the **Maintenance** menu to display the **Set Online State** dialog box, then click **Set Offline**. Be sure to set the director back online after you change this value.

**NOTE:** If you change the **Operating Mode** to **S/390**, all ISL/E-Ports are disabled.

Click either the **S/390** or **Open Systems** radio buttons:

- If the FICON Management Server feature is enabled, the default mode will be S/390. The operating mode cannot be changed to Open Systems with the FICON Management Server feature enabled. Typically, S/390 mode is used when

attaching an IBM S/390 Parallel Enterprise or IBM zSeries server to the director and implementing inband director management through a Fibre Connection (FICON) channel.

- Use **Open Systems** mode for all other (non-FICON) Fibre Channel environments.

## Configuring Fabric Operating Parameters

Use procedures in this section to set parameters on the director for fabric operation through the **Configure Fabric Parameters** dialog box. These operating parameters are stored in NV-RAM on the director.

1. Verify that the director is set offline. For instructions, refer to the “[Setting Director Online State](#)” on [page 2–13](#).



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

---

2. Choose **Configure > Operating Parameters > Fabric Parameters** from the **Product Manager** window. The **Configure Fabric Parameters** dialog box displays, as shown in [Figure 3–3](#).

The dialog box is titled "Configure Fabric Parameters" and has a grey background. It contains the following fields and controls:

- BB\_Credit:** A text input field containing the value "16".
- R\_A\_TOV:** A text input field containing "100" with the text "(tenths of a second)" to its right.
- E\_D\_TOV:** A text input field containing "20" with the text "(tenths of a second)" to its right.
- Switch Priority:** A dropdown menu with "Default" selected.
- Interop Mode:** A dropdown menu with "Open Fabric 1.0" selected.
- At the bottom, there are two buttons: "Activate" and "Cancel".

**Figure 3–3: Configure Fabric Parameters dialog box**

3. Use information under “[Fabric Parameters](#)” to change settings as required for parameters in this dialog box.
4. After you change settings, click **Activate**.
5. Back up the configuration data when you are finished configuring the director.



6. Set the director online. For instructions, see “[Setting Director Online State](#)” on page 2–13.

## Fabric Parameters

Configure the following parameters as required by your fabric.

### BB\_Credit

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

### R\_A\_TOV

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

**NOTE:** Set the same value for R\_A\_TOV on all directors and switches in a multiswitch fabric. If the value is not the same on all units, the fabric segments. Also, the value for R\_A\_TOV must be greater than the value configured for E\_D\_TOV.

### E\_D\_TOV

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

**NOTE:** Set the same value for E\_D\_TOV on all switches and directors in a multiswitch fabric. If the value is not the same, the fabric segments.

## Switch Priority

Setting this value determines the principal director for the multiswitch fabric. Choose **Principal** (highest priority), **Default**, or **Never Principal** (lowest priority) from the **Switch Priority** drop-down list.

Setting these priority values determines the principal director selected for the multiswitch fabric. For example, if you have three directors in the fabric and set one as **Principal**, one as **Default**, and one as **Never Principal**, the unit set to **Principal** becomes the principal director in the fabric.

If all directors are set to **Principal** or **Default**, the director with the highest priority and the lowest WWN becomes the principal director. Following are some examples of principal director selection when directors have these settings:

- If you have three directors and set all to **Default**, the director with the lowest WWN becomes the principal director.
- If you have three directors and set two to **Principal** and one to **Default**, the director with the **Principal** setting that has the lowest WWN becomes the principal director.
- If you have three directors and set two to **Default** and one to **Never Principal**, the director with the **Default** setting and the lowest WWN becomes the principal director.

At least one director in a multiswitch fabric needs to be set as **Principal** or **Default**. If all of the directors are set to **Never Principal**, all of the interswitch links (ISLs) will segment. If all but one director is set to **Never Principal** and the director that was principal goes offline, then all of the other ISLs will segment.

**NOTE:** We recommend you leave the switch priority setting as Default. If you are considering setting this value to something other than default, refer to the section on principal switch selection for multiswitch fabrics in the *hp StorageWorks high availability planning guide* for details.

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

## Interop Mode

Choose one of the following options:

- **Homogeneous Fabric**—Choose this mode if the fabric contains only HP directors and switches that are operating in Homogeneous Fabric mode.
- **Open Fabric 1.0**—Default. Choose this mode if the fabric contains HP directors and switches, as well as other open-fabric compliant switches. Choose this mode for managing heterogeneous fabrics.

## Configuring Switch Binding

For complete procedures on configuring this optional feature, refer to “[Switch Binding](#)” on [page 6–7](#).

## Configuring Ports

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

**NOTE:** The **Configure Ports** dialog box is different for S/390 and open systems mode. Those options available in open systems mode only are labeled as such.

The Port Binding feature must be installed before the **Port Binding** and **Bound WWN** columns can be used. Refer to “[Configuring Feature Key](#)” on [page 3–24](#) to install the Port Binding feature.

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

- **Port #**—You cannot edit this field. The physical port number, from **0-63** on the Director 2/64, and **0-127** and **132-143** on the Director 2/140. Note that for the Director 2/140, ports **128-131** are internal ports and not available for external connections.
- **Name (open systems mode only)**—Enter a name for the port. The port names display in the **Port Properties** dialog box and elsewhere in the Product Manager to identify the port.

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

To name ports in S/390 mode, use the **Configure Addresses** dialog box.

- **Blocked (open systems mode only)**—Placing a check mark in the check boxes of this column blocks the operation of the port.

To block ports in S/390 mode, use the **Configure Addresses** dialog box.

- **10–100Km**—This column is for extended distance buffering. You can enable extended distance for a port even if it is not an extended distance port. However, enabling extended distance buffering on a port disables the ability for the port to send broadcast traffic. When you choose this option, the port can support up to 60 buffer-to-buffer credits (BB\_Credits) to handle link distances up to 100 km. This

enables the port to process 2K frames from attached devices. If this option is not enabled, the port uses the BB\_Credit (1–60) configured through the **Operating Parameters** dialog box.

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

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

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

A link incident causes a yellow attention indicator (triangle) to display for the port in the **Hardware View**, **Port Card View**, and in the alert column of the **Port List View**. Once a LIN occurs, you must acknowledge it by choosing the **Clear Link Incident Alert** option from the right-click menu for the port (**Hardware View**). A description of the alert displays in the **Link Incident** field of the **Port Properties** dialog box (refer to [Figure 2–11 on page 2-17](#)).

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

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

For additional information about LIN alerts, refer to “[Link Incident Alerts](#)” on [page 2-44](#).

- **Type**—Choose each port's type (**G\_Port**, **E\_Port**, or **F\_Port**) in this column from the drop-down list.

**NOTE:** In S/390 mode, you cannot change port types unless the optional SANtegrity feature is installed. If ports are configured as E\_Ports in Open Systems mode, and you install SANtegrity before changing to S/390 mode, the ports will remain as E\_Ports when you change to S/390 mode. If SANtegrity is not installed, setting a director to S/390 mode will change all E\_ports to G\_Ports.

- **Port Binding**—Placing a check mark in the check boxes of this column enables the binding state of the port.
- **Speed**—Click the **Speed** column for a specific port, and choose **2 Gb/sec**, **1 Gb/sec**, or **Negotiate**. This sets the data rate for the port. Choosing **Negotiate** allows the port to negotiate the data speed with an attached device. Follow this rule when setting the data speed:
  - Only set the speed to 2 Gb/sec on ports that support this speed. If the port optics do not support 2 Gb/sec, a warning displays stating that the optical transceiver in the port does not support the data rate.
  - Do not set the port speed greater than the director speed. For example, if you set the port speed to **2 Gb/sec** and the director data speed is set to **1 Gb/sec**, an error displays stating that port speeds cannot be configured at higher data rates than the director speed. The director speed is set through the **Configure Operating Parameters** dialog box (Director 2/64 only).

When you change a port's speed and click **Activate** on the dialog box, a confirmation message displays stating that this setting will temporarily disrupt port data transfers.

**NOTE:** Your director model, firmware, and port cards may not allow 2 Gb/sec data speeds.

- **Bound WWN**—Enter the WWN or nickname of the device that is attached to the port.

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

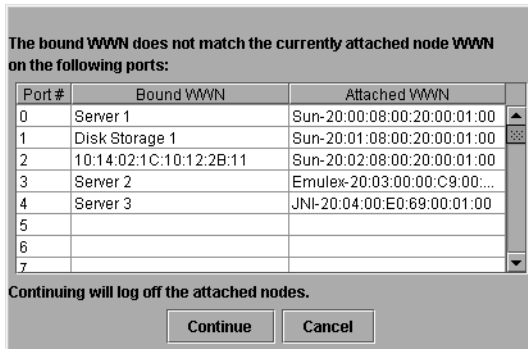
If the check box in the **Port Binding** column is checked but no WWN is entered in the **Bound WWN** field, no device can connect to the port.

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

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

## Warning and Error Messages

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



**Figure 3–4: Warning! dialog box**

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

## Menu Options

Menu options are available when you right-click any column except the **Port #** column:

- **Name (open systems mode only)**
  - **Clear All Port Names**—Clears all port names entered in this column.
- **Blocked (open systems mode only)**
  - **Block All Ports**—Places a check mark in all check boxes in the **Blocked** column and blocks all ports on the switch.
  - **Unblock All Ports**—Clears all check boxes in the **Blocked** column and unblocks all ports on the switch.

- **10–100 km**
  - **Clear All 10–100 km**—Clears all check boxes in the column. No port will be set for extended distance buffering.
  - **Set All 10–100 km**—Places a check mark in all check boxes in the column and sets extended distance buffering for all ports.
- **LIN Alerts**
  - **Clear All LIN Alerts**—Clears all **LIN Alert** check boxes in the column. LIN alerts will be disabled for all ports on the switch.
  - **Set All LIN Alerts**—Places a check mark in all check boxes in this column. LIN alerts will be enabled for all ports on the switch.
- **Type (open systems mode only)**
  - **Set All to F\_Ports**—Sets all fields in this column to **F\_Port** and configures all ports on the switch as F\_Ports.
  - **Set All to G\_Ports**—Sets all fields in this column to **G\_Port** and configures all ports on the switch as G\_Ports.
  - **Set All to E\_Ports**—Sets all fields in this column to **E\_Port** and configures all ports on the switch as E\_Ports.
- **Port Binding**
  - **Bind All WWNs**—Places a check mark in all check boxes in this column and binds each port to the device with the WWN or nickname entered in the **Bound WWN** column for that port.
  - **Unbind All WWNs**—Removes check marks in all check boxes in this column. A device with any WWN can attach to all ports.
  - **Bind All Ports to Attached WWN**—Places a check mark in all check boxes in this column and binds each port to the device currently attached to that port. The **Bound WWN** column will display that device's WWN.
  - **Bind Port to Attached WWN**—Places a check mark in the check box for the port where you clicked to display the menu. This binds that port to the device currently attached to that port. The **Bound WWN** column will display that device's WWN.
  - **Clear All Bound WWNs** - Clears all WWNs listed in the **Bound WWN** column.
- **Speed**

- **Set All to 1 Gb/sec** - Sets the port optics to a 1 Gb/sec data rate.
- **Set All to 2 Gb/sec** - Sets the port optics to a 2 Gb/sec data rate.
- **Set All to Negotiate** - Allows the port to negotiate the data rate with the attached device.

**NOTE:** Your director model, firmware, and port cards may not allow 2 Gb/sec data speeds.

- **Bound WWN**

- **Bind All WWNs**—Places a check mark in all check boxes in this column and binds each port to the device with the WWN or nickname entered in the **Bound WWN** column for that port.
- **Unbind All WWNs**—Removes check marks in all check boxes in this column. A device with any WWN can attach to all ports.
- **Bind All Ports to Attached WWN**—Places a check mark in all check boxes in this column and binds each port to the device currently attached to that port. The **Bound WWN** column will display that device's WWN.
- **Bind Port to Attached WWN**—Places a check mark in the check box for the port where you clicked to display the menu. This binds that port to the device currently attached to that port. The **Bound WWN** column will display that device's WWN.
- **Clear All Bound WWNs**—Clears all WWNs listed in the **Bound WWN** column.

## Configuring Ports in the Open Systems Mode

To configure ports in open systems mode, use the following steps:

1. Choose **Ports** from the Product Manager menu bar. The **Configure Ports** dialog box displays, as shown in [Figure 3-5](#).



Port #	Name	Blocked	10-100 km	LIN Alerts	Type	Speed	Port Binding	Bound WWN
0		<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	G_PORT	2 Gb/sec	<input checked="" type="checkbox"/>	20:00:00:00:C9:00:00:00
1		<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	G_PORT	2 Gb/sec	<input type="checkbox"/>	20:01:00:00:C9:00:00:00
2		<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	G_PORT	2 Gb/sec	<input type="checkbox"/>	20:02:00:00:E0:69:00:00:00
3		<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	G_PORT	2 Gb/sec	<input checked="" type="checkbox"/>	20:03:00:00:C9:00:00:00
4		<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	G_PORT	2 Gb/sec	<input type="checkbox"/>	20:04:00:00:C9:00:00:00
5		<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	G_PORT	2 Gb/sec	<input type="checkbox"/>	20:05:00:00:E0:69:00:00:00
6		<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	G_PORT	2 Gb/sec	<input checked="" type="checkbox"/>	20:06:00:00:E0:69:00:00:00
7		<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	G_PORT	2 Gb/sec	<input type="checkbox"/>	20:07:00:00:C9:00:00:00
8		<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	G_PORT	2 Gb/sec	<input type="checkbox"/>	20:08:00:00:C9:00:00:00
9		<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	G_PORT	2 Gb/sec	<input checked="" type="checkbox"/>	20:09:00:00:20:00:00:00
10		<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	G_PORT	2 Gb/sec	<input type="checkbox"/>	20:0A:00:60:48:00:00:00
11		<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	G_PORT	2 Gb/sec	<input type="checkbox"/>	20:0B:00:60:48:00:00:00
12		<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	G_PORT	2 Gb/sec	<input checked="" type="checkbox"/>	20:0C:00:00:C9:00:00:00
13		<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	G_PORT	2 Gb/sec	<input type="checkbox"/>	20:0D:00:60:48:00:00:00
14		<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	G_PORT	2 Gb/sec	<input type="checkbox"/>	20:0E:08:00:20:00:00:00
15		<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	G_PORT	2 Gb/sec	<input checked="" type="checkbox"/>	20:0F:08:00:20:00:00:00
16		<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	G_PORT	2 Gb/sec	<input type="checkbox"/>	20:10:00:E0:69:00:00:00
17		<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	G_PORT	2 Gb/sec	<input type="checkbox"/>	20:11:08:00:20:00:00:00
18		<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	G_PORT	2 Gb/sec	<input checked="" type="checkbox"/>	20:12:00:E0:69:00:00:00
19		<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	G_PORT	2 Gb/sec	<input type="checkbox"/>	20:13:00:E0:69:00:00:00
20		<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	G_PORT	2 Gb/sec	<input type="checkbox"/>	20:14:08:00:20:00:00:00
21		<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	G_PORT	2 Gb/sec	<input checked="" type="checkbox"/>	20:15:00:00:C9:00:00:00
22		<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	G_PORT	2 Gb/sec	<input type="checkbox"/>	20:16:00:E0:69:00:00:00
23		<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	G_PORT	2 Gb/sec	<input type="checkbox"/>	20:17:00:E0:69:00:00:00

**Figure 3–5: Configure Ports dialog box (Open Systems Mode)**

Ports are numbered from **0-63** on the Director 2/64, and **0-127** and **132-143** on the Director 2/140. Note that for the Director 2/140, ports **128-131** are internal ports and not available for external connections.

- Type a name that reflects the end device connected through the port in the **Name** field. For example, use `XYZ Server`, where `XYZ` is the brand name of the server.
- Block or unblock operation for a port when you click the check box in the **Blocked** column. When a check mark displays, the port is blocked.
- Enable or disable extended distance buffering for the port when you click the check box in the **10-100 km** column. When a check mark displays, extended distance buffering is enabled.
- Enable or disable LIN alerts for the port when you click the check box in the **LIN Alerts** column. When a check mark displays, LIN alerts are enabled.  
**NOTE:** The factory default for LIN alerts is enabled.
- Choose a port type when you click in the **Type** field and selecting from the list.
- Prevent an unspecified device from being connected to the port when you click the check box in the **Port Binding** column.
- To set the data speed for the port, click in the **Speed** column for the port, and choose **1 Gb/sec**, **2 Gb/sec**, or **Negotiate**. When you choose **Negotiate**, it allows the port and attached device to negotiate the data rate.

**NOTE:** Note that your director model, firmware, and port card may not allow 2 Gb/sec data speeds.

9. Click the **Bound WWN** field, and type the WWN or nickname of the specific device to be connected to the port.
10. Use the scroll bar on the right side of the **Configure Ports** dialog box table to display additional ports that you want to configure.
11. Click **Activate** to activate the changes and close the dialog box.
12. If you are finished configuring the switch, back up the configuration data. For more information, refer to “[Backing Up and Restoring Configuration Data](#)” on page 3–36.

## Configuring Ports in the S/390 Mode

To configure ports in S/390 mode, use the following steps:

**NOTE:** You cannot configure port names in the **Configure Ports** dialog box in S/390 mode. Use the **Configure Addresses - “Active”** dialog box.

1. Choose **Ports** from the **Configure** menu on the menu bar. The **Configure Ports** dialog box displays, as shown in [Figure 3–6](#).

Port #	10-100 km	LIN Alerts	Port Binding	Type	Speed	Bound WWN
0	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	N/A	2 Gb/sec	20:00:00:00:C9:00:00:00
1	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	N/A	2 Gb/sec	20:01:00:00:C9:00:00:00
2	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	N/A	2 Gb/sec	20:02:00:00:E0:69:00:00:00
3	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	N/A	2 Gb/sec	20:03:00:00:C9:00:00:00
4	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	N/A	2 Gb/sec	20:04:00:00:C9:00:00:00
5	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	N/A	2 Gb/sec	20:05:00:00:E0:69:00:00:00
6	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	N/A	2 Gb/sec	20:06:00:00:E0:69:00:00:00
7	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	N/A	2 Gb/sec	20:07:00:00:C9:00:00:00
8	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	N/A	2 Gb/sec	20:08:00:00:C9:00:00:00
9	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	N/A	2 Gb/sec	20:09:08:00:20:00:00:00
10	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	N/A	2 Gb/sec	20:0A:00:60:48:00:00:00
11	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	N/A	2 Gb/sec	20:0B:00:60:48:00:00:00
12	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	N/A	2 Gb/sec	20:0C:00:00:C9:00:00:00
13	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	N/A	2 Gb/sec	20:0D:00:60:48:00:00:00
14	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	N/A	2 Gb/sec	20:0E:08:00:20:00:00:00
15	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	N/A	2 Gb/sec	20:0F:08:00:20:00:00:00
16	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	N/A	2 Gb/sec	20:10:00:E0:69:00:00:00
17	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	N/A	2 Gb/sec	20:11:08:00:20:00:00:00
18	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	N/A	2 Gb/sec	20:12:00:E0:69:00:00:00
19	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	N/A	2 Gb/sec	20:13:00:E0:69:00:00:00
20	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	N/A	2 Gb/sec	20:14:08:00:20:00:00:00
21	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	N/A	2 Gb/sec	20:15:00:00:C9:00:00:00
22	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	N/A	2 Gb/sec	20:16:00:E0:69:00:00:00
23	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	N/A	2 Gb/sec	20:17:00:E0:69:00:00:00

**Figure 3–6: Configure Ports dialog box (S/390 Mode)**

Ports are numbered from **0-63** on the Director 2/64, and **0-127** and **132-143** on the Director 2/140. Note that for the Director 2/140, ports **128-131** are internal ports and not available for external connections.

2. Enable or disable extended distance buffering for the port when you click the check box in the **10-100 km** column. When a check mark displays, extended distance buffering is enabled.
3. Enable or disable LIN alerts for the port when you click the check box in the **LIN Alerts** column. When a check mark displays, LIN alerts are enabled.  
**NOTE:** The factory default for LIN alerts is “enabled.”
4. Prevent an unspecified device from being connected to the port when you click the check box in the **Port Binding** column.
5. To set the data speed for the port, click in the **Speed** column for the port, and choose **1 Gb/sec**, **2 Gb/sec**, or **Negotiate**. When you choose **Negotiate**, it allows the port and attached device to negotiate the data rate.  
**NOTE:** Note that your director model and firmware may not allow 2 Gb/sec data speeds.
6. Click the **Bound WWN** field, and type the WWN or nickname of the specific device to be connected to the port.
7. Use the scroll bar on the right side of the **Configure Ports** dialog box table to display additional ports that you want to configure.
8. Click **Activate** to activate the changes and close the dialog box.
9. If you are finished configuring the switch, back up the configuration data. For more information, refer to “[Backing Up and Restoring Configuration Data](#)” on [page 3–36](#).

## Configuring Port Addresses

**S/390 mode only.** Use this procedure to create and activate port address configurations.

### Parameters

- **Addr**—This read-only field lists the port’s address. Each port in the switch has a corresponding port address which equals the physical port number plus four. Therefore, the address for port 0 is 4 (0+4).
- **Port Name**—This user-defined name is assigned to the address. Up to 24 alphanumeric characters are allowed, including spaces, hyphens and underscores.

- **Blocked**—If the box is checked, the port is blocked. Blocked ports continuously transmit offline sequences (OLS), but cannot communicate to an attached device. If the box is not checked, the port is unblocked.
- **Port connection array**—This yellow area of the dialog box is a matrix of port addresses that is used to configure connections between port addresses.

All port addresses for the switch are listed along the top and left side of the matrix. The intersection between a vertical and horizontal row of cells (squares) is where you can either allow or prohibit connections between two addresses when you click the cell to prohibit connection or right-click the cell and display a menu of attributes.

**NOTE:** For the Director 2/140, port addresses 84-87 contain X's. These refer to the internal ports 128-131, which cannot have external fiber cable connections.

The default state of a cell is an empty cell (square), which represents an allowed connection. The symbol for a prohibited connection is shown in [Figure 3–7](#). Click a cell to add the prohibited symbol and prohibit connection to that cell. To remove the prohibit symbol, click the cell again.



**Figure 3–7: Prohibited Port Connection symbol**

Move your cursor over the squares in the array to display the corresponding address. Right-click the array to display the following menu options:

- **Prohibit row**—Prohibits connection between all addresses in a row. In effect, this prohibits connection between a specific address and all other port addresses.
- **Allow row**—Allows connection for all port addresses on a row that are currently prohibited. This allows connection between a port with a specific address and other allowed ports.
- **Prohibit all**—Prohibits connection between all port addresses. In this state, ports in the switch cannot connect with any other port address.
- **Allow all**—This allows a dynamic connection through all port addresses from which connection is currently prohibited. The allowed attribute has the lowest precedence and does not override any other attribute.
- **Block all ports**—Blocks communication between all ports. Ports that are blocked continuously transmit offline sequences (OLS).

- **Unblock all ports**—Unblocks all port addresses that are currently blocked. This allows communication from all port addresses in the switch.
- **Clear all**—Clears the prohibit and blocked status of all port addresses in the switch.
- **CUP Name**—This user-defined name is assigned to the control unit port (CUP). Up to 24 alphanumeric characters allowed, including spaces, hyphens and underscores. A space is not allowed as the first character, and the characters are case-sensitive. This is not a required field.
- **Activate**—Click to activate the current configuration. A warning displays before the action occurs.
- **Save As**—Click to save the current configuration with a name and description. The saved configuration will be stored on the HAFM Server and in the **Address Configuration Library**. Refer to [“Managing Stored Address Configurations”](#) on page 3–20 for information on accessing this library.
- **Cancel**—Click to cancel the configuration settings and close the dialog box without saving. If you click this button after you click **Save As**, your changes will be saved and the dialog box will simply close.

To configure, save, and activate port addresses, use the following steps:

1. Choose **Addresses** from the **Configure** menu on the menu bar, then choose **Active**. The **Configure Addresses - “Active”** dialog box displays.

Addr	Port Name	Blocked	04	05	06	07	08	09	0A	0B	0C	0D	0E	0F	10	11	12	13
04		<input checked="" type="checkbox"/>									<input type="checkbox"/>							
05		<input type="checkbox"/>				<input type="checkbox"/>					<input type="checkbox"/>							
06		<input checked="" type="checkbox"/>									<input type="checkbox"/>							
07		<input type="checkbox"/>			<input type="checkbox"/>						<input type="checkbox"/>							
08		<input type="checkbox"/>									<input type="checkbox"/>							
09		<input type="checkbox"/>									<input type="checkbox"/>							
0A		<input type="checkbox"/>									<input type="checkbox"/>							
0B		<input type="checkbox"/>									<input type="checkbox"/>							
0C		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
0D		<input type="checkbox"/>									<input type="checkbox"/>							
0E		<input type="checkbox"/>									<input type="checkbox"/>							
0F		<input checked="" type="checkbox"/>									<input type="checkbox"/>							
10		<input type="checkbox"/>									<input type="checkbox"/>							
11		<input type="checkbox"/>									<input type="checkbox"/>							
12		<input type="checkbox"/>									<input type="checkbox"/>							
13		<input type="checkbox"/>									<input type="checkbox"/>							

CUP Name:

Activate Save As... Cancel

**Figure 3–8: Configure Addresses - “Active” dialog box**

2. Enter information into the appropriate fields.
3. Click the squares to either prohibit or allow connections. In [Figure 3–8](#), port address 07 is prohibited from communicating with port address 05. Also, Port OC is prohibited from communicating with all other port addresses.
4. Click **Save As** to open the **Save Address Configuration As** dialog box.
5. Click the **Port Name** field and enter a name.

Names must be between 1 and 8 characters in length. Valid characters are uppercase A-Z, 0-9, hyphen (-), and underscore (\_). The name may not be CON, AUX, COMn (where n=1-9), LPTn (where n=1-9), NUL, or PRN.

Descriptions must be between 0 and 24 characters in length. Up to 24 alphanumeric characters allowed, including spaces, hyphens, and underscores.

6. Click **OK** to save changes and to close the **Save Address Configuration As** dialog box.
7. In the **Configure Addresses - “Active”** dialog box, click **Activate** to activate the configuration or click **Cancel** to close without activating.

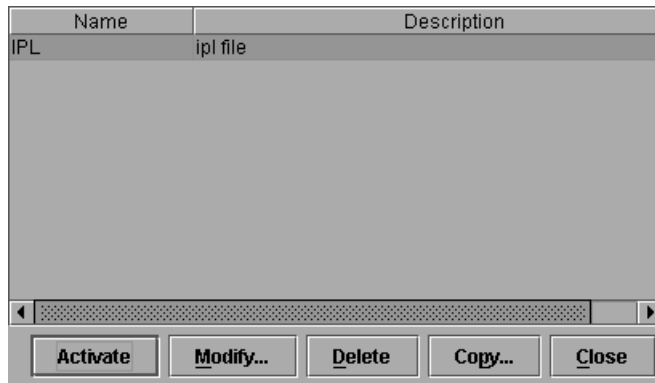
**NOTE:** If you click **Cancel** after saving, your configuration will still be added to the library without being activated.

## Managing Stored Address Configurations

**S/390 mode only.** Once addresses configurations are created through the **Configure Addresses - “Active”** dialog box they are saved to the **Address Configuration Library**. Use this procedure to manage address configurations in the **Address Configuration Library**.

To manage saved library entries:

1. Choose **Addresses** from the **Configure** menu on the menu bar, and then choose **Stored**. The **Address Configuration Library** dialog box displays.



**Figure 3–9: Address Configuration Library dialog box**

2. Choose a configuration entry by selecting a row. Then use one of the procedures below.

- **To modify a stored configuration**—Click **Modify**. The **Configure Addresses** dialog box displays for the configuration. See “[Configuring Port Addresses](#)” on [page 3–17](#) for details on using this dialog box.
- **To delete a stored configuration**—Click **Delete**. A warning displays before deletion.
- **To copy a stored configuration**—Click **Copy** to copy the configuration and rename/describe it. When the **Copy Address Configuration** dialog box displays, provide a name and description for the configuration.

Names must be between 1 and 8 characters in length. Valid characters are uppercase A-Z, 0-9, hyphen (-), and underscore (\_). The name may not be CON, AUX, COMn (where n=1-9), LPTn (where n=1-9), NUL, or PRN. Descriptions must be between 0 and 24 characters in length. Up to 24 alphanumeric characters are allowed, including spaces, hyphens and underscores. Click **OK** and the configuration is added to the library.

- **To activate a stored configuration**—Click the **Activate** button to activate the configuration and send it to the switch for immediate use. A warning displays before the action occurs.

**NOTE:** If **Active=Saved** is enabled in through the **Configure FICON Management Server** dialog box (**Configure** menu), this overwrites the current IPL address configuration.

3. When finished managing the library, click **Close** to close the dialog box.

## Configuring SNMP Trap Message Recipients

Use the procedures in this section to:

- Configure the SNMP agent that runs on the director and implements the following MIBs:
  - MIB-II.
  - Fibre Channel Fabric Element MIB.
  - Director private MIB.
  - Fibre Alliance MIB.

**NOTE:** For complete information on objects defined in MIBs and steps to download MIB variables to your SNMP workstation, refer to the *hp StorageWorks CLI reference guide for directors and edge switches*.

- Configure network addresses and community names for up to six SNMP trap recipients. An SNMP trap recipient is a network management station that receives messages through SNMP for specific events that occur on the director.
- Define SNMP community names that SNMP managers use for reading variables.
- Authorize write permissions for writable MIB variables.

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

To configure the SNMP agent:

1. At the **Hardware View** page, choose **Configure > SNMP Agent**. The **Configure SNMP** dialog box displays, as shown in [Figure 3–10](#).
  - a. For each trap recipient to be configured, type a community name of 32 or fewer alphanumeric characters in the associated **Community Name** field. The community name is incorporated in SNMP trap messages to ensure against unauthorized viewing or use.
  - b. Click the check box in the **Write Authorization** column to enable or disable write authorization for the trap recipient (default is disabled). A check mark in the box indicates write authorization is enabled. When the feature is enabled, a management workstation user can change the HAFM server's **sysContact**, **sysName**, and **sysLocation** SNMP variables.



- c. Type the IP address or DNS host name of the trap recipient (SNMP management workstation) in the associated **Trap Recipient** field. Use 64 or fewer alphanumeric characters. Hewlett-Packard recommends using the IP address.

Community Name	Write Authorization	Trap Recipient	UDP Port Number
public	<input type="checkbox"/>		161
private	<input type="checkbox"/>		161
	<input type="checkbox"/>		
	<input type="checkbox"/>		
	<input type="checkbox"/>		

**Figure 3–10: Configure SNMP dialog box**

- d. Type a decimal user datagram protocol (UDP) port number in the associated **UDP Port Number** field. (This number is commonly 162.)
2. To enable transmission of trap messages to configured SNMP management workstations, click **Enable Authorization Traps**. A check mark displays in the box when transmission is enabled.
  3. Click **Activate** to save the information and close the dialog box.
  4. If you are finished configuring the director, back up the configuration data. For more information, refer to [“Backup and Restore Configuration”](#) on page 5–6.

## Configuring Open Systems Management Server

For complete procedures on configuring this optional feature, refer to [“Configuring the Open Systems Management Server”](#) on page 6–5.

## Configuring FICON Management Server

For complete procedures on configuring this optional feature, refer to [“Configuring the FICON Management Server”](#) on page 6–2.

## Configuring Feature Key

A feature key is a string of alphanumeric characters consisting of both uppercase and lowercase. The following is an example of a feature key format:

XxXx-XXxX-xxXX-xX.

**NOTE:** The total number of characters may vary. The key is case sensitive and must be entered exactly, including the dashes.

The feature key, which is encoded with a director's serial number, can only be configured on the director to which it is assigned.

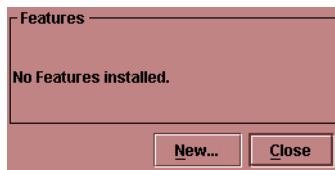
To enable an optional feature on the director, first set the director offline, then enter the feature key into the **New Feature Key** dialog box.

Display this dialog box by selecting **Feature** from the **Configure** menu on the menu bar.

**FICON Management Server Feature:** If you are enabling the FICON Management Server feature, the operating mode automatically configures to S/390 mode. You cannot change the operating mode to open systems mode with the FICON Management Server feature is enabled.

To configure a feature key, use the following steps:

1. Set the director offline using the **Set Online State** dialog box.
  - a. Choose **Maintenance > Set Online State** from the **Product Manager** window. The **Set Online State** dialog box displays.
  - b. Click **Set Offline**. A warning box displays asking you to confirm the offline state.
  - c. Click **OK**.
2. Choose **Configure > Features** from the **Product Manager** window. The **Configure Feature Key** dialog box displays, as shown in [Figure 3-11](#).



**Figure 3-11: Configure Feature Key dialog box**

3. Click **New** to add a new feature key. The **New Feature Key** dialog box displays, as shown in [Figure 3-12](#).



**Figure 3-12: New Feature Key dialog box**

4. Enter the director's feature key in the **Key** field and click **OK**.
  - Feature keys are only valid for a director with a specific serial number. They cannot be interchanged between directors. If an error stating "Invalid serial number" displays, verify that you have entered the feature key that was assigned to the director. To verify, check the serial number of the director through the **Switch Properties** dialog box and compare it to the serial number listed in the documentation provided with your feature key.
  - The feature key is a string of alphanumeric characters with dashes. The key is case-sensitive, so enter the key exactly as printed in the documentation that you received for the feature. If an error stating "Invalid feature key" displays, verify that you have entered the feature key correctly.

The **Enable Feature Key** dialog box displays with a warning, stating that this action will override the current set of features on the director. The list in the left column of the dialog box is a list of features that are active on the director. The list on the right is a set of features that come with the new feature key. All of the features that are active are included in the new feature list.

5. Click **Activate** to activate the new feature key.

An IPL will occur, during which the Ethernet connection between the HAFM server and director is momentarily interrupted.

**NOTE:** If you click **Activate**, all current features will be replaced with new features. That is, if there are features shown in the current list that are not shown in the new list, then those features will be removed from the director.

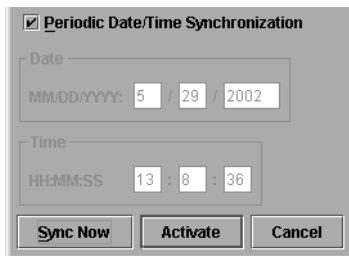
6. Set the director back online.
  - a. Choose **Maintenance > Set Online State** from the **Product Manager** window. The **Set Online State** dialog box displays.
  - b. Click **Set Online**. A warning box displays asking you to confirm the online state.
  - c. Click **OK**.
7. When you are finished configuring the director, you can back up the configuration data.

## Configuring Director Date and Time

The Director 2/140 Product Manager log entries are stamped with the date and time received from the director. Use these steps to set the effective date and time for the director.

**NOTE:** The director and HAFM synchronize at least once daily.

1. At the **Hardware View** page, click the **Configure** menu.
2. Choose **Date/Time** from the drop-down menu. The **Configure Date and Time** dialog box displays, as shown in [Figure 3–13](#).
3. Set director date and time manually, or set for periodic updates. For specific instructions, see the following sections:
  - “[Setting Date and Time Manually](#)” on [page 3–26](#)
  - “[Synchronizing Date and Time](#)” on [page 3–27](#)



**Figure 3–13: Configure Date and Time dialog box**

## Setting Date and Time Manually

Use these steps to set the director date and time manually.

1. At the **Configure Date and Time** dialog box, click the **Periodic Date/Time Synchronization** check box to deselect the option (no check mark in the box). The grayed-out **Date** and **Time** fields activate.
2. Click the **Date** fields that require change, and type numbers in the following ranges:
  - Month (MM): 1 through 12
  - Day (DD): 1 through 31
  - Year (YYYY): greater than 1980

3. Click the **Time** fields that require change, and type numbers in the following ranges:  
Hour (HH): 0 through 23  
Minute (MM): 0 through 59  
Second (SS): 0 through 59
4. Click **Activate** to set the director date and time, and close the **Configure Date and Time** dialog box.

## Synchronizing Date and Time

Use these steps to set the director to periodically synchronize date and time with HAFM.

1. At the **Configure Date and Time** dialog box, choose the **Periodic Date/Time Synchronization** check box. The **Date** and **Time** fields are grayed-out and not selectable.
2. Click **Activate** to enable synchronization and close the **Configure Date and Time** dialog box. The director date and time synchronize with the HAFM date and time at the next update period (at least once daily).
3. Click **Sync Now** to synchronize the director and HAFM immediately. The **Date and Time Synced** dialog box displays.
4. Click **OK**.
5. Click **Activate** to enable synchronization and close the **Configure Date and Time** dialog box.
6. If you are finished configuring the director, back up the configuration data. For more information, refer to “[Backing Up and Restoring Configuration Data](#)” on [page 3–36](#).

## Configuring Threshold Alerts

A threshold alert notifies users when the transmit (Tx) or receive (Rx) throughput reaches specified values for specific director ports or port types, (E\_Ports or F\_Ports). You are notified of a threshold alert by:

- A yellow triangle that displays on the port in the **Port Card View**.
- A yellow triangle that displays on the port in the **Hardware View**.

- A yellow triangle that displays in the **Alert** column of the **Port List View**.
- A yellow triangle that displays by the **Threshold Alerts** field in the **Port Properties** dialog box.
- Detailed threshold alert data recorded in the **Threshold Alert Log**.

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

- Name for the alert.
- Type of threshold for the alert (Rx, Tx, or either).
- Active or inactive state of the alert.
- Threshold criteria:
  - Percent traffic capacity utilized—The percent of the port's throughput capacity achieved by the measured throughput. This setting constitutes the threshold value. For example a value of 50 means that the port's threshold is reached when throughput is 50% of capacity.
  - Time interval during which throughput is measured and alert notification can occur.
  - The maximum cumulative time that the throughput percentage threshold can be exceeded during the set time interval before an alert is generated.
- Ports for which you are configuring threshold alerts.

You can configure up to 16 alerts, and any number of alerts can be active at one time. Use the following procedures to create a new threshold alert, or to modify, activate, deactivate, or delete an alert.

## Creating New Alerts

1. At the **Hardware View** page, choose **Configure > Threshold Alerts**. The **Configure Threshold Alerts** dialog box displays, as shown in [Figure 3-14](#).

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

Name	Type	State
test 2	Tx or Rx Throughput	Inactive
test threshold	Tx or Rx Throughput	Active

Buttons: New... Modify... View Delete Activate Deactivate Close

**Figure 3–14: Configure Threshold Alerts dialog box**

2. Click **New**. The **New Threshold Alert** dialog box displays, as shown in [Figure 3–15](#).

Enter name and type of threshold alert:

Threshold Alert Name:

Threshold Type:

<< Previous    Next >>    Finish    Cancel

**Figure 3–15: New Threshold Alerts dialog box—first screen**

3. Enter a name from one to 64 characters in length. All characters in the ISO Latin-1 character set, excluding control characters, are allowed.
4. Choose one of the following from the drop-down list under the **Name** field:
  - **Rx Throughput**—An alert will occur if the threshold set for receive throughput is reached

- **Tx Throughput**—An alert will occur if the threshold set for transmit throughput is reached.
  - **Rx or Tx Throughput**—An alert will occur if the threshold set for either receive or transmit throughput is reached.
5. Click **Next**. A new screen displays with additional parameters, as shown in [Figure 3–16](#). The name configured for the alert displays at the top of the screen.
- NOTE:** Click **Previous** if you need to return to the previous screen.

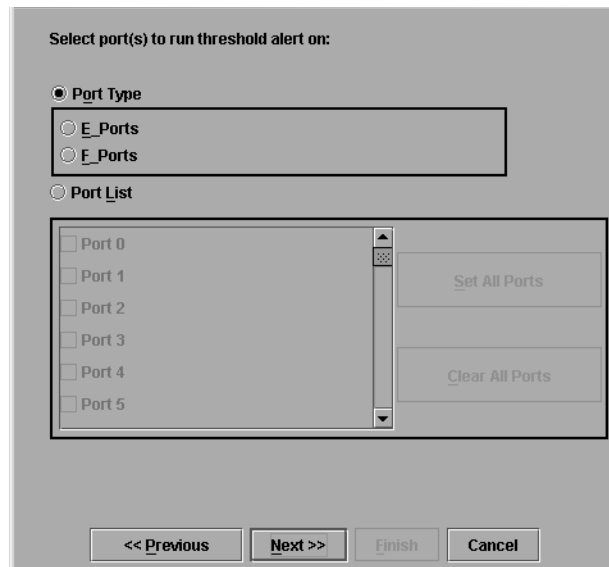
The screenshot shows a dialog box titled "Generate a Threshold Alert named 'Name', if Tx Throughput reaches:". It contains several input fields and radio buttons. The first field is for "% utilization". Below it are two radio buttons: "At any time" (which is selected) and "For [ ] cumulative minutes or more". Below the second radio button is another field for "during the [ ] minute notification interval." At the bottom, there are four buttons: "<< Previous", "Next >>", "Finish", and "Cancel".

**Figure 3–16: New Threshold Alerts dialog box—second screen**

6. Enter a percentage from 1 through 100 for % utilization. When throughput reaches this percentage of port capacity, a threshold alert will occur.
7. Enter the amount of cumulative minutes in which the % utilization should exist during the notification interval before an alert is generated. You can also choose **At any time** if you want an alert to occur whenever the set % utilization is reached. The valid range is from 1 to the interval value set in [step 8](#).
8. Enter the interval in minutes in which throughput is measured and threshold notifications can occur. The valid range is 5 minutes to 70,560 minutes.

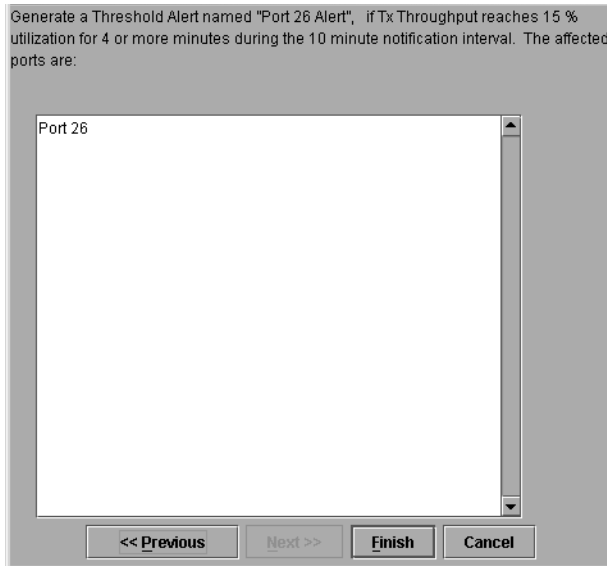


- Click **Next**. A new screen displays for selecting ports for the alerts, as shown in [Figure 3–17](#).



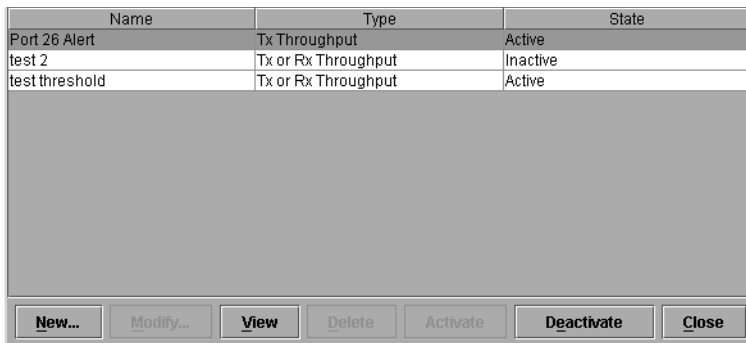
**Figure 3–17: New Threshold Alerts dialog box—third screen**

- Choose either **Port Type** or **Port List**.
  - For **Port Type**, choose either **E\_Ports** or **F\_Ports** will cause this alert to generate for all ports configured as **E\_Ports** or **F\_Ports** respectively.
  - For **Port List**, you can choose individual ports when you click the check box by each port number or set all ports. Choosing **Set All Ports** places a check mark by each port number. Choosing **Clear All Ports** will clear the check marks by each port number.
- Click **Next**. A final screen displays to provide a summary of your alert configuration, as shown in [Figure 3–18](#).



**Figure 3–18: New Threshold Alerts dialog box—summary screen**

12. Click **Finish**. The **Configure Threshold Alerts** dialog box displays listing the name, type, and state of the alert that you just configured.
13. At this point, the alert is not active. To activate the alert, choose the alert information that displays in the **Configure Threshold Alerts** table and click **Activate**. The alert is activated as shown in [Figure 3–19](#).



**Figure 3–19: Configure Threshold Alerts dialog box—alert activated**

---

## Modifying Alerts

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

1. At the **Hardware View** page, choose **Configure > Threshold Alerts**. The **Configure Threshold Alerts** dialog box displays.  
  
Choose the alert that you want to modify when you click the alert information in the table. If the alert is active, an error message displays prompting you to deactivate the alert.
2. If the alert is active, click **Deactivate**, then choose the alert information in the table again.
3. Click **Modify**. An initial **Modify Threshold** screen displays where you can change the threshold type.
4. Select a threshold type from the drop-down list.
5. Click **Next** when you are done. A **Modify Threshold** screen displays where you can change the % utilization, cumulative minutes for the threshold to occur before notification, and the time interval for measuring throughput and for alert notification.
6. Make appropriate changes, then continue through the **Modify Threshold** screens, making changes as necessary, until the summary screen displays the alert configuration.
7. Perform either of the following steps:
  - If you need to change any parameters, click **Previous** or **Next** to display the desired **Modify Threshold** screen.
  - Click **Finish** when you are done.

## Activating or Deactivating Alerts

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

1. At the **Hardware View** page, choose **Configure > Threshold Alerts**. The **Configure Threshold Alerts** dialog box displays.  
  
The port's current state, inactive or active, is listed under the **State** column.
2. To change the state, choose the alert by the alert information in the table.

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

## Deleting Alerts

Use the following steps to delete existing threshold alerts.

1. At the **Hardware View** page, choose **Configure > Threshold Alerts**. The **Configure Threshold Alerts** dialog box displays.
2. Select the alert that you want to delete by selecting the alert information in the table and click **Delete**. A message displays asking you to confirm the deletion.
3. Click **Yes**. The alert is removed from the dialog box.

## Exporting the Configuration Report

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

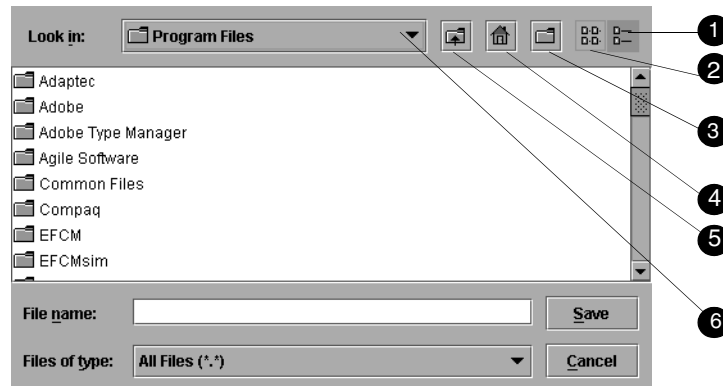
**NOTE:** This file cannot be used to set configuration parameters through the Product Manager.

Data in the file includes:

- **Product identification**—Data from the **Configure Identification** dialog box.
- **Operating parameters**—Data from the **Operating Parameters** dialog box.
- **Port parameters**—Data from the **Configure Ports** dialog box.
- **SNMP parameters**—Data from the **Configure SNMP** dialog box.
- **Active zoning configuration**—This specifies the active zone and zone members, if set, and whether the default zone is enabled or disabled.

To export a configuration report:

1. Choose **Export Configuration Report** from the **Configure** menu on the menu bar. The **Export Configuration Report** dialog box displays.



- |                     |                   |
|---------------------|-------------------|
| ❶ Details           | ❷ Home            |
| ❸ List              | ❹ Go up one level |
| ❺ Create new folder | ❻ Drive list      |

**Figure 3–20: Export Configuration Report dialog box**

- Choose the folder where you want to save the file.
- Type in a file name and extension in the **File name** field.
- Click **Save**. The file saves to the specified folder as an ASCII text file.

## Enabling Embedded Web Server

Use the following steps to enable EWS:

- At the **Hardware View** page, choose **Configure > Enable Web Server**. Choosing **Enable Web Server** automatically places a check mark in the check box.
- Choose **Enable Web Server** again to remove the check mark and disable the EWS interface. When disabled, remote users cannot access the interface.

## Enabling Telnet

Use the following steps to enable Telnet:

- At the **Hardware View**, choose **Configure > Enable Telnet**. Choosing **Enable Telnet** automatically places a check mark in the check box.

2. Choose **Enable Telnet** again to remove the check mark and disable telnet access. When disabled, remote users cannot access the director through telnet.

## Backing Up and Restoring Configuration Data

Use the **Backup and Restore Configuration** option to back up the NV-RAM configuration, which includes all of the data that you input through instructions in this chapter. This option is available through the **Maintenance** menu on the menu bar. Choosing this option backs up the configuration data to a file on the HAFM server hard drive. The restore function writes this data back to NV-RAM on the director. Using the restore function overwrites the existing configuration. For more information, refer to “[Backup and Restore Configuration](#)” on [page 5–6](#).

In addition to the **Backup and Restore Configuration** option, the Iomega *QuikSync* application backs up configuration and other critical data from the HAFM server automatically. As long as a Zip disk remains in the Zip drive of the HAFM server, data backs up to the Zip disk whenever the directory contents change or you reboot the HAFM server. For more information, refer to “[Backing Up and Restoring Product Manager Data](#)” on [page 1–40](#).

**NOTE:** Hewlett-Packard doesn't recommend changing the default QuikSync settings.

---

## Using Logs

This chapter describes the StorageWorks Director 2/64 and Director 2/140 logs. Access these logs, from the logs menu on the menu bar:

- Audit Log
- Event Log
- Hardware Log
- Link Incident Log
- Threshold Alert Log

### Using Logs

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

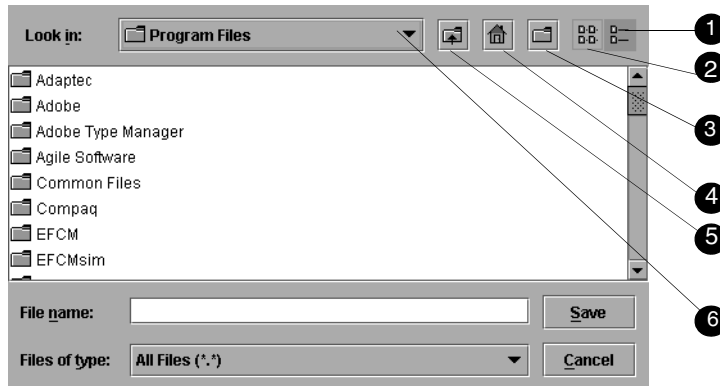
### Button Functions

Button function is the same for all logs:

- **Clear**—When you click **Clear**, it clears all entries in the log for all users. A warning dialog box displays requesting confirmation that you want to clear all entries in the log.
- **Refresh**—When you click **Refresh**, it reads the current data and refreshes the screen with the new display.
- **Close**—Closes the log and displays the Director Product Manager window.
- **Export**—When you click **Export** on a log window, it displays the **Save** dialog box shown in [Figure 4-1](#). Click the **Home** icon to return to the files in your home directory. The folders listed in the display area of the **Save** dialog box, after you click the **Home** icon, are those that are stored in your home directory. If you choose, you may create a folder for your home directory and save the file there.

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

1. Click **Export** on the log window to display the **Save** dialog box. This dialog box contains the following controls, as shown in [Figure 4-1](#):



- |                     |                   |
|---------------------|-------------------|
| ❶ Details           | ❷ Home            |
| ❸ List              | ❹ Go up one level |
| ❺ Create new folder | ❻ Drive list      |

**Figure 4-1: Save dialog box—log windows**

2. In the **Save** dialog box, choose the folder where you want to save the file.
3. Type in a file name and extension in the **File name** field.
4. Click **Save**. The file saves to the specified folder as an ASCII text file.

## Expanding Columns

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

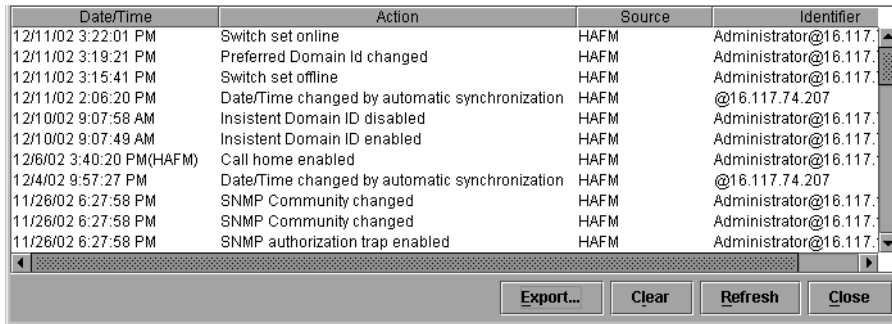
## Sorting Entries

Sort log entries in columns when you click a column heading. A down arrow in the header indicates sorting in descending order. An up arrow indicates sorting in ascending order. Click once to sort. Click again to reverse the sort.



## Audit Log

The Audit Log displays a history of all configuration changes applied to the director from any source such as HAFM, SNMP management stations, or host.



Date/Time	Action	Source	Identifier
12/11/02 3:22:01 PM	Switch set online	HAFM	Administrator@16.117.74.207
12/11/02 3:19:21 PM	Preferred Domain Id changed	HAFM	Administrator@16.117.74.207
12/11/02 3:15:41 PM	Switch set offline	HAFM	Administrator@16.117.74.207
12/11/02 2:06:20 PM	Date/Time changed by automatic synchronization	HAFM	@16.117.74.207
12/10/02 9:07:58 AM	Insistent Domain ID disabled	HAFM	Administrator@16.117.74.207
12/10/02 9:07:49 AM	Insistent Domain ID enabled	HAFM	Administrator@16.117.74.207
12/6/02 3:40:20 PM(HAFM)	Call home enabled	HAFM	Administrator@16.117.74.207
12/4/02 9:57:27 PM	Date/Time changed by automatic synchronization	HAFM	@16.117.74.207
11/26/02 6:27:58 PM	SNMP Community changed	HAFM	Administrator@16.117.74.207
11/26/02 6:27:58 PM	SNMP Community changed	HAFM	Administrator@16.117.74.207
11/26/02 6:27:58 PM	SNMP authorization trap enabled	HAFM	Administrator@16.117.74.207

**Figure 4–2: Audit Log**

Some actions, such as backing up configuration data and enabling automatic date/time synchronization, are performed only by the HAFM server without director interaction. These actions are indicated when HAFM displays in the **Source** column, as shown in [Figure 4–2](#). If HAFM does not display, the time stamp is from the director.

- **Date/Time**—The date and time of the change on the director.
- **Action**—User action that caused the configuration change, such as offline status, port name change, or change of address.
- **Source**—Identifies the user making the change through the Director Product Manager and IP or DNS host name address of the remote user’s workstation.
  - Maintenance Port—Change was made by a user connected to the maintenance port.
  - *HAFM* application—Change was made by a Product Manager user.
  - SNMP—Change was made by a remote SNMP management station.
  - Fabric—Change was initiated by another director in the fabric that is not managed by this HAFM server.
  - Web server—Change was made by a user through the Embedded Web Server interface.
  - Fibre channel Host—Change was made inband by a Fibre Channel host through the open systems or FICON management server.

- Telnet—Change was made through a telnet connection.
- **Identifier**—Identifies the user making the change according to the source:
  - Maintenance Port—No entry displays.
  - *HAFM* application—Includes user@address, where “user” is the Product Manager user name, and “address” is the network address of the workstation (remote user workstation or HAFM server).
  - SNMP—Contains the network address of the SNMP management station.
  - Fabric—No entry displays.
  - Web Server—The Identifier column contains user@address, where “user” is the web server user name and “address” is the network address of the web user.
  - Fibre Channel Host—No entry displays.
  - Telnet—Change was made through a telnet connection.

## Event Log

The Event Log provides a record of significant events that have occurred on the director, such as hardware failures, degraded operation, port problems, FRU failures, FRU removals and replacements, port problems, Fibre Channel link incidents, and HAFM server to director communication problems. The information is useful to maintenance personnel for fault isolation and repair verification.

Date/Time	Event	Description	Severity	FRU-Position	Event Data
3/11/02 11:18:18 AM	070	E_Port has become segmented.	Informational		2B 00 00 00 02 00 00 00 15 00 00 00
3/11/02 11:15:54 AM	070	E_Port has become segmented.	Informational		2B 00 00 00 02 00 00 00 15 00 00 00
3/11/02 11:13:15 AM	203	Power supply AC voltage recovery.	Informational	PWR-0	

Export...
Clear
Refresh
Close

**Figure 4-3: Event Log**

All detected firmware faults and hardware failures are sent to the HAFM server and recorded in the Event Log. The log provides a maximum of 1000 log entries before it wraps and overwrites the oldest entries.

For detailed information on event data and problem resolution, refer to the *hp StorageWorks director 2/64 service manual* for the Director 2/64 and the *hp StorageWorks director 2/140 service manual* for the Director 2/140.

Each log entry includes the following:

- **Date/Time**—The date and time of the event on the director.
- **Event**—Events are identified by a unique code. Event codes include:

**Table 4–1: Event Codes**

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

The following acronyms may display in this column for the port card:

- GLSL—G\_Port, long wave, single mode LC connector, 1 Gigabit
- GSML—G\_Port, short wave, multimode, LC connector, 1 Gigabit
- GXXL—G\_Port, mixed mode, LC connector, 1 Gigabit
- FPM—G\_Port, small form factor optics (SFO) pluggable, FICON port module, 1 Gigabit
- UPM—G\_Port, small form factor optics (SFO) pluggable, universal port module, 2 Gigabit
- GSF2—GPort, small form factor optics (SFO) pluggable, universal port module, 2 Gigabit
- GLSR—G\_Port, short wave, single mode, MT-RJ connector, 1 Gigabit
- GXXR—G\_Port, mixed mode, MT-RJ connector, 1 Gigabit
- GSMR—G\_Port, short wave, multimode, MT-RJ connector, 1 Gigabit.

The chassis (slot) position for a nonredundant FRU is **0**. The chassis positions for redundant FRUs are **0**, **1**, and **2**. The chassis positions for port cards are **0** through **35**, and slot **32** is unavailable.

- **Description**—A short description of the event.
- **Severity**—There are four classifications of severity that identify the importance of the event.

- 0=Informational
- 2=Minor
- 3=Major
- 4=Severe (not operational)
- **FRU Position**—An acronym representing the FRU type, followed by a number representing the FRU chassis position. FRU acronyms are:
  - **BKPLNE**—backplane.
  - **CTP**—control processor (CTP) card.
  - **SBAR**—serial crossbar (SBAR) card.
  - **Port**—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**, **1**, and **2**. The chassis positions for port cards are **0** through **35**, and slot **32** is unavailable.

- **Event Data**—Up to 32 bytes of supplementary information for the event in hexadecimal format. For detailed information on event data and problem resolution, refer to the event code tables appendix in the *hp StorageWorks director 2/64 service manual* for the Director 2/64 and the *hp StorageWorks director 2/140 service manual* for the Director 2/140.

## Hardware Log

The Hardware Log displays information on FRUs inserted and removed from the director.

Date/Time	FRU	Position	Action	Part Number	Serial Number
2/14/02 9:09:18 AM	GSF2	1	Inserted	470-000396-201	121234561
2/14/02 9:09:18 AM	GSF2	0	Inserted	470-000396-201	121234560
2/14/02 9:09:18 AM	GXXL	13	Removed	470-000396-222	1012345613
2/14/02 9:09:18 AM	GSML	12	Removed	470-000396-201	912345612
2/14/02 9:09:18 AM	GLSL	11	Removed	470-000396-201	812345611
2/14/02 9:09:18 AM	GXXR	10	Removed	470-000396-201	1512345610
2/14/02 9:09:18 AM	GSMR	9	Removed	470-000396-201	141234569
2/14/02 9:09:18 AM	GLSR	8	Removed	470-000396-201	131234568
2/14/02 9:09:18 AM	GLSR	7	Removed	470-000396-222	131234567
2/14/02 9:09:18 AM	GLSR	6	Removed	470-000396-222	131234566

Export... Clear Refresh Close

**Figure 4-4: Hardware Log**

Each log entry includes the following:

- **Date/Time**—Date and time of the insertion or removal of the FRU.
- **FRU**—The name of the inserted or removed FRU.

**Table 4-2: FRU Names**

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

The following acronyms may display in this column for the port card:

- GLSL—G\_Port, long wave, single mode LC connector, 1 Gigabit
- GSML—G\_Port, short wave, multimode, LC connector, 1 Gigabit
- GXXL—G\_Port, mixed mode, LC connector, 1 Gigabit
- FPM—G\_Port, small form factor optics (SFO) pluggable, FICON port module, 1 Gigabit
- UPM—G\_Port, small form factor optics (SFO) pluggable, universal port module, 2 Gigabit
- GSF2—GPort, small form factor optics (SFO) pluggable, universal port module, 2 Gigabit
- GLSR—G\_Port, short wave, single mode, MT-RJ connector, 1 Gigabit

- GXXR—G\_Port, mixed mode, MT-RJ connector, 1 Gigabit
- GSMR—G\_Port, short wave, multimode, MT-RJ connector, 1 Gigabit.
- **Position**—Slot position in the chassis relative to identical components installed.
- **Action**—Inserted or removed.
- **Part Number**—Part number of the component.
- **Serial Number**—Serial number of the component.

## Link Incident Log

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

Date/Time	Port	Link Incident
3/11/02 12:51:57 PM	43	Bit-error threshold exceeded.
3/11/02 12:35:32 PM	43	Bit-error threshold exceeded.
3/11/02 12:03:29 PM	43	Bit-error threshold exceeded.
3/11/02 11:41:20 AM	43	Loss-of-Signal or Loss-of-Synchronization.
3/11/02 11:25:36 AM	43	Loss-of-Signal or Loss-of-Synchronization.
3/11/02 11:18:14 AM	43	Not Operational primitive sequence (NOS) received.

**Figure 4–5: Link Incident Log**

Each log entry contains:

- **Date/Time**—The date and time of the incident.
- **Port**—The number of the port on which the incident occurred.
- **Link Incident**—A short description of the incident. The following events may cause a link incident to be written to the log.
  - Implicit incident. The attached node detects a condition that may cause problems on the link.
  - Bit-error threshold exceeded. The number of code violation errors has exceeded threshold.
  - Loss-of-signal or loss-of-synchronization. This occurs if a cable is unplugged from an attached node. Loss-of-synchronization condition has persisted for longer than the resource allocation time out value (R\_A\_TOV).

- Not-operational (NOS) primitive sequence received. A NOS was recognized.
- Primitive sequence timeout. Link reset protocol timeout occurred. Timeout occurred for an appropriate response while in NOS receive state and after NOS is no longer recognized.
- Invalid primitive sequence received for the current link state. Either a link reset or a link reset response primitive sequence was recognized while waiting for the offline sequence.

For corrective actions in response to these link incident messages, refer to the diagnostics chapter in the *hp StorageWorks director 2/64 service manual* for the Director 2/64 and the *hp StorageWorks director 2/140 service manual* for the Director 2/140.

## Threshold Alert Log

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

Date/Time	Name	Port	Type	Utilization %	Alert Time	Interval
10/24/01 2:19:38 PM	a test	7	Rx Throughput	1	0	5
10/24/01 2:19:37 PM	a test	15	Rx Throughput	1	0	5
10/24/01 2:14:38 PM	a test	7	Rx Throughput	1	0	5
10/24/01 2:14:36 PM	a test	15	Rx Throughput	1	0	5
10/24/01 2:09:38 PM	a test	7	Rx Throughput	1	0	5
10/24/01 2:09:36 PM	a test	15	Rx Throughput	1	0	5
10/24/01 2:04:38 PM	a test	7	Rx Throughput	1	0	5
10/24/01 2:04:36 PM	a test	15	Rx Throughput	1	0	5
10/24/01 1:59:38 PM	a test	7	Rx Throughput	1	0	5
10/24/01 1:59:36 PM	a test	15	Rx Throughput	1	0	5
10/24/01 1:54:37 PM	a test	7	Rx Throughput	1	0	5
10/24/01 1:54:36 PM	a test	15	Rx Throughput	1	0	5
10/24/01 1:49:37 PM	a test	7	Rx Throughput	1	0	5
10/24/01 1:49:36 PM	a test	15	Rx Throughput	1	0	5
10/24/01 1:44:37 PM	a test	7	Rx Throughput	1	0	5
10/24/01 1:44:36 PM	a test	15	Rx Throughput	1	0	5
10/24/01 1:39:36 PM	a test	7	Rx Throughput	1	0	5
10/24/01 1:39:35 PM	a test	15	Rx Throughput	1	0	5
10/24/01 1:34:36 PM	a test	7	Rx Throughput	1	0	5
10/24/01 1:34:35 PM	a test	15	Rx Throughput	1	0	5
10/24/01 1:29:35 PM	a test	15	Rx Throughput	1	0	5
10/24/01 1:29:35 PM	a test	7	Rx Throughput	1	0	5
10/24/01 1:24:34 PM	a test	15	Rx Throughput	1	0	5
10/24/01 1:24:34 PM	a test	7	Rx Throughput	1	0	5
10/24/01 1:19:34 PM	a test	15	Rx Throughput	1	0	5
10/24/01 1:19:34 PM	a test	7	Rx Throughput	1	0	5
10/24/01 1:14:34 PM	a test	15	Rx Throughput	1	0	5
10/24/01 1:14:34 PM	a test	7	Rx Throughput	1	0	5

Export... Clear Refresh Close

**Figure 4-6: Threshold Alert Log**

- **Date/Time**—Date and time stamp for when the alert occurred.
- **Name**—Name for the alert as configured through the **Configure Threshold Alerts** dialog box.
- **Port**—Port number where the alert occurred.
- **Type**—The type of alert: transmit (Tx) or receive (Rx).
- **Utilization %**—Percent usage of traffic capacity. This is the percent of the port's throughput capacity achieved by the measured throughput. This setting constitutes the threshold value and is configured through the **Configure Threshold Alerts** dialog box. For example, a value of 25 means that threshold occurs when throughput reaches 25 percent of the port's capacity.
- **Alert Time**—The time that the utilization % must exist before an alert is generated. This is set through the **Configure Threshold Alerts** dialog box.
- **Interval**—The time interval during which the throughput is measured and an alert can generate. This is set through the **Configure Threshold Alerts** dialog box.



---

## Using Maintenance Features

This chapter describes how to use the options that display under the **Maintenance** menu on the menu bar along the top of the Product Manager window.

### Port Diagnostics

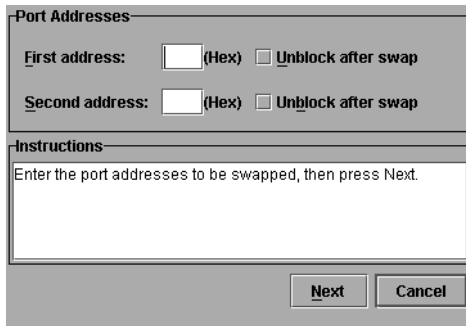
The **Port Diagnostics** option enables you to run internal and external loopback tests on any port or all ports on a port card. To use this option, follow the detailed steps in the *hp StorageWorks director 2/64 service manual* for the Director 2/64 and the *hp StorageWorks director 2/140 service manual* for the Director 2/140.

### Swap Ports

**S/390 mode only.** Choose **Swap Ports** to display the **Swap Ports** dialog box. Use this dialog box to swap one port address for another. For example, if the current address for port 0 is currently 04 and the address for port 1 is currently 05, you can swap so that the address for port 0 has address 05 and port 1 has address 04.

To swap ports, use the following steps:

1. Choose **Swap Ports** from the **Maintenance** menu on the menu bar. The **Swap Ports** dialog box displays, as shown in [Figure 5–1](#).



**Figure 5–1: Swap Ports dialog box**

2. Enter the first address (in hexadecimal format).
3. If you want to unblock the port, choose **Unblock after swap** option. Note that ports are automatically blocked during the swap process.
4. Enter the second address (in hexadecimal format).
5. If you want to unblock the port, choose **Unblock after swap** option.
6. Click **Next** to continue.
7. Follow the on-screen instructions and click **Next** to continue through to the next screen.
8. If you are finished configuring the director, back up the configuration data. For more information, refer to [“Backup and Restore Configuration”](#) on page 5–6.

## Notes

- Make sure that the system administrator varies devices offline that are attached to the ports whose addresses you are going to swap.
- Ports that you are going to swap are blocked during this procedure, as swapping ports is disruptive to port operation.

## Collect Maintenance Data

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

To use this option, follow the detailed steps in the *hp StorageWorks director 2/64 service manual* for the Director 2/64 and the *hp StorageWorks director 2/140 service manual* for the Director 2/140.

## Execute an IPL

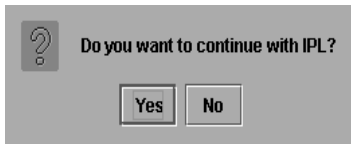


**CAUTION:** The Ethernet connection between the HP StorageWorks HA-Fabric Manager (HAFM) server and director is interrupted momentarily during an IPL.

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

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

1. Choose **IPL** from the **Configure** menu on the menu bar. The **IPL Confirmation** dialog box displays, as shown in [Figure 5–2](#).



**Figure 5–2: IPL Confirmation dialog box**

2. Click **Yes**.

Choosing **IPL** from the **Maintenance** menu causes Ethernet connection between the director and HAFM server to drop momentarily. The following occurs in the Product Manager window:

- As the network connection drops, the Director **Status** table on the **Hardware View** turns yellow.
- The **Status** field in the table displays **No Link** and the **State** field displays the reason for no link.
- A gray square displays in the status bar. Refer to [Table 1–1](#) for an explanation of this status bar display.
- The FRUs in the illustration in the **Hardware View** do not display. They display again as the connection is reestablished.

For details on functions performed by an IPL, refer to the *hp StorageWorks director 2/64 service manual* for the Director 2/64 and the *hp StorageWorks director 2/140 service manual* for the Director 2/140.

## Set Online State

Use the procedure in this section to display the current director operating state (offline or online) and change the state as required. The director can have one of the following operational states:

- **Online**—When the director is in the online state, all of the unblocked ports are allowed to log in to the fabric and to begin communicating. Devices can connect to the director and communicate with another device if:
  - The port is not blocked.
  - The default zone is enabled or both devices are in the same zone.
- **Offline**—When the director is in the offline state, all the installed ports are offline. The ports transmit an OLS (offline sequence), and they cannot accept a login for connection from an attached device. All ports in the director, including E\_Ports, are placed offline regardless of whether they were blocked or unblocked and the director is removed from a multiswitch fabric.



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

---

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

1. Choose **Set Online State** from the **Maintenance** menu on the menu bar.
2. Click **Set Offline** or **Set Online**, depending on the operating state you want to set.
3. When a warning box displays requesting you to confirm the offline or online state, click **OK**.

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

## Manage Firmware Versions

Firmware refers to the internal operating code for the director. You can maintain up to eight firmware versions on the HAFM server for downloading to a director. To use the **Firmware Library** option to manage firmware versions, follow the steps in the *hp StorageWorks director 2/64 service manual* for the Director 2/64 and the *hp StorageWorks director 2/140 service manual* for the Director 2/140.

## Enable E-Mail Notification

E-mail addresses and the simple mail transfer protocol (SMTP) server address for e-mail notification of director events must be configured through the *HAFM* application. Refer to the *hp StorageWorks ha-fabric manager user guide* for instructions on configuring e-mail.

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

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

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

1. Choose **Enable E-Mail Notification** from the **Maintenance** menu on the menu bar.
2. To enable e-mail notification, choose the option to add a check mark to the check box.
3. To disable e-mail notification, choose the option to remove the check mark from the check box.

## Enable Call-Home Notification

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

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

### Notes

- You must enable Call-Home Event Notification through the StorageWorks *HAFM* application **Maintenance** menu before enabling this function through the Product Manager for individual directors. A choice of two Call Home features is provided when HAFM is installed.
- In legacy HP environments, call-home notification for directors and switches requires installation of Proactive Service software. This service is offered at no additional charge for subsystems covered under an on-site warranty or on-site storage hardware support contract. To register or order Proactive Services software, contact your HP customer service representative.
- In classic HP environments, configure telephone numbers and other information for the call-home feature through the Windows dial-up networking application. To enable call-home notification for a director, choose **Enable Call Home Notification** from the **Maintenance** menu. Refer to the *hp StorageWorks director 2/64 service manual* for the Director 2/64 and the *hp StorageWorks director 2/140 service manual* for the Director 2/140.

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

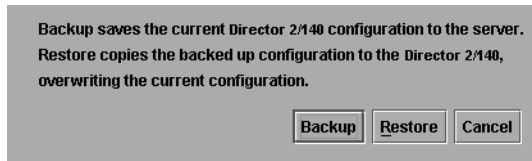
## Backup and Restore Configuration

Choose this option to save the product configuration stored on the director to the HAFM server hard disk, or to restore the product configuration from the HAFM server. Only a single copy of the configuration is kept on the server.

The purpose of the backup is primarily for single-CTP systems, such as the director, where a backup is needed in order to restore a replacement CTP card. You can also use this feature for a special purpose configuration or for temporary testing of a configuration. You cannot modify the location and file name of the saved configuration.

**NOTE:** You can only restore the configuration to a director with the same IP address.

1. Choose **Backup and Restore Configuration** from the **Maintenance** menu on the menu bar. The **Backup and Restore Configuration** dialog box displays, as shown in [Figure 5-3](#).



**Figure 5-3: Backup and Restore Configuration dialog box**

The **Backup and Restore Configuration** dialog box consists of a short description of the features performed when you choose **Backup** or **Restore**.

2. Click **Backup** to save the current director configuration to the HAFM server. The following is a list of configurations that are backed up to the HAFM server:
  - Identification data (director name, description, and location).
  - Port configuration data (port names, blocked states, and extended distance settings).
  - Operating parameters (BB\_Credit, E\_D\_TOV, R\_A\_TOV, director priority, preferred domain ID, rerouting delay, domain RSCNs, and director speed (Director 2/64 only)).
  - SNMP configuration (trap recipients, community names, and write authorizations).
  - Zoning configuration (active zone set and default zone state).

A backup is immediately attempted when you click **Backup** on this dialog box. A dialog box displays to confirm that the backup to the server is complete. If the backup fails, a dialog box displays to inform you that the backup to the server failed.

3. Set the director to offline before performing the restore function. If you click **Restore** and the director is online, a message dialog displays requesting that you turn the director offline. No action takes place when you close the dialog box. For instructions on setting the director offline or online, refer to “[Set Online State](#)” on [page 5–4](#).
4. Click **Restore** on the **Backup and Restore Configuration** dialog box to copy the backed up configuration to the nonvolatile random access memory (NV-RAM) on the director.

If the director is already offline and you click **Restore**, a confirmation dialog box displays indicating that the restore will overwrite any existing configurations already on the director and it displays the date of the restored backup.

**NOTE:** The restore operation initiates an IPL.

The **Export Configuration Report** function accessed through the **Configure** menu on the menu bar is an ASCII file of the backup performed in this section.

## Reset Configuration

This feature is used to reset all configuration data for the director to factory default values. You must have maintenance authorization rights to access this feature.

The internet protocol (IP) address will reset to the factory default value during this procedure, you may not recover the Ethernet connection between the director and HAFM server if you have changed the director’s IP addressing from that default value. In this case you must reenter LAN addressing, such as IP and gateway addresses, through a terminal attached to the maintenance port.

Before using the reset configuration option, record the director’s current IP address, which displays below the icon in the *HAFM* application’s **Product View** when the view’s **Display Options** are set to **Network Address**. You can also find the current IP address through the Embedded Web Server interface.

After resetting the configuration, reset LAN addressing to the desired values through the maintenance port or the Embedded Web Server interface.

**NOTE:** Use of the maintenance port is not covered in this manual. For procedures, refer to the *hp StorageWorks director 2/64 service manual* for the Director 2/64 and the *hp StorageWorks director 2/140 service manual* for the Director 2/140.



Use the following steps to reset the configuration parameters on the director to the default values.

1. Choose **Reset Configuration** from the **Maintenance** menu. The following warning displays:



**WARNING:** This operation will reset all director configuration data and nonvolatile settings to factory default values. The director must be offline to continue.

2. Set the director offline. For instructions, refer to “[Set Online State](#)” on [page 5–4](#).
3. To continue the reset operation, click **Reset** on the **Reset Configuration** dialog box. If you want to cancel the operation, click **Cancel**.

**NOTE:** If you have enabled features that add additional port function since the director was shipped from the factory, these features will be disabled (factory default) when the configuration is reset. Only those ports that were enabled at the factory will function. You will have to enable the additional port function features again through the **Configure Feature Key** dialog box.

**NOTE:** Factory-default values may vary, depending on the firmware release installed in your director. For a list of values, refer to the *hp StorageWorks director 2/64 service manual* for the Director 2/64 and the *hp StorageWorks director 2/140 service manual* for the Director 2/140.

**Table 5–1: Data Default Values**

Configuration	Description	Default
Identification	Director Name	NULL string
	Director Description	“Fibre Channel Director”
	Director Contact	“End User Contact (please configure)”
	Director Location	“End User Contact (please configure)”
Ports	Port Names	NULL strings
	Port Blocked States	Unblocked
	Extended Distance (10-100km)	Disabled
	LIN Alerts	Disabled
	Port Address	Port number plus 4

**Table 5–1: Data Default Values (Continued)**

<b>Configuration</b>	<b>Description</b>	<b>Default</b>
Director Addressing	IP Address	10, mac[3], mac[4], mac[5] converted to word32 MAC addresses are set in hexadecimal; IP addresses in decimal. A MAC address of 08 00 88 <b>20 00 57</b> will be reset to an IP address of 10. <b>32.0.87</b> .
	Subnet Mask	255.0.0.0
	Gateway Address	0.0.0.0
	MAC Address	PROM value
Operating Parameters	Preferred Domain ID	1
	Buffer-to-Buffer Credit	16
	R_A_TOV	10 seconds (100 tenths)
	E_D_TOV	2 seconds (20 tenths)
	Director Priority	254
	Rerouting Delay	Disabled
SNMP	SNMP Communities	“public” — 5 NULL strings
	SNMP Write Authorizations	Read only per community
	Trap Recipient IP Addressees	0 for each
	UDP Port	162
	SNMP Authorization Trap State	5

**Table 5–1: Data Default Values (Continued)**

<b>Configuration</b>	<b>Description</b>	<b>Default</b>
Zoning	Number of Zone Members	0
	Number of Zones	0
	Number of Zone Sets	0
	Zone Names	None
	Zone Sets Names	None
	Zone Members	None
	Default Zone State	Enabled
	Active Zone Set State	Disabled
	Active Zone Set Name	NULL string



---

## Optional Features

This chapter provides detailed information on using, administering, and configuring optional HAFM's features through *HAFM* applications. There are two types of features covered in this chapter:

- “Keyed” features, requiring feature keys to be purchased and enabled through the **Configure Feature Key** dialog box in the product's *Product Manager* application.
- Features not requiring feature keys themselves, but requiring that specific keyed features be enabled before they can be accessed through *HAFM* or *Product Manager* applications.
- The following sections are covered in this chapter:
  - [FICON Management Server on page 6-1](#)
  - [Open Systems Management Server on page 6-4](#)
  - [SANtegrity Features on page 6-6](#)
  - [Enterprise Fabric Mode on page 6-12](#)

### FICON Management Server

The FICON Management Server is a keyed feature that allows host control and inband management of the director or switch through an IBM System/390 or zSeries 900 Parallel Enterprise Server attached to a director or switch port. The server communicates with the switch or director through a FICON channel. Control of connectivity and statistical product monitoring are provided through a host-attached console.

### Installation

To install and enable this option, choose the **Configure Feature Key** option under the Product Manager's **Configure** menu. Use steps under “[Configuring Feature Key](#)” on [page 3-24](#).

## Configuring the FICON Management Server

Use this procedure to configure whether the host is the controlling manager.

**NOTE:** The optional FICON Management Server feature must be installed in order to perform this procedure.

- **Switch Clock Alert Mode**—Click this check box to display a check mark and enable clock alert mode. If this is enabled, the following occurs when users set the date and time through the **Configure Date and Time** dialog box (**Configure** menu):
  - If you enable **Periodic Date/Time Synchronization**, an error message displays indicating that Clock Alert Mode must be cleared to enable automatic synchronization of the date and time.
  - If you manually sets the date and time (**Periodic Date/Time Synchronization** is not enabled), a confirmation dialog box will display. You must click **OK** on that dialog box to continue manual configuration.
- **Host Control Prohibited**—Click this check box to display a check mark and prohibit a host management program from changing configuration and connectivity parameters on the director. In this case, the host program will have read authorization only and cannot make changes. When the check mark is not displayed, a host program can change configuration and connectivity parameters on the director.
- **Programmed offline state control**—Click this check box to display a check mark and enable a host management program to control the director’s offline and online state. When a check mark is not displayed, a host program cannot set the director online or offline.
- **Active=Saved**—Click this check box to display a check mark and enable the active=saved function for the IPL address configuration.
  - If **Active=Saved** is enabled (check mark), the IPL and the active address configuration are maintained as identical configurations. If a new configuration is activated through the **Configure Addresses - “Active”** dialog box, that configuration becomes the IPL address configuration.
  - If **Active=Saved** is not enabled (no check mark), the IPL address configuration and the active configuration are not maintained as identical and may, in fact, be different configurations. If the feature *is not* enabled, you can modify the IPL configuration through the **Configure Addresses - “Active”** dialog box. If the feature *is* enabled, the IPL file is locked to modification through the **Configure Addresses - “Active”** dialog box.

- **Code Page**—Consider the language required for the port name display that displays on the HAFM Server. Language support is provided through character set 697 for all Extended Binary-Coded Decimal Interchange Code (EBCDIC) pages.

When planning the installation, select the EBCDIC code page for displaying host-assigned port names or the CUP name. As an example, if the code page for Italy is selected and a port name is assigned in Italian by the host management program, then the Italian language port name will display in the Product Manager.

This field lists the code pages that are available for configuration. The default code page is United States/Canada 00037. Refer to the following table for other code pages:

**Table 6–1: Available Code Pages**

Code Page Name	Code Page	Hexadecimal CPGID
United States/Canada	00037	0025
Germany/Austria	00273	0111
—	00275	0113
Italy	00280	0118
Japan	00281	0119
Spain/Latin America	00284	011C
United Kingdom	00285	011D
France	00297	0129
International #5	00500	01F4

To configure FICON management server, use the following steps:

1. Choose **Configure > Management Server** from the **Product Manager** window. The **Configure FICON Management Server** dialog box displays, as shown in [Figure 6–1](#).



**Figure 6–1: Configure FICON Management Server dialog box**

2. Enable or disable the management server when you click **Enable Management Server** check box. (To disable the management server, click the check box again to remove the check mark.)
3. Enable or disable switch clock alert mode when you click the **Director Clock Alert Mode** check box. When a check mark displays, the alert mode is enabled.
4. Allow or prohibit host control when you click the check box in the **Host Control Prohibited** field. When a check mark displays, host control is prohibited.
5. Allow or prohibit offline state control when you click the check box in the **Programmed offline state control** field. When a check mark displays, programmed control of the offline state is allowed.
6. Enable or disable Active=Saved mode when you click the check box in the **Active=Saved** field. When a check mark displays, the Active=Saved mode is enabled.
7. If necessary, select a code page from the **Code Page** drop-down list.
8. Click **Activate** to activate changes and close the dialog box.
9. If you are finished configuring the switch, back up the configuration data.

## Open Systems Management Server

The Open System Management Server (OSMS) is a keyed feature that allows host control and inband management of the director or switch through a management application that resides on an open-systems interconnection (OSI) device. This device is attached to a director or switch port. The device communicates with the switch or director through Fibre Channel common transport (FC-CT) protocol.



## Installation

To install and enable this option, choose the **Configure Feature Key** option under the Product Manager's **Configure** menu.

## Configuring the Open Systems Management Server

Use these procedures to configure the open systems inband management program to function with the switch.

The optional Open Systems Management Server feature must be installed in order to perform this procedure.

To configure open systems management server, use the following steps:

1. Choose **Configure > Management Server** from the **Product Manager** window. The **Configure Open Systems Management Server** dialog box displays, as shown in [Figure 6–2](#).



**Figure 6–2: Configure Open Systems Management Server dialog box**

2. Enable the management server when you click the **Enable Management Server** check box. (To disable the management server, click the check box again to remove the check mark.)
3. Click the check box in the **Host Control Prohibited** field to display a check mark and to prohibit the host management program from changing configuration and connectivity parameters on the switch. In this case, the host program has read-only access to configuration and connectivity parameters. Click the check box when it contains a check mark removes the check mark and allows a host program to change configuration and connectivity parameters on the switch.
4. To activate changes and close the dialog box, click **Activate**.
5. If you are finished configuring the switch, you can back up the configuration data.

## SANtegrity Features

SANtegrity includes a set of features that enhance security in SANs (Storage Area Networks) that contain a large and mixed group of fabrics and attached devices. Through these features you can allow or prohibit switch attachment to fabrics and device attachment to switches. These features are enabled by purchasing a feature key, then enabling the key through the **Configure Feature Key** dialog box.

SANtegrity features include:

- Fabric Binding
- Switch Binding

**Enterprise Fabric Mode** - Although this is not a keyed feature, the SANtegrity Fabric Binding and Switch Binding must be installed before you can use Enterprise Fabric Mode function through the **HAFM Fabrics** menu.

## Fabric Binding

This feature is managed through the Fabric Binding option, available through the **Fabrics** menu in HAFM when the **Fabrics** tab is selected. Using Fabric Binding, you can allow specific switches to attach to specific fabrics in the SAN. This provides security from accidental fabric merges and potential fabric disruption when fabrics become segmented because they cannot merge.

## Enable/Disable and Online State Functions

In order for Fabric Binding to function, specific operating parameters and optional features must be enabled. Also, there are specific requirements for disabling these parameters and features when the director or switch is offline or online. Be aware of the following:

- Because switches are bound to a fabric by World Wide Name (WWN) and domain ID, the Insistent Domain ID option in the **Configure Switch Parameters** dialog box is automatically enabled if Fabric Binding is enabled. You cannot disable Insistent Domain ID while Fabric Binding is active and the switch is online.
- If Fabric Binding is enabled and the switch is online, you cannot disable Insistent Domain ID.
- If Fabric Binding is enabled and the director or switch is offline, you can disable Insistent Domain ID, but this will disable Fabric Binding.

- You cannot disable Fabric Binding or Switch Binding if Enterprise Fabric Mode is enabled. However, if Enterprise Fabric Mode is disabled, you can disable Fabric Binding, Switch Binding, or both.

## Switch Binding

This feature is managed through the **Switch Binding** submenu options available on the Product Manager **Configure** menu. Using **Switch Binding**, you can specify devices and switches that can attach to director and switch ports. This provides security in environments that include a large number of devices by ensuring that only the intended set of devices attach to a switch or director.

### Configuring Switch Binding—Overview

To configure switch binding, you must first activate the feature using the **Switch Binding State Change** dialog box while selecting the type of port where you want to restrict connection (connection policy). Possible selections are E\_Ports, F\_Ports, or all types.

If the director or switch is online, activating switch binding populates the Membership List in the **Switch Binding - Membership List** dialog box (Product Manager) with the following WWNs currently connected to the director or switch, depending on the connection policy set in the **State Change** dialog box:

- WWNs of devices connected to F\_Ports (F\_Port connection policy). The WWN is the WWN of the attached device's port.
- WWNs of switches connected to E\_Ports (E\_Port connection policy). The WWN is the WWN of the attached switch.
- WWNs of devices connected to F\_Ports and switches connected to E\_Ports (all-ports connection policy).

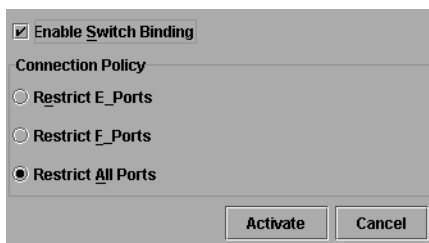
### Notes

- When the Switch Binding feature is first installed and has not been enabled, the Switch Membership List is empty. When you enable Switch Binding, the Membership List is populated with WWNs of devices, switches, or both that are currently connected to the switch.
- If the switch is offline and you activate switch binding, the Membership List is not automatically populated.
- Edits to the Switch Binding Membership list will be maintained when you enable or disable Switch Binding.

After enabling Switch Binding, you prohibit devices and/or switches from connecting with director or switch ports by removing them from the Membership List in the **Switch Binding Membership List** dialog box. You allow connections by adding them to the Membership List. You can also add detached nodes and switches.

## Enable/Disable Switch Binding

1. Choose the **Configure > Switch Binding > Change State** from the **Product Manager** window. The **Switch Binding State Change** dialog box displays, as shown in [Figure 6–3](#).



**Figure 6–3: Switch Binding State Change dialog box**

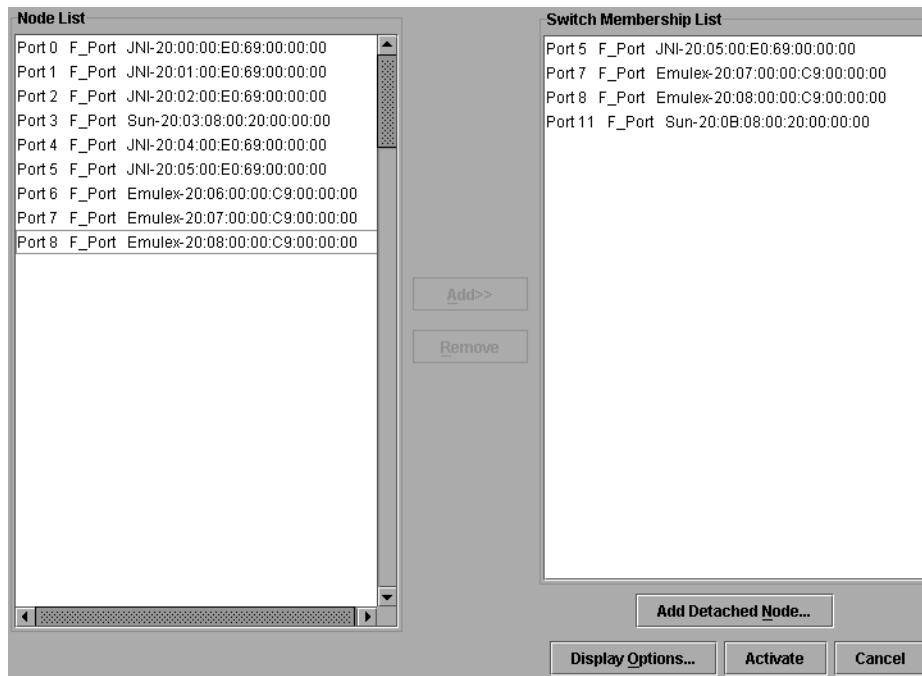
2. Perform one of the following steps:
  - To disable Switch Binding (a check mark displays in the **Enable Switch Binding** check box), click the **Enable Switch Binding** check box to remove the check mark, then click **Activate**.
  - To enable Switch Binding (check mark is not in the **Enable Switch Binding** check box), click the **Enable Switch Binding** check box to add a check mark. Go on to step 3 to set the Connection Policy.
3. Click one of the **Connection Policy** options.
  - **Restrict E\_Ports**. Select if you want to restrict connections from specific switches to switch E\_Ports. Switch WWNs can be added to the Switch Membership List to allow connection and removed from the Membership List to prohibit connection. Devices are allowed to connect to any F\_Port.
  - **Restrict F\_Ports**. Select if you want to restrict connections from specific devices to switch F\_Ports. Device WWNs can be added to the Switch Membership List to allow connection and removed from the Membership List to prohibit connection. Switches are allowed to connect to any E\_Port.

- **Restrict All.** Select if you want to restrict connections from specific devices to switch F\_Ports and switches to switch E\_Ports. Device and switch WWNs can be added to the Switch Membership List to allow connection and removed from the Membership List to prohibit connection.
4. Click **Activate** to enable the changes and close the dialog box.
  5. Edit the Switch Membership List through the **Switch Binding Membership List** dialog box to add or remove switches and devices that are allowed to connect with the switch.

## Editing the Switch Membership List

1. Choose the **Configure > Switch Binding > Edit Membership List** from the **Product Manager** window. The **Switch Binding Membership List** dialog box displays, as shown in [Figure 6–4](#).

The WWNs of devices and/or switches that can currently connect to switch ports are listed in the **Switch Membership List** panel.



**Figure 6–4: Switch Binding Membership List dialog box**

Refer to “[Configuring Switch Binding—Overview](#)” on [page 6–7](#) for information on how the Switch Membership List is populated with WWNs according to options set in the **Switch Binding State Change** dialog box.

2. If nicknames are configured for WWNs through HAFM and you want these to display instead of WWNs in this dialog box, click **Display Options**. The **Display Options** dialog box displays.
3. Click **Nickname**, then click **OK**.
4. To prohibit connection to a switch port from a WWN currently in the Membership List, click the WWN or nickname in the **Membership List**, then click **Remove**. The WWN or nickname will move to the **Node List** panel. WWNs can only be removed from the fabric if any of the following is true:
  - The switch is offline.
  - Switch Binding is disabled.
  - The switch or device with the WWN is not connected to the switch.
  - Switch Binding is not enabled for the same port type as enabled for the Connection Policy in the **Switch Binding State Change** dialog box. For example, a WWN for a switch attached to an E\_Port can be removed if the Switch Binding Connection Policy was enabled to Restrict F\_Ports.
  - The switch or device with the WWN is connected to a port that is blocked.
  - The switch or device with the WWN is not currently connected to the switch (detached node).
5. WWNs can be added to the **Switch Membership List** (and thereby allowed connection) when Switch Binding is either enabled or disabled. To allow connection to a switch port from a WWN in the **Node List** panel, select the WWN or nickname in the **Node List** panel, then click the **Add** button. The WWN or nickname will move to the **Membership List** panel.
6. To add a WWN for a device or switch not currently connected to the switch, click **Detached Node**. The **Add Detached Node** dialog box displays.
7. Enter the appropriate WWN or nickname (if configured through HAFM) and click **OK**. The WWN or nickname displays in the **Switch Membership List**.
8. Click **Activate** to enable the changes and close the dialog box.

## Enable/Disable and Online State Functions

In order for Switch Binding to function, specific operating parameters and optional features must be enabled. Also, there are specific requirements for disabling these parameters and features when the director or switch is offline or online. Be aware of the following:

- Switch Binding can be enabled or disabled whether the switch is offline or online.
- Enabling Enterprise Fabric Mode automatically enables Switch Binding.
- You cannot disable Switch Binding if Enterprise Fabric Mode is enabled.
- If Enterprise Fabric Mode is enabled and the director or switch is online, you cannot disable Switch Binding. However, if Enterprise Fabric Mode is disabled, you can disable Fabric Binding, Switch Binding, or both.
- If Enterprise Fabric Mode is enabled and the director or switch is offline you can disable Switch Binding, but Enterprise Fabric Mode will also disable.
- WWNs can be added to the Switch Membership List when Switch Binding is enabled or disabled.
- WWNs can only be removed from the Switch Membership List if any of the following are true:
  - The director or switch is offline.
  - Switch Binding is disabled.
  - The switch or device with the WWN is not connected to the director or switch.
  - Switch Binding is not enabled for the same port type as enabled for the Connection Policy in the **Switch Binding State Change** dialog box. For example, a WWN for a switch attached to an E\_Port can be removed if Switch Binding Connection Policy was enabled to Restrict F\_Ports.
  - The switch or device with the WWN is connected to a port that is blocked.
  - The switch or device with the WWN is not currently connected to the director or switch (detached node).
- If the director or switch is online and Switch Binding is not enabled, all nodes and switches attached to the director or switch are automatically added to the Switch Membership List.

## Zoning with Switch Binding Enabled

Note that SANtegrity has no effect on existing zoning configurations. However, note that if a device WWN is in a specific zone, but the WWN is not in the Switch Membership List, the device cannot log in to the director or switch port and cannot connect to other devices in the zone with Switch Binding enabled.

## Enterprise Fabric Mode

**Enterprise Fabric Mode** is an option available on the **Fabrics** menu in the *HAFM* application if the SANtegrity feature key is installed. This option automatically enables the following features and operating parameters that are necessary in multiswitch Enterprise Fabric environments. Note that there are specific requirements for disabling these parameters and features when the director or switch is offline or online.

### Features and Parameters Enabled

#### Fabric Binding

This is a SANtegrity feature enabled through the **Fabrics** menu in HAFM that allows or prohibits switches and directors from merging with a selected fabric. Refer to [“Enable/Disable and Online State Functions on page 6-6](#) for details on enabling/disabling Fabric Binding with Enterprise Fabric Mode enabled.

#### Switch Binding

This is a SANtegrity feature enabled through the **Configure** menu in the Product Manager that allows or prohibits switches and/or directors from connecting to switch E\_Ports, devices from connecting to F\_Ports. Refer to [“Enable/Disable and Online State Functions on page 6-11](#) for details on enabling/disabling Switch Binding with Enterprise Fabric Mode enabled.

#### Rerouting Delay

Rerouting delay is a parameter in the **Configure Switch Parameters** dialog box, available from **Configure** menu in the Product Manager application.

Rerouting Delay ensures that frames are delivered through the fabric in order to their destination. If there is a change to the fabric topology that creates a new path (for example, a new switch is added to the fabric), frames may be routed over this new path if its hop count is less than a previous path with a minimum hop count. This may result in frames being delivered to a destination out of order since frames sent over the new,



shorter path may arrive ahead of older frames still in route over the older path. If Rerouting Delay is enabled, traffic ceases in the fabric for the time specified in the E\_D\_TOV field of the **Configure Fabric Parameters** dialog box (**Configure** menu). This delay enables frames sent on the old path to exit to their destination before new frames begin traversing the new path.

If Enterprise Fabric Mode is enabled, this option is automatically enabled and cannot be disabled unless the director or switch is offline. In this case, disabling Rerouting Delay also disables Enterprise Fabric Mode.

## Domain RSCNs

This is a parameter in the **Configure Switch Parameters** dialog box, available from **Configure** menu in the *Product Manager* application. Domain register for state change notifications (domain RSCNs) are sent between end devices in a fabric to provide additional connection information to host bus adapters and storage devices. As an example, this information might be that a logical path has been broken because of a physical event, such as a fiber optic cable being disconnected from a port.

If Enterprise Fabric Mode is enabled, this parameter is automatically enabled and cannot be disabled unless the director or switch is offline. In this case, disabling Domain RSCNs also disables Enterprise Fabric Mode.

## Insistent Domain Identification (ID)

This is a parameter in the **Configure Switch Parameters** dialog box, available from **Configure** menu in the *Product Manager* application. Enabling this option sets the domain ID configured in the **Preferred Domain ID** field in the **Configure Switch Parameters** dialog box as the active domain identification when the fabric initializes. A static and unique domain identification is required by the Fabric Binding feature because the feature's Fabric Membership list identifies switches by WWN and Domain ID. If a duplicate preferred domain ID is used, then insisted, warnings occur when directors and switches are added to a Fabric Membership List.

If Fabric Binding or Enterprise Fabric Mode is enabled, this option is automatically enabled and cannot be disabled unless these options are disabled when the director or switch is offline. If the director or switch is online, disabling Insistent Domain ID will disable Enterprise Fabric Mode and Fabric Binding.



---

## Information and Error Messages

This appendix lists information and error messages in alphabetical order that display in pop-up message boxes from the HP StorageWorks Director 2/64 *Product Manager* application.

If you do not find an error message in this list, review the *hp StorageWorks ha-fabric manager user guide*.

The text of each message is followed by a description and recommended course of action.

### StorageWorks Director 2/64 Product Manager Messages

This section lists StorageWorks Director 2/64 Product Manager information and error messages in alphabetical order.

**Table A-1: Product Manager Messages**

Message	Description	Action
<b>A Product Manager instance is already open.</b>	Only one instance of the <i>Product Manager</i> application can be open at one time.	Close the open <i>Product Manager</i> application so the desired instance of the <i>Product Manager</i> application can be opened.
<b>Activating this configuration will overwrite the current configuration.</b>	Confirmation to activate a new address configuration.	Click <b>Yes</b> to confirm activating the new address configuration or <b>No</b> to cancel the operation.

**Table A–1: Product Manager Messages (Continued)**

<b>Message</b>	<b>Description</b>	<b>Action</b>
<b>All configuration names must be unique.</b>	All address configurations must be saved with unique names.	Save the configuration with a different name that is unique to all saved configurations.
<b>All FPM ports will be held inactive while the director is configured to 2 Gb/sec speed. Do you want to continue?</b>	Occurs when FPM cards are installed in the director and director speed is being set to 2 Gb/sec in the <b>Configure Operating Parameters</b> dialog box.	Replace FPM cards with UPM cards (UPM cards operate at 1 and 2 Gb/sec) or set the director speed to 1 Gb/sec.
<b>All port names must be unique.</b>	A duplicate Fibre Channel port name was configured. All port names must be unique.	Reconfigure the Fibre Channel port with a unique name.
<b>Another Product Manager is currently performing a firmware install.</b>	Only one instance of the <i>Product Manager</i> 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.
<b>Are you sure you want to delete firmware version?</b>	This message requests confirmation to delete a firmware version. Firmware library can store up to 8 firmware versions.	Click <b>Yes</b> to delete the firmware version or <b>No</b> to abort the operation.

Table A–1: Product Manager Messages (Continued)

Message	Description	Action
<b>Are you sure you want to send firmware version?</b>	This message requests confirmation to send a firmware version from the HAFM server's firmware library to the director. Firmware library can store up to 8 firmware versions.	Click <b>Yes</b> to send the firmware version or <b>No</b> to abort the operation.
<b>Cannot change Port Type while in S/390 mode without SANtegrity feature. Please contact your sales representative.</b>	User attempted to change a port type in the <b>Configure Ports</b> dialog box while in S/390 mode, but the optional SANtegrity feature is not installed.	Informational message. Install SANtegrity before changing port types in the <b>Configure Ports</b> dialog box while in S/390 operating mode.
<b>Cannot disable Switch Binding while Enterprise Fabric Mode is active and the switch is Online.</b>	User attempted to disable switch binding through the <b>Switch Binding Change State</b> dialog box, but Enterprise Fabric Mode is enabled.	You must either disable Enterprise Fabric Mode using the <b>Enterprise Fabric Mode</b> dialog box in the <i>HAFM</i> application or set the switch offline before you can disable Switch Binding.
<b>Cannot disable Insistent Domain ID while Fabric Binding is active.</b>	User attempted to disable the <b>Insistent Domain ID</b> parameter through the <b>Configure Switch Parameters</b> dialog box, but Fabric Binding is enabled.	Disable Fabric Binding through the <b>Fabric Binding</b> dialog box before disabling these parameters.
<b>Cannot enable beaconing on a failed FRU.</b>	Occurs when selecting <b>Enable Beaconing</b> option for a failed FRU.	Replace FRU and enable beaconing again or enable beaconing on operating FRU.

Table A–1: Product Manager Messages (Continued)

Message	Description	Action
<b>Cannot enable beaconing while the system light is on.</b>	Occurs when choosing <b>Enable Beaconing</b> option for a failed FRU.	Replace FRU and enable beaconing again or enable beaconing on an operating FRU.
<b>Cannot have E-Ports in S/390 mode unless SANtegrity feature is installed. Please contact your sales representative.</b>	User attempted to change operating mode from Open Systems to S/390 mode with E_Ports configured, but SANtegrity is not installed.	Informational message. If you install SANtegrity before changing to S/390 mode, then E_Ports will remain as E_Ports when you change to S/390 mode. If SANtegrity is not installed, setting a director to S/390 mode will change all E_ports to G_Ports.
<b>Cannot have spaces in field.</b>	Spaces are not allowed as part of the entry for this field.	Delete spaces from the field entry.
<b>Cannot install firmware to a director with a failed CTP card.</b>	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.
<b>Cannot modify director/switch speed. Ports cannot be configured at a higher data rate than the director/speed.</b>	Port speeds cannot be configured at a higher data rate than the director speed. This message displays when you set director speed to 1 GB/sec through the <b>Configure Operation Parameters</b> dialog box and at least one of the ports is running at 2 Gb/sec.	Either return the director speed to 2 Gb/sec or configure all port data speeds to 1 Gb/sec through the <b>Configure Ports</b> dialog box.

Table A-1: Product Manager Messages (Continued)

Message	Description	Action
<b>Cannot perform this operation while the director is offline.</b>	This operation cannot take place while the director is offline.	Configure the director offline through the <b>Set Offline State</b> dialog box and then retry the operation.
<b>Cannot retrieve current SNMP configuration.</b>	The director SNMP configuration cannot be retrieved by the <i>Product Manager</i> application because the Ethernet link is down or busy.	Retry the operation later. If the condition persists, contact the next level of support.
<b>Cannot retrieve diagnostics results.</b>	<b>Director diagnostic results</b> cannot be retrieved by the <i>Product Manager</i> application because the Ethernet link is down or busy.	Retry the operation later. If the condition persists, contact the next level of support.
<b>Cannot retrieve director date and time.</b>	The director date and time cannot be retrieved by the <i>Product Manager</i> application because the Ethernet link is down or busy.	Retry the operation later. If the condition persists, contact the next level of support.
<b>Cannot retrieve director state.</b>	The director state cannot be retrieved by the <i>Product Manager</i> 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-1: Product Manager Messages (Continued)**

<b>Message</b>	<b>Description</b>	<b>Action</b>
<b>Cannot retrieve port configuration.</b>	The port configuration cannot be retrieved by the <i>Product Manager</i> application because the Ethernet link is down or busy.	Retry the operation later. If the condition persists, contact the next level of support.
<b>Cannot retrieve information for port.</b>	Port information cannot be retrieved by the <i>Product Manager</i> application because the Ethernet link is down or busy.	Retry the operation later. If the condition persists, contact the next level of support.
<b>Cannot retrieve port statistics.</b>	Port statistics cannot be retrieved by the <i>Product Manager</i> application because the Ethernet link is down or busy.	Retry the operation later. If the condition persists, contact the next level of support.
<b>Cannot run diagnostics on a port that is failed.</b>	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.
<b>Cannot run diagnostics on an active E-port.</b>	Port diagnostics cannot be performed on an active E-port.	Run diagnostics on an E-port only when it is not active.



Table A-1: Product Manager Messages (Continued)

Message	Description	Action
<b>Cannot run diagnostics on a port that is not installed.</b>	Port diagnostics cannot be performed on a port card that is not installed.	Run diagnostics only on a port that is installed.
<b>Cannot run diagnostics on a port card that is not installed.</b>	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.
<b>Cannot run diagnostics while a device is logged-in to the port.</b>	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.
<b>Cannot save IPL configuration while active=saved is enabled.</b>	The user cannot save the IPL file while the active=saved property is set.	The FICON management server property, active=save, must be disabled for HAFM to save the IPL file.
<b>Cannot save port configuration.</b>	The port configuration cannot be saved at the <i>Product Manager</i> application because the Ethernet link is down or busy.	Retry the operation later. If the condition persists, contact the next level of support.
<b>Cannot save SNMP configuration.</b>	The director SNMP configuration cannot be saved at the <i>Product Manager</i> 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-1: Product Manager Messages (Continued)

Message	Description	Action
<b>Cannot set all ports to 1 Gb/sec due to speed restriction on some ports.</b>	Displays if you try to set ports to operate at 1 Gb/sec data speed through the <b>Configure Ports</b> dialog box and some ports do not support speed configuration.	Replace ports that do not support speed configuration with those that do support more than one configuration.
<b>Cannot set all ports to 2 Gb/sec due to speed restriction on some ports.</b>	Displays if you try to set ports to operate at 2 Gb/sec data speed through the <b>Configure Ports</b> dialog box and some ports do not support speed configuration.	Replace ports that do not support speed configuration with those that do support more than one configuration.
<b>Cannot set all ports to Negotiate due to port speed restriction on some ports.</b>	Displays if you try to set all ports to <b>Negotiate</b> through the <b>Configure Ports</b> dialog box and some ports do not support speed configuration.	Replace ports that do not support speed configuration with those that do support more than one speed configuration.
<b>Cannot set director state.</b>	The director state cannot be set at the <i>Product Manager</i> application because the Ethernet link is down or busy.	Retry the operation later. If the condition persists, contact the next level of support.
<b>Cannot set Fibre Channel parameters.</b>	Fibre Channel parameters for the director cannot be set at the <i>Product Manager</i> 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-1: Product Manager Messages (Continued)

Message	Description	Action
<b>Cannot set switch date and time.</b>	The switch date and time cannot be set at the <i>Product Manager</i> application because the Ethernet link is down or busy.	Retry the operation later. If the condition persists, contact the next level of support.
<b>Cannot set switch state.</b>	The switch state cannot be set at the <i>Product Manager</i> application because the Ethernet link is down or busy.	Retry the operation later. If the condition persists, contact the next level of support.
<b>Cannot set write authorization without defining a community name.</b>	A community name was not defined in the <b>Configure SNMP</b> dialog box for the write authorization selected.	Provide a name in the name field where write authorization is checked.
<b>Cannot start data collection.</b>	The data collection procedure cannot be started by the <i>Product Manager</i> application because the Ethernet link is down or busy.	Retry the operation later. If the condition persists, contact the next level of support.
<b>Cannot start firmware install while CTP synchronization is in progress.</b>	The director's CTP cards are synchronizing and firmware cannot be installed until synchronization is complete.	Install the firmware after CTP card synchronization completes.

Table A-1: Product Manager Messages (Continued)

Message	Description	Action
<b>Cannot start port diagnostics.</b>	Port diagnostics cannot be started at the <i>Product Manager</i> application because the Ethernet link is down or busy.	Retry the operation later. If the condition persists, contact the next level of support.
<b>Cannot swap an uninstalled port.</b>	A port swap cannot be performed when the port card is not installed.	Perform a swap only on a port that is installed.
<b>Click OK to remove all contents from log.</b>	This action deletes all contents from the selected log.	Click <b>OK</b> to delete the log contents or click <b>Cancel</b> to cancel the operation.
<b>Connection to HAFM server lost. Click OK to exit application.</b>	The <i>HAFM</i> application at a remote workstation lost the network connection to the HAFM server.	Start the <i>HAFM</i> application to connect to the HAFM server.
<b>Continuing may overwrite host programming. Continue?</b>	Configurations sent from the host may be overwritten by HAFM.	Continuing will activate the current configuration, which may have been configured by an S/390 host.
<b>Could not export log to file.</b>	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.	Ensure file name and drive are correct.
<b>Could not find firmware file.</b>	Firmware file selected was not found in the FTP directory. Or, the selected file is not a firmware file.	Ensure file name and directory are correct. Or, obtain a valid firmware file from your service representative.

Table A-1: Product Manager Messages (Continued)

Message	Description	Action
<b>Could not remove dump files from server.</b>	Dump files could not be deleted from the HAFM server because the link may be down or the notebook PC or <i>Product Manager</i> application is busy.	Retry the operation later. If the condition persists, contact the next level of support.
<b>Could not stop port diagnostics.</b>	Port diagnostics could not be stopped by the <i>Product Manager</i> 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.
<b>Could not write firmware to flash.</b>	A firmware version could not be written from the HAFM server to FLASH memory on the director's CTP card.	Retry the operation again. If the condition persists, contact the next level of support.
<b>CUP name and port name are identical</b>	Within the address configuration, one or more of the port names are the same as the CUP name.	Make sure all names are unique for the ports and CUP name.
<b>Date entered is invalid.</b>	The date is entered incorrectly at the <b>Configure Date and Time</b> dialog box. Individual field entries may be correct, but the overall date is invalid (for example, a day entry of <b>31</b> for a 30-day month).	Verify each entry is valid and consistent.

Table A-1: Product Manager Messages (Continued)

Message	Description	Action
<b>Device applications should be terminated before starting diagnostics. Press NEXT to continue.</b>	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.
<b>[device WWN] cannot be removed from the Switch Membership List while participating in Switch Binding. The device must be isolated from the switch, or Switch Binding deactivated before it can be removed.</b>	User attempted to remove a device WWN from the <b>Switch Membership List</b> (SANtegrity feature) while Switch Binding is enabled.	Remove the device from the switch by blocking the port, setting the switch offline, or disabling Switch Binding through the <b>Switch Binding Change State</b> dialog box before removing devices from the <b>Switch Membership List</b> .
<b>Director clock alert mode must be cleared before enabling period synchronization.</b>	Clock alert mode is enabled through the <b>Configure FICON Management Server</b> dialog box and user is attempting to enable <b>Periodic Date/Time Synchronization</b> through the <b>Configure Date and Time</b> dialog box.	Disable clock alert mode through the <b>Configure FICON Management Server</b> dialog box.

Table A-1: Product Manager Messages (Continued)

Message	Description	Action
<b>Director must be offline to configure.</b>	Clock alert mode is enabled through the <b>Configure FICON Management Server</b> dialog box and user is attempting to enable <b>Periodic Date/Time Synchronization</b> through the <b>Configure Date and Time</b> dialog box.	Disable clock alert mode through the <b>Configure FICON Management Server</b> dialog box.
<b>Disabling Insistent Domain ID will disable Fabric Binding. Do you want to continue?</b>	Fabric Binding is enabled through HAFM and user attempted to disable Insistent Domain ID in the <b>Configure Switch Parameters</b> dialog box.	Click <b>Yes</b> if you want to continue and disable Fabric Binding.
<b>Disabling Switch Binding will disable Enterprise Fabric Mode. Do you want to continue?</b>	User attempted to disable Switch Binding through the <b>Switch Binding State Change</b> dialog box, but Enterprise Fabric Mode is enabled.	Disable Enterprise Fabric Mode through the <b>Enterprise Fabric Mode</b> dialog box before disabling Switch Binding.
<b>Do you want to continue with IPL?</b>	This message requests confirmation to initial program load (IPL) the director.	Click <b>Yes</b> to IPL the director or <b>Cancel</b> to cancel the operation.
<b>Duplicate Community names require identical write authorizations.</b>	Duplicate community names are entered at the <b>Configure SNMP</b> dialog box, and have different write authorizations.	Delete the duplicate community name or make the write authorizations consistent.

Table A–1: Product Manager Messages (Continued)

Message	Description	Action
<b>Enterprise Fabric Mode will be disabled if any of the following parameters are disabled: Insistent Domain ID, Rerouting Delay, Domain RSCNs. Do you want to continue?</b>	User attempted to disable these parameters in the <b>Configure Switch Parameters</b> dialog box while the switch was online, but Enterprise Fabric Mode (SANtegrity feature) is enabled.	Click <b>Yes</b> if you want to continue, and disable Enterprise Fabric Mode.
<b>Error retrieving port information.</b>	An error occurred at the <i>Product Manager</i> 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.
<b>Error retrieving port statistics.</b>	An error occurred at the <i>Product Manager</i> 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.
<b>Error stopping port diagnostics.</b>	An error occurred at the <i>Product Manager</i> application while attempting to stop port diagnostics from running because the Ethernet link is down or busy.	Retry the operation later. If the condition persists, contact the next level of support.



Table A–1: Product Manager Messages (Continued)

Message	Description	Action
<b>Error transferring files &lt; message &gt;.</b>	An error occurred while transferring files from the PC hard drive to the <i>Product Manager</i> application. The message varies, depending on the problem.	Try the file transfer operation again. If the problem persists, contact the next level of support.
<b>Field cannot be blank.</b>	The data field requires an entry and cannot be left blank.	Enter appropriate information in the data field.
<b>File transfer aborted.</b>	The user aborted the file transfer process.	Verify the file transfer is to be aborted, then click <b>OK</b> to continue.
<b>File transfer is in progress.</b>	A firmware file is being transferred from the HAFM server hard drive, or a data collection file is being transferred to a diskette.	Informational message only—no action is required.
<b>File transfer is in progress.</b>	A firmware file is being transferred from the HAFM server hard drive, or a data collection file is being transferred to a diskette.	Informational message only—no action is required.
<b>Firmware download timed out.</b>	The director did not respond in the time allowed. The status of the firmware install operation is unknown.	Retry the operation. If the problem persists, contact the next level of support.

**Table A–1: Product Manager Messages (Continued)**

Message	Description	Action
<b>Firmware file I/O error.</b>	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.
<b>Firmware file not found.</b>	The firmware version is not installed (or was deleted) from the firmware library at the HAFM server.	Add the firmware version to the library and retry the operation.
<b>Incompatible configuration between operating mode and management server.</b>	The user has selected the open systems operating mode, but has the FICON Management Server feature installed, and is attempting to activate the operating mode.	User needs to install Open Systems Management Server or choose the S/390 operating mode.
<b>Incorrect product type.</b>	When configuring a new product through the <b>New Product</b> dialog box, an incorrect product was specified.	Choose the correct product type for the product with the network address.

Table A-1: Product Manager Messages (Continued)

Message	Description	Action
<b>Installing this feature key, while online, will cause an IPL operation on the switch and a momentary loss of LAN connection. This operation is non-disruptive to the Fibre Channel traffic. Do you wish to continue installing this feature key?</b>	If the switch is online, installing the new feature key will cause an internal program load (IPL). The LAN connection to the HAFM server will be lost momentarily, but Fibre Channel traffic will not be affected.	Click <b>Yes</b> to install the feature key or <b>No</b> to not install.
<b>Internal file transfer error received from director.</b>	The director detected an internal file transfer error.	Retry the operation. If the problem persists, contact the next level of support.
<b>Invalid character in field.</b>	An invalid character was entered in the data field.	Remove invalid characters from the entry.
<b>Invalid configuration name.</b>	Attempted to save an address configuration name with an invalid name.	Use up to 24 alphanumeric characters, including spaces, hyphens, and underscores.
<b>Invalid feature key.</b>	The feature key was not recognized.	Re-enter the feature key noting the key is case sensitive and to include the dashes.
<b>Invalid firmware file.</b>	The file selected for firmware download is not a firmware version file.	Choose the correct firmware version file and retry the operation.

**Table A-1: Product Manager Messages (Continued)**

<b>Message</b>	<b>Description</b>	<b>Action</b>
<b>Invalid HAFM server address.</b>	The IP address specified for the HAFM server is unknown to the domain name server (invalid).	Verify and enter a valid HAFM server IP address.
<b>Invalid network address.</b>	The IP address specified for the product is unknown to the domain name server (invalid).	Verify and enter a valid product IP address.
<b>Invalid port address.</b>	Invalid port address has been entered.	Verify port address through the <b>Configure Addresses - "Active"</b> dialog box (S/390 mode only) and re-enter.
<b>Invalid port number.</b>	The port number must be within a range of ports for the specific director model	Enter a port number within the correct range.
<b>Invalid port number. Valid ports are (0 - 63).</b>	Director 2/64 only. The Fibre Channel number entered is invalid. The port number must be an integer from <b>0</b> through <b>63</b> inclusive.	Verify and enter a valid port number.

Table A-1: Product Manager Messages (Continued)

Message	Description	Action
<b>Invalid port number. Valid ports are (0 - 127, 132-143).</b>	Director 2/140 only. Port number must be within the range of ports for the specific director model. For this model, the valid port numbers are 0 - 127 and 132-143. Ports 128-131 are not valid because they are internal ports and cannot be connected to external fiber optic cables.	Enter a port number within the correct range.
<b>Invalid port swap.</b>	Port swap selection is not allowed.	Ensure that each port selected for swap has not been previously swapped.
<b>Invalid response received from director.</b>	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.
<b>Invalid serial number for this feature key.</b>	The serial number and the feature key did not match.	Ensure that the feature key being installed is specifically for this director serial number.
<b>Invalid UDP port number.</b>	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 from 1 through 65535.

Table A-1: Product Manager Messages (Continued)

Message	Description	Action
<b>Invalid value for BB_Credit.</b>	At the <b>Configure Operating Parameters</b> dialog box, the buffer-to-buffer credit ( <b>BB_Credit</b> ) value must be an integer from <b>1</b> through <b>60</b> inclusive.	Verify and enter a valid number between <b>1</b> through <b>60</b> .
<b>Invalid value for day (1 - 31).</b>	At the <b>Configure Date and Time</b> dialog box, the <b>DD</b> value (day) must be an integer from <b>1</b> through <b>31</b> inclusive.	Verify and enter a valid date.
<b>Invalid value for E_D_TOV.</b>	At the <b>Configure Operating Parameters</b> dialog box, the error detect time-out value ( <b>E_D_TOV</b> ) must be an integer from <b>2</b> through <b>600</b> inclusive.	Verify and enter a valid number which must be between <b>2</b> through <b>600</b> .
<b>Invalid value for hour (0 - 23).</b>	At the <b>Configure Date and Time</b> dialog box, the <b>HH</b> value (hour) must be an integer from <b>0</b> through <b>23</b> inclusive.	Verify and enter a valid time.
<b>Invalid value for minute (0 - 59).</b>	At the <b>Configure Date and Time</b> dialog box, the <b>MM</b> value (minute) must be an integer from <b>0</b> through <b>59</b> inclusive.	Verify and enter a valid time.

Table A-1: Product Manager Messages (Continued)

Message	Description	Action
<b>Invalid value for month (1 - 12).</b>	At the <b>Configure Date and Time</b> dialog box, the <b>MM</b> value (month) must be an integer from <b>1</b> through <b>12</b> inclusive.	Verify and enter a valid date.
<b>Invalid value for R_A_TOV.</b>	At the <b>Configure Operating Parameters</b> dialog box, the resource allocation time-out value ( <b>R_A_TOV</b> ) must be an integer from <b>10</b> through <b>1200</b> inclusive.	Verify and enter a valid number which must be between <b>10</b> through <b>1200</b> .
<b>Invalid value for second (0 - 59).</b>	At the <b>Configure Date and Time</b> dialog box, the <b>SS</b> value (second) must be an integer from <b>0</b> through <b>59</b> inclusive.	Verify and enter a valid time.
<b>Invalid value for year.</b>	At the <b>Configure Date and Time</b> dialog box, the <b>YYYY</b> value (year) must be a four-digit value.	Verify and enter a four-digit value for the year.

**Table A-1: Product Manager Messages (Continued)**

<b>Message</b>	<b>Description</b>	<b>Action</b>
<b>Invalid World Wide Name or nickname.</b>	The World Wide Name or nickname that you have specified is invalid. The valid format for the World Wide Name is eight two-digit hexadecimal numbers separated by colons (xx:xx:xx:xx:xx:xx:xx:xx). The valid format for a nickname is non blank characters, up to 32 characters.	Try the operation again using a valid World Wide Name or nickname.
<b>Link dropped.</b>	The HAFM server-to-director Ethernet link was dropped.	Retry the operation. If the condition persists, contact the next level of support.
<b>Log is currently in use.</b>	Access to the log is denied because the log was opened by another instance of the <i>Product Manager</i> application.	Retry the operation later. If the condition persists, contact the next level of support.
<b>Loopback plug(s) must be installed on ports being diagnosed. Press Next to continue.</b>	External loopback diagnostics require an optical loopback plug to be installed.	Ensure that an optical loopback plug is installed in port optical transceiver before running external wrap diagnostic testing.
<b>Maximum number of versions already installed.</b>	The number of firmware versions that can be defined to the <i>HAFM</i> application's firmware library was reached.	Delete an existing firmware version before adding a new version.



Table A-1: Product Manager Messages (Continued)

Message	Description	Action
<b>No file was selected.</b>	Action requires the selection of a file.	Select a file.
<b>No firmware version file was selected.</b>	A file was not selected in the <b>Firmware Library</b> 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.
<b>No firmware versions to delete.</b>	There are no firmware versions in the firmware library to delete, therefore the operation cannot be performed.	Informational message only—no action is required.
<b>Nonredundant director must be offline to install firmware.</b>	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.
<b>Not all of the optical transceivers are installed for this range of ports.</b>	Some ports in the specified range do not have optical transceivers installed.	Use a port range that is valid for the ports installed.
<b>Performing this action will overwrite the date/time on the director.</b>	Warning that occurs when configuring the date and time through the <b>Configure Date and Time</b> 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.

Table A-1: Product Manager Messages (Continued)

Message	Description	Action
<b>Performing this operation will change the current state to Offline.</b>	This message requests confirmation to set the director offline.	Click <b>OK</b> to set the director offline or click <b>Cancel</b> to cancel the operation.
<b>Performing this operation will change the current state to Online.</b>	This message requests confirmation to set the director online.	Click <b>OK</b> to set the director online or click <b>Cancel</b> to cancel the operation.
<b>Periodic Date/Time synchronization must be cleared.</b>	Action cannot be performed because <b>Periodic Date/Time Synchronization</b> option is active.	Click <b>Periodic Date/Time Synchronization</b> check box in <b>Configure Date and Time</b> dialog box ( <b>Configure</b> menu) to clear check mark and disable periodic date/time synchronization.
<b>Port binding was removed from attached devices that are also participating in Switch Binding.</b>	Informational message. User has removed Port Binding from attached devices, but one or more of these devices is still controlled by Fabric Binding.	Review the <b>Switch Binding Membership List</b> to determine if the devices should be members.
<b>Port cannot swap to itself.</b>	Port addresses entered in the <b>Swap Ports</b> dialog box are the same.	Ensure that address in the first and second port address fields are different.
<b>Port diagnostics cannot be performed on an inactive port.</b>	This displays when port diagnostics is run on a port in an inactive state.	Run the diagnostics on an active port.
<b>Port speeds cannot be configured at a higher rate than the director speed.</b>	This displays when you configure a port to 2 Gb/sec and the director speed is set to 1 Gb/sec.	Set the director speed to 2 Gb/sec in the <b>Configure Operating Parameter</b> dialog box.

Table A-1: Product Manager Messages (Continued)

Message	Description	Action
<b>Product Manager error &lt; error number 5001 or 5002 &gt;.</b>	The <i>Product Manager</i> application encountered an internal error ( <b>5001</b> or <b>5002</b> ) and cannot continue operation.	Contact the next level of support to report the problem.
<b>Product Manager instance is currently open.</b>	A Product Manager window is currently open.	Informational message only.
<b>R_A_TOV must be greater than E_D_TOV.</b>	R_A_TOV must be greater than E_D_TOV.	Change one of the values so that R_A_TOV is greater than E_D_TOV
<b>Resource is unavailable.</b>	The specified operation cannot be performed because the product is unavailable.	Verify that the Ethernet connection between the HAFM server and the director is up or available.
<b>SANtegrity Feature not installed. Please contact your sales representative.</b>	The user selected <b>Switch Binding</b> from the <b>Configure</b> menu, but the optional SANtegrity feature is not installed.	Install the SANtegrity key through the <b>Configure Feature Key</b> dialog box before using Switch Binding features.
<b>Send firmware failed.</b>	A firmware download operation failed.	Retry the firmware download operation. If the problem persists, contact the next level of support.
<b>SNMP trap address not defined.</b>	If an SNMP community name is defined, a corresponding SNMP trap recipient address must also be defined.	Enter a corresponding SNMP trap recipient address.

Table A–1: Product Manager Messages (Continued)

Message	Description	Action
<b>Stop diagnostics failed. The test is already running.</b>	Diagnostics for the port was not running and <b>Stop</b> was selected on the <b>Port Diagnostics</b> dialog box. Diagnostics quit for the port for some reason, but the <b>Stop</b> button remains enabled.	Verify port operation. Retry diagnostics for the port and choose <b>Stop</b> from the dialog box. If problem persists, contact the next level of support.
<b>Stop diagnostics failed. The test was not running.</b>	This action failed because the test was not running.	Informational message.
<b>Switch Binding was removed from attached devices that are also participating in Port Binding. Please review the Port Binding Configuration.</b>	The device WWNs were removed from the director's <b>Switch Membership List</b> (SANtegrity Switch Binding feature), but you should note that one or more of these devices still has security control in port binding.	Verify that the security level for each device is as required by reviewing the <b>Bound WWN</b> list in the <b>Configure Ports</b> dialog box.
<b>System diagnostics cannot run. The Operational Status is invalid.</b>	System diagnostics cannot run on switches with failed ports	Replace failed ports.
<b>The add firmware process has been aborted.</b>	The user aborted the process to add a firmware version to the HAFM Server's firmware library.	Verify the firmware addition is to be aborted, then click <b>OK</b> to continue.
<b>The data collection process failed.</b>	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.

Table A-1: Product Manager Messages (Continued)

Message	Description	Action
<b>The data collection process has been aborted.</b>	The user aborted the data collection procedure.	Verify the data collection procedure is to be aborted, then click <b>OK</b> to continue.
<b>The default zone must be disabled to configure.</b>	The message displays when the user attempts to change the operating mode to the open fabric mode and the default zone is enabled.	Disable the default zone and repeat the operation.
<b>The director did not accept the request.</b>	The director cannot perform the requested action.	Retry the operation. If the condition persists, contact the next level of support.
<b>The director did not respond in the time allowed.</b>	While waiting to perform a requested action, the director timed out.	Retry the operation. If the condition persists, contact the next level of support.
<b>The director is busy saving maintenance information.</b>	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.
<b>The director must be offline to configure.</b>	A configuration change was attempted for a configuration requiring offline changes.	Take the appropriate actions to set the director offline before attempting the configuration change.
<b>The Ethernet link dropped.</b>	The Ethernet connection between the HAFM server and the director is down or unavailable.	Establish and verify the network connection.

Table A-1: Product Manager Messages (Continued)

Message	Description	Action
<b>The firmware file is corrupted.</b>	A firmware version file is corrupt.	Contact the next level of support to report the problem.
<b>The firmware version already exists.</b>	This firmware version already exists in HAFM server's firmware library.	Informational message only—no action is required.
<b>The following parameters cannot be disabled while Enterprise Fabric Mode is active: Insistent Domain ID, Rerouting Delay, Domain RSCNs.</b>	User attempted to disable these parameters in the <b>Configure Switch Parameters</b> dialog box while Enterprise Fabric Mode is enabled.	Disable Enterprise Fabric Mode through the <b>Enterprise Fabric Mode</b> dialog box in HAFM, then disable the parameters.
<b>The HAFM server is busy processing a request from another Product Manager.</b>	The HAFM server PC is processing a request from another instance of a <i>Product Manager</i> application, and cannot perform the requested operation.	Wait until the process is completes, then perform the operation again.
<b>The IPL configuration cannot be deleted.</b>	Deletion of the IPL address configuration was attempted and was not allowed.	Cancel the operation.
<b>The link to the director is not available.</b>	The Ethernet connection between the HAFM server and the director is down or unavailable.	Establish and verify the network connection.
<b>The maximum number of address configurations has been reached.</b>	The maximum number of saved address configurations has been reached.	Delete configurations no longer needed to allow new configuration to be saved.

Table A-1: Product Manager Messages (Continued)

Message	Description	Action
<b>This feature is not installed. Please contact your sales representative.</b>	This feature is not supported in this software version.	Contact your sales representative.
<b>The optical transceiver is not installed.</b>	The maximum number of saved address configurations has been reached.	Delete configurations no longer needed to allow new configurations to be saved.
<b>This feature has not been installed. Please contact your sales representative.</b>	Indicator that the feature has not been installed on this switch.	Contact your sales representative to obtain the desired feature.
<b>This feature key does not include all of the features currently installed and cannot be activated while the switch is online.</b>	The feature set currently installed for this system contains features that are not being installed with the new feature key. To activate the new feature key, you must set the switch offline. Activating the new feature set, however, will remove current features not in the new feature set.	Set the switch offline through the <b>Set Online State</b> dialog box, then activate the new feature key using the <b>Configure Feature Key</b> dialog box.
<b>This feature key does not include all of the features currently installed. Do you want to continue with feature key activation?</b>	The feature set currently installed for this system contains features that are not being installed with the new feature key.	Click <b>Yes</b> to activate the feature key and remove current features not in the new feature set or <b>No</b> to cancel.

**Table A-1: Product Manager Messages (Continued)**

Message	Description	Action
<b>Threshold alerts are not supported on firmware earlier than 01.03.00.</b>	Threshold alerts are not supported on firmware earlier than 01.03.00.	Informational message.
<b>Unable to change incompatible firmware release.</b>	The user tried to download a firmware release that is not compatible with the current product configuration.	Refer to the product release notes or contact the next level of support to report the problem.
<b>Unable to save data collection file to destination.</b>	The HAFM 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.
<b>You do not have rights to perform this action.</b>	Configured user rights do not allow this operation to be performed.	Verify user rights with the customer's network administrator and change as required.



---

# Glossary

This glossary defines terms used in this guide or related to this product and is not a comprehensive glossary of computer terms.

The following cross-references are used in this glossary:

*Contrast with.* This refers to a term that has an opposite or substantively different meaning.

*See.* This refers the reader to another keyword or phrase for the same term.

*See also.* This refers the reader to definite additional information contained in another entry.

## **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 multiswitch 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.

## **allowed port connection**

In S/390 mode, this attribute establishes dynamic connectivity capability.

**arbitration**

Process of choosing 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.

**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.

**CHPID**

*See* channel path identifier.

**call-home**

Product feature which requires installation of HP Proactive Service software and enables the HAFM server to automatically transmit system events (failure information) to a HP customer support center. The HP support center server accepts calls from the HAFM 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.

**channel path identifier**

In a channel subsystem, a value assigned to each installed channel path of the system that uniquely identifies that path to the system.

**channel wrap test**

A diagnostic procedure that checks S/390 host-to-director connectivity by returning the output of the host as input. The test is host-initiated, and transmits Fibre Channel frames to a director port. A director port enabled for channel wrapping echoes the frame back to the host.

**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 multiswitch 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 HAFM 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.

**control unit port**

An internal director port on the CTP card that communicates with the attached IBM S/390 or similar processor channels to report error conditions and link initialization.

**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.

**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 Director 2/64 *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 multiswitch 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\_D\_TOV**

*See* error detect time-out value.

**E\_Port**

*See* expansion port.

**Embedded Web Server**

With director firmware Version 1/2 or later installed, 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 Director 2/64 *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 HAFM 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 multswitch fabric. *See also* segmented E\_Port.

**explicit fabric login**

Data field size, supported by an F\_Port, that is agreed upon during fabric login.

**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 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 card**

Each fiber module card provides four Fibre Channel connections through duplex small form factor pluggable (SFP) fiber-optic transceivers. 1 gigabit per second enabled.

**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 fabric element**

Any device linked to a fabric. Information about these devices is recorded in a management information base (MIB) which can be accessed by fabric management software.

**Fibre Channel input/output controller (FCC-IOC)**

A device that controls the embedded Fibre Channel port and configures the ports' ASICs.



**FICON**

An IBM set of products and services introduced in 1999 that is based on the Fibre Channel Standard. FICON technology uses fiber-optic cables as the data transmission medium and significantly improves I/O performance (including one Gbps bidirectional data transfer).

**FICON Management Server**

An optional feature that can be enabled on the director or switch through the *Product Manager* application. When enabled, host control and management of the director or switch is provided through an S/390 Parallel Enterprise or zSeries Server attached to a director or switch port.

**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.

**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.

**HAFM application**

*See* StorageWorks HA-Fabric Manager application.

**HAFM server**

*See* StorageWorks HA-Fabric Manager server.

**hardware log**

Record of FRU insertions and removals for the director.

**hardware management console**

The console runs the Hardware Management Console application (HWMCA), and is the operations and management PC platform for S/390 and zSeries servers.

**HBA**

*See* host bus adapter.

**heterogeneous fabric**

A fabric with both HP and non-HP 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 HP 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.

**IML**

*See* initial machine load.

**inband management**

Management of the director through a Fibre Channel connection to a port card.

**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.

**input/output configuration**

The collection of channel paths, control units, and I/O devices that attaches to the S/390 or zSeries processor.

**input/output configuration program**

A program that defines all available I/O devices and channel paths to an IBM S/390 or zSeries processor system. Replaced by the Hardware Configuration Definition Program starting with MVS/ESA Version 4.0.

**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.

**IOCDs**

A data set that contains an I/O configuration definition built by the IOCP.

**IOCP**

See input/output configuration program.

**IP address**

See internet protocol address.

**IPL**

See initial program load.

**ISL**

See interswitch link.

**jumper cable**

Optical cable that provides physical attachment between two devices or between a device and a distribution panel. *Contrast with* trunk cable.

**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 HP directors takes place automatically.

**logical port address**

The port numbering system for a director with the FICON Management Server active.

**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.

**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 *HAFM* application. For example, the Director 2/64 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 *HAFM* application. Management Services runs only on the HAFM server, and cannot be downloaded to remote workstations.

**management session**

A management session exists when a user logs on to the *HAFM* application. The application can support multiple concurrent management sessions. The user must specify the network address of the HAFM 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.

**multiswitch fabric**

Fibre Channel fabric created by linking more than one director or switching device within a fabric.

**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.

**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.

**Open Systems Management Server**

An optional feature that can be enabled on the director or switch through the *Product Manager* application. When enabled, host control and management of the director or switch are provided through an open systems interconnection (OSI) device attached to a director or switch port.

**operating state (director)**

The 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.

**operating state (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.

**operating status (director)**

The operating status depends on hardware component failures, which are indicated by status symbols that display in *HAFM* application views.

**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).

**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 Director 2/64, the product name can also be accessed by an SNMP manager as the system name.

**prohibited port connection**

In S/390 operating mode, an attribute that removes dynamic connectivity capability.

**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 *HAFM* and *Director 2/64 Product Manager* applications that can access the HAFM 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.

**RFI shield**

Radio frequency interface shield, S/390 mode only.

**SAN**

*See* storage area network.

**SBAR**

*See* serial crossbar assembly.

**SC**

Acronym for subscriber connector.

**segmented E\_Port**

E\_Port that has ceased to function as an E\_Port within a multiswitch 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.

**StorageWorks Director 2/64 Product Manager application**

Application that implements the management user interface for a specified Director 2/64. When a product instance is opened from the *HAFM* application's **Product View**, the Director 2/64 *Product Manager* application is invoked.

**StorageWorks HA-Fabric Manager (HAFM) application**

Application that implements the management user interface for HP Fibre Channel switching products, and as a launching point for the Director 2/64 *Product Manager* application. The application runs locally on the HAFM server or on a remote workstation.

**StorageWorks HA-Fabric Manager (HAFM) server**

Notebook computer shipped with a director to run the HAFM, Director 2/64 *Product Manager* applications.

**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 automation for operating system 390 (SA OS/390)**

IBM-licensed software that provides System/390 Parallel Sysplex management, automation capabilities, and integrated systems and network management. SA OS/390 manages host, remote processor, and I/O operations. SA OS/390 integrates the functions of Automated Operations Control for MVS, ESCON Manager, and Target System Control Facility.

**system services processor (SSP)**

Controls the RS-232 maintenance port, the Ethernet port, and the operator panel of a Fibre Channel director.

**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, *contrast with* jumper cable.

**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).

**universal port module card**

Each fiber port module card provides four Fibre Channel connections through duplex small form factor pluggable (SFP) fiber-optic transceivers. 1 or 2 gigabits per second enabled.

**UPM card**

See universal port module card

**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.

**warning message**

Software message that indicates a possible error was detected. *See also* 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.

**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 multiswitch 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 km configuration, in port properties 2–18

## A

acronyms, FRU 4–6

active zone set state, default value 5–11

active=saved 6–2

address configuration library 3–21

address configuration library dialog box 3–21

address configurations, stored, managing 3–21

address ID errors 2–40

addresses

    director, default values 5–10

alert panel 1–23, 2–4

alert status 1–25, 2–4

alerts, link incident (LIN)

    configuring 3–10

    description 2–45

ASCII format for logs 4–2

attached WWN radio button 2–23

attachment

    invalid, port state 2–42

    port binding error 2–18

attachment, invalid, list of reasons 2–19

audit log

    capacity 4–1

    description 1–20, 4–3

## B

backing up and restoring

    configuration 5–6

    configuration data 3–39

    product manager data 1–40

backup and restore configuration dialog box 5–7

backup and restore configuration option 1–22

bar graph in performance view 2–37

BB\_Credit 2–32

    default value 5–10

    extended distance buffering 3–10

beaconing

    enabling

        for CTP card 2–14

        for FPM card 2–13

        for SBAR card 2–15

        for unit 2–11, 2–22

    port properties dialog box 2–18

    port state 2–42

    SBAR card indicator 2–8

binding, port, error 2–19

bit-error threshold 4–8

block all ports dialog box, displaying 2–14, 2–21

block configuration, port properties dialog box 2–18

blocked states, port 2–26

blocking ports 3–10

    S/390 mode 3–18, 3–19

bound WWN, configure ports dialog box 3–12

buffer-to-buffer credit

    default value 5–10

    node properties dialog box 2–34

button functions, performance view 2–41

## C

call-home

    notification, enabling 1–22, 5–6

circle, green

    meaning of 1–25

class 2 statistics table 2–38

class 3 statistics 2–39

- class of service, node properties dialog box 2–34
- clear system error light
  - product menu 1–16
- clearing link incident alerts 2–23
- clearing port counters 1–36
- close
  - product menu 1–17
- closing the product manager 1–36
- code pages 6–3
  - table 6–3
- collect maintenance data option 5–1
- collecting maintenance data 5–1
- component status, monitoring 2–4
- configuration changes, audit log 4–3
- configuration data
  - backing up and restoring 3–39, 5–6
  - default configuration values 5–9
  - resetting 5–8
- configuration report 3–38
- configurations
  - backing up and restoring 1–22
  - resetting 1–23, 5–8
- configure addresses - "active" 3–20
- configure addresses - "active" dialog box 3–20
- configure addresses, stored option 3–21
- configure date and time
  - periodic synchronization 2–12
- configure date and time, manual procedure 2–12
- configure fabric parameters dialog box 3–6
- configure feature key
  - dialog box 3–25
  - procedure 3–25
- configure feature key dialog box
  - procedure 3–25
- configure features menu option 1–19
- configure FICON management server dialog box 6–3
- configure icon 1–24
- configure identification dialog box 1–17
- configure management server 3–24
- configure menu
  - addresses - "active" 3–20
  - backup and restore configuration 3–39
  - date/time 1–19, 3–27
  - export configuration report 1–20, 3–38
  - fabric parameters 1–18
  - features 1–19, 3–25
  - identification 1–17
  - management server 1–19, 3–24
  - SNMP agent 1–19
  - switch binding 1–18, 6–9
  - switch parameters 1–17
- configure open systems management server dialog box 6–5
- configure operating mode 3–15
  - open systems mode procedure 3–15
  - S/390 procedure 3–17
- configure ports dialog box 3–15
  - blocking ports 2–26
  - menu options 3–13
  - open system mode 3–16
  - S/390 mode 3–17
- configure SNMP dialog box 1–19
- configure switch parameters dialog box 3–2
- configuring
  - date and time 1–19, 3–27
  - fabric operating parameters 3–6
  - feature key 3–24
  - port addresses 3–18
  - ports, S/390 mode 3–17
- connection failure, port binding 3–12
- control unit port (CUP) name 3–20
- cooling fan module, failure indicator 2–5, 2–6, 2–8
- copy address configuration dialog box 3–22
- counters, port, clearing 1–36
- CPGID, code pages 6–3
- CRC errors 2–40
- CTP card
  - active indicator 2–5, 2–6, 2–7
  - beaconing, enabling 2–14
  - failure indicator 2–5, 2–6, 2–7
  - FRU properties 2–14
  - IML 5–3



- IPL 5-3
  - properties 1-29
  - switchover 2-14
- CTP card menu 1-29, 2-14
- CUP name 3-20
  - assigning 3-20
- current IP address, director 5-8
- cyclic redundancy checks, errors 2-40
- D**
- data collection option 1-21
- data default values table 5-9
- data field size, node properties dialog box 2-34
- data, backing up and restoring 1-40
- date and time, configuring 2-11, 3-27
- date/time periodic synchronization feature 2-12
- defaults
  - call-home notification 1-22, 5-6
  - code page 6-3
  - configuration data 5-8
  - data, table of values 5-9
  - enable e-mail notification 1-22
  - LIN alerts 3-10
  - switch priority setting 3-9
- define nickname dialog box, displaying 2-33
- degraded operation, event log 4-4
- delimiter errors 2-40
- diagnostics, port
  - FPM card menu 2-14
  - port card view menu 2-21
  - running 5-1
- dialog boxes
  - address configuration library 3-21
  - backup and restore configuration 5-7
  - block all ports 2-14, 2-21
  - configure addresses - "active" 3-20
  - configure date and time 2-11
  - configure date and time periodic synchronization 2-12
  - configure fabric parameters 3-6
  - configure feature key 3-25
    - displaying 1-19
      - procedure 3-25
  - configure FICON management server 6-3
  - configure identification 1-17
  - configure open systems management server 6-5
  - configure ports 3-15
    - S/390 mode 3-17
  - configure SNMP 1-19
  - configure switch parameters 3-2
  - copy address configuration 3-22
  - define nickname 2-33
  - director properties 2-11
    - illustration 2-9
  - export configuration report 1-20, 3-38
  - fabric operating parameters 1-18
  - firmware library 1-22
  - FRU properties 2-8
    - displaying 1-27
  - how to use 1-10
  - IPL 5-3
  - keyboard navigation 1-11
  - node properties 2-33
  - port binding 2-24
  - port card properties 2-13
  - port diagnostics 1-21
  - port properties
    - displaying 2-17, 2-33
    - illustration 2-17
  - save 4-2
  - save data collection 1-21
  - set online state 1-22
  - swap ports 5-1
  - switch binding membership list 6-9
  - switch operating parameters 1-17
  - switchover CTP 2-14
  - switchover SBAR 2-15
  - unblock all ports 2-14, 2-21
  - warning 3-13
- diamond, red
  - meaning of 1-25
- director
  - alert panel, status indicator 2-4

- audit log 4–3
- date and time, configuring 3–27
- Fibre Channel addresses 3–4
- FRU list view 2–29
- information, displaying 2–9
- IP address
  - current 5–8
  - resetting configuration 5–8
- IPL 2–11, 5–3
- link incident log 2–45
- node list view 2–30
- NV-RAM 3–2, 3–6
- offline state, setting 2–13
- online state, setting 2–13
- operation, monitoring 2–2
- operational states 2–3, 5–4
- performance view 2–35
- segmentation error 2–18
- director addressing, default values 5–10
- director menu 1–28, 2–10
- director priority, default value 5–10
- director properties dialog box
  - displaying 2–11
  - illustration 2–9
- Director Speed
  - director properties dialog box 2–10
- director status table 2–2
- discarded frames 2–40
- displaying port statistics 2–38
- domain ID
  - director properties dialog box 2–10
  - insistent 3–4
  - preferred 3–4
- domain RSCNs 3–5
  - enterprise fabric mode 6–13
- E**
- E\_D\_TOV
  - default value 5–10
- e\_d\_tov 3–8
  - fabric segmentation 3–8
  - less than r\_a\_tov 3–8
  - multiswitch fabrics 3–8
  - rerouting delay 3–5
- E\_Port segmentation
  - reasons, list of 2–18
- E\_port segmentation
  - preferred domain ID 3–4
- E\_Port segmentation errors, list of 2–19
- E\_Port, segmented, port state 2–43
- EBCDIC code pages 6–3
- e-mail notification
  - enabling 1–22, 5–5
    - LIN alerts 2–45, 3–11
  - enable call-home notification option 1–22
  - enable e-mail notification option 1–22
  - enable unit beaconing
    - product menu 1–16
- enabling
  - beaconing 2–22
  - call-home notification 5–6
  - e-mail notification 5–5
- engineering change level, director properties dialog box 2–10
- enterprise fabric mode 6–12, 6–13
- error light, clearing 2–11
- error statistics 2–39
- Ethernet connection, interrupted 5–3
- Ethernet no-link status 2–3
- event codes, list of 4–5
- event data 4–6
- event log
  - capacity 4–1
  - description 1–20
  - illustration 4–4
  - using 4–4
- export configuration report dialog box 1–20, 3–38
- export configuration report, procedure 3–38
- extended distance buffering (10–110 km) 3–10
- extended distance, default value 5–9
- F**
- fabric binding 6–6

- enterprise fabric mode 6–13
    - online state functions 6–6
  - fabric operating parameters dialog box 1–18
  - fabric parameters
    - e\_d\_tov 3–8
    - interop mode 3–9
    - r\_a\_tov 3–8
    - switch priority 3–8
  - fabric segmentation
    - e\_d\_tov 3–8
    - preferred domain ID 3–4
  - factory defaults
    - configuration data 5–8
    - LIN alerts 3–10
  - fan module
    - failure indicator 2–5, 2–6, 2–8
    - FRU properties 2–15
  - fan module menu 1–29
  - fault isolation, event log 4–4
  - faults, event log 4–4
  - feature
    - SANtegrity 6–6
  - feature key 3–25
    - configuring 3–24
  - Fibre Channel address, port properties dialog box 2–18
  - Fibre Channel addresses 3–4
  - FICON management server 3–6, 3–25, 6–1
    - active=saved 6–2
    - code page 6–3
    - configuration procedure 6–3
    - configuring 6–2, 6–3
    - host control 6–2
    - installing 6–1
    - programmed offline state control 6–2
  - file transfer protocol 5–1
  - firmware faults, event log 4–4
  - firmware level, director properties dialog box 2–10
  - firmware library dialog box 1–22
  - firmware versions 1–22
    - managing 5–5
  - FPM card
    - acronyms, port technology 2–29
    - attention indicator 2–6
    - beaconing, enabling 2–13
    - loopback test 5–1
    - port card view 2–16
    - properties 2–13
    - status, determining 1–30
  - FPM card menu 1–28, 2–13
  - frames
    - discarded 2–40
    - performance view 2–38
    - routing of 3–5
  - frames too long, error statistics 2–40
  - FRU
    - description 1–16
    - product menu 1–16
  - FRU acronyms 2–29, 4–6
  - FRU list view
    - description 1–24, 1–32
    - displaying 2–29
    - FRU acronyms 2–29
    - illustration 1–33, 2–29
  - FRU list view menu 1–32
  - FRU properties
    - cooling fan module 1–29
    - CTP card 2–14
    - fan module 2–15
    - FPM card 2–13
    - general 2–8
    - SBAR card 1–29, 2–15
  - FRU properties dialog box 1–27
    - displaying 1–27
    - illustration 2–8
  - FRUs
    - failures, event log 4–4
    - position numbers 2–30
  - FTP 5–1
- G**
- gateway address, default value 5–10

## H

### HAFM

- configuring SNMP trap message recipients 3–22

### HAFM application

- description 1–8
- logging in to 1–11
- main window 1–13
- SMTP server address 1–22
- user rights 1–37

### HAFM Applications CD 1–41

### HAFM manager

- messages A–1

### HAFM server

- audit log 4–3
- call-home feature 5–6
- configuration, backing up and restoring 5–6
- maintenance data 5–1
- restoring data to 1–41

### HafmData directory 1–40

### hardware failures, event log 4–4

### hardware log

- capacity 4–1
- detailed description 4–6
- general description 1–21
- using 4–6

### hardware view

- alert conditions 1–26
- component operation, monitoring 2–4
- CTP card menu 2–14
- description 1–23
- director information, displaying 2–9
- director menu 2–10
- director operation, monitoring 2–2
- director status table 2–2
- fan module FRU properties 2–15
- FPM card menu 2–13, 2–14
- identifying FRUs 2–1
- illustration 1–26, 2–5, 2–6
- menu options, using 2–10
- obtaining hardware status 2–8

- online state 2–13

- port information, displaying 2–17

- SBAR card menu 2–15

- status table 2–2

- using 1–26, 2–1

### help 1–23

- help icon 1–23

- hop counts 3–5

- host control 6–2

- host control prohibited field 6–4, 6–5

- host, audit log 4–3

## I

### icons

- configure 1–24

- help 1–23

- logs 1–20

- view 1–17

### identification

- default values 5–9

### IML, CTP card 5–3

- inband switch management 3–6

- initial program load (IPL) 1–21

- executing 5–3

- insistent domain ID 3–4

- enterprise fabric mode 6–14

- interop mode 3–9

- invalid attachment, port state 2–42

- invalid attachment, reasons for 2–19

- invalid transmission words 2–40

### IP address

- configuration, restoring 5–7

- default value 5–10

### IPL

- connection interruption 5–3

- CTP card 5–3

- executing 5–3

- menu option 1–21, 2–11

- IPL dialog box 5–3

## K

- keyboard navigation in dialog boxes 1–11

**L**

- languages, code page 6–3
- laser LC transceiver 2–22
- LEDs
  - CTP card switchover 2–15
  - port card view 2–16
  - SBAR card switchover 2–15
- light, signal, port state 2–43
- LIN alerts configuration, port properties dialog box 2–18
- LIN alerts, default values 5–9
- link failures 2–39
- link incident
  - causes, list of 4–8
  - port properties dialog box 2–18
  - port state 2–42
- link incident (LIN) alerts
  - clearing 2–23, 2–45
  - configuring 3–10
  - description 2–45
- link incident log
  - capacity 4–1, 4–7
  - description 1–21, 4–7
  - illustration 4–8
- link reset, port state 2–42
- link resets, performance view 2–41
- link utilization percentage, performance view 2–38
- logging in to HAFM application 1–11
- logs
  - ASCII format 4–2
  - audit 1–20, 4–3
  - event 1–20, 4–4
  - expanding columns 4–2
  - hardware 1–21, 4–6
  - link incident 1–21, 4–7
  - using 4–1
  - window button function 4–1
- logs icon 1–20
- logs menu
  - audit 1–20
  - event 1–20

- hardware 1–21
- link incident 1–21
- loopback tests 2–21, 2–22, 5–1
- loss of signal 4–8
- loss of synchronization 4–8

**M**

- MAC address, default 5–10
- main panel 1–25
- maintenance data, collecting 5–1
- maintenance menu 1–21
  - backup and restore configuration 1–22, 5–6
  - collect maintenance data 5–1
  - data collection 1–21
  - enable call-home notification 1–22, 5–6
  - enable e-mail notification 1–22, 5–5
  - firmware library 1–22
  - IPL 1–21, 5–3
  - port diagnostics 1–21, 5–1
  - reset configuration 1–23, 5–8
  - set online state 1–22, 5–4
- maintenance port 5–8
- management server
  - FICON 3–25, 6–1
    - configuring 6–2
    - installing 6–1
  - open systems 3–24, 6–5
    - installing 6–5
- managing firmware versions 5–5
- managing stored address configurations 3–21
- matrix of port addresses 3–18
- menus
  - configure icon 1–24
  - CTP card 1–29, 2–14
  - director 1–28, 2–10
  - fan module 1–29
  - FPM card 1–28, 2–13
  - FRU list view 1–32
  - hardware view 2–10
  - help icon 1–23
  - maintenance 1–21
  - maintenance menu 1–21

- menu bar description 1-17
- node list view 1-33, 2-32
- performance view 1-35, 2-36
- port 1-28, 2-14
- port card view 1-29, 2-21
- port list 1-31
- port list view 2-28
- product 1-16
- SBAR card 1-29, 2-15
- view icon 1-17

messages

- HAFM A-1
- product manager A-1

mirroring 1-40

mode

- enterprise fabric 6-12
- interop 3-9
- open fabric 1.0 3-9
- open systems 3-6
- operating 3-6
- S/390 3-6

model number, director properties dialog box 2-10

monitoring director operation 2-2

multi-switch fabric

- director, removing 5-4

multiswitch fabric

- e\_d\_tov 3-8
- principal switch 3-8

**N**

N\_Ports, node list view 1-33

name, configure ports dialog box 3-10

nickname

- port binding 3-12
- port binding error 2-19

nicknames, defining 2-33

nicknames, displaying 2-33

no light, port state 2-43

node list view

- description 1-24, 2-30
- how to use 1-33

- illustration 1-34, 2-31
- menu 2-32

node list view menu 1-33

node nickname, node properties dialog box 2-34

node port number, node properties dialog box 2-35

node properties dialog box

- description 2-33
- displaying 2-21
- illustration 2-34

node properties, displaying 1-33, 2-33

node type, node properties dialog box 2-34

node WWN, port properties dialog box 2-34

no-link status 2-3

NOS

- hardware log 4-8
- port state 2-43

not operational port state 2-43

not-operational (NOS) primitive sequence,

- hardware log 4-8

NV-RAM 3-2, 3-6

- configuration data, backing up and restoring 3-39
- export configuration report 3-38

**O**

offline sequences (OLS)

- performance view 2-41
- S/390 mode 3-19

offline signals (OLS) 2-22

offline state, setting 2-13

offline, port state 2-43

OLS 3-10

- S/390 mode 3-19

online state, setting 2-13, 5-4

online, port state 2-43

open fabric 1.0 3-9

open port card view 2-13

open systems management server 3-24, 6-5

- configuring 6-5
- installing 6-5

open systems mode 3-6

- ports
  - configuring, procedure 3–15
  - operating mode 3–6
  - operating parameters
    - default values 5–10
  - operating status for the StorageWorks director 2/64 1–25
  - operational state, port 2–27
  - operational state, port properties dialog box 2–18
  - operational states for ports 2–41
- P**
- part number, hardware log 4–7
- performance view
  - bar graph 2–37
  - button functions 2–41
  - description 1–24, 1–34
  - illustration 2–36
  - menu 2–36
  - port, statistics 2–37
  - using 2–35
- performance view menu 1–35
- port
  - description 1–16
- port address
  - default value 5–9
- port addresses
  - matrix of 3–18
  - S/390 mode 3–18
- port binding
  - dialog box 2–23
  - enabling 3–11
- port binding dialog box
  - description 2–23
  - illustration 2–24
- port binding error 2–19
- port binding feature
  - bound WWN 3–12
  - configuring ports 3–9
- port blocked states, default value 5–9
- port card properties dialog box 2–13
- port card view
  - displaying 2–14, 2–16
  - illustration 1–30, 2–16
  - opening 2–13
- port card view menu 1–29, 2–21
- port configuration data, NV-RAM storage 3–10
- port connection array, S/390 mode 3–18
- port diagnostics dialog box
  - displaying 2–14, 2–21, 2–22
- port diagnostics menu option 1–21
- port failure, port state 2–43
- port list view 2–25
  - description 1–24
  - displaying 1–31, 2–25
  - illustration 1–31, 2–26
  - using 1–31
  - using menu 2–28
- port list view menu 1–31
- port menu 1–28, 2–14
- port name
  - configure ports dialog box 3–10
  - port properties dialog box 2–17
  - S/390 mode 3–18, 3–21
- port nickname, port properties dialog box 2–34
- port number
  - configure ports dialog box 3–10
  - node properties dialog box 2–34
  - port properties dialog box 2–17
- port operational states
  - port list view 2–27
  - table of 2–41
- port pop-up menu 1–28
- port properties dialog box
  - 10-100 configuration 2–18
  - description 2–17
  - displaying 2–21, 2–28, 2–33
  - illustration 2–17
- port properties, displaying 2–33
- port statistics
  - class 2 statistics 2–38
  - class 3 statistics 2–39
  - error statistics table 2–39
  - traffic statistics 2–38

- port technology dialog box, displaying 2–21
- port transmission, blocking 2–22
- port type 3–11
- port WWN
  - node list view 2–32
  - node properties dialog box 2–34
- ports
  - bar graph 1–35, 2–37
  - binding 2–23
  - blocked states 2–26
  - blocking 3–10
    - S/390 mode 3–18, 3–19
  - blocking all 2–14, 2–21
  - configuring
    - open systems mode 3–15
    - S/390 mode 3–17
  - connections, prohibiting 3–19
  - counters, clearing 1–36
  - default configuration 1–18
  - default values 5–9
  - diagnostics 1–21, 2–14, 2–21, 5–1
  - displaying information 2–17
  - displaying statistics 1–36
  - event log 4–4
  - extended distance buffering (10–110 km) 3–10
  - loopback tests 2–21, 2–22
  - maintenance 5–8
  - naming 3–10
  - operating states 2–16
  - operational states, table of 2–41
  - product menu 1–16
  - resetting 2–23
  - statistics
    - description 2–38
    - displaying 2–37
  - status, determining 1–30
  - transmission, blocking 2–22
  - type
    - port list view 2–27
    - port properties dialog box 2–17
  - UDP, default value 5–10
  - unblocking 2–14
    - WWN 2–18
  - power indicator 2–7
  - power supply, failure indicator 2–5, 2–6, 2–7
  - preferred domain ID 3–4
    - default value 5–10
    - multiswitch fabric 3–3
  - primitive sequence errors 2–39
  - primitive sequence, hardware log 4–8
  - principal switch, determining 3–8
  - problems, event log 4–4
  - product manager
    - accessing 1–9
    - alert panel 1–23
    - audit log 4–3
    - backing up and restoring 1–40
    - call-home notification, enabling 5–6
    - closing 1–36
    - configure icon 1–24
    - description 1–8
    - e-mail notification, enabling 5–5
    - FRU list view 1–32, 2–29
    - hardware view 1–26
    - help icon 1–23
    - IPL 5–3
    - link incident log 2–45, 3–10
    - logs icon 1–20
    - main panel 1–25
    - maintenance menu 1–21
    - menu bar panel 1–17
    - messages A–1
    - node list view 1–33, 2–30
    - node list view menu 1–33
    - non-English language support 6–3
    - overview 1–10
    - performance view 1–34, 2–35
    - performance view menu 1–35
    - port list view 1–31, 2–25
    - port list view menu 1–31
    - port menu 1–28
    - product 1–16
    - user rights 1–37



- uses, list of 1–8
- view icon 1–17
- window layout and function 1–15

product menu 1–16

- clear system error light 1–16
- close 1–17
- enable unit beaconing 1–16
- FRU 1–16
- port 1–16
- ports 1–16
- properties 1–17

product view 1–13

programmed offline state control 6–2

properties

- product menu 1–17

## R

R\_A\_TOV

- default value 5–10
- synchronization, loss of 4–8

r\_a\_tov 3–8

- greater than e\_d\_tov 3–8

reason field

- director status table 2–3
- port properties dialog box 2–18

receive values 2–38

remote user workstations 1–1, 1–11

rerouting delay

- enterprise fabric mode 6–13

reset configuration option 1–23

reset port option 2–23

resetting

- configuration 5–8
- configuration data 5–8

restoring data, HAFM server 1–41

rights, user 1–37

routing delay, default value 5–10

## S

S/390 mode 3–6

- address configuration, managing 3–21
- FICON management server 3–6
- port addresses, configuring 3–18

- port addressing 3–18
- port connection array 3–18
- ports
  - configuring 3–17
  - swapping 5–1
- SANtegrity feature 6–6
  - fabric binding 6–6
- SANtegrity features
  - switch binding 6–7
- SANworks director 2/64 product manager,
  - description 1–8
- save data collection dialog box 1–21
- save dialog box 4–2
- SBAR card
  - beaconing indicator 2–8
  - beaconing, enabling 2–15
  - failure indicator 2–5, 2–6, 2–8
  - FRU properties 2–15
  - switchover 2–15
- SBAR card menu 1–29, 2–15
- segmentation, reasons for error 2–19
- segmented E\_Port, port state 2–43
- sequence errors 2–39
- serial number
  - director properties dialog box 2–10
  - hardware log 4–7
- set director date and time manually 3–28
- set online state dialog box 1–22
- setting online state 5–4
- severity classifications 4–5
- signal light, port state 2–43
- signal losses, error statistics 2–39
- signal, loss of 4–8
- SMTP server address 1–22
- SNMP
  - default values 5–10
  - SNMP agent option 1–19
  - SNMP authorization trap states, default value 5–10
  - SNMP communities, default value 5–10
  - SNMP management station, audit log 4–3
  - SNMP write authorizations, default value 5–10

- speed, default 2–22
  - square, gray, meaning of 1–25
  - statistics values tables 2–38
  - statistics, ports 1–36, 2–37
  - status field 2–3
  - status indicator 2–4
  - status table 2–2
  - StorageWorks director 2/64
    - alert panel, status indicator 2–4
    - date and time, configuring 3–27
    - FRU list view 2–29
    - IPL 2–11, 5–3
    - link incident log 2–45
    - node list view 2–30
    - offline state, setting 2–13
    - online state, setting 2–13
    - operating status 1–25
    - operational states 2–3, 5–4
    - performance view 2–35
    - segmentation error 2–18
    - status 2–2
  - StorageWorks SAN director 2/64
    - audit log 4–3
  - stored address configurations, managing 3–21
  - subnet mask, default value 5–10
  - support center server 5–6
  - swap ports dialog box 5–1
  - switch binding 6–7, 6–13
    - enable and disable 6–8
    - membership list 6–9
    - online state functions 6–11
    - zoning function 6–12
  - switch binding membership list dialog box 6–9
  - switch clock alert mode 6–2
  - switch clock alert mode field 6–4
  - switch operating parameters dialog box 1–17
  - switch parameters
    - domain RSCNs 3–5
    - insistent domain ID 3–4
    - NV-RAM storage 3–2, 3–6
    - operating mode 3–6
    - preferred domain ID 3–4
  - switch priority 3–8
    - related number codes 3–9
  - switch priority setting 3–9
  - switches, principal, determining 3–8
  - switchover CTP dialog box 2–14
  - switchover SBAR card 2–15
  - switchover SBAR dialog box 2–15
  - symbols, alert, table of 1–25
  - sync losses 2–39
  - synchronization, loss of 4–8
  - synchronize date and time 3–29
  - system error indicator 2–7
  - system error light, clearing 2–11
- T**
- technical support 5–1
  - testing, port state 2–44
  - traffic statistics 2–38
  - transmission words, invalid 2–40
  - transmit values 2–38
  - trap recipient IP addresses, default value 5–10
  - traps, SNMP 3–23
  - triangle, yellow
    - LIN alert 3–10
    - meaning of 1–25
- U**
- UDP port, default value 5–10
  - unblock all ports dialog box, displaying 2–14, 2–21
  - unit beaconing, enabling 2–11
  - United States/Canada 00037 code page 6–3
  - user rights 1–37
- V**
- versions, firmware
    - firmware library dialog box 1–22
    - managing 5–5
  - view icon 1–17
  - view menu
    - FRU list 1–24
    - hardware 1–23
    - node list 1–24

---

- performance 1–24
- port list 1–24, 2–25
- views
  - FRU list 2–29
  - hardware 2–1
  - node list 2–30
  - performance 2–35
  - port list 2–25

**W**

- warning dialog box 3–13
- window layout 1–15
- Windows dial-up networking 5–6
- WWN
  - director properties dialog box 2–10
  - nickname for 2–33

- node list view 2–32
- port binding 3–12
- port binding error 2–19
- port properties dialog box 2–18
- principal switch 3–8

**Z**

- Zip disk 1–40
- zone members, default value 5–11
- zone set state, default value 5–11
- zone sets, default value 5–11
- zone states, default value 5–11
- zones, number of, default value 5–11
- zoning configuration, backing up and restoring 5–7
- zoning, default values 5–11

