8/4Gbps FC SAN Module

Hardware User's Manual

Notes, Cautions, and Warnings

NOTE
A NOTE indicates important information that helps you make better use of your computer.

CAUTION
A CAUTION indicates potential damage to hardware or loss of data if instructions are not followed.

DANGER
A DANGER indicates a potential for property damage, personal injury, or death.

Contents

About this document

This document is a hardware reference manual written for SAN administrators using Blade Servers that support the Dell 8/4Gbps Fibre Channel (FC) SAN Module. It provides information on installing, configuring, and maintaining of the FC SAN Module.

NOTE
Throughout this document, the Dell 8/4Gbps FC SAN Module is referred to as the FC SAN Module.

How this document is organized

This document is organized to help you find information that you need as quickly as possible. The document contains the following components:

- Chapter 1, "Introducing the FC SAN Module," describes the FC SAN Module and explains its basic concepts and features. This chapter also provides instructions for unpacking the FC SAN Module from its shipping container, references to the appropriate publication for installing the module into the Dell PowerEdge M1000e Blade Enclosure, and Fibre Channel port cabling guidelines.

- Chapter 2, "Configuring the FC SAN Module" describes how to change the FC SAN Module's IP address, connect the module to the Ethernet network and fabric, and activate additional ports.

- Chapter 3, "Operating the FC SAN Module," provides details about operating and replacing a 8/4Gbps FC SAN Module.

- Appendix A, "8/4Gbps FC SAN Module specifications," is a product specification reference.

Supported hardware and software

This document includes information specific to the Dell 8/4Gbps FC SAN Module. For more information about deploying and managing this product, refer to the *Dell 8/4Gbps FC SAN Module Administrator's Guide*.

What's new in this document

This is a new document. For further information, see the *release notes* for this product.

Document conventions

This section describes text formatting conventions and important notice formats used in this document.

Text formatting

The narrative-text formatting conventions that are used are as follows:

bold text	Identifies command names Identifies the names of user-manipulated GUI elements Identifies keywords and operands Identifies text to enter at the GUI or CLI
italic text	Provides emphasis Identifies variables Identifies paths and Internet addresses Identifies document titles
`code` text	Identifies CLI output Identifies command syntax examples

For readability, command names in the narrative portions of this guide are presented in mixed lettercase: for example, switchShow. In actual examples, command lettercase is often all lowercase. Otherwise, this manual specifically notes those cases in which a command is case sensitive.

Command syntax conventions

Command syntax in this manual follows these conventions:

command	Commands are printed in bold.
--**option, option**	Command options are printed in bold.
-**argument,** arg	Arguments.
[ ]	Optional element.
variable	Variables are printed in italics. In the help pages, values are <u>underlined</u> or enclosed in angled brackets < >.
...	Repeat the previous element, for example "member[;member...]"
value	Fixed values following arguments are printed in plain font. For example, --**show** WWN
|	Boolean. Elements are exclusive. Example: --**show** -**mode** egress | ingress

Notes, attention, caution, and danger

The following notices appear in this document.

NOTE

A note provides a tip, emphasizes important information, or provides a reference to related information.

ATTENTION

An attention alerts you to potential damage to hardware, firmware, software or data.

CAUTION

A caution alerts you to potential injury to personnel.

DANGER

A danger alerts you to potential lethal injury to personnel.

For definitions of SAN-specific terms, visit the Storage Networking Industry Association online dictionary at *http://www.snia.org/education/dictionary*.

Notice to the reader

This document may contain references to the trademarks of the following corporations. These trademarks are the properties of their respective companies and corporations.

These references are made for informational purposes only.

Corporation	Referenced Trademarks and Products
Dell, Inc.	PowerEdge
Microsoft Corporation	Windows, Windows 2000, Windows 2003, Windows XP
Sun Microsystems, Inc.	Solaris
Red Hat Inc.	Red Hat Enterprise Linux (RHEL)
Novell, Inc	SUSE Linux Enterprise Server (SLES)

Additional information

Refer to the following documentation related to this product:

- *Dell 8/4Gbps FC SAN Module Administrator's Guide*
- *Dell 8/4Gbps FC SAN Module Getting Started Guide*

For additional resource information on the Fibre Channel industry, visit the Technical Committee T11 Web site. This Web site provides interface standards for high-performance and mass storage applications for Fibre Channel, storage management, as well as other applications:

> *http://www.t11.org*

For information about the Fibre Channel industry, visit the Fibre Channel Industry Association Web site:

> *http://www.fibrechannel.org*

Getting technical help

Contact Dell for hardware, firmware, and software support, including product repairs and part ordering. To expedite your call, have the following information available:

1. General Information

   - Dell Service Tag
   - Technical Support contract number, if applicable
   - FC SAN Module model
   - FC SAN Module operating system version
   - Error numbers and messages received
   - **supportSave** command output
   - Detailed description of the problem and specific questions
   - Description of any troubleshooting steps already performed and results
   - Serial console and Telnet session logs
   - syslog message logs

2. 8/4Gbps FC SAN Module Serial Number

   The FC SAN Module serial number and corresponding bar code are provided on the serial number label attached to the module. Following is an example of a serial number and barcode:

   FT00X0054E9

   |||||||||||||||||||||||||||||||||

3. World Wide Name (WWN). Use the CLI **wwn** or **switchShow** commands to display the WWN.

4. Software licenses. Use the CLI **licenseIdShow** command to display the list of licenses and corresponding license IDs available on the unit.

Introducing the FC SAN Module

The Dell 8/4Gbps FC SAN Module is a 24-port Fibre Channel module with 8 external ports and 16 internal ports that installs in a Dell PowerEdge M1000e Blade Enclosure. Although the product may ship with a specific number of ports enabled, it can upgraded to 24 ports through port upgrade licenses. These ports support link speeds up to 8 Gbps.

NOTE
You can also install 4 Gbps SFPs in the FC SAN Module. Only use supported SFPs, as shown in "Optical transceivers supported" on page 30. The module is designed for use in I/O Bays 3, 4, 5, and 6 of a Dell M1000e chassis.

NPIV mode

The Dell 8/4Gbps FC SAN Module functions in NPIV (N_port ID virtualization) mode only. NPIV provides Fibre Channel switch functions that improve FC SAN Module scalability, manageability, and interoperability. For more information on NPIV mode, refer to the following:

- For a list of FC SAN Module F_Ports mapped to N_Ports in the FC SAN Module as shipped from the factory, refer to "Default port mapping" on page 27.
- For general information and details on using NPIV (N_port ID Virtualization), refer to the *Dell 8/4Gbps FC SAN Module Administrator's Guide.*

You may have to prepare the edge fabric before connecting it the FC SAN Module functioning in NPIV mode.

NOTE
The FC SAN Module functioning in NPIV mode cannot be connected directly into an array; it requires a fabric for support.

NPIV mode provides the following features:

- Up to 8 autosensing (2, 4, and 8 Gbps) Fibre Channel ports. These are universal and self-configuring ports capable of becoming N_Ports (fabric-enabled).
- Up to 16 internal backplane F_Ports, which connect to blades within the M1000e chassis. Each port can automatically negotiate its speed at either 4 Gbps or 8 Gbps to match the speed of attached devices
- Dynamic port licensing, which allows any port to be activated as needed based on available licenses.
- Up to eight small-form-factor pluggable (SFP) optical transceivers.

  The FC SAN Module ships with two 8 Gbps SFPs installed. If you purchase a license for additional ports, you will receive additional SFPs.

  NOTE
  You can also install 4 Gbps SFPs in the FC SAN Module, however all SFPs must be Dell-supported, as shown in "Optical transceivers supported" on page 30.

- One serial console port on the front panel (RJ45 connector).
- One green/amber LED to indicate status for each port.

  If dark, the port is unlicensed.

- The following system light-emitting diodes (LEDs):
  - One green power LED to indicate module power-on.
  - One green/amber LED to indicate module status.
  - One blue, identify module and flash blue to locate module.

See "Interpreting LED activity" on page 23 for details about the FC SAN Module LEDs.

Port upgrade licensing

The FC SAN Module ships with 12 active ports. You can purchase and allocate port licenses to activate additional ports. The FC SAN Module supports two licensing methods: static and dynamic (default).

- For dynamic port licensing, 12 licenses are available for the first 12 active ports. Ports 17 and 18 are licensed at the factory. The remaining 10 licenses are assigned to active ports as required. Once licenses are issued, they can be moved from one port to another, making port licensing more flexible.
- For static port licensing, Table 1 shows the base internal and external ports that are licensed, as well as the additional 12 ports that can be activated with a port upgrade license. For details about activating and deactivating additional ports when you have port upgrade licensing, refer to "Activating additional ports" on page 18.

TABLE 1   Ports available

Port Licensing	External Ports	Internal Ports
Base	17, 18, 19, and 20	1, 2, 3, 4, 5, 6, 7, and 8
Port upgrade	0, 21, 22, and 23	9, 10, 11, 12, 13, 14, 15, and 16

Hardware Description

This section describes the physical FC SAN Module as shipped from the factory. For specifications, such as installed memory, weight and physical dimensions, facility requirements, architectural specifications, and regulatory compliance, refer to Appendix A, "8/4Gbps FC SAN Module specifications"

Port side

Externally accessible ports and LEDs are on the port side of the FC SAN Module. The port side faces out when the FC SAN Module is inserted into the I/O bay of the PowerEdge Blade Enclosure. Figure 1 details the port side. For a complete description of the locations and interpretations of these LEDs, see "Interpreting LED activity" on page 23.

Access the I/O module handle at the front of the port side of the FC SAN Module. By lifting the handle's release latch, you can open the handle to remove and insert the unit from the PowerEdge Blade Enclosure.

FIGURE 1   Port side view
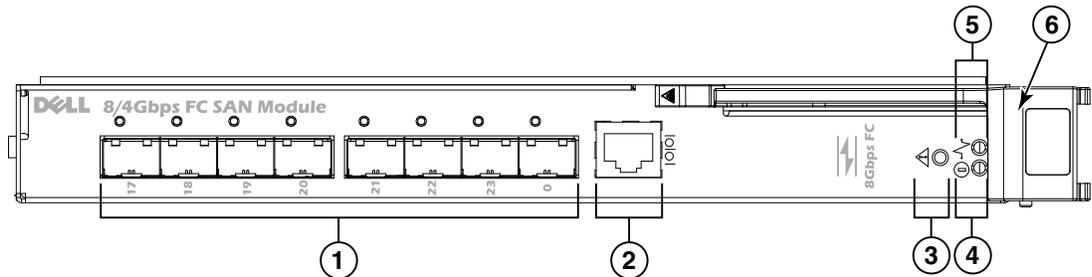
1.   Ports with port status and port speed LEDs

2.   RJ45 console port

3.   FC SAN Module status LED

4.   Power status LED

5.   Server management LED

6.   FC SAN Module handle

The nonport (FC SAN Module status) LEDs, shown as item 3 of Figure 1, display FC SAN Module-level information as shown in Figure 2.

FIGURE 2   Other status LEDs
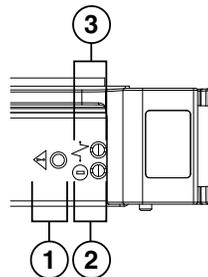
1   FC SAN Module status LED

2   Power status LED

3   Server Management LED

Nonport side

The nonport side of the FC SAN Module (shown in Figure 3) is seated into the enclosure. You do not need to line up the FC SAN Module as it will seat correctly when the insertion arm is closed.

When the FC SAN Module is inserted, the backplane connectors activate a connection port, allowing the FC SAN Module to be configured in the PowerEdge Blade Enclosure.

FIGURE 3   Nonport side, viewed from top
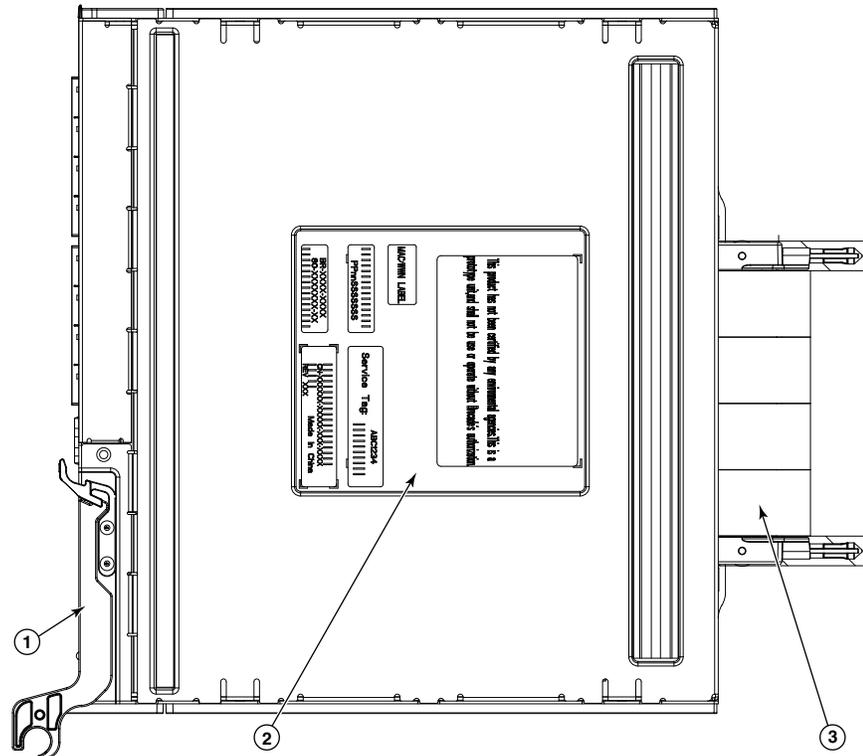
1. I/O module handle. Lifting the handle's release latch opens the handle to install and remove the module from the PowerEdge Blade Enclosure.

2. Product label including serial number.

3. Connectors

Labeling

Figures 3 shows the labels appearing on the FC SAN Module. A second serial label is located beneath the insertion arm on the enclosure (visible only when the arm is extended).

To extend the insertion arm, gently squeeze the release tab and pull outward.

SFPs

NOTE
You must install Dell-supported SFPs in the FC SAN Module.

The FC SAN Module was designed to work with small form-factor pluggable (SFP) optical modules. The FC SAN Module ships with two 8 Gbps SFPs installed. If you purchase a license for additional ports, you will receive additional SFPs.

NOTE
You can also install 4 Gbps SFPs in the FC SAN Module, All SFPs must be Dell-supported.

SFPs provide optical connections to external devices for both SWL and LWL connections. Replace SFPs with a new pluggable unit rather than replacing the FC SAN Module. Refer to the manufacturer's instructions when installing SFPs.

"Removing and replacing the FC SAN Module" on page 24 provides details about removing SFPs from the FC SAN Module.

Unpacking and installing the FC SAN Module

If the FC SAN Module is installed in the Blade Enclosure that is shipped to you, skip this section. This section applies when installing a new module in an empty bay or replacing an existing FC SAN Module.

NOTE
The FC SAN Module is designed to work only in I/O bays B1/B2 and C1/C2 of the Dell M1000e Blade Enclosure. Make sure to comply with installation requirements in the Blade Enclosure *Hardware Owner's Manual*.

Perform the following steps to remove the FC SAN Module from its shipping package.

1. Open the shipping box and inspect the contents, making sure that nothing is missing or damaged.

   Do not insert a damaged FC SAN Module into the Blade Enclosure. If the FC SAN Module appears to be damaged, contact your sales representative before proceeding.

2. Remove the cardboard accessory tray from on top of the FC SAN Module.

   This tray contains the documentation, regulatory statements, product information guide, and Documentation CD.

3. Remove the FC SAN Module from the box.

   The protective foam ends will slide out with the FC SAN Module.

4. Remove the foam ends from the FC SAN Module.

5. Be sure that you have taken the necessary precautions for electrostatic sensitivity; then break the seal warning.

6. Slide the FC SAN Module out of the antistatic sleeve and inspect it carefully for any obvious defects or shipping damage.

NOTE
Be sure to remove the protective covers from the midplane connectors on the rear of the FC SAN Module before installing the module into the enclosure.

7. For complete instructions to install the FC SAN Module into the Blade Enclosure, refer to the section on installing an FC SAN module in the Blade Enclosure *Hardware Owner's Manual*.

Cabling guidelines

After modifying the FC SAN Module's IP address, we recommend that you cable all external ports to fabric connections before bringing the FC SAN Module online. Refer to Chapter 2, "Configuring the FC SAN Module," for steps on modifying the IP address.

Begin by cabling ports 17, 18, 19, 20, 21, 22, 23, and 0. Ports 17 and 18 are licensed at the factory by default. By cabling these ports first, you will not need to move licenses to other ports you may have cabled.

ATTENTION
Do not connect the FC SAN Module directly to Fibre Channel target device(s). Ensure that there is always at least one fabric switch between FC SAN Module and the target device(s).

Configuring the FC SAN Module

Use procedures in this chapter to configure the FC SAN Module to operate on a network and fabric. Also provided are steps to activate additional ports and connecting to the FC SAN Module via CLI.

NOTE
The FC SAN Module is configured in NPIV (N_port ID Virtualization) mode only. For more information, refer to "NPIV mode" on page 7.

This publication provides procedures that use FC SAN Module Command Line Interface (CLI). For details, refer to the *Dell 8/4Gbps FC SAN Module Administrator's Guide*. If the same operation can be performed using the Blade Enclosure chassis management application, use that application instead.

Items required

The following items are required for configuring and connecting the FC SAN Module for use in a network and fabric:

- The FC SAN Module installed in a Blade Enclosure. For instructions, refer to the steps on installing an FC SAN module in the *Hardware Owner's Manual* for the Blade Enclosure.

- If required, management workstation (computer) that has a terminal emulator (such as HyperTerminal) or a keyboard, video, and mouse (KVM) device. Note that this is only required if not changing the FC SAN Module IP address through the Blade Enclosure GUI or CLI management programs.

- An unused IP address and corresponding subnet mask and gateway address unless DHCP is used.

- If required, a serial cable to connect to the FC SAN Module serial console port. Note that this is only required if not changing the FC SAN Module IP address through the Blade Enclosure GUI or CLI management programs.

- SFP transceivers and compatible fibre cables, as required.

  NOTE
  Use only Dell-approved SFPs on the external ports of this module, shown in "Optical transceivers supported" on page 30.

- Access to an FTP server for backing up the FC SAN Module configuration.
- Access to these publications:
  - Blade Enclosure *Hardware Owner's Manual*
  - Blade Enclosure *Configuration Guide*
  - *Dell 8/4Gbps FC SAN Module Administrator's Guide*

Modify the FC SAN Module IP address

By default, the IP address for the FC SAN Module is configured as 10.77.77.77 with a default Ethernet subnet mask of 255.255.255.0.

You can reset the IP address using three methods. If the IP values are set using any of these methods, the IP values are stored on the FC SAN Module.

- FC SAN Module Command Line Interface (CLI).
- Blade Enclosure CMC CLI.
- Blade Enclosure CMC graphical user interface (GUI).

ATTENTION
Do not connect the FC SAN Module to the internal network until the IP address is correctly set for your Ethernet network requirements.

NOTE
It is recommended that you set the IP address using the Blade Enclosure CMC GUI application because this enables centralized management of the FC SAN Module.

Using the FC SAN Module CLI to set the IP address

Use the following tasks to change the IP address on the FC SAN Module using the Module's CLI.

Task 1: Establish a terminal session with the FC SAN Module

Use these steps to establish a terminal emulation session between the FC SAN Module and a Blade Enclosure management workstation used for managing the FC SAN Module. Once this session is established, you can log into the FC SAN Module and use its CLI commands to manage the module.

1. Connect a serial cable between the serial console port on the FC SAN Module and a Blade Enclosure management workstation that can establish a terminal emulation session with the FC SAN Module. For instructions, refer to *Configuration Guide* for your Blade Enclosure.

2. Disable any serial communication programs that are running on the workstation.

3. Using a terminal emulator application (such as HyperTerminal on a PC or TERM in a LINUX or UNIX environment), establish a terminal session to the FC SAN Module from the management workstation. You will use this connection if you want to reset the module's IP address using CLI commands and perform other configuration tasks.

For Windows 95, 98, 2000, XP or NT

    a. Click **Start** and select **Programs -> Accessories -> Communications**.

    b. Select **Hyperterminal** and enter a name for the connection.

    c. From the Hyperterminal window, click the **Connect** drop-down menu and select an available COM port.

    d. Click **OK**.

e. From the **COM Port Properties** window, select the following configuration values:

- `Bits per second: 9600`
- `Databits: 8`
- `Parity: None`
- `Stop bits: 1`
- `Flow Control: None`

For LINUX or UNIX

a. Enter the following at the command prompt:

`tip /dev/ttyb -9600`

b. When the terminal application stops reporting information, press **Enter** to display the login prompt.

c. Log in to the default administrative account using the following identification:

`Login: admin`

`Password: password`

d. When prompted either change the administrative password, or press **Ctrl-C** to bypass.

Task 2: Changing the IP address

1. Verify that the FC SAN Module has completed POST. When POST is complete, the port status and FC SAN Module power and status LEDs return to a standard healthy state.

2. Enter the CLI ipAddrSet command.

    Follow on-screen instructions and supply the correct information, as shown in the following example.

```
switch:admin> ipaddrset
Ethernet IP Address [10.77.77.77]:10.32.53.47
Ethernet Subnetmask [255.255.255.0]:255.255.240.0
Fibre Channel IP Addresss [none]:
Fibre Channel Subnetmask [none]:
Gateway IP Address [0.0.0.0]:10.32.48.1
DHCP [Off]:
IP address is being changed...Done.
```

3. Enter ipAddrShow at the prompt to verify that the address was correctly set.

Using the CMC CLI to set the IP address

Use the following steps to connect modify the FC SAN Module IP address through the CMC CLI.

1. Establish a Telnet session to the CMC CLI.

2. At the command prompt, type **connect switch-x** where *x* is the bay where the FC SAN Module is installed. For example, **switch-x** can be:

- Switch-3 for FC SAN Module installed in bay B1.
- Switch-4 for FC SAN Module installed in bay B2.
- Switch-5 for FC SAN Module installed in bay C1.
- Switch-6 for FC SAN Module installed in bay C2.

3. At the login prompt, enter the default user name as "admin" and password as "password".

4. Use the appropriate CLI commands to change the IP address of the selected FC SAN module. Refer to your Blade Enclosure CLI documentation.

Using the CMC GUI to set the IP address

To change the IP address, use the following steps:

1. Open the CMC application's **Setup** tab.

2. Enter the new information in the **IP Address**, **Subnet Mask**, and **Gateway** fields as appropriate and click **Apply**.

3. To enable DHCP, select **DHCP Enabled** and click **Apply**.

FIGURE 4   CMC Setup tab
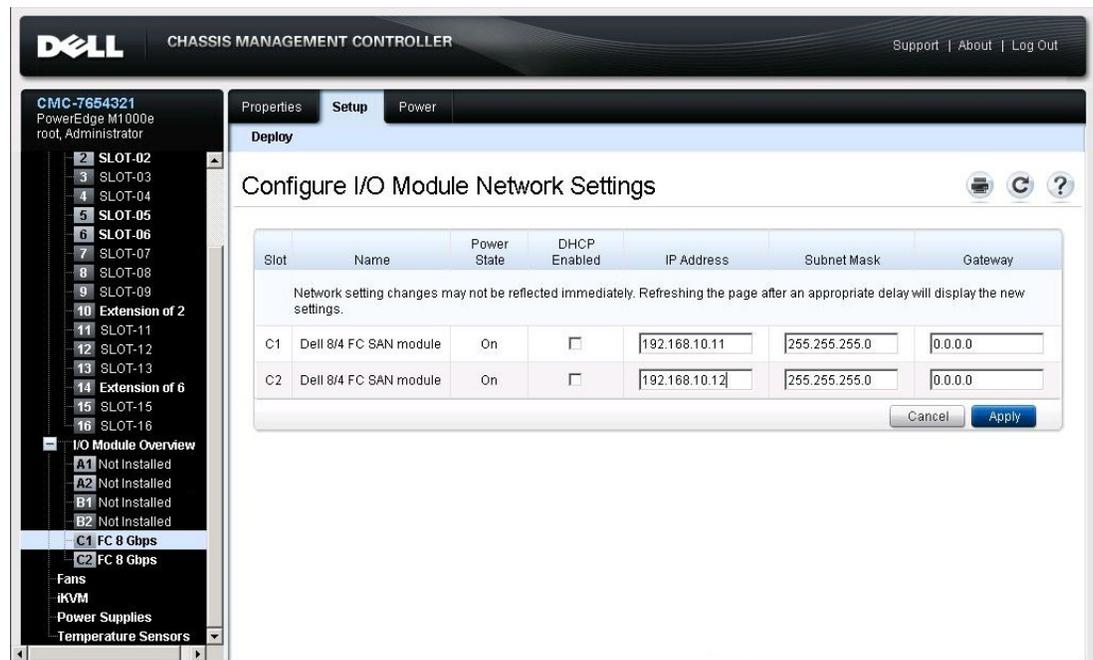
NOTE
Refer to the application for additional detail.

Connecting the FC SAN Module to the Ethernet network

Once you have successfully set the appropriate IP address of the FC SAN Module, you can establish an Ethernet connection through the Chassis Management Controller (CMC) to a remote management workstation for any additional configuration. The management workstation must be on the same Ethernet subnet as the CMC.

NOTE
Ensure that the FC SAN Module is not being modified from any other connection until configuration is complete.

Connecting the FC SAN Module to the fabric

Perform the following steps to connect the FC SAN Module to the fabric.

1. If you need to install SFP transceivers, install them in the external Fibre Channel ports as required.

   a. Remove the dust plugs from the ports to be used.

   b. If necessary, remove the end caps from the SFP.

   c. Orient the transceiver correctly and insert it into a port until it is firmly seated and the latching mechanism clicks.

      For instructions specific to the type of transceiver, refer to the transceiver manufacturer's documentation.

   d. Repeat substeps a, b, and c for the remaining ports, as required.

   NOTE
   Use only Dell-approved SFPs on the external ports of this module, shown in "Optical transceivers supported" on page 30.

2. Connect the cables to the transceivers.

   The transceivers are keyed to ensure correct orientation. If a transceiver does not install easily, ensure that it is correctly oriented and that the end caps have been removed.

   ATTENTION
   A cable should not be bent to a radius less than 5.08 cm (2 inches) under full tensile load and 3.048 cm (1.2 inches) with no tensile load.

   Tie wraps are not recommended for optical cables because they are easily overtightened.

   a. Orient a cable connector so that the key (the ridge on one side of connector) aligns with the slot in the transceiver.

   b. Insert the cable into the transceiver until the latching mechanism clicks. For instructions specific to cable type, refer to the cable manufacturer's documentation.

   c. Repeat for the remaining transceivers as required.

3. Check the LEDs to verify that all components are functional.

   For information about LED patterns, see "Interpreting LED activity" on page 23.

4. Verify the correct operation of the FC SAN Module by typing the **switchShow** command from the workstation.

   This command provides information about FC SAN Module and port status.

5. Verify the correct operation of the FC SAN Module in the fabric by typing the **fabricShow** CLI command from the workstation.

6. Back up the FC SAN Module configuration to an FTP server by typing the **configUpload** command and following the prompts.

   This command uploads the FC SAN Module configuration to the server, making it available for downloading to a replacement FC SAN Module if necessary. We recommend backing up the configuration on a regular basis to ensure that a complete configuration is available for downloading to a replacement FC SAN Module.

   For specific instructions about how to back up the configuration, see the *Dell 8/4Gbps FC SAN Module Administrator's Guide.*

Activating additional ports

The port upgrade licensing allows you to enable up to 24 ports from the initial 12 ports. Add port upgrade using a Telnet connection; do not use the Blade Enclosure CMC software.

Additional ports can be unlocked in the FC SAN Module firmware when an upgrade license key is provided. Port upgrade licenses are available from Dell.

Once you have installed the license keys, you must enable the ports. You can do so without disrupting FC SAN Module operation, or alternatively, you can disable and re-enable the FC SAN Module to activate all ports.

If you remove a port upgrade license, ports that were enabled by that license are disabled.

Activating ports with a port upgrade license

You can activate ports with a port upgrade license while the FC SAN Module is connected to existing SANs or before connecting to an existing SAN.

For FC SAN Modules already connected to existing storage networks:

1. Add the port upgrade license using the CLI.

2. Enable each newly licensed port using the CLI.

NOTE
This method is non-disruptive to existing servers and storage connecting to FC SAN Module.

For new FC SAN Module installations, perform the following *before* connecting to an existing SAN:

ATTENTION
Do not use this method if the FC SAN Module is operating in an existing SAN because traffic will be disrupted.

1. Disable the FC SAN Module.

2. Add the port upgrade license using the CLI.

3. Enable the FC SAN Module using the CLI. When the FC SAN Module is enabled, the newly-added ports are also enabled.

Operating the FC SAN Module

This chapter describes the operation and interoperability of the Dell 8/4Gbps FC SAN Module.

Interoperability

The FC SAN Module supports interoperability for the following functions:

- link initialization
- principal FC SAN Module selection
- routing (FSPF)

- soft WWN zoning
- SNMP facilities

Port negotiation

The FC SAN Module has been designed to be highly interoperable. Eight Gbps ports support 2, 4, and 8 Gbps transmit and receive rates with autonegotiation. You can also install 4 Gbps SFPs, which allow 1 Gbps, 2 Gbps, and 4 Gbps transmit and receive rates with autonegotiation. The actual data signaling rate used on a port is automatically sensed and set to the rate supported by the device or devices attached to the port.

NOTE
You must install Dell-supported SFPs in the FC SAN Module.

If the FC SAN Module is connected to a device, but is unable to negotiate the signaling rate, the operator can manually set the speed of each port through CLI.

The FC SAN Module is compliant with current Fibre Channel standards, including most current-generation switch N_Ports, NL_Ports and host adapters, Redundant Array of Independent Disks (RAID) storage devices, hubs, Fibre-SCSI bridge devices, and older switch families.

Operating system support

There are no specific host operating system dependencies.

Accessing the FC SAN Module

The FC SAN Module is managed as a single element. It has a single IP address and appears as a separate entity to the Telnet protocol and the Simple Network Management Protocol (SNMP).

When SNMP devices send SNMP messages to a management console running SAN management software, the information is stored in a Management Information Base (MIB). The FC SAN Module Fabric OS 4.4.1 supports the FibreAlliance Fibre Channel Management (FCMGMT) MIBs, allowing the provision of needed information to a SAN administrator.

Secure Telnet access is available using Secure Shell (SSH), a network security protocol for secure remote login and other secure network services over an insecure network.

Interpreting POST results

The power-on self test (POST) system check is performed each time the FC SAN Module is powered on, rebooted, or reset.

Example POST Output

```
POST1: Started running Tue Nov  9 20:27:57 GMT 2004
POST1: Test #1 - Running turboramtest
POST1: Test #2 - Running centralmemorytest
POST1: Test #3 - Running cmitest
POST2: Running diagshow
POST1: Script PASSED with exit status of 0 Tue Nov  9 20:28:10 GMT 2004 took
(0:
0:13)
POST2: Started running Tue Nov  9 20:28:12 GMT 2004
POST2: Test #1 - Running camtest
POST2: Test #2 - Running txdpath
POST2: Test #3 - Running spinsilk (SERDES)
POST2: Running diagshow
POST2: Script PASSED with exit status of 0 Tue Nov  9 20:29:11 GMT 2006 took
(0:
0:59)
Initializing Ports ....
Port Initialization Completed
Enabling switch...
```

During POST, the LEDs are activated in various indicator patterns.

Perform the following steps to determine POST completion status.

1. Verify that the LEDs on the FC SAN Module indicate a healthy FC SAN Module. LED patterns are described in .

    If one or more LEDs do not display a healthy state, verify that the LEDs are not set to beacon. Use the FC SAN Module CLI **switchShow** command or Web Tools to verify the LED state. For information about how to turn beaconing on and off, see the *Dell 8/4Gbps FC SAN Module Administrator's Guide*.

2. Use the Blade Enclosure's Chassis Management Controller (CMC) GUI to verify that the FC SAN Module is working correctly.

    For details, refer to the *Hardware Owner's Manual* for the PowerEdge Blade Enclosure.

3. Review the system log for errors.

Any errors detected during POST are written to the system log. Access this log through the Module's CLI **errShow** command. For information about this command, see the *Dell 8/4Gbps FC SAN Module Administrator's Guide*.

Interpreting LED activity

Each FC SAN Module uses LEDs to indicate status. These LEDs are shown in Figure 5.
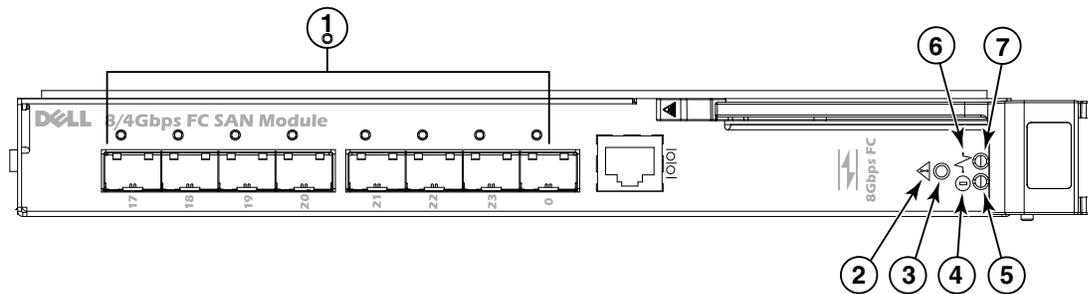
FIGURE 5   LED Locations

TABLE 2   Key to Figure 5

Location	Indicator	Color	Operation
1	FC (external) port status	green/amber	Note: LED meanings are not valid during boot, diagnostics, or POST. Green: Off (dark): No signal carrier or unlicensed. Steady: Online normal active port but no port activity. Flickering: normal active port (I/O activity). Slow blink: Online but segmented. Fast blink: Internal loopback. Amber Steady: Signal present but not online. Slow blink or flash: Disabled port (less than two second interval). Fast (rapid) blink or flash: Error or fault with port (less than 1/2 second interval).
2 (status icon) and 3 (LED)	module status	green/amber	Off: FC SAN Module is off or power supplies for the Blade Server or onboard DCC have failed. Green: No errors and all ports are ready for use. Amber: Steady: Boot-up state, port(s) offline, or in reset state. Blinking (green/amber): One or more environmental ranges are exceeded, or error log contains diagnostic error messages. Note: The LED might blink during testing.

TABLE 2 Key to Figure 5 (Continued)

Location	Indicator	Color (Continued)	Operation (Continued)
4 (icons) and 5 (LED)	module power	green	Off: FC SAN Module is off or power supplies for the Blade Server Enclosure or onboard DCC have failed. Green: Normal operation and power supply is functioning. properly. Power is supplied by the Blade Server Enclosure.
6 (icon) 7 (LED)	server management	blue/amber	Controlled by the PowerEdge Blade Enclosure's CLI. For details, refer to the *Hardware Owner's Manual* for the Blade Enclosure.

Locating the serial number

Before contacting service support, be sure to obtain the module's serial number. Use one of these methods to locate the number:

- Use the CLI and enter the **ChassisShow** command. The FC SAN Module serial number is displayed along with other data.

- Locate the serial number on the label attached to the FC SAN Module. Refer to Figure 3 on page 10 for location.

Removing and replacing the FC SAN Module

Complete the following steps to remove and replace a failed FC SAN Module.

NOTE
Before beginning this procedure, ensure that you have a replacement FC SAN Module or filler panel available because you do not want to leave the slot on the Blade Enclosure open for an extended period of time. The slot must be filled with either a replacement FC SAN Module or a filler panel to maintain proper airflow.

1. Back up the FC SAN Module configuration to an FTP server by using the Module's **configUpload** CLI command and following the prompts.

   This command uploads the FC SAN Module configuration to the server, making it available for downloading to a replacement FC SAN Module if necessary. It is recommended to back up the configuration on a regular basis to ensure that a complete configuration is available for downloading to a replacement FC SAN Module.

2. Stop all SAN activity requiring the ports used by the FC SAN Module.

   For details about port management, refer to your Blade Enclosure Hardware Owner's Manual. Verify that there is no activity by viewing the FC SAN Module LEDs. For details about LED activity on the FC SAN Module, see "Interpreting LED activity" on page 23.

3. Remove all cables from the SFP modules.

4. Remove the SFP modules according to the manufacturer's instructions.

   Figure 6 on page 25 details the generic process for removing an SFP from a port.

FIGURE 6   Removing an SFP from a Port
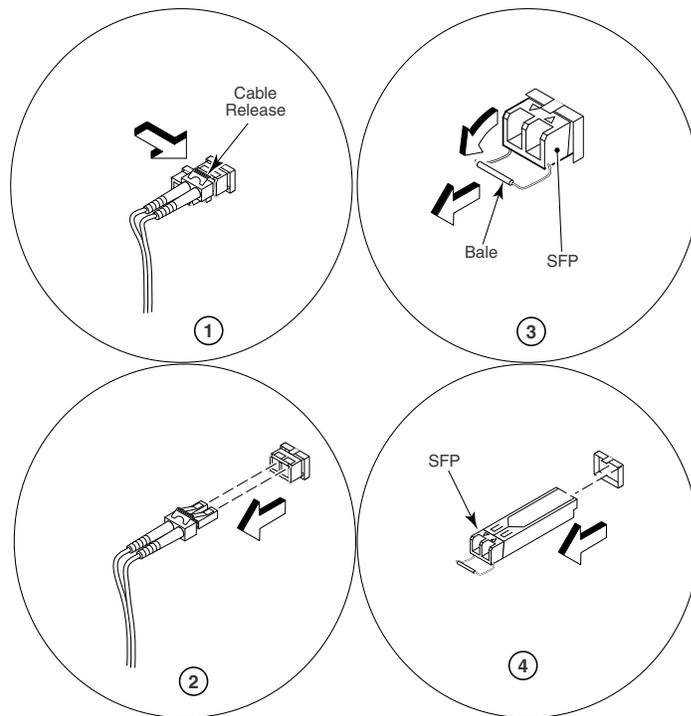
5.   Refer to the *Hardware Owner's Manual* for the PowerEdge Blade Enclosure to remove and replace the FC SAN Module from the enclosure.

ATTENTION

If you are not replacing the FC SAN Module, use a filler panel to fill the empty slot to maintain proper air flow. Do not leave the slot empty.

3

Removing and replacing the FC SAN Module

8/4Gbps FC SAN Module specifications

This appendix provides product specifications and regulatory compliance as a handy reference.

Default port mapping

The Dell 8/4Gbps FC SAN Module can contain 24 total ports. Of these, F_Ports are ports 1-16 and N_Ports are ports 0 and 17-23.

The FC SAN Module is operates in NPIV mode only. In NPIV mode, the FC SAN Module F_Ports are mapped to N_Ports. This following lists the factory-default F_Port to N_Port mapping for NPIV mode. Since the FC SAN Module is shipped with Dynamic port licensing enabled, any out of the 24 ports can be enabled. Therefore this mapping applies for 12 active ports or, if a port upgrade license is enabled, for 24 ports. For more information on changing port mapping and managing ports in NPIV mode, refer to the *Dell 8/4Gbps FC SAN Module Administrator's Guide*.

- 17-23, 0 as N_Port with failover enabled, failback enabled
- 1, 2 mapped to 17
- 3, 4 mapped to 18
- 5, 6 mapped to 19·
- 7, 8 mapped to 20
- 9, 10 mapped to 21·
- 11, 12 mapped to 22·
- 13, 14 mapped to 23·
- 15, 16 mapped to 0

Processor and memory specifications

The processor and memory installed in the 8/4Gbps FC SAN Module are shown in Table 3.

TABLE 3   Memory Specifications

Memory Type	Value
PowerPC 440EPX processor	667 MHz
SDRAM	512 MB DDR2 - for system memory at 64 bits wide with 8 ECC operating at 166 MHz
Boot flash	4 MB
Compact flash	512 MB

Weight and physical dimensions

Table 4 lists the weight and physical dimensions of the 8/4Gbps FC SAN Module.

TABLE 4   8/4Gbps FC SAN Module Specifications

Dimension	Measurements
Height	1.27 in (32.48 mm)
Width	10.74 in (272.75 mm)
Depth	12.09 in (307.24 mm)
Weight	4.65 (2.10 kg) — without media

Facility requirements

The information in Table 5 shows the operating and non-operating limitations of the Dell 8/4Gbps FC SAN Module

TABLE 5   Environmental Requirements

Condition	Operating	Non-operating
Temperature	32°F to 104°F (0°C to 40°C)	-4°F to 158°F (-20°C to 70°C)
Humidity	10% to 90%, non-condensing at 84.2°F (29°C)	5% to 95%, non-condensing at 100.4 °F (38°C)
Altitude	Up to 10,000 ft (3,048 m)	35,000 ft (10,668 m)
Shock	20 G for 6 ms	50G with velocity change of 4216 mm/sec squared
Vibration	0.4 G at 5-500 Hz for 60 minutes	0.5 G at 2-200 Hz for 15 minutes
Air flow	86 °F (30°C) Ambient: Approx. 3CFM 104°F (40°C) Ambient: Approx. 9CFM	None required

Electrical

Table 6 lists FC SAN Module electrical specifications.

TABLE 6   Electrical specifications and requirements

Dimension	Measurements
DC input	12 V and 3.3 V from chassis
Power consumption	About 32 W normally and 39 W maximum measured

Architectural specification

The 8/4Gbps FC SAN Module meets the specifications shown in Table 7.

TABLE 7   Architecture

Feature	Description
NPIV logins per port	Max: 254, Default: 126
NPIV login per Module	Max: 2032, Default: 384.
Performance	1.063 Gbps line speed, full duplex 2.125 Gbps line speed, full duplex 4.25 Gbps line speed, full duplex 8.50 Gbps line speed, full duplex
Fabric latency (Fabric OS Native mode only)	<0.7 sec with no contention
Maximum frame size	2112-byte payload
Class of service	Class 2 Class 3
Port types	FL_Port F_Port N_Port

Supported HBAs

For more information and a list of supported HBAs, refer to your Dell PowerEdge documentation.

Optical transceivers supported

The following optical transceivers are validated and approved for use with your FC SAN Module.

TABLE 8   Optical transceiver supported with your FC SAN Module

Description	US SKU	MOD	PN
8Gb FC Long Wave SFP Transceiver	330-4328	J922G	K451G
8Gb FC Short Wave SFP Transceiver	330-2107	C866K	K441G
4Gb FC Short Wave SFP Transceiver	330-2344	K168K	T151G

Fibre Channel standards compliance

The 8/4Gbps FC SAN Module switch meets or exceeds the following Fibre Channel standards for compliance, performance, and feature capabilities:

- FC-GS-5 ANSI INCITS 427: (includes the following.)

  FC-GS-4 ANSI INCITS 387: 2004

- FC-IFR revision 1.01
- FC-VI INCITS 357: 2002
- FC-TAPE INCITS TR-24: 1999
- FC-DA INCITS TR-36: 2004 (includes the following)
  - FC-FLA INCITS TR-20: 1998
  - FC-PLDA INCIT S TR-19: 1998
- FC-MI-2 ANSI/INCITS TR-39-2005
- FC-PI INCITS 352: 2002
- FC-PI-2 INCITS 404: 2005
- FC-PI-4 INCITS 1647-D, revision 7.1 (under development)
- FC-FS-2 ANSI/INCITS 424:2006 (includes the following)

  FC-FS INCITS 373: 2003

- FC-LS revision 1.62
- FC-BB-3 INCITS 414: 2006 (includes the following)

  FC-BB-2 INCITS 372: 2003

- RFC 2625 IP and ARP Over FC
- RFC 2837 Fabric Element MIB
- MIB-FA INCITS TR-32: 2003
- FCP-3 INCITS 416: 2006 (replaces FCP ANSI X3.269: 1996)

Regulatory compliance

This section describes the regulatory compliance requirements for the Dell 8/4Gbps FC SAN Module.

FCC warning (US only)

This equipment has been tested and complies with the limits for a Class A computing device pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment.

This equipment generates, uses, and can radiate radio frequency energy, and if not installed and used in accordance with the instruction manual, might cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at the user's own expense.

Korea Communications Commission (KCC) statement

사용자 안내문 : A 급기기

이 기기는 업무용으로 전자파 적합 등록을 받은 기기
이오니, 판매자 또는 사용자는 이점을 주의하시기
바라며, 만약 잘못 구입하셨을 때에는 구입한 곳에
서 비업무용으로 교환하시기 바랍니다.

VCCI statement (Japan)

This is a Class A product based on the standard of the Voluntary Control Council for Interference by Information Technology Equipment (VCCI). If this equipment is used in a domestic environment, radio disturbance might arise. When such trouble occurs, the user might be required to take corrective actions.

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

CE statement

ATTENTION
This is a Class A product. In a domestic environment, this product might cause radio interference, and the user might be required to take corrective measures.

The standards compliance label on the FC SAN Module contains the CE mark which indicates that this system conforms to the provisions of the following European Council directives, laws, and standards:

- Electromagnetic Compatibility (EMC) Directive 89/336/EEC and the Complementary Directives 92/31/EEC and 93/68/EEC
- Low Voltage Directive (LVD) 73/23/EEC and the Complementary Directive 93/68/EEC
- EN50082-2/EN55024:1998 (European Immunity Requirements)
  - EN61000-3-2/JEIDA (European and Japanese Harmonics Spec)
  - EN61000-3-3

Canadian requirements

This Class A digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations, ICES-003 Class A.

Laser compliance

This equipment contains Class 1 laser products and complies with FDA Radiation Performance Standards, 21 CFR Subchapter I and the international laser safety standard EN60825-1:1994 +A1+A2.

⚠ **CAUTION**

Use only optical transceivers that are qualified by Dell Inc. with this product and comply with the FDA Class 1 radiation performance requirements defined in 21 CFR Subchapter I, and with IEC825-2 to EN60825-1:1994 +A1+A2. Optical products that do not comply with these standards might emit light that is hazardous to the eyes.

Regulatory compliance standards

Table 9 lists the regulatory compliance standards for which the FC SAN Module is certified.

TABLE 9   Regulatory compliance standards

Country	Standards		Agency Certifications and Markings	
	Safety	**EMC**	**Safety**	**EMC**
United States	Bi-Nat UL/CSA 60950-1 1st Ed or latest	ANSI C63.4	cCSAus	FCC Class B and Statement
Canada	Bi-Nat UL/CSA 60950-1 1st Ed or latest	ICES-003 Class A	cCSAus	ICES A and Statement
Japan		CISPR22 and JEIDA (Harmonics)		VCCI-A and Statement
European Union	EN60950-1 or latest	EN55022 and EN55024	TUV Type	CE marking
Australia, New Zealand		EN55022 or CISPR22 or AS/NZS CISPR22		C-Tick mark
Korea		KN22 and KN24		MIC mark Class A

Environmental regulation compliance

This section describes the China ROHS environmental regulatory compliance requirements for the FC SAN Module.

Environmental Protection Use Period (EPUP) Disclaimer

In no event do the EPUP logos shown on the product and FRUs alter or expand that warranty that Dell provides with respect to its products as set forth in the applicable contract between Dell and its customer. Dell hereby disclaims all other warranties and representations with respect to the information contained on this CD including the implied warranties of merchantability, fitness for a particular purposes and non-infringement.

The EPUP assumes that the product will be used under normal conditions in accordance with the operating manual of the product.

环保使用期限 **(EPUP)** 免责声明：
EPUP　　标志不会出现在产品和　　FRU　　的改装产品中，也不会对　DELL
所提供的相关产品保修条款（该保修条款在　DELL
及其客户间达成的适用合同中列出）进行增补。对于此 CD
上包含的相关信息，如适销性、针对特定用途的适用性和非侵权性的暗示保证，
DELL 在此郑重声明本公司对于与上述信息相关的所有其他保证和陈述概不负责。
EPUP 假设在"产品操作手册"中注明的常规条件下使用该产品。

China RoHS

The contents included in this section are per the requirements of the People's Republic of China-Management Methods for Controlling Pollution by Electronic Information products.

遵守环境法规

中国 **RoHS**

本节中包含的内容都遵守了中华人民共和国《电子信息产品污染控制管理办法》的要求。

Names and Contents of the Toxic and Hazardous Substances or Elements

In accordance with China's Management Measures on the Control of Pollution caused by Electronic Information products (Decree No. 39 by the Ministry of Information Industry), the following information is provided regarding the names and concentration level of Hazardous substances (HS) which may be contained in this product.

China ROHS Hazardous Substances/Toxic Substances (HS/TS) Concentration Chart

Name of the Component	Hazardous/Toxic Substance/Elements					
	Lead (PB)	Mercury (Hg)	Cadium (CD)	Hexavalent Chromium (CR6+)	Polybrominated Biphenyl (PBB)	Polybrominated Diphenyl Ether (PBDE)
Fibre Channel Switch	X	O	O	O	O	O
PCBA cards	X	O	O	O	O	O
SFPs (optical cable connectors)	X	O	O	O	O	O
Sheet Metal	X	O	O	O	O	O
Mechanical brackets and Slides	X	O	O	O	O	O
Software/ Documentation CDs	O	O	O	O	O	O

X indicates that the concentration of such hazardous/toxic substance in all the units of homogeneous material of such component is higher than the SJ/T11363-2006 Requirements for Concentration Limits.

O indicates that no such substances are used or that the concentration is within the aforementioned limits.

CHINA ROHS有害物质/有毒物质(HS/TS)限量列表

有毒与有害物质或元素的名称及含量

根据中国的<<电子信息产品污染控制管理办法>>

(信息产业部第39号令)，本公司提供以下有关产品中可能含有的有害物质(HS)的名称及含量水平的信息。

主要部件名称	有害/有毒物质或元素					
	铅 （PB）	汞 （Hg）	镉 （CD）	六价铬 （CR6+）	多溴联苯 （PBB）	多溴二苯醚 （PBDE）
光纤通道交换机	X	O	O	O	O	O
线路板部件	X	O	O	O	O	O
SFP（光纤接头）	X	O	O	O	O	O
钣金件	X	O	O	O	O	O
机械支架及滑轨	X	O	O	O	O	O
软件/文档光盘	O	O	O	O	O	O

X　　表示此类部件内同质材料中的有害/有毒含量高于SJ/T11363-2006的限量要求。

O　　表示未使用此类物质或其含量低于上述限量要求。

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