BladeCenter Virtual Fabric 10Gb Switch Module

Installation Guide
BladeCenter Virtual Fabric 10Gb Switch Module

Installation Guide
Note: Before using this information and the product it supports, read the general information in Appendix B, “Notices,” on page 57, the Safety Information and Environmental Notices and User Guide documents on the Documentation CD, and the Important Notices document that comes with the product.
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Safety

Before installing this product, read the Safety Information.

Antes de instalar este producto, lea las Informaciones de Seguridad.

安裝本產品之前，請詳細閱讀 Safety Information

(安全信息)。

Ennen kuin asennat tämän tuotteen, lue turvaohjeet kohdasta Safety Information.

Avant d'installer ce produit, lisez les consignes de sécurité.

Vor der Installation dieses Produkts die Sicherheitshinweise lesen.

Πριν εγκαταστήσετε το προϊόν αυτό, διαβάστε τις πληροφορίες ασφάλειας (safety information).

לפני מתן צוות זה, קורא את ההוראות הבוסתרות.

A termék telepítése előtt olvassa el a Biztonsági előírásokat!

Prima di installare questo prodotto, leggere le Informazioni sulla Sicurezza.

製品の設置の前に、安全情報をお読みください。

본 제품을 설치하기 전에 안전 정보를 읽으십시오.

Пред да се инсталира овој продукт, прочитајте информацијата за безбедност.

Les sikkerhetsinformasjonen (Safety Information) før du installerer dette produktet.

Przed zainstalowaniem tego produktu, należy zapoznać się z książką "Informacje dotyczące bezpieczeństwa" (Safety Information).

Antes de instalar este producto, lea la información de seguridad.

Перед установкой продукта прочтите инструкции по технике безопасности.

Pred inštaláciou tohto zariadenia si pečítajte Bezpečnostné predpisy.

Pred namestitvijo tega proizvoda preberite Varnostne informacije.

Antes de instalar este producto, lea la información de seguridad.

Läs säkerhetsinformationen innan du installerar den här produkten.
Important:

Each caution and danger statement in this document is labeled with a number. This number is used to cross reference an English-language caution or danger statement with translated versions of the caution or danger statement in the Systems Safety Notices document.

For example, if a caution statement is labeled “Statement 1,” translations for that caution statement are in the Systems Safety Notices document under “Statement 1.”

Be sure to read all caution and danger statements in this document before you perform the procedures. Read any additional safety information that comes with the server or optional device before you install the device.

This device is intended for use with UL Listed BladeCenters.
Statement 1:

DANGER

Electrical current from power, telephone, and communication cables is hazardous.

To avoid a shock hazard:
- Do not connect or disconnect any cables or perform installation, maintenance, or reconfiguration of this product during an electrical storm.
- Connect all power cords to a properly wired and grounded electrical outlet.
- Connect to properly wired outlets any equipment that will be attached to this product.
- When possible, use one hand only to connect or disconnect signal cables.
- Never turn on any equipment when there is evidence of fire, water, or structural damage.
- Disconnect the attached power cords, telecommunications systems, networks, and modems before you open the device covers, unless instructed otherwise in the installation and configuration procedures.
- Connect and disconnect cables as described in the following table when installing, moving, or opening covers on this product or attached devices.

<table>
<thead>
<tr>
<th>To Connect:</th>
<th>To Disconnect:</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Turn everything OFF.</td>
<td>1. Turn everything OFF.</td>
</tr>
<tr>
<td>2. First, attach all cables to devices.</td>
<td>2. First, remove power cords from outlet.</td>
</tr>
<tr>
<td>3. Attach signal cables to connectors.</td>
<td>3. Remove signal cables from connectors.</td>
</tr>
<tr>
<td>4. Attach power cords to outlet.</td>
<td>4. Remove all cables from devices.</td>
</tr>
<tr>
<td>5. Turn device ON.</td>
<td></td>
</tr>
</tbody>
</table>
CAUTION:
When laser products (such as CD-ROMs, DVD drives, fiber optic devices, or transmitters) are installed, note the following:

DANGER
Some laser products contain an embedded Class 3A or Class 3B laser diode. Note the following.
Laser radiation when open. Do not stare into the beam, do not view directly with optical instruments, and avoid direct exposure to the beam.

Class 1 Laser Product
Laser Klasse 1
Laser Klass 1
Luokan 1 Laserlaite
Appareil À Laser de Classe 1
Statement 8:

CAUTION:
Never remove the cover on a power supply or any part that has the following label attached.

Hazardous voltage, current, and energy levels are present inside any component that has this label attached. There are no serviceable parts inside these components. If you suspect a problem with one of these parts, contact a service technician.
Chapter 1. The BladeCenter Virtual Fabric 10Gb Switch Module

The BladeCenter Virtual Fabric 10Gb Switch Module is a high-speed Ethernet component that is installed into a BladeCenter unit that supports high-speed I/O modules.

This Installation Guide contains instructions for and information about:

- Setting up and installing or replacing the BladeCenter Virtual Fabric 10Gb Switch Module
- Installing and removing optional devices in the switch module
- Using the information panel, LEDs, and external ports on the switch module
- Cabling the switch module and its optional devices
- Configuring the switch module
- Updating the switch-module software
- Solving problems with the switch module

For installation instructions, see Chapter 2, “Installing and replacing a switch module,” on page 7 and Chapter 3, “Installing and removing a 10 Gb SFP+ module,” on page 15. For additional information about switch modules and other BladeCenter components, see the BladeCenter documentation that comes with these devices.

To support each BladeCenter Virtual Fabric 10Gb Switch Module that you install in the BladeCenter unit, you must also install a compatible high-speed Ethernet expansion card (also known as an Ethernet I/O card) in each blade server that you want to communicate with the switch module. In this environment, the expansion card operates as a host channel adapter (HCA). For additional information, see Chapter 2, “Installing and replacing a switch module,” on page 7 and the installation information for the Ethernet expansion card.

For information about the types of compatible expansion cards for the blade server, contact your marketing representative or authorized reseller. For a list of supported optional devices for the blade server, see [http://www.ibm.com/servers/eserver/serverproven/compat/us/] For details about compatible expansion card installation, configuration, and use, see the documentation that comes with the adapter.

You can obtain up-to-date information about the switch module at [http://www.ibm.com/systems/bladecenter/]

Notes:

1. Throughout this document, the BladeCenter Virtual Fabric 10Gb Switch Module is referred to as the high-speed switch module, the HSSM, the switch module, or the I/O module.

2. Unless otherwise stated, references to the BladeCenter unit apply to all BladeCenter units that support high-speed I/O modules, such as the BladeCenter H unit.
3. Changes are made periodically to the support website. Procedures for locating firmware and documentation might vary slightly from what is described in this document.
4. The illustrations in this document might differ slightly from your hardware.
5. The screens that are described or referenced in this document might differ slightly from the screens that are displayed by your system. Screen content varies according to the type of BladeCenter unit and the firmware versions and options that are installed.
6. Unless otherwise stated, references to the management module apply only to the BladeCenter Advanced Management Module, which is the only type of management module that supports the switch module.

The switch module has the following components:
• Fourteen internal 10 Gb ports, one connected to each of the blade servers in the BladeCenter unit
• Two internal 1 Gb ports to connect to the management module
• Ten external 10 Gb user ports for connecting small-form-factor pluggable (SFP+) modules
• One external 1 Gb Ethernet port
• One external RS-232 serial port for management use

You can manage and configure the switch module through multiple interfaces:
• A Telnet connection to the embedded command-line interface (CLI)
• A terminal emulation program connection to the serial-port interface
• A Web browser-based interface (BBI) connection to the switch module

Record information about the switch module in the following table. The product name and serial number are on the identification label on the bottom cover of the switch module. The media access control (MAC) address is on a separate label on the bottom cover of the switch module. For an illustration that shows the locations of these labels, see “Major components of the switch module” on page 5. You will need this information when you register the switch module. You can register the switch module at http://www.ibm.com/support/mynotifications/.

<table>
<thead>
<tr>
<th>Product name</th>
<th>BladeCenter Virtual Fabric 10Gb Switch Module</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model number</td>
<td></td>
</tr>
<tr>
<td>Serial number</td>
<td></td>
</tr>
<tr>
<td>Part number</td>
<td></td>
</tr>
<tr>
<td>Media access control (MAC)</td>
<td></td>
</tr>
<tr>
<td>address for switch module</td>
<td></td>
</tr>
<tr>
<td>MAC addresses for other</td>
<td></td>
</tr>
<tr>
<td>components</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Specifications

For detailed information about the switch-module hardware and software features, specifications, and standards, see the switch module Application Guide.

Related documentation

This Installation Guide contains setup and installation instructions for the switch module and general information about the switch module, including getting started, how to configure the switch module, and how to get help.

Notes:

• The most recent versions of this Installation Guide and all other BladeCenter documentation are at http://www-947.ibm.com/support/entry/portal/documentation/ enter the name of your product in the Quick Find field and press Enter.
• Depending on your blade server model, additional documentation might be included on the BladeCenter Documentation CD for your BladeCenter unit type.

The following related documentation is available at http://www-947.ibm.com/support/entry/portal/documentation/ :

• BladeCenter Problem Determination and Service Guide
• BladeCenter Hardware Maintenance Manual and Troubleshooting Guide
• BladeCenter Advanced Management Module Installation Guide or BladeCenter T Advanced Management Module Installation Guide
• BladeCenter Advanced Management Module Command-Line Interface Reference Guide
• BladeCenter Advanced Management Module User’s Guide
• Installation and User’s Guide for the BladeCenter unit
• Systems Safety Notices
• Broadcom 10 Gb 2-Port and 4-Port Ethernet Expansion Cards (CFFh) for BladeCenter Installation and User’s Guide
• Application Guide for the BladeCenter Virtual Fabric 10Gb Switch Module
• BBI Quick Guide for the BladeCenter Virtual Fabric 10Gb Switch Module
• Menu-Based CLI Command Reference for the BladeCenter Virtual Fabric 10Gb Switch Module
• ISCLI-Industry Standard CLI Command Reference for the BladeCenter Virtual Fabric 10Gb Switch Module

See the Configuration and Options Guide for information about which SFP+ module and cable are required to connect the switch module to other network devices. This document is available in both HTML and Portable Document Format (PDF) from http://www-03.ibm.com/systems/xbc/cog/search.html

For more information about documentation requirements, see “Using the documentation” on page 34.
Inventory checklist

Make sure that the shipping carton contains the following items:

- One switch module
- One filler module
- One Documentation CD which includes the BladeCenter Virtual Fabric 10Gb Switch Module Installation Guide (this document)
- One Environmental Notices CD
- One Warranty document
- One Important Notices document

If any of these items are missing or damaged, contact your authorized reseller for replacement.

Notices and statements in this document

The caution and danger statements in this document are also in the multilingual Systems Safety Notices document, which is on the BladeCenter Documentation CD for the BladeCenter unit. Each statement is numbered for reference to the corresponding statement in your language in the Systems Safety Notices document.

The following notices and statements are used in this document:

- **Note:** These notices provide important tips, guidance, or advice.
- **Important:** These notices provide information or advice that might help you avoid inconvenient or problem situations.
- **Attention:** These notices indicate potential damage to programs, devices, or data. An attention notice is placed just before the instruction or situation in which damage could occur.
- **Caution:** These statements indicate situations that can be potentially hazardous to you. A caution statement is placed just before the description of a potentially hazardous procedure step or situation.
- **Danger:** These statements indicate situations that can be potentially lethal or extremely hazardous to you. A danger statement is placed just before the description of a potentially lethal or extremely hazardous procedure step or situation.
Major components of the switch module

The following illustration shows the major components of the switch module.

Note: The illustrations in this document might differ slightly from your hardware, and your switch module might have labels that are not shown in the illustrations in this document.

For more information about the components of the information panel, see Chapter 6, “Information panels, LEDs, and external ports,” on page 25.
Chapter 2. Installing and replacing a switch module

This chapter provides instructions for installing a switch module in the BladeCenter unit and for removing a switch module from the BladeCenter unit. See the documentation for your BladeCenter unit for information about I/O-module bay locations and the components that can be installed in them that is specific to your BladeCenter unit type.

The following illustration shows an example of a BladeCenter unit with the I/O-module bays identified. In this example, these bays are in the rear of the BladeCenter chassis. In a different type of BladeCenter unit, the bays might be in a different location.

An expansion card or host channel adapter (HCA) must be installed in each blade server that you want to communicate with. To enable the switch module to communicate with a blade server, at least one switch module must be installed in the BladeCenter unit. For details about expansion-card installation, configuration, and use, see the documentation that comes with the expansion card.

Installing a second switch module enables a redundant path and a separate connection from the blade server to the external Ethernet network.

The BladeCenter unit supports a maximum of four BladeCenter Virtual Fabric 10Gb Switch Modules. Depending on the type of BladeCenter unit that you are using, the BladeCenter unit supports a maximum of 10 or 14 expansion cards.
Notes:

- The blade servers or BladeCenter units that are described or shown in this document might be different from your blade server or BladeCenter unit. For additional information, see the documentation that comes with your blade server or BladeCenter unit.
- If you are installing only one switch module, use I/O-module bay 7 or 9.
- When the switch module is installed in a BladeCenter unit, the internal ports operate at 10 Gbps. The external ports can operate at 10 Gbps or 1 Gbps, depending on the SFP module type.

Installation guidelines

Before you install the switch module in the BladeCenter unit, read the following information:

- Read the safety information that begins on page [Handling static-sensitive devices](#) and the safety statements in the BladeCenter unit documentation. This information will help you work safely.
- Observe good housekeeping in the area where you are working. Place removed covers and other parts in a safe place.
- Blue on a component indicates touch points, where you can grip the component to remove it from or install it in the blade server or BladeCenter unit, open or close a latch, and so on.
- Orange on a component or an orange label on or near a component on the switch module, blade server, or BladeCenter unit indicates that the component can be hot-swapped, which means that if the BladeCenter unit and operating system support hot-swap capability, you can remove or install the component while the BladeCenter unit is running. (Orange can also indicate touch points on hot-swap components.) See the instructions for removing or installing a specific hot-swap component for any additional procedures that you might have to perform before you remove or install the component.
- You do not have to turn off the BladeCenter unit to install or replace any of the hot-swap modules on the front or rear of the BladeCenter unit.
- When you install a switch module in the BladeCenter unit, you must also install a compatible I/O expansion card in the blade server to support the switch module.
- When you are finished working on the blade server or BladeCenter unit, reinstall all safety shields, guards, labels, and ground wires.

System reliability guidelines

To help ensure proper cooling, performance, and system reliability, make sure that the following requirements are met:

- Each of the module bays on the rear of the BladeCenter unit contains either a module or a filler module.
- A removed hot-swap module is replaced with an identical module or filler module within 1 minute of removal.
- A removed hot-swap blade server is replaced with another blade server or filler blade within 1 minute of removal.
• The ventilation areas on the sides of the blade server are not blocked.
• You have followed the reliability guidelines in the documentation that comes with the BladeCenter unit.

Cable requirements for the switch module are described in the Configuration and Options Guide at http://www-03.ibm.com/systems/xbc/cog/search.html. See the documentation that comes with the blade server for cable-routing information.

Handling static-sensitive devices

Attention: Static electricity can damage the BladeCenter unit and other electronic devices. To avoid damage, keep static-sensitive devices in their static-protective packages until you are ready to install them.

To reduce the possibility of electrostatic discharge, observe the following precautions:
• Limit your movement. Movement can cause static electricity to build up around you.
• Handle the device carefully, holding it by its edges or its frame.
• Do not touch solder joints, pins, or exposed printed circuitry.
• Do not leave the device where others can handle and damage it.
• While the device is still in its static-protective package, touch it to an unpainted metal surface of the BladeCenter unit chassis or an unpainted metal surface on any other grounded rack component in the rack that you are installing the device in for at least 2 seconds. This drains static electricity from the package and from your body.
• Remove the device from its package and install it directly into the BladeCenter unit without setting down the device. If it is necessary to set down the device, put it back into its static-protective package. Do not place the device on the BladeCenter unit or on a metal surface.
• Take additional care when you handle devices during cold weather. Heating reduces indoor humidity and increases static electricity.
• Some types of BladeCenter units come with electrostatic discharge (ESD) connectors. If the BladeCenter unit is equipped with an ESD connector, see the documentation that comes with the BladeCenter unit for using the ESD connector.
Installing a switch module

Note: The following illustration shows how to install a switch module in a Type 8852 BladeCenter unit. The appearance of your BladeCenter unit might be different; see the documentation for your BladeCenter unit for additional information.

To install a switch module, complete the following steps:

1. Read the safety information that begins on page v and “Installation guidelines” on page 8.
2. Select I/O-module bay in which to install the switch module.
   
   Note: For details about I/O-module bay requirements and bay locations, see the documentation for the BladeCenter unit and blade servers.
3. Remove the filler module from the selected bay. Store the filler module for future use.
4. If you have not already done so, touch the static-protective package that contains the switch module to an unpainted metal surface of the BladeCenter unit or an unpainted metal surface on any other grounded rack-component for at least 2 seconds.
5. If the removed filler module (from step 3) occupied two bays:
   - Remove the single-high filler module from its static-protective package.
   - Install the single-high filler module into the unused bay.
6. Remove the switch module from its static-protective package.
7. Make sure that the release levers on the switch module are in the open position (perpendicular to the module).
   For specific instructions for installing a switch module in the BladeCenter unit, see the documentation that comes with the BladeCenter unit.
8. Slide the switch module into the applicable I/O-module bay until it stops.
9. Push the release levers on the front of the switch module to the closed position. After you insert and lock the switch module, it is turned on, and a power-on self-test (POST) occurs to verify that the switch module is operating correctly.
Notes:

a. The switch module takes approximately 60 seconds to complete the POST. When the switch module is turned on, an LED test occurs. All LEDs are lit and remain lit during POST; then, all the LEDs except the OK LED turn off. This indicates normal POST results.

b. To maintain proper airflow, make sure that the ventilation holes on the front of the switch module are not blocked.

10. Make sure that the LEDs on the switch module indicate that it is operating correctly (see “Information LEDs” on page 26).

11. If you have another switch module to install, repeat step 3 on page 10 through step 10; otherwise, go to the next step.

12. Install the SFP+ modules in the switch module. For information and instructions, see Chapter 3, “Installing and removing a 10 Gb SFP+ module,” on page 15 and the documentation that comes with the SFP+ module.

13. Attach any cables that are required by the switch module. For additional information about cabling the switch module, see Chapter 4, “Cabling the switch module and the SFP+ module,” on page 19 and the documentation that comes with the cables, and the optional network devices to which the cables have been connected. For the locations of the connectors on the BladeCenter unit, see the documentation that comes with the BladeCenter unit. Then, continue with the next step.

14. Make sure that the external ports on the switch module are enabled through one of the management-module interfaces, such as the Web-based interface or the CLI.
Removing or replacing a switch module

Note: The following illustration shows how to remove and replace a switch module from a Type 8852 BladeCenter unit. The appearance of your BladeCenter unit might be different; see the documentation for your BladeCenter unit for additional information.

To replace a switch module, complete the following steps:

1. Read the safety information that begins on page v and “Installation guidelines” on page 8.

2. Disconnect any cables from the switch module that you are removing. Removing these cables (especially an Ethernet cable) disrupts the network connection from the external Ethernet port to any connected external Ethernet devices. If you plan to replace the switch module with another switch module, you can use the existing Ethernet cable, provided that it remains securely attached to the Ethernet network. For additional information about cabling the switch module, see Chapter 4, “Cabling the switch module and the SFP+ module,” on page 19, the documentation that comes with the cables, and the optional network devices to which the cables have been connected. For the locations of the connectors on the BladeCenter unit, see the documentation that comes with the BladeCenter unit. Then, continue with step 3.

3. Pull the release latches out from the switch module. The switch module moves out of the bay approximately 0.6 cm (0.25 inch).

4. Slide the switch module out of the bay and set it aside.

5. Place either another switch module or a filler module in the bay.

   Important: Complete this step within 1 minute. (For more information, see steps 9 and 10 on page 11)

6. If you placed a filler module in the bay, continue with Chapter 3, “Installing and removing a 10 Gb SFP+ module,” on page 15.

7. If you placed a switch module in the bay, reconnect the other cables that you disconnected. Attach any additional cables that are required by the switch module. For additional information about cabling the switch module, see Chapter 4, “Cabling the switch module and the SFP+ module,” on page 19, the documentation that comes with the cables, and the optional network devices to which the cables have been connected. For the locations of the connectors on...
the BladeCenter unit, see the documentation that comes with the BladeCenter unit. Then, continue with Chapter 3, “Installing and removing a 10 Gb SFP+ module,” on page 15.
Chapter 3. Installing and removing a 10 Gb SFP+ module

The switch module supports both the 10 Gb small-form-factor pluggable (SFP+) module and the 1 Gb small-form-factor pluggable (SFP) module. The SFP+ and SFP modules are laser products that convert electrical signals to optical signals.

For additional information about the location of the switch module, the network interface requirements, and expansion options, see the documentation for your BladeCenter unit.

Notes:
1. The illustrations in this document might differ slightly from your hardware.
2. While the information in this section describes the 10 Gb small-form-factor pluggable (SFP+) module, it also applies to the 1 Gb small-form-factor pluggable (SFP) module.
3. The switch module also supports MSA-compliant copper direct-attach cables (DAC), up to 7 m (23 ft) in length.

Handling an SFP+ module

Before you install an SFP+ module, read the following information:
• The module housing of the SFP+ has an integral guide key that is designed to prevent you from inserting the module incorrectly.
• Use minimal pressure when you insert the module into the port. Forcing the module into the port can cause damage to the module or the module port.
• You can insert or remove the module while the BladeCenter unit is turned on.
• You must first insert the module into the port before you can connect the cables.
• You must remove the cable from the SFP+ module before you remove the SFP+ module from the switch module.
Statement 3:

CAUTION:
When laser products (such as CD-ROMs, DVD drives, fiber optic devices, or transmitters) are installed, note the following:
- Do not remove the covers. Removing the covers of the laser product could result in exposure to hazardous laser radiation. There are no serviceable parts inside the device.
- Use of controls or adjustments or performance of procedures other than those specified herein might result in hazardous radiation exposure.

DANGER
Some laser products contain an embedded Class 3A or Class 3B laser diode. Note the following.
Laser radiation when open. Do not stare into the beam, do not view directly with optical instruments, and avoid direct exposure to the beam.
Installing an SFP+ module

The SFP+ module provides two fiber-optic cable connectors for connecting to external ports. To install an SFP+ module, complete the following steps:

1. Read the safety information that begins on page v and "Installation guidelines" on page 8.

2. If you have not already done so, touch the static-protective package that contains the SFP+ module to an unpainted metal surface of the BladeCenter chassis or an unpainted metal surface on any other grounded rack component in the rack in which you are installing the switch module for at least 2 seconds.

3. Read the information in "Handling an SFP+ module" on page 15.

4. Remove the SFP+ module from its static-protective package.

5. Remove the protective cap, if one is installed, from the SFP+ module port where you are installing the SFP+ module and store it in a safe place.

6. Remove the protective cap from the SFP+ module and store it in a safe place.

   **Attention:** To avoid damage to the cable or the SFP+ module, make sure that you do not connect the fiber optic cable before you install the SFP+ module.

7. Insert the SFP+ module into the SFP+ module port until it clicks into place.

8. Connect the fiber optic cable (see "Connecting the SFP+ module cable" on page 20) and any cables that you disconnected earlier.
Removing an SFP+ module

To remove an SFP+ module, complete the following steps:

1. Read the safety information that begins on page vi and "Installation guidelines" on page 8.
2. Read the information in "Handling an SFP+ module" on page 15.
3. Remove the fiber optic cable from the SFP+ module that you want to replace. For more information about removing the cable, see "Disconnecting the SFP+ module cable" on page 20.
   **Attention:** To avoid damage to the cable or the SFP+ module, make sure that you disconnect the fiber-optic cable *before* you remove the SFP+ module.
4. Unlock the SFP+ module by pulling the wire tab straight out, as shown in the following illustration.

5. Grasp the wire tab on the SFP+ module and pull it out of the port.
6. Replace the protective cap on the SFP+ module and the SFP+ module port.
7. Place the SFP+ module into a static-protective package.
Connecting the serial console cable

To connect the serial console cable to the switch module, connect the serial cable to the RS-232 serial console port of the switch module and the other end of the cable to the console device.

Disconnecting the serial console cable

To disconnect the serial console cable, grasp the connector and gently pull the cable from the switch module.
Connecting the SFP+ module cable

Attention: To avoid damage to the fiber optic cables, follow these guidelines:

- Do not route the cable along a folding cable-management arm.
- When you attach the cable to a device on slide rails, leave enough slack in the cable so that it does not bend to a radius of less than 38 mm (1.5 in.) when the device is extended or become pinched when the device is retracted.
- Route the cable away from places where it can be snagged by other devices in the rack.
- Do not overtighten the cable straps or bend the cables to a radius of less than 38 mm (1.5 in.).
- Do not put excess weight on the cable at the connection point. Make sure that the cable is well supported.

To connect the SFP+ module cable, complete the following steps:

1. Remove the protective caps from the end of the fiber optic cable.

2. Gently slide the fiber optic cable into the SFP+ module until it clicks into place.

3. Check the LEDs on the switch module. When the switch module is operating correctly, the green link LED is lit. For information about the status of the switch module LEDs, see Chapter 6, “Information panels, LEDs, and external ports,” on page 25.

Disconnecting the SFP+ module cable

To disconnect the SFP+ module cable, complete the following steps:

1. Squeeze the release tabs and gently pull the fiber optic cable from the SFP+ module.

2. Replace the protective caps on the ends of the fiber optic cable.
**Connecting the RJ-45 cable**

The RJ-45 cable can be connected to port 11.

To connect the RJ-45 connector to the switch module, push the RJ-45 cable connector into the port connector until it clicks into place, as shown in the following illustration.

**Disconnecting the RJ-45 cable**

To disconnect the RJ-45 connector, squeeze the release tab and gently pull the cable connector out of the switch-module connector.
Chapter 5. Updating the software and configuring the switch module

Make sure that you are using the latest version of management module firmware for your BladeCenter unit type. See the Management Module User's Guide for your unit type, located at http://publib.boulder.ibm.com/infocenter/bladectr/documentation/index.jsp for your BladeCenter unit type for additional information.

Make sure that you are using the latest version of the switch module software. For instructions on upgrading the switch module software, see the Menu-Based CLI Command Reference or the ISCLI–Industry Standard CLI Command Reference Guide at http://www-947.ibm.com/support/entry/portal/docdisplay?lndocid=MIGR-54667.

For instructions on configuring the switch module, see the BladeCenter Command Reference Guide for your switch module located at http://www.bladenetwork.net/IBM-BladeCenter-support.html.
Chapter 6. Information panels, LEDs, and external ports

This chapter describes the information panels and LEDs on the switch module and identifies the external ports on the information panels.

Note: The illustrations in this document might differ slightly from your hardware.

Information panel

The front panel of the switch module contains information LEDs, ten SFP+ module port connectors, one RS-232 serial port connector, and one Ethernet port connector, as shown in the following illustration.

The switch-module information panel contains the following components:

- LEDs that display the following information:
  - The status of the switch module and its network connection
  - The status of the external connections to the switch module

For further details about LEDs, see “Information LEDs” on page 26.

- Ten SFP+ port connectors to attach SFP+ modules. These connectors are identified as ports EXT1 through EXT10 in the I/O-module configuration menus and are labeled 1 through 10 (from left to right) on the switch module.

- One RS-232 serial port connector for console port use (management purposes) only. This connector is between SFP+ module ports 5 and 6 on the switch module. Do not attach any devices to this connector other than the serial cable that comes with the switch module, as described in Chapter 4, “Cabling the switch module and the SFP+ module,” on page 19.

- One RJ-45 Ethernet port connector. Do not attach any devices to this connector other than a compatible cable. This connector is identified as port EXT11 in the I/O-module configuration menus and is labeled 11 on the switch module.
Information LEDs

The front panel of the switch module has two sets of LEDs. The OK and switch-module error LEDs in the first column at the left of the switch module indicate the switch-module status. The link (LINK) and activity (TX/RX) LEDs indicate the status of the external ports. Ports 1 through 10 have a single LED that indicates both link and activity status. Port 11 has separate link and activity LEDs.

The following illustration shows the locations of the LEDs on the switch module. These LEDs are described in “Switch-module status LEDs” on page 27 and “Port status LEDs” on page 27.

Notes:

- An amber LED on the BladeCenter unit is lit when a system error or event has occurred. To identify the error or event, check the BladeCenter management-module event log or the switch system log.
- An LED test occurs whenever the switch module is turned on. All LEDs are lit and remain lit during POST, and then all the LEDs except the OK LED turn off.

Any errors that are detected during POST are written to the system log. For information about the command to read the system log, see the Menu-Based CLI Command Reference guide for the switch module.

When POST errors are written to the system log, these errors are also written to the BladeCenter management-module event log. If a hardware error, such as a current fault occurs, the management module displays it. If a software error occurs, the management module displays the Module did not complete POST message and a post error code that indicates the test that was running when the error was detected.

Note: You can also use the management module to make sure that the switch module is operating correctly. For more information, see the documentation for the BladeCenter unit.
Switch-module status LEDs

The following table provides descriptions of the switch-module status LEDs on the front panel of the switch module.

*Table 1. Switch-module status LEDs*

<table>
<thead>
<tr>
<th>Status LED</th>
<th>Description</th>
</tr>
</thead>
</table>
| **OK (/slick) LED** | This green LED is at the top left of the switch module on the front panel.  
  • When this LED is lit, it indicates that the switch module is on.  
  • When this LED is not lit and the amber switch-module error LED is lit, it indicates a critical alert. If the amber LED is also not lit, it indicates that the switch module is off. |
| **Switch-module error (!) LED** | This amber LED is at the bottom left of the switch module on the front panel.  
  • When this LED is lit, it indicates a POST failure or critical alert.  
  **Note:** When this LED is lit, the system-error LED on the BladeCenter unit is also lit.  
  • When this LED is not lit and the green LED is lit, it indicates that the switch module is working correctly. If the green LED is also not lit, it indicates that the switch module is off. |

Port status LEDs

The following table provides descriptions of the port status LEDs on the front panel of the switch module.

*Table 2. Port status LEDs*

<table>
<thead>
<tr>
<th>Status LED</th>
<th>Description</th>
</tr>
</thead>
</table>
| **Link / Activity LED**  
  *(Ports 1 through 10)* | This green LED is on ports 1 through 10. It indicates whether the corresponding port link is up or down and the status of the link activity for the corresponding port.  
  • When this LED is not lit, it indicates that there is no signal on the corresponding port, or the link is down.  
  • When this LED is lit, there is an active connection (or link) between the corresponding port and the device that is using this connection.  
  • When this LED is flashing, the corresponding port is connected and online, and link activity is occurring on that port. |
| **Link (L) LED**  
  *(Port 11 only)* | This green LED is on port 11. It indicates whether the port link is up or down.  
  • When this LED is lit, there is an active connection (or link) between the corresponding port and the device that is using this connection.  
  • When this LED is not lit, it indicates that there is no signal on the corresponding port, or the link is down. |
| **Activity (TX/RX) LED**  
  *(Port 11 only)* | This amber LED is on port 11. It indicates the status of the link activity for the port.  
  • When this LED is flashing or lit, the corresponding port is connected and online, and link activity is occurring on that port.  
  • When this LED is not lit, it indicates that there is no signal or no link activity on the corresponding port. |
Chapter 7. Parts listing

Replaceable components consist of consumable parts, structural parts, and customer replaceable units (CRUs):

- **Consumable parts**: Purchase and replacement of consumable parts (components such as printer cartridges, that have depletable life) is your responsibility. If Lenovo acquires or installs a consumable part at your request, you will be charged for the installation.

- **Structural parts**: Purchase and replacement of structural parts (components such as the top cover) is your responsibility. If Lenovo acquires or installs a structural part at your request, you will be charged for the installation.

- **Tier 1 customer replaceable unit (CRU)**: Replacement of Tier 1 CRUs is your responsibility. If Lenovo installs a Tier 1 CRU at your request without a service contract, you will be charged for the installation.

- **Tier 2 customer replaceable unit**: You may install a Tier 2 CRU yourself or request Lenovo to install it, at no additional charge, under the type of warranty service that is designated for your compute node. For information about the terms of the warranty and getting service and assistance, see the Warranty Information document.

The replaceable components in the following table are Tier 1 CRUs. If other BladeCenter components require replacement, see the following documentation that comes with these devices:

- BladeCenter Problem Determination and Service Guide or Hardware Maintenance Manual and Troubleshooting Guide
- Installation and User’s Guide or Installation Guide

<table>
<thead>
<tr>
<th>Part</th>
<th>CRU number (Tier 1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>BladeCenter Virtual Fabric 10Gb Switch Module assembly</td>
<td>46C7194</td>
</tr>
<tr>
<td>Serial console cable</td>
<td>43X0510</td>
</tr>
<tr>
<td>BladeCenter 10 Gb SFP+ small-form-factor pluggable module, SR (850 nm)</td>
<td>44W4411</td>
</tr>
<tr>
<td>I/O module filler, single high</td>
<td>31R3303</td>
</tr>
</tbody>
</table>
Chapter 8. Solving problems

This section provides basic troubleshooting information to help you solve some problems that might occur while you are setting up the switch module. The Application Guide for the switch module provides more details about troubleshooting the switch module.

If you cannot locate and correct a problem by using the information in this section, see Appendix A, “Getting help and technical assistance,” on page 33.

Running POST

To ensure that it is fully operational, the switch module processes a series of tests during power-up or a restart (power-on self-test, or POST). These tests take approximately 1 minute to complete. The management module reads the test results and displays them for you. During normal operation, these tests are completed without error, and the green OK LED is lit. However, if the switch module fails POST, the amber switch-module error LED and the system-error LED on the BladeCenter unit are lit. An event is stored in the event log in the system status panel of the management module. The specific failure is displayed on the system status I/O module panel of the management module.

**Note:** For the locations and descriptions of the switch module LEDs, see Chapter 6, "Information panels, LEDs, and external ports,” on page 25.

POST errors

There are two types of errors: noncritical and critical. A noncritical error applies to one port, and the switch module is operational. You can continue to operate the switch module; however, you must replace it as soon as possible. When critical errors occur, the switch module does not operate. To view POST results, complete the following steps:

1. Log on to the management module as described in the BladeCenter Advanced Management Module Command-Line Interface Reference Guide. If necessary, obtain the IP address of the management module from your system administrator. The login window opens.
2. Turn off the power to the switch module; then, turn it on again.
3. After POST is completed, the management module displays the results. Refresh the window to view the POST results. If a critical error occurs, replace the switch module. If a noncritical error occurs, see the switch-module error log for additional details.
The following table describes the basic critical and noncritical failures. This abbreviated list is representative; it is not an exhaustive list. An error code is associated with each failure. Error codes are displayed on the Management Module Switch Information window. Be sure to note the applicable error code and corresponding failure. You might have to provide this information when you call for service. For details, see Appendix A, “Getting help and technical assistance,” on page 33.

<table>
<thead>
<tr>
<th>Diagnostic indicator (in hex)</th>
<th>Failing functional area</th>
<th>Failure criticality</th>
</tr>
</thead>
<tbody>
<tr>
<td>00 - 7F</td>
<td>Base internal functions</td>
<td>Critical</td>
</tr>
<tr>
<td>80 - 9F</td>
<td>Internal interface failures</td>
<td>Noncritical</td>
</tr>
<tr>
<td>A0 - AF</td>
<td>External interface errors</td>
<td>Noncritical</td>
</tr>
<tr>
<td>B0 - FE</td>
<td>Reserved</td>
<td>Noncritical</td>
</tr>
<tr>
<td>FF</td>
<td>Switch module “good” indicator</td>
<td>Operation</td>
</tr>
</tbody>
</table>
Appendix A. Getting help and technical assistance

Getting help and technical assistance

If you need help, service, or technical assistance or just want more information about Lenovo products, you will find a wide variety of sources available from Lenovo to assist you.

Use this information to obtain additional information about Lenovo and Lenovo products, and determine what to do if you experience a problem with your Lenovo system or optional device.

Note: This section includes references to IBM web sites and information about obtaining service. IBM is Lenovo's preferred service provider for the System x, Flex System, and NeXtScale System products.

Before you call

Before you call, make sure that you have taken these steps to try to solve the problem yourself.

If you believe that you require warranty service for your Lenovo product, the service technicians will be able to assist you more efficiently if you prepare before you call.

• Check all cables to make sure that they are connected.
• Check the power switches to make sure that the system and any optional devices are turned on.
• Check for updated software, firmware, and operating-system device drivers for your Lenovo product. The Lenovo Warranty terms and conditions state that you, the owner of the Lenovo product, are responsible for maintaining and updating all software and firmware for the product (unless it is covered by an additional maintenance contract). Your service technician will request that you upgrade your software and firmware if the problem has a documented solution within a software upgrade.
• If you have installed new hardware or software in your environment, check [http://www.ibm.com/systems/info/x86servers/serverproven/compat/us/] to make sure that the hardware and software is supported by your product.
• Go to [http://www.ibm.com/supportportal/] to check for information to help you solve the problem.
• Gather the following information to provide to the service technician. This data will help the service technician quickly provide a solution to your problem and ensure that you receive the level of service for which you might have contracted.
  – Hardware and Software Maintenance agreement contract numbers, if applicable
  – Machine type number (Lenovo 4-digit machine identifier)
  – Model number
  – Serial number
  – Current system UEFI and firmware levels
  – Other pertinent information such as error messages and logs
Go to [http://www.ibm.com/support/entry/portal/Open_service_request](http://www.ibm.com/support/entry/portal/Open_service_request) to submit an Electronic Service Request. Submitting an Electronic Service Request will start the process of determining a solution to your problem by making the pertinent information available to the service technicians. The IBM service technicians can start working on your solution as soon as you have completed and submitted an Electronic Service Request.

You can solve many problems without outside assistance by following the troubleshooting procedures that Lenovo provides in the online help or in the Lenovo product documentation. The Lenovo product documentation also describes the diagnostic tests that you can perform. The documentation for most systems, operating systems, and programs contains troubleshooting procedures and explanations of error messages and error codes. If you suspect a software problem, see the documentation for the operating system or program.

### Using the documentation

Information about your Lenovo system and preinstalled software, if any, or optional device is available in the product documentation. That documentation can include printed documents, online documents, readme files, and help files.

See the troubleshooting information in your system documentation for instructions for using the diagnostic programs. The troubleshooting information or the diagnostic programs might tell you that you need additional or updated device drivers or other software. Lenovo maintains pages on the World Wide Web where you can get the latest technical information and download device drivers and updates. To access these pages, go to [http://www.ibm.com/supportportal/](http://www.ibm.com/supportportal/).

### Getting help and information from the World Wide Web

Up-to-date information about Lenovo products and support is available on the World Wide Web.

On the World Wide Web, up-to-date information about Lenovo systems, optional devices, services, and support is available at [http://www.ibm.com/supportportal/](http://www.ibm.com/supportportal/). The most current version of the product documentation is available in the following product-specific Information Centers:

- **Flex System products:**
- **System x products:**
- **NeXtScale System products:**

### How to send DSA data

You can use the Enhanced Customer Data Repository to send diagnostic data to IBM.


You can use any of the following methods to send diagnostic data:

Creating a personalized support web page

You can create a personalized support web page by identifying Lenovo products that are of interest to you.

To create a personalized support web page, go to [http://www.ibm.com/support/mynotifications/](http://www.ibm.com/support/mynotifications/). From this personalized page, you can subscribe to weekly email notifications about new technical documents, search for information and downloads, and access various administrative services.

Software service and support

Through IBM Support Line, you can get telephone assistance, for a fee, with usage, configuration, and software problems with your Lenovo products.


Hardware service and support

IBM is Lenovo’s preferred service provider for the System x, Flex System and NeXtScale System products.

You can receive hardware service through your Lenovo reseller or from IBM. To locate a reseller authorized by Lenovo to provide warranty service, go to [http://www.ibm.com/partnerworld/](http://www.ibm.com/partnerworld/) and click Business Partner Locator. For IBM support telephone numbers, see [http://www.ibm.com/planetwide/](http://www.ibm.com/planetwide/) in the U.S. and Canada, call 1-800-IBM-SERV (1-800-426-7378).

In the U.S. and Canada, hardware service and support is available 24 hours a day, 7 days a week. In the U.K., these services are available Monday through Friday, from 9 a.m. to 6 p.m.
Taiwan product service

Use this information to contact IBM Taiwan product service.

台灣 IBM 產品服務聯絡方式：
台灣國際商業機器股份有限公司
台北市松仁路 7 號 3 樓
電話：0800-016-888

IBM Taiwan product service contact information:
IBM Taiwan Corporation
3F, No 7, Song Ren Rd.
Taipei, Taiwan
Telephone: 0800-016-888
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Any performance data contained herein was determined in a controlled environment. Therefore, the result obtained in other operating environments may vary significantly. Some measurements may have been made on development-level systems and there is no guarantee that these measurements will be the same on generally available systems. Furthermore, some measurements may have been estimated through extrapolation. Actual results may vary. Users of this document should verify the applicable data for their specific environment.

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Internet Explorer, Microsoft, and Windows are trademarks of the Microsoft group of companies.

Linux is a registered trademark of Linus Torvalds.

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### Important notes

Processor speed indicates the internal clock speed of the microprocessor; other factors also affect application performance.

CD or DVD drive speed is the variable read rate. Actual speeds vary and are often less than the possible maximum.

When referring to processor storage, real and virtual storage, or channel volume, KB stands for 1,024 bytes, MB stands for 1,048,576 bytes, and GB stands for 1,073,741,824 bytes.

When referring to hard disk drive capacity or communications volume, MB stands for 1,000,000 bytes, and GB stands for 1,000,000,000 bytes. Total user-accessible capacity can vary depending on operating environments.

Maximum internal hard disk drive capacities assume the replacement of any standard hard disk drives and population of all hard-disk-drive bays with the largest currently supported drives that are available from Lenovo.

Maximum memory might require replacement of the standard memory with an optional memory module.

Each solid-state memory cell has an intrinsic, finite number of write cycles that the cell can incur. Therefore, a solid-state device has a maximum number of write cycles that it can be subjected to, expressed as total bytes written (TBW). A device that has exceeded this limit might fail to respond to system-generated commands or might be incapable of being written to. Lenovo is not responsible for replacement of a device that has exceeded its maximum guaranteed number of program/erase cycles, as documented in the Official Published Specifications for the device.
Lenovo makes no representations or warranties with respect to non-Lenovo
products. Support (if any) for the non-Lenovo products is provided by the third
party, not Lenovo.

Some software might differ from its retail version (if available) and might not
include user manuals or all program functionality.

Particulate contamination

Attention: Airborne particulates (including metal flakes or particles) and reactive
gases acting alone or in combination with other environmental factors such as
humidity or temperature might pose a risk to the device that is described in this
document.

Risks that are posed by the presence of excessive particulate levels or
concentrations of harmful gases include damage that might cause the device to
malfunction or cease functioning altogether. This specification sets forth limits for
particulates and gases that are intended to avoid such damage. The limits must not
be viewed or used as definitive limits, because numerous other factors, such as
temperature or moisture content of the air, can influence the impact of particulates
or environmental corrosives and gaseous contaminant transfer. In the absence of
specific limits that are set forth in this document, you must implement practices
that maintain particulate and gas levels that are consistent with the protection of
human health and safety. If Lenovo determines that the levels of particulates or
gases in your environment have caused damage to the device, Lenovo may
condition provision of repair or replacement of devices or parts on implementation
of appropriate remedial measures to mitigate such environmental contamination.
Implementation of such remedial measures is a customer responsibility.

Table 3. Limits for particulates and gases

<table>
<thead>
<tr>
<th>Contaminant</th>
<th>Limits</th>
</tr>
</thead>
</table>
| Particulate | • The room air must be continuously filtered with 40% atmospheric dust spot efficiency (MERV 9) according to ASHRAE Standard 52.2.  
• Air that enters a data center must be filtered to 99.97% efficiency or greater, using high-efficiency particulate air (HEPA) filters that meet MIL-STD-282.  
• The deliquescent relative humidity of the particulate contamination must be more than 60%.  
• The room must be free of conductive contamination such as zinc whiskers. |
| Gaseous     | • Copper: Class G1 as per ANSI/ISA 71.04-1985  
• Silver: Corrosion rate of less than 300 Å in 30 days |


2 The deliquescent relative humidity of particulate contamination is the relative humidity at which the dust absorbs enough water to become wet and promote ionic conduction.

Telecommunication regulatory statement

This product may not be certified in your country for connection by any means whatsoever to interfaces of public telecommunications networks. Further certification may be required by law prior to making any such connection. Contact a Lenovo representative or reseller for any questions.

Electronic emission notices

When you attach a monitor to the equipment, you must use the designated monitor cable and any interference suppression devices that are supplied with the monitor.

Federal Communications Commission (FCC) statement

Note: This equipment has been tested and found to comply with the limits for a Class A digital 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, may 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 his own expense.

Properly shielded and grounded cables and connectors must be used in order to meet FCC emission limits. Lenovo is not responsible for any radio or television interference caused by using other than recommended cables and connectors or by unauthorized changes or modifications to this equipment. Unauthorized changes or modifications could void the user's authority to operate the equipment.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that might cause undesired operation.

Industry Canada Class A emission compliance statement

This Class A digital apparatus complies with Canadian ICES-003.

Avis de conformité à la réglementation d'Industrie Canada

Cet appareil numérique de la classe A est conforme à la norme NMB-003 du Canada.

Australia and New Zealand Class A statement

Attention: This is a Class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

European Union EMC Directive conformance statement

This product is in conformity with the protection requirements of EU Council Directive 2004/108/EC on the approximation of the laws of the Member States relating to electromagnetic compatibility. Lenovo cannot accept responsibility for
any failure to satisfy the protection requirements resulting from a non-recommended modification of the product, including the installation of option cards from other manufacturers.

This product has been tested and found to comply with the limits for Class A Information Technology Equipment according to European Standard EN 55022. The limits for Class A equipment were derived for commercial and industrial environments to provide reasonable protection against interference with licensed communication equipment.

Lenovo, Einsteinova 21, 851 01 Bratislava, Slovakia

**Germany Class A statement**

**Deutschsprachiger EU Hinweis: Hinweis für Geräte der Klasse A EU-Richtlinie zur Elektromagnetischen Verträglichkeit**

**Deutschsprachiger EU Hinweis:**

Hinweis für Geräte der Klasse A EU-Richtlinie zur Elektromagnetischen Verträglichkeit


**Deutschland:**


Informationen in Hinsicht EMVG Paragraf 4 Abs. (1) 4: Das Gerät erfüllt die Schutzanforderungen nach EN 55024 und EN 55022 Klasse A.
Nach der EN 55022: “Dies ist eine Einrichtung der Klasse A. Diese Einrichtung kann im Wohnbereich Funkstörungen verursachen; in diesem Fall kann vom Betreiber verlangt werden, angemessene Maßnahmen durchzuführen und dafür aufzukommen.”


Anmerkung: Um die Einhaltung des EMVG sicherzustellen sind die Geräte, wie in den Handbüchern angegeben, zu installieren und zu betreiben.

Japan VCCI Class A statement

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This is a Class A product based on the standard of the Voluntary Control Council for Interference (VCCI). If this equipment is used in a domestic environment, radio interference may occur, in which case the user may be required to take corrective actions.

Japan Electronics and Information Technology Industries Association (JEITA) statement

Japanese Electronics and Information Technology Industries Association (JEITA) Confirmed Harmonics Guideline with Modifications (products greater than 20 A per phase)

Korea Communications Commission (KCC) statement

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This is electromagnetic wave compatibility equipment for business (Type A). Sellers and users need to pay attention to it. This is for any areas other than home.
Russia Electromagnetic Interference (EMI) Class A statement

ВНИМАНИЕ! Настоящее изделие относится к классу А. В жилых помещениях оно может создавать радиопомехи, для снижения которых необходимы дополнительные меры.

People's Republic of China Class A electronic emission statement

中华人民共和国“A类” 声明

声 明

此为A类产品，在生活环境中，该产品可能会造成无线电干扰。在这种情况下，用户自费采取适当措施以解决干扰问题。

Taiwan Class A compliance statement

警告使用者：
這是甲類的資訊產品，在居住的環境中使用時，可能會造成射頻干擾，在這種情況下，使用者會被要求採取某些適當的對策。
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