C H A P T E R **4**

Transceiver Modules

This chapter tells you where to find instructions for installing SFP modules and X2 modules, which are laser optical transceivers used for Ethernet connections. Where needed, notes applying specifically to these switches are provided.

SFP Modules

To install SFP Modules, refer to the *Cisco Small Form-Factor Pluggable Modules Installation Note* at the following location:

http://www.cisco.com/en/US/docs/interfaces_modules/transceiver_modules/installation/note/78_15160.html

To get the latest information on SFP compatibility, refer to the relevant documents at the following location:

http://www.cisco.com/en/US/products/hw/modules/ps5455/products_device_support_tables_list.html

SFP Modules and Alternative Wiring

The Catalyst 4948 switches have four ports that can be configured with any combination of SFP modules with LC connectors, as shown in Figure 4-2. The interface configuration mode command **media-type sfp | rj45** can be used to configure the media type for these ports in the switch software and determines whether the SFP or the RJ-45 connector is used. The default is SFP.

Note You must insert the SFP with the latching mechanism reversed on SFP port 46 and port 48.

Figure 4-1   Connecting LC Connectors to the SFP Module (Catalyst 4948)
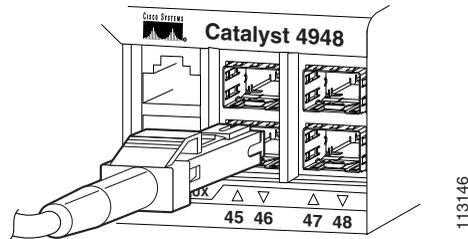

X2 Modules

You must connect the cables and install the X2 modules as shown in Figure 4-2 and Figure 4-3. More general installation information is in the *10-Gigabit Ethernet X2 Transceiver Installation Note* at the following location:
http://www.cisco.com/en/US/docs/interfaces_modules/transceiver_modules/installation/note/78_16705.html

For compatibility information, refer to the documents at the following location:

http://www.cisco.com/en/US/products/hw/modules/ps5455/products_device_support_tables_list.html

Figure 4-2   *Connecting SC Connectors to the X2 Module*
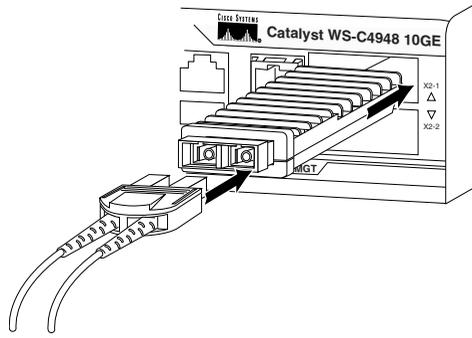
If a module designed for operation on an SMF cable is directly coupled to an MMF cable, an effect known as Differential Mode Delay (DMD) might occur. See the *Catalyst 4500 Series Module Installation Guide* for more information.

Figure 4-3   Installing the 10-Gigabit Ethernet X2 Module
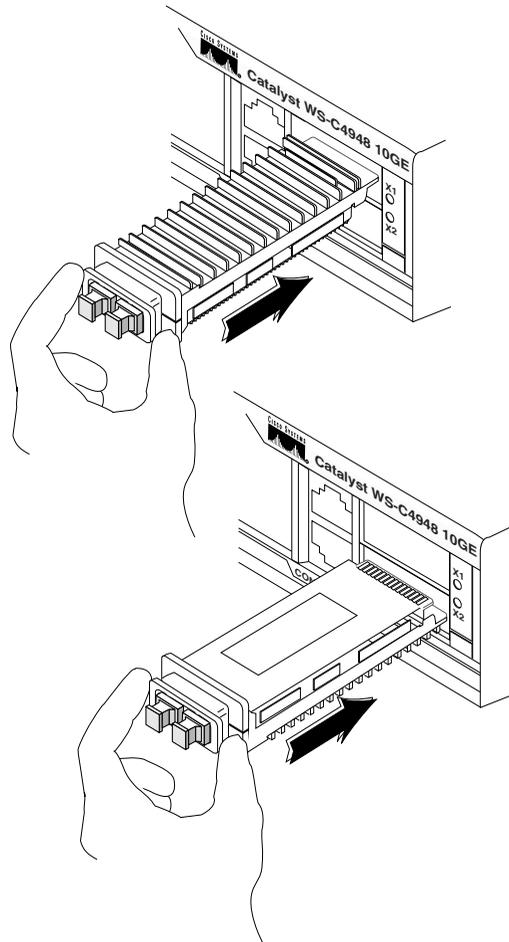
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Caution   If you attempt to insert the bottom X2 module with the cooling fins pointing up, you will probably permanently damage the connector. For either the top or bottom connector, forcing a module could potentially damage both the module and the switch.

Tip For complete information on inspecting and cleaning fiber-optic connections, refer to the white-paper document at this URL:

http://www.cisco.com/en/US/tech/tk482/tk876/technologies_white_paper09186a0080254eba.shtml

Module Maintenance Guidelines

To properly maintain modules, follow these guidelines:

- To prevent ESD damage, follow normal handling procedures.

- When the module is stored or when a fiber-optic cable is not plugged in, always keep plugs in the optical bores.

- The most common source of contaminants in the optical bores is debris picked up on the ferrules of the optical connectors. Use an alcohol swab or Kim-Wipe to clean the ferrules of the optical connector.

Warning **Invisible laser radiation may be emitted from disconnected fibers or connectors. Do not stare into beams or view directly with optical instruments.** Statement 1051

Cleaning the Fiber-Optic Connectors

In a fiber-optic system, light is transmitted through an extremely small fiber core, often 62.5 microns or less in diameter. Because dust particles range from a tenth of a micron to several microns in diameter, dust and any contamination at the end of the fiber core can degrade the performance of the connector interface where the two cores meet. Therefore, the connector must be precisely aligned, and the connector interface must be absolutely free of trapped foreign material.

Connector loss, or insertion loss, is a critical performance characteristic of a fiber-optic connector. Return loss is also an important factor. Return loss specifies the amount of reflected light; the lower the reflection, the better the connection. The best physical contact connectors have return losses greater than –40 dB, although –20 to –30 dB is more common.

The connection quality depends on the type of connector and the proper cleaning and connection techniques. Dirty fiber connectors are a common source of light loss. Keep the connectors clean at all times, and keep the dust covers installed when the connectors are not in use.

Before installing any type of cable or connector, use a lint-free alcohol pad from a cleaning kit to clean the ferrule, the protective white tube around the fiber, and the end-face surface of the fiber.

As a general rule, whenever there is a significant, unexplained loss of light, clean the connectors.

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Caution   Use extreme care when removing or installing connectors so that you do not damage the connector housing or scratch the end-face surface of the fiber. Always install protective covers on unused or disconnected components to prevent contamination. Always clean fiber connectors before installing them.

To clean the optical connectors, use a CLETOP cassette cleaner (type A for SC connectors or type B for MT-RJ connectors) and follow the product directions. If a CLETOP cassette cleaner is not available, follow these steps:

Step 1   Use a lint-free tissue soaked in 99 percent pure isopropyl alcohol to gently wipe the faceplate. Wait five seconds for the surfaces to dry, and repeat.

Step 2   Remove any residual dust from the faceplate with clean, dry, oil-free compressed air.

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Warning   **Invisible laser radiation may be emitted from disconnected fibers or connectors. Do not stare into beams or view directly with optical instruments.** Statement 1051

Step 3   Use a magnifying glass or inspection microscope to inspect the ferrule at an angle. Do not look directly into the aperture. Repeat the process if any contamination is detected.

Additional Guidelines

The connectors used inside the system have been cleaned by the manufacturer and connected to the adapters in the proper manner. The operation of the system should be error free if the customer provides clean connectors on the application side, follows the previous directions, and follows these guidelines:

- Clean the connectors using either a CLETOP cassette cleaner (Type A for SC connectors and Type B for MT-RJ connectors) or lens tissues before connecting to the adapters. Use pure alcohol to remove contamination.

- Do not clean the inside of the connector adapters.

- Do not use force or quick movements when connecting the fiber-optic connectors in the adapters.

- Cover the connectors and adapters to keep the inside of the adapters or the surface of the connectors from getting dirty when you are not using the connectors or while you are cleaning the chassis.