Installation Notes for the Cisco TwinGig Converter Module

This note provides the installation instructions for the Cisco TwinGig Converter Module. This document contains these sections:

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Overview

The Cisco TwinGig Converter Module (model CVR-X2-SFP), also known as the *converter module,* is a hot-swappable input/output (I/O) device that slides into a 10-Gigabit Ethernet slot on a Catalyst 3750-E or 3560-E switch. It converts the 10-Gigabit interface into a dual SFP interface. The converter module is shown in Figure 1.

Figure 1   *Cisco TwinGig Converter Module*
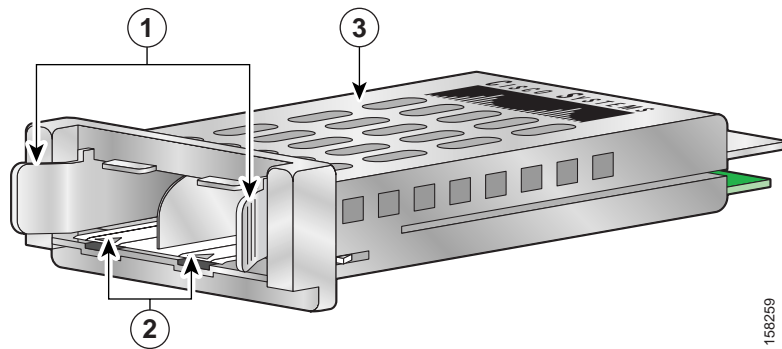
1	Latch arms
2	SFP slots
3	Top of the converter module

The converter module supports up to two small-form factor pluggable (SFP) modules. These modules plug into the converter module slots to establish fiber-optic and copper connections to network devices. Table 1 lists the SFP modules that the converter module supports.

Note   Use only Cisco SFP modules in the converter module. Each Cisco module has an internal serial EEPROM that is encoded with security information. This encoding provides a way for Cisco to identify and validate that the module meets the requirements for the switch.

Table 1   Supported SFP Modules

SFP Module Number	Description
GLC-GE-100FX	100BASE-FX
GLC-LH-SM	1000BASE-LX
GLC-SX-MM	1000BASE-SX
GLC-T	1000BASE-T
GLC-ZX-SM	1000BASE-ZX
GLC-BX-D	1000BASE-BX, 1490 nm[1]
GLC-BX-U	1000BASE-BX, 1310 nm
CWDM-SFP-1470	CWDM SFP 1470 nm
CWDM-SFP-1490	CWDM SFP 1490 nm
CWDM-SFP-1510	CWDM SFP 1510 nm
CWDM-SFP 1530	CWDM-SFP 1530 nm
CWDM SFP 1550	CWDM SFP 1550 nm
CWDM-SFP-1570	CWDM SFP 1570 nm
CWDM-SFP-1590	CWDM SFP 1590 nm
CWDM-SFP-1610	CWDM SFP 1610 nm
CAB-SFP-50CM (3560-E only)	SFP module patch cable[2]

1. nm = nanometer

2. The Catalyst 3560-E switch supports the SFP module patch cable, a 0-5-meter, copper, passive cable with SFP module connectors at each end. The patch cable can connect two Catalyst 3560-E switches in a cascaded configuration.

Table 2 lists the fiber-optic cabling specifications for the SFP modules that you install in the converter module. Each port must match the wave-length specifications on the other end of the cable, and the cable must not exceed the stipulated cable length.

The SFP modules using fiber-optic connections need fiber-optic cables with LC/PC connectors. The SFP modules using copper connections need Category 5 cables with RJ-45 connectors. Cooper 1000 BASE-T SFP modules use standard four twisted pair category 5 cable at lengths up to 328 feet (100 meters).

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Table 2   *Fiber-Optic Port Cabling Specifications*

SFP Module	Wavelength (nanometers)	Fiber Type	Core Size (micron)	Modal Bandwidth (MHz/km)	Cable Distance
1000BASE-SX	850	MMF	62.5 62.5 50 50	160 200 400 500	722 feet (220 m) 902 feet (275 m) 1640 feet (500 m) 1804 feet (550 m)
1000BASE-LX/LH	1300	MMF[1] SMF	62.5 50 50 G.652[2]	500 400 500 —	1804 feet (550 m) 1804 feet (550 m) 1804 feet (550 m) 32,810 feet (10 km
1000BASE-ZX	1550	SMF	G.652[2]	—	43.4 to 62 miles (70 to 100 km)[3]
1000BASE-BX	1490/1310	SMF	G.652[2]	—	32,810 feet (10 km)
Course Wave Division Multiplexing (CWDM)	1470, 1490, 1510, 1530, 1550, 1570, 1590, 1610	SMF	G.652[2]	—	43.4 to 62 miles (70 to 100 km)[3]

1. A mode-conditioning patch cord is required. An ordinary patch cord with MMF, 1000BASE-LX/LH SFP modules, and a short link distance can cause transceiver saturation, resulting in an elevated bit error rate (BER). When using the LX/LH SFP module with 62.5-micron diameter MMF, you must also install a mode-conditioning patch cord between the SFP module and the MMF cable on both the sending and receiving ends of the link. The mode-conditioning patch cord is required for link distances greater than 984 feet (300 m).

2. ITU-T G.652 SMF as specified by the IEEE 802.3z standard.

3. 1000BASE-ZX and CWDM SFP modules can send data up to 62 miles (100 km) by using dispersion-shifted SMF or low-attenuation SMF; the distance depends on the fiber quality, the number of splices, and the connectors.

Converter Module Installation

This section describes how to install and remove the converter module in a Catalyst 3750-E or 3560-E switch and how to install and remove the SFP modules. It contains these sections:

Safety Warnings

This section includes the basic installation caution and warning statements. Translations of the warning statements appear in the *Regulatory Compliance and Safety Information for the Catalyst 3750-E and Catalyst 3560-E* document that ships with the switch. Read this section before you start the installation procedure.

⚠

Caution Proper ESD protection is required whenever you handle Cisco equipment. Installation and maintenance personnel should be properly grounded by means of grounding straps to eliminate the risk of ESD damage to the equipment. Equipment is subject to ESD damage whenever it is removed from the switch.

⚠

Warning **This warning symbol means danger. You are in a situation that could cause bodily injury. Before you work on any equipment, be aware of the hazards involved with electrical circuitry and be familiar with standard practices for preventing accidents. Use the statement number provided at the end of each warning to locate its translation in the translated safety warnings that accompanied this device.** Statement 1071

⚠

Warning **Only trained and qualified personnel should be allowed to install, replace, or service this equipment.** Statement 148

⚠️
Warning **Do not reach into a vacant slot or chassis while you install or remove a module. Exposed circuitry could constitute an energy hazard.** Statement 206

⚠️
Warning **Ultimate disposal of this product should be handled according to all national laws and regulations.** Statement 1040

⚠️
Warning **Class 1 laser product.** Statement 1008

Installation Guidelines

Follow these guidelines when working with the converter module or an SFP module:

- The converter module and SFP module are static sensitive. To prevent ESD damage, wear an ESD-preventive wrist strap that is connected to the chassis. Place the module in an antistatic bag when not in use.

- Verify the correct orientation of the converter module or SFP module before inserting it into the slot. Incorrect insertion can damage the module or the switch.

- Do not install or remove the converter module with the SFP modules installed. Always remove any SFP cables and SFP modules from the converter module before installing it in the switch.

- Do not install or remove an SFP module with the cables attached because of the potential damage to the cables, the cable connector, or the optical interfaces in the module. Disconnect all cables before removing or installing the SFP module.

- Verify that the converter module is straight and not at an angle when you install it in the slot. Installing the module at an angle can damage it. Any module that is only partially connected to the switch might not operate correctly.

- Do not force the converter module into its slot. This can damage the pins if they are not aligned with the module.

- Do not remove the EMI plug from the converter module, the dust plug from the SFP module, or the rubber caps from the fiber-optic cable until you are ready to connect the cable. The plugs and caps protect the module ports and cables from contamination and ambient light.

- Removing and installing the converter module or SFP module can shorten its useful life. Do not remove and insert a module more often than is absolutely necessary.

Note The Catalyst 3750-E and 3560-E switches support hot swapping of the converter module. You can remove and replace the module without disconnecting the system power. Hot swapping the module does not interrupt normal switch operation.

Installing and Removing the Converter Module

These sections describe how to install and remove the Cisco TwinGig Converter Module in the switch 10-Gigabit Ethernet module slots.

Note When you install or remove the converter module, the mode on the switch changes from 10 Gigabit Ethernet to Gigabit Ethernet or the reverse. During this mode change, data traffic on the other switch uplink ports (X2 transceiver or SFP module ports) might temporarily stop. When you install or remove an X2 transceiver or SFP module, traffic delay does not occur.

Installing the Converter Module

To install the converter module in the switch module slot, follow these steps:

Step 1 Attach an ESD-preventive wrist strap to your wrist and to a bare metal surface.

Step 2 Remove the 10-Gigabit Ethernet module slot EMC plugs and save.

⚠
Caution Do not remove the EMC plug from the 10-Gigabit Ethernet slot until you are ready to install the converter module. A module or an EMC plug must be installed in the slot at all times.

Step 3 Remove the converter module from its protective packaging.

⚠
Caution Do not install the converter module with the SFP modules installed. Always remove any cables and SFP modules before installing the converter module in the switch.

⚠
Caution Verify the correct orientation of the converter module before inserting it into the slot. Incorrect insertion can damage the module.

Step 4 Slide the converter module gently but firmly into the 10-Gigabit switch module slot until the converter module is flush with the switch faceplate and the converter module snaps into place.

When using the switch upper 10-Gigabit Ethernet module slot (slot1), insert the converter module face up. When using the switch lower module slot (slot 2), insert the converter module face down (Figure 2).

Step 5 Install the SFP module into the converter module (See the"Installing an SFP Module" section on page 11). The switch detects the presence of both the converter module and any inserted Cisco SFP modules.

Figure 2   Installing the Converter Module in the Catalyst 3750-E and Catalyst 3560-E Switch
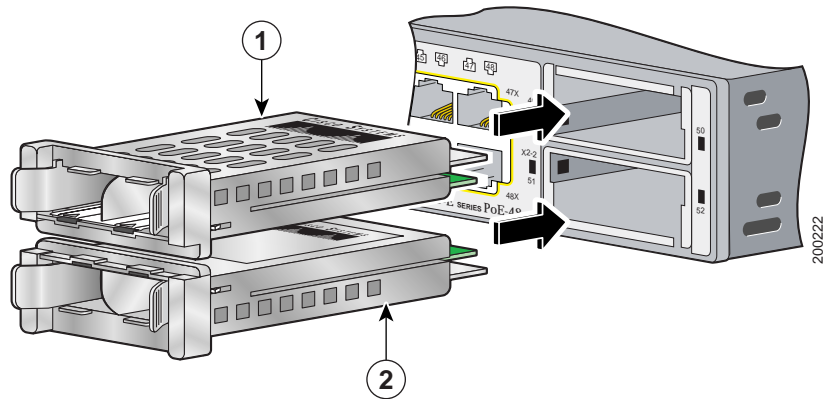

1	Module inserted face up
2	Module inserted face down

Removing the Converter Module

To remove the converter module from the switch module slot, follow these steps:

Step 1   Attach an ESD-preventive wrist strap to your wrist and to a bare metal surface on the chassis.

Step 2   Disconnect the cables from the SFP module and remove the SFP modules from the converter module. (See the "Installing and Removing SFP Modules" section on page 10).

Step 3   Pinch the latch arms on each side of the converter module, and carefully slide it out of the slot (Figure 3).

Step 4   Place all SFP modules and converter modules in an antistatic bag or other protective environment.

Step 5   Replace the EMI plug in the switch empty 10-Gigabit Ethernet module slot.

Installation Notes for the Cisco TwinGig Converter Module

Figure 3   *Removing the Converter Module from the Catalyst 3750-E and 3560-E Switch*
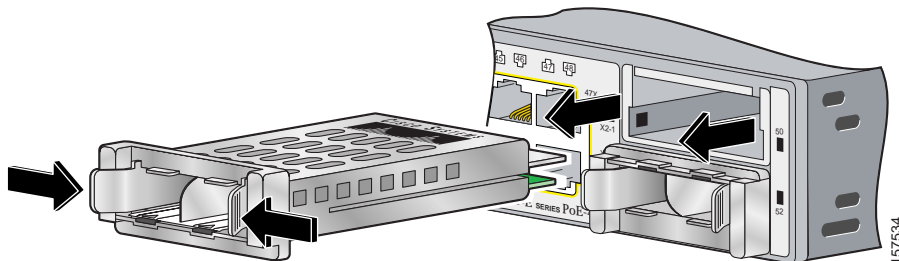
Installing and Removing SFP Modules

This section describes how to install and remove SFP modules in the converter module slots. You must have the converter module installed in a 10-Gigabit Ethernet switch slot to use SFP modules with the switch. Figure 4 on page 12 shows the converter module in the switch with the SFP modules installed.

For detailed information about installing, removing, cabling, and troubleshooting SFP modules, see the module documentation that shipped with your device.

⚠️

Caution   To avoid damage to the converter module, first install the converter module in the switch 10-Gigabit Ethernet slot before installing the SFP modules.

✎

Note   Do not install or remove the SFP module with cables attached to it because of the potential damage to the cables, the cable connector, or the optical interfaces in the SFP module. Disconnect all cables before removing or installing an SFP module.
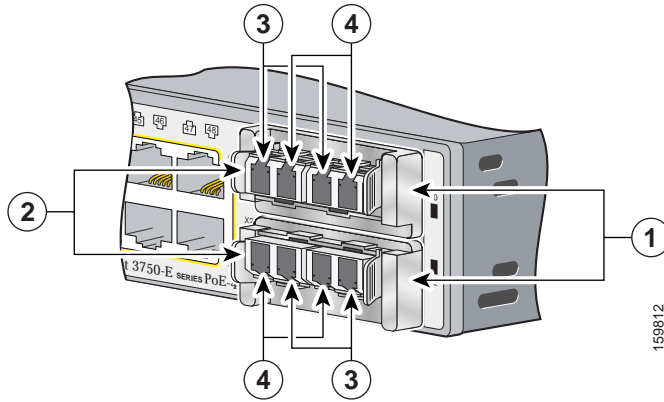
Installing an SFP Module

⚠️

Caution Verify the correct orientation of the SFP module before inserting it into the converter module. Incorrect insertion can damage the converter module, the SFP module, or the switch.

To insert an SFP module into a converter module slot, follow these steps:

Step 1 Attach an ESD-preventive wrist strap to your wrist and to a bare metal surface.

Step 2 Find the send (TX) and receive (RX) markings that identify the top side of the SFP module.

On some SFP modules, the send and receive (TX and RX) markings might be replaced by arrows that show the direction of the connection, either send (arrow pointing out) or receive (arrow pointing).

- When installing an SFP module in the switch upper 10-Gigabit Ethernet module slot (slot 1), insert the SFP module face up. When installing an SFP module in the switch lower module slot (slot 2), insert the SFP module face down.

- If you are using an SFP module patch cable, and the converter module is installed in the switch upper 10-Gigabit Ethernet module slot (slot 1), insert the SFP patch cable into the converter module with the label facing up. If the converter module is installed in the switch lower module slot (slot 2), insert the patch cable into the converter module with the label facing down (Figure 5).

Step 3 If the SFP module has a bale-clasp latch, move it to the open, unlocked position.

Step 4 Slide the SFP module or the patch cable into the opening until you feel the connector on the module snap into place.

Step 5 If the module has a bale-clasp latch, close it to lock the SFP module in place.

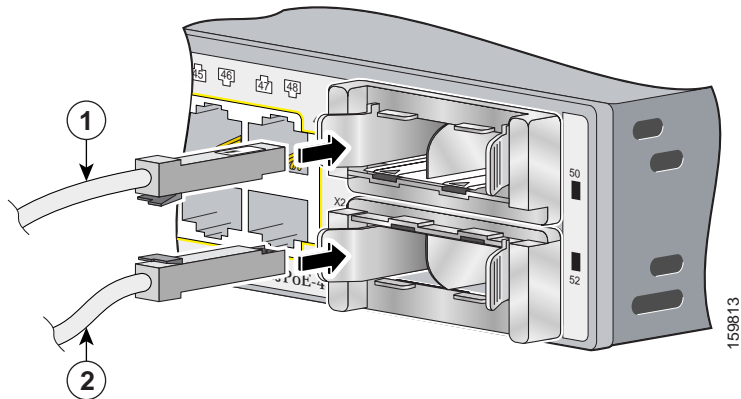**Step 6** Remove the dust plugs from the SFP module and save. Attach the cables to the SFP module.

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Figure 4   *Converter Module with SFP Modules Installed*

1	Converter module	3	Send (TX) optical bore
2	SFP modules[1]	4	Receive (RX) optical bore

1. Lower SFP modules are inverted.

Figure 5   *SFP Patch Cable Installation*

1	Patch cable inserted face up
2	Patch cable inserted face down

Removing an SFP Module

To remove an SFP module from the converter module, follow these steps:

Step 1   Attach an ESD-preventive wrist strap to your wrist and to a bare metal surface.

Step 2   Disconnect the cable from the SFP module. For reattachment, note which cable connector plug is send (TX) and which is receive (RX).

Step 3   Insert a dust plug into the optical ports of the SFP module to keep the optical interfaces clean.

Step 4   If the SFP module has a bale-clasp latch, pull the bale out and down to eject the module. If the bale-clasp latch is obstructed and you cannot use your index finger to open it, use a small, flat-blade screwdriver or other long, narrow instrument to open the bale-clasp latch.

Step 5   Grasp the SFP module, and carefully remove it from the converter module.

Step 6   Place the removed SFP module in an antistatic bag or other protective environment.

Related Publications

You can order printed copies of documents with a DOC-xxxxxx= number. For more information, see the "Obtaining Documentation" section on page 14.

These documents provide complete information about the Catalyst 3750-E and Catalyst 3560-E switch and are available on Cisco.com:

- *Regulatory Compliance and Safety Information for the Catalyst 3750-E and Catalyst 3560-E Switch* (order number DOC-7817569=)
- *Catalyst 3750-E and Catalyst 3560-E Switch Hardware Installation Guide* (not orderable but available on Cisco.com)
- *Catalyst 3750-E Switch Getting Started Guide* (order number DOC-7817568=)
- *Catalyst 3560-E Switch Getting Started Guide* (order number DOC-7817617=)

- *Release Notes for the Catalyst 3750-E and Catalyst 3560-E Switch* (not orderable but available on Cisco.com)

- *Catalyst 3750-E and Catalyst 3560-E Switch Software Configuration Guide* (not orderable but available on Cisco.com)

- *Catalyst 3750-E and Catalyst 3560-E Switch Command Reference* (not orderable but available on Cisco.com)

- *Catalyst 3750-E and Catalyst 3560-E Switch System Message Guide* (not orderable but available on Cisco.com)

- *Catalyst 3750-E and Catalyst 3560-E Switch Stack Compatibility Guide* (not orderable but available on Cisco.com)

- *Cisco Redundant Power System 2300 Hardware Installation Guide* (order number DOC-7817647=)

Obtaining Documentation

Cisco documentation and additional literature are available on Cisco.com. This section explains the product documentation resources that Cisco offers.

Cisco.com

You can access the most current Cisco documentation at this URL:

http://www.cisco.com/techsupport

You can access the Cisco website at this URL:

http://www.cisco.com

You can access international Cisco websites at this URL:

http://www.cisco.com/public/countries_languages.shtml

Product Documentation DVD

The Product Documentation DVD is a library of technical product documentation on a portable medium. The DVD enables you to access installation, configuration, and command guides for Cisco hardware and software products. With the DVD, you have access to the HTML documentation and some of the PDF files found on the Cisco website at this URL:

http://www.cisco.com/univercd/home/home.htm

The Product Documentation DVD is created and released regularly. DVDs are available singly or by subscription. Registered Cisco.com users can order a Product Documentation DVD (product number DOC-DOCDVD= or DOC-DOCDVD=SUB) from Cisco Marketplace at the Product Documentation Store at this URL:

http://www.cisco.com/go/marketplace/docstore

Ordering Documentation

You must be a registered Cisco.com user to access Cisco Marketplace. Registered users may order Cisco documentation at the Product Documentation Store at this URL:

http://www.cisco.com/go/marketplace/docstore

If you do not have a user ID or password, you can register at this URL:

http://tools.cisco.com/RPF/register/register.do

Documentation Feedback

You can provide feedback about Cisco technical documentation on the Cisco Support site area by entering your comments in the feedback form available in every online document.

Cisco Product Security Overview

Cisco provides a free online Security Vulnerability Policy portal at this URL:

http://www.cisco.com/en/US/products/products_security_vulnerability_policy.html

From this site, you will find information about how to do the following:

- Report security vulnerabilities in Cisco products
- Obtain assistance with security incidents that involve Cisco products
- Register to receive security information from Cisco

A current list of security advisories, security notices, and security responses for Cisco products is available at this URL:

http://www.cisco.com/go/psirt

To see security advisories, security notices, and security responses as they are updated in real time, you can subscribe to the Product Security Incident Response Team Really Simple Syndication (PSIRT RSS) feed. Information about how to subscribe to the PSIRT RSS feed is found at this URL:

http://www.cisco.com/en/US/products/products_psirt_rss_feed.html

Reporting Security Problems in Cisco Products

Cisco is committed to delivering secure products. We test our products internally before we release them, and we strive to correct all vulnerabilities quickly. If you think that you have identified a vulnerability in a Cisco product, contact PSIRT:

- For emergencies only—security-alert@cisco.com

  An emergency is either a condition in which a system is under active attack or a condition for which a severe and urgent security vulnerability should be reported. All other conditions are considered nonemergencies.

- For nonemergencies—psirt@cisco.com

In an emergency, you can also reach PSIRT by telephone:

- 1 877 228-7302
- 1 408 525-6532

Tip We encourage you to use Pretty Good Privacy (PGP) or a compatible product (for example, GnuPG) to encrypt any sensitive information that you send to Cisco. PSIRT can work with information that has been encrypted with PGP versions 2.*x* through 9.*x*.

Never use a revoked encryption key or an expired encryption key. The correct public key to use in your correspondence with PSIRT is the one linked in the Contact Summary section of the Security Vulnerability Policy page at this URL:

http://www.cisco.com/en/US/products/products_security_vulnerability_policy.html

The link on this page has the current PGP key ID in use.

If you do not have or use PGP, contact PSIRT to find other means of encrypting the data before sending any sensitive material.

Product Alerts and Field Notices

Modifications to or updates about Cisco products are announced in Cisco Product Alerts and Cisco Field Notices. You can receive these announcements by using the Product Alert Tool on Cisco.com. This tool enables you to create a profile and choose those products for which you want to receive information.

To access the Product Alert Tool, you must be a registered Cisco.com user. Registered users can access the tool at this URL:

http://tools.cisco.com/Support/PAT/do/ViewMyProfiles.do?local=en

To register as a Cisco.com user, go to this URL:

http://tools.cisco.com/RPF/register/register.do

Obtaining Technical Assistance

Cisco Technical Support provides 24-hour-a-day award-winning technical assistance. The Cisco Support website on Cisco.com features extensive online support resources. In addition, if you have a valid Cisco service contract, Cisco Technical Assistance Center (TAC) engineers provide telephone support. If you do not have a valid Cisco service contract, contact your reseller.

Cisco Support Website

The Cisco Support website provides online documents and tools for troubleshooting and resolving technical issues with Cisco products and technologies. The website is available 24 hours a day at this URL:

http://www.cisco.com/en/US/support/index.html

Access to all tools on the Cisco Support website requires a Cisco.com user ID and password. If you have a valid service contract but do not have a user ID or password, you can register at this URL:

http://tools.cisco.com/RPF/register/register.do

Note   Before you submit a request for service online or by phone, use the **Cisco Product Identification Tool** to locate your product serial number. You can access this tool from the Cisco Support website by clicking the **Get Tools & Resources** link, clicking the **All Tools (A-Z)** tab, and then choosing **Cisco Product Identification Tool** from the alphabetical list. This tool offers three search options: by product ID or model name; by tree view; or, for certain products, by copying and pasting **show** command output. Search results show an illustration of your product with the serial number label location highlighted. Locate the serial number label on your product and record the information before placing a service call.

Tip   Displaying and Searching on Cisco.com

If you suspect that the browser is not refreshing a web page, force the browser to update the web page by holding down the Ctrl key while pressing **F5**.

To find technical information, narrow your search to look in technical documentation, not the entire Cisco.com website. After using the Search box on the Cisco.com home page, click the **Advanced Search** link next to the Search box on the resulting page and then click the **Technical Support & Documentation** radio button.

To provide feedback about the Cisco.com website or a particular technical document, click **Contacts & Feedback** at the top of any Cisco.com web page.

Submitting a Service Request

Using the online TAC Service Request Tool is the fastest way to open S3 and S4 service requests. (S3 and S4 service requests are those in which your network is minimally impaired or for which you require product information.) After you describe your situation, the TAC Service Request Tool provides recommended solutions. If your issue is not resolved using the recommended resources, your service request is assigned to a Cisco engineer. The TAC Service Request Tool is located at this URL:

http://www.cisco.com/techsupport/servicerequest

For S1 or S2 service requests, or if you do not have Internet access, contact the Cisco TAC by telephone. (S1 or S2 service requests are those in which your production network is down or severely degraded.) Cisco engineers are assigned immediately to S1 and S2 service requests to help keep your business operations running smoothly.

To open a service request by telephone, use one of the following numbers:

Asia-Pacific: +61 2 8446 7411
Australia: 1 800 805 227
EMEA: +32 2 704 55 55
USA: 1 800 553 2447

For a complete list of Cisco TAC contacts, go to this URL:

http://www.cisco.com/techsupport/contacts

Definitions of Service Request Severity

To ensure that all service requests are reported in a standard format, Cisco has established severity definitions.

Severity 1 (S1)—An existing network is "down" or there is a critical impact to your business operations. You and Cisco will commit all necessary resources around the clock to resolve the situation.

Severity 2 (S2)—Operation of an existing network is severely degraded, or significant aspects of your business operations are negatively affected by inadequate performance of Cisco products. You and Cisco will commit full-time resources during normal business hours to resolve the situation.

Severity 3 (S3)—Operational performance of the network is impaired while most business operations remain functional. You and Cisco will commit resources during normal business hours to restore service to satisfactory levels.

Severity 4 (S4)—You require information or assistance with Cisco product capabilities, installation, or configuration. There is little or no effect on your business operations.

Obtaining Additional Publications and Information

Information about Cisco products, technologies, and network solutions is available from various online and printed sources.

- The Cisco Online Subscription Center is the website where you can sign up for a variety of Cisco e-mail newsletters and other communications. Create a profile and then select the subscriptions that you would like to receive. To visit the Cisco Online Subscription Center, go to this URL:

  http://www.cisco.com/offer/subscribe

- The *Cisco Product Quick Reference Guide* is a handy, compact reference tool that includes brief product overviews, key features, sample part numbers, and abbreviated technical specifications for many Cisco products that are sold through channel partners. It is updated twice a year and includes the latest Cisco channel product offerings. To order and find out more about the *Cisco Product Quick Reference Guide*, go to this URL:

  http://www.cisco.com/go/guide

- Cisco Marketplace provides a variety of Cisco books, reference guides, documentation, and logo merchandise. Visit Cisco Marketplace, the company store, at this URL:

  http://www.cisco.com/go/marketplace/

- Cisco Press publishes a wide range of general networking, training, and certification titles. Both new and experienced users will benefit from these publications. For current Cisco Press titles and other information, go to Cisco Press at this URL:

  http://www.ciscopress.com

- *Internet Protocol Journal* is a quarterly journal published by Cisco for engineering professionals involved in designing, developing, and operating public and private internets and intranets. You can access the *Internet Protocol Journal* at this URL:

  http://www.cisco.com/ipj

- Networking products offered by Cisco, as well as customer support services, can be obtained at this URL:

  http://www.cisco.com/en/US/products/index.html

- Networking Professionals Connection is an interactive website where networking professionals share questions, suggestions, and information about networking products and technologies with Cisco experts and other networking professionals. Join a discussion at this URL:

  http://www.cisco.com/discuss/networking

- "What's New in Cisco Documentation" is an online publication that provides information about the latest documentation releases for Cisco products. Updated monthly, this online publication is organized by product category to direct you quickly to the documentation for your products. You can view the latest release of "What's New in Cisco Documentation" at this URL:

  http://www.cisco.com/univercd/cc/td/doc/abtunicd/136957.htm

- World-class networking training is available from Cisco. You can view current offerings at this URL:

  http://www.cisco.com/en/US/learning/index.html