



Installation and Configuration Note for the Catalyst 4500 Series Supervisor Engine II-Plus

Product Numbers: WS-X4013+ = Catalyst 4500 Series Supervisor Engine II-Plus

This publication describes how to install and verify the operation of the Catalyst 4500 series switch Supervisor Engine II-Plus. Refer to the software configuration guide for your switch to obtain configuration information for the supervisor engines and switching modules.

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Corporate Headquarters:

Cisco Systems, Inc., 170 West Tasman Drive, San Jose, CA 95134-1706 USA

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Safety Overview

Throughout this publication, safety warnings appear in procedures that may harm you if performed incorrectly. A warning symbol precedes each warning statement.



Warning

IMPORTANT SAFETY INSTRUCTIONS

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. To see translations of the warnings that appear in this publication, refer to the translated safety warnings that accompanied this device.

Note: SAVE THESE INSTRUCTIONS

Note: This documentation is to be used in conjunction with the specific product installation guide that shipped with the product. Please refer to the Installation Guide, Configuration Guide, or other enclosed additional documentation for further details.

Waarschuwing

BELANGRIJKE VEILIGHEIDSIINSTRUCTIES

Dit waarschuwingssymbool betekent gevaar. U verkeert in een situatie die lichamelijk letsel kan veroorzaken. Voordat u aan enige apparatuur gaat werken, dient u zich bewust te zijn van de bij elektrische schakelingen betrokken risico's en dient u op de hoogte te zijn van de standaard praktijken om ongelukken te voorkomen. Voor een vertaling van de waarschuwingen die in deze publicatie verschijnen, dient u de vertaalde veiligheidswaarschuwingen te raadplegen die bij dit apparaat worden geleverd.

Opmerking BEWAAR DEZE INSTRUCTIES.

Opmerking Deze documentatie dient gebruikt te worden in combinatie met de installatiehandleiding voor het specifieke product die bij het product wordt geleverd. Raadpleeg de installatiehandleiding, configuratiehandleiding of andere verdere ingesloten documentatie voor meer informatie.

Varoitus

TÄRKEITÄ TURVALLISUUTEEN LIITTYVIÄ OHJEITA

Tämä varoitusmerkki merkitsee vaaraa. Olet tilanteessa, joka voi johtaa ruumiinvammaan. Ennen kuin työskentelet minkään laitteiston parissa, ota selvää sähkökytkentöihin liittyvistä vaaroista ja tavanomaisista onnettomuuksien ehkäisykeinoista. Tässä asiakirjassa esitettyjen varoitusten käännökset löydät laitteen mukana toimitetuista ohjeista.

Huomautus SÄILYTÄ NÄMÄ OHJEET

Huomautus Tämä asiakirja on tarkoitettu käytettäväksi yhdessä tuotteen mukana tulleen asennusoppaan kanssa. Katso lisätietoja asennusoppaasta, kokoonpano-oppaasta ja muista mukana toimitetuista asiakirjoista.

Attention IMPORTANTES INFORMATIONS DE SÉCURITÉ

Ce symbole d'avertissement indique un danger. Vous vous trouvez dans une situation pouvant causer des blessures ou des dommages corporels. Avant de travailler sur un équipement, soyez conscient des dangers posés par les circuits électriques et familiarisez-vous avec les procédures couramment utilisées pour éviter les accidents. Pour prendre connaissance des traductions d'avertissements figurant dans cette publication, consultez les consignes de sécurité traduites qui accompagnent cet appareil.

Remarque CONSERVEZ CES INFORMATIONS

Remarque Cette documentation doit être utilisée avec le guide spécifique d'installation du produit qui accompagne ce dernier. Veuillez vous reporter au Guide d'installation, au Guide de configuration, ou à toute autre documentation jointe pour de plus amples renseignements.

Warnung WICHTIGE SICHERHEITSANWEISUNGEN

Dieses Warnsymbol bedeutet Gefahr. Sie befinden sich in einer Situation, die zu einer Körperverletzung führen könnte. Bevor Sie mit der Arbeit an irgendeinem Gerät beginnen, seien Sie sich der mit elektrischen Stromkreisen verbundenen Gefahren und der Standardpraktiken zur Vermeidung von Unfällen bewusst. Übersetzungen der in dieser Veröffentlichung enthaltenen Warnhinweise sind im Lieferumfang des Geräts enthalten.

Hinweis BEWAHREN SIE DIESE SICHERHEITSANWEISUNGEN AUF

Hinweis Dieses Handbuch ist zum Gebrauch in Verbindung mit dem Installationshandbuch für Ihr Gerät bestimmt, das dem Gerät beiliegt. Entnehmen Sie bitte alle weiteren Informationen dem Handbuch (Installations- oder Konfigurationshandbuch o. Ä.) für Ihr spezifisches Gerät.

Figyelem! FONTOS BIZTONSÁGI ELŐÍRÁSOK

Ez a figyelmeztető jel veszélyre utal. Sérülésveszélyt rejtő helyzetben van. Mielőtt bármely berendezésen munkát végezte, legyen figyelemmel az elektromos áramkörök okozta kockázatokra, és ismerkedjen meg a szokásos balesetvédelmi eljárásokkal. A kiadványban szereplő figyelmeztetések fordítása a készülékhez mellékelt biztonsági figyelmeztetések között található.

Megjegyzés ŐRIZZE MEG EZEKET AZ UTASÍTÁSOKAT!

Megjegyzés Ezt a dokumentációt a készülékhez mellékelt üzembe helyezési útmutatóval együtt kell használni. További tudnivalók a mellékelt Üzembe helyezési útmutatóban (Installation Guide), Konfigurációs útmutatóban (Configuration Guide) vagy más dokumentumban találhatók.

Avvertenza IMPORTANTI ISTRUZIONI SULLA SICUREZZA

Questo simbolo di avvertenza indica un pericolo. La situazione potrebbe causare infortuni alle persone. Prima di intervenire su qualsiasi apparecchiatura, occorre essere al corrente dei pericoli relativi ai circuiti elettrici e conoscere le procedure standard per la prevenzione di incidenti. Per le traduzioni delle avvertenze riportate in questo documento, vedere le avvertenze di sicurezza che accompagnano questo dispositivo.

Nota CONSERVARE QUESTE ISTRUZIONI

Nota La presente documentazione va usata congiuntamente alla guida di installazione specifica spedita con il prodotto. Per maggiori informazioni, consultare la Guida all'installazione, la Guida alla configurazione o altra documentazione acclusa.

Advarsel VIKTIGE SIKKERHETSINSTRUKSJONER

Dette varselssymbolet betyr fare. Du befinner deg i en situasjon som kan forårsake personskade. Før du utfører arbeid med utstyret, bør du være oppmerksom på farene som er forbundet med elektriske kretssystemer, og du bør være kjent med vanlig praksis for å unngå ulykker. For å se oversettelser av advarslene i denne publikasjonen, se de oversatte sikkerhetsvarslene som følger med denne enheten.

Merk TA VARE PÅ DISSE INSTRUKSJONENE

Merk Denne dokumentasjonen skal brukes i forbindelse med den spesifikke installasjonsveiledningen som fulgte med produktet. Vennligst se installasjonsveiledningen, konfigureringsveiledningen eller annen vedlagt tilleggsdokumentasjon for detaljer.

Aviso INSTRUÇÕES IMPORTANTES DE SEGURANÇA

Este símbolo de aviso significa perigo. O utilizador encontra-se numa situação que poderá ser causadora de lesões corporais. Antes de iniciar a utilização de qualquer equipamento, tenha em atenção os perigos envolvidos no manuseamento de circuitos eléctricos e familiarize-se com as práticas habituais de prevenção de acidentes. Para ver traduções dos avisos incluídos nesta publicação, consulte os avisos de segurança traduzidos que acompanham este dispositivo.

Nota GUARDE ESTAS INSTRUÇÕES

Nota Esta documentação destina-se a ser utilizada em conjunto com o manual de instalação incluído com o produto específico. Consulte o manual de instalação, o manual de configuração ou outra documentação adicional inclusa, para obter mais informações.

¡Advertencia! INSTRUCCIONES IMPORTANTES DE SEGURIDAD

Este símbolo de aviso indica peligro. Existe riesgo para su integridad física. Antes de manipular cualquier equipo, considere los riesgos de la corriente eléctrica y familiarícese con los procedimientos estándar de prevención de accidentes. Vea las traducciones de las advertencias que acompañan a este dispositivo.

Nota GUARDE ESTAS INSTRUCCIONES

Nota Esta documentación está pensada para ser utilizada con la guía de instalación del producto que lo acompaña. Si necesita más detalles, consulte la Guía de instalación, la Guía de configuración o cualquier documentación adicional adjunta.

Varning! VIKTIGA SÄKERHETSANVISNINGAR

Denna varningssignal signalerar fara. Du befinner dig i en situation som kan leda till personskada. Innan du utför arbete på någon utrustning måste du vara medveten om farorna med elkretsar och känna till vanliga förfaranden för att förebygga olyckor. Se översättningarna av de varningsmeddelanden som finns i denna publikation, och se de översatta säkerhetsvarningarna som medföljer denna anordning.

OBS! SPARA DESSA ANVISNINGAR

OBS! Denna dokumentation ska användas i samband med den specifika produktinstallationshandbok som medföljde produkten. Se installationshandboken, konfigurationshandboken eller annan bifogad ytterligare dokumentation för närmare detaljer.

Предупреждение **ВАЖНЫЕ СВЕДЕНИЯ ПО БЕЗОПАСНОСТИ**

Этот символ предупреждает о наличии опасности. При неправильных действиях возможно получение травм. Перед началом работы с любым оборудованием необходимо ознакомиться с ситуациями, в которых возможно поражение электротоком, и со стандартными действиями для предотвращения несчастных случаев. Переведенный текст предупреждений содержится в соответствующем документе, поставляемом вместе с устройством.

Примечание **СОХРАНЯЙТЕ ЭТУ ИНСТРУКЦИЮ**

Примечание Эта инструкция должна использоваться вместе с руководством по установке конкретного изделия, входящим в комплект поставки. Дополнительные сведения см. в руководстве по установке, руководстве по настройке и другой документации, поставляемой с изделием.

警告 **有关安全的重要说明**

这个警告符号指有危险。您所处的环境可能使身体受伤。操作设备前必须意识到电流的危险性，务必熟悉操作标准，以防发生事故。如果需要了解本说明中出现的警告符号的译文，请参阅本装置所附之安全警告译文。

注意 保存这些说明

注意 本文件应与本产品附带的具体安装说明一并阅读。如欲了解详情，请参阅《安装说明》、《配置说明》或所附的其他文件。

警告 **安全上の重要な注意事項**

「危険」の意味です。人身事故を予防するための注意事項が記述されています。装置の取り扱い作業を行うときは、電気回路の危険性に注意し、一般的な事故防止対策に留意してください。このマニュアルに記載されている警告の各国語版は、装置に付属の「Translated Safety Warnings」を参照してください。

注 これらの注意事項を保管しておいてください。

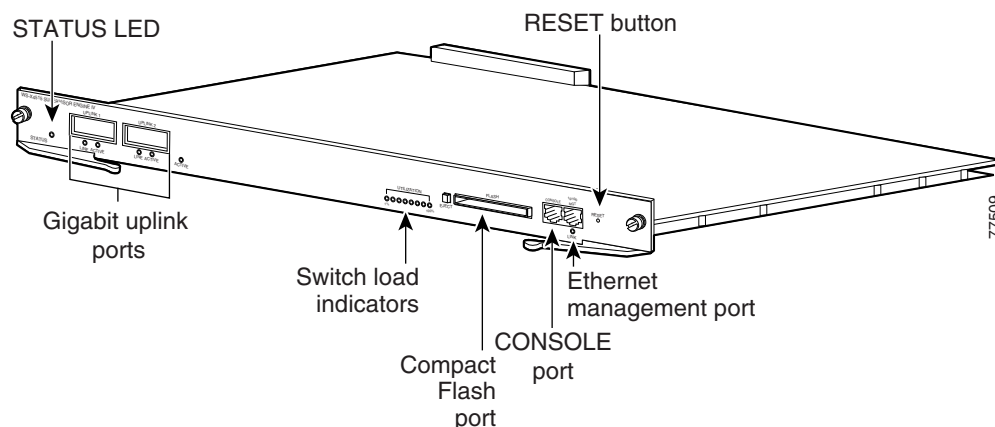
注 この資料は、製品に付属のインストレーション ガイドと併用してください。詳細は、インストレーション ガイド、コンフィギュレーション ガイド、または添付されているその他のマニュアルを参照してください。

Supervisor Engine II-Plus

This section describes the Catalyst 4500 series Supervisor Engine II-Plus (WS-X4013+). This supervisor engine provides data path and data control for all network interfaces.

The Catalyst 4500 series Supervisor Engine II-Plus is supported by the Catalyst 4006, Catalyst 4503, Catalyst 4506, and Catalyst 4507R switches. Install the Catalyst 4500 series Supervisor Engine II-Plus in slot 1 of all Catalyst 4500 Series switches. You can install two Catalyst 4500 series Supervisor Engine II-Pluses in a Catalyst 4507R switch with the second supervisor engine serving as a redundant supervisor engine. The Catalyst 4500 series Supervisor Engine II-Plus in slot 1 of the Catalyst 4507R switch is the primary supervisor engine. The Catalyst 4500 series Supervisor Engine II-Plus in slot 2 of the Catalyst 4507R switch is the redundant supervisor engine.

The supervisor engine is hot swappable, but packets are not forwarded when the supervisor engine has been removed. When a supervisor engine is reinserted, the system reboots.

Figure 1 Catalyst 4500 Series Supervisor Engine II-Plus (WS-X4013+)

The supervisor engine includes interfaces for SNMP, console, and Telnet, and provides management functions, such as environmental status monitoring.

Features of the Supervisor Engine Front Panel

The following sections describe the LEDs, connectors, and switches on the Catalyst 4500 series Supervisor Engine II-Plus:

- [LEDs, page 6](#)
- [Gigabit Ethernet Uplink Ports, page 7](#)
- [Ethernet Management Port, page 7](#)
- [Console Port, page 7](#)
- [Reset Button, page 7](#)
- [Flash Port, page 8](#)

LEDs

[Table 1](#) describes the LEDs on the supervisor engine front panel.

Table 1 Supervisor Engine LEDs (WS-X4013+)

LED	LED Status	Description
STATUS	Green	Indicates the results of a series of self-tests. All diagnostic tests passed.
	Red	A test failed.
	Orange	System boot or diagnostic test is in progress.
	Off	Module is disabled.
UTILIZATION	Green 1–100%	If the switch is operational, this display indicates the current traffic load over the backplane (as an approximate percentage).

Table 1 Supervisor Engine LEDs (WS-X4013+) (continued)

LED	LED Status	Description
Link		Indicates the status of the 10/100BASE-T Ethernet management port or uplink ports.
	Green	The link is operational.
	Orange	The link is disabled by user.
	Flashing orange	The power-on self-test indicates a faulty port.
Active	Off	No signal is detected, or there is a link configuration failure.
Active		Indicates whether or not the uplink port is active.
	Green	The port is active.
	Off	The port is not active.

Gigabit Ethernet Uplink Ports

The Gigabit Ethernet uplink ports operate in full-duplex mode only. These ports use the 1000BASE-SX, 1000BASE-LX/LH, Cisco CWDM (Coarse Wave Division Multiplexing) GBICs, 1000BASE-T GBIC (using an RJ-45 connector), and 1000BASE-ZX Gigabit Interface Converters (GBICs). GBICs have SC connectors to interface with multimode fiber (MMF) and single-mode fiber (SMF) cable. For further information on GBICs, see the [“GBIC Handling Guidelines and Installation” section on page 14](#).

Ethernet Management Port

The Ethernet management port can be used (in ROMMON mode only) to recover a switch software image that has been corrupted or destroyed due to a network catastrophe. When using Cisco IOS Release 12.2(50)SG or later, this port can also perform the same functions as the console port. For earlier Cisco IOS software releases, this port is not active while the switch is operating normally.

Console Port

The Catalyst 4500 series Supervisor Engine II-Plus console port has an EIA/TIA-232 RJ-45 connector. The console port allows you to perform the following functions:

- Configure the switch from the CLI
- Monitor network statistics and errors
- Configure SNMP agent parameters



Note

EIA/TIA-232 was known as recommended standard RS-232 before its acceptance as a standard by the Electronic Industries Alliance (EIA) and Telecommunications Industry Association (TIA).

Reset Button

The Reset button is used to restart the switch.

**Note**

Use a paper clip or other small, pointed object to press the Reset button.

Flash Port

The Flash port accepts a Type 1 compact Flash card. You can use it for file transfer tasks such as loading a new software image. The Flash card (MEM-C4K-FLD64M= or MEM-C4K-FLD128M=) is optional.

For more information, refer to *Using the Compact Flash on the Catalyst 4000 Family Supervisor Engine III and IV* at the following URL:

http://www.cisco.com/en/US/docs/switches/lan/catalyst4500/hardware/configuration/notes/OL_2788.html

Port Cabling Specifications

This section provides port cabling specifications and includes the following subsections:

- [Maximum Cable Distances, page 8](#)
- [Using a Patch Cord, page 9](#)

The length of your networks and the distances between connections depend on the type of signal, the signal speed, and the transmission medium (the type of cabling used to transmit the signals). The distance and rate limits in this document are the IEEE-recommended maximum speeds and distances for signaling. [Table 2](#) shows the transmission speed versus the distance.

Table 2 EIA/TIA-232 Transmission Speed in Contrast with Distance

Rate (bps)	Distance (ft)	Distance (m)
2400	200	60
4800	100	30
9600	50	15
19,200	25	7.6
38,400	12	3.7
56,000	8.6	2.6

Maximum Cable Distances

[Table 3](#) shows the maximum cable distances for transceiver speed and cable type.

Table 3 Maximum Cable Distances

Transceiver Speed	Cable Type	Duplex Mode	Maximum Distance Between Stations
10 Mbps	Category 3 UTP	Half or full	328 ft (100 m)
10 Mbps	MMF	Half or full	1.2 mi (2 km)
100 Mbps	Category 5 UTP	Half or full	328 ft (100 m)

Table 3 Maximum Cable Distances (continued)

Transceiver Speed	Cable Type	Duplex Mode	Maximum Distance Between Stations
100 Mbps	MMF	Half	1312 ft (400 m)
100 Mbps	MMF	Full	1.2 mi (2 km)

[Table 4](#) provides cabling specifications for the GBICs that you install in the Gigabit Ethernet port modules. All GBIC ports have SC-type connectors, and the minimum cable distance for all GBICs listed is 6.5 feet (2 meters).

Table 4 GBIC Port Cabling Specifications

GBIC	Wavelength (nm)	Fiber Type	Core Size (micron)	Modal Bandwidth (MHz/km)	Cable Distance
SX ¹	850	MMF	62.5	160	722 ft (220 m)
			62.5	200	902 ft (275 m)
			50.0	400	1640 ft (500 m)
			50.0	500	1804 ft (550 m)
LX/LH	1300	MMF ²	62.5	500	1804 ft (550 m)
			50.0	400	1804 ft (550 m)
			50.0	500	1804 ft (550 m)
		SMF	9/10	-	6.2 mi (10 km)
ZX	1550	SMF	9/10	-	43.5 mi (70 km)
		SMF ³	9/10	-	62.1 mi (100 km)

1. MMF only.
2. Patch cord required. (See the [“Using a Patch Cord”](#) section for details.)
3. Dispersion-shifted single-mode fiber-optic.

Using a Patch Cord

When using the LX/LH GBIC with 62.5-micron diameter MMF, you must install a mode-conditioning patch cord (Cisco product number CAB-GELX-625 or equivalent) between the GBIC and the MMF cable on both the transmit and receive ends of the link.

The patch cord is required for link distances greater than 984 feet (300 meters) and must comply with IEEE standards. The IEEE found that link distances could not be met with certain types of fiber-optic cable due to a problem in the center of some fiber-optic cable cores. The solution is to launch light from the laser at a precise offset from the center by using the patch cord. At the output of the patch cord, the LX/LH GBIC is compliant with the IEEE 802.3z standard for 1000BASE-LX. For a detailed description of this problem, refer to the installation guide for your switch.



Note

We do not recommend using the LX/LH GBIC with MMF without a patch cord for very short link distances (tens of meters). The result could be an elevated bit error rate (BER).

Cisco Gigabit Ethernet products have been tested and evaluated to comply with the standards listed in Appendix A, “Specifications,” of the installation guide for your switch. All equivalent cables should also meet these standards.

Installing and Removing the Supervisor Engine

All Catalyst 4500 series switches support hot swapping, which lets you install, remove, replace, and rearrange supervisor engines and switching modules without powering off the system. When the system detects that a switching module has been installed or removed, it runs diagnostic and discovery routines automatically, acknowledges the presence or absence of the module, and resumes system operation with no operator intervention.

This section contains the following subsections:

- [Required Tools, page 10](#)
- [Installing the Supervisor Engine, page 10](#)
- [Removing the Supervisor Engine, page 12](#)

Required Tools

You will need these tools to install a supervisor engine in a Catalyst 4500 series switch:

- Number 1 and number 2 Phillips screwdrivers for the captive installation screws on most modules
- 3/16-inch flat-blade screwdriver for the captive installation screws on other modules
- Antistatic mat or antistatic foam
- Wrist strap or other grounding device

**Note**

Whenever you handle supervisor engines, use a wrist strap or other grounding device to prevent ESD damage.

Installing the Supervisor Engine

Catalyst 4500 series switches have horizontal chassis slots that are numbered from top to bottom. On the Catalyst 4006, Catalyst 4503, and Catalyst 4506 switches, you can only install the supervisor engine in slot 1. On the Catalyst 4507R switch, install the primary supervisor engine in slot 1. You can install an optional redundant supervisor engine in slot 2.

**Warning**

Hazardous voltage or energy is present on the backplane when the system is operating. Use caution when servicing.

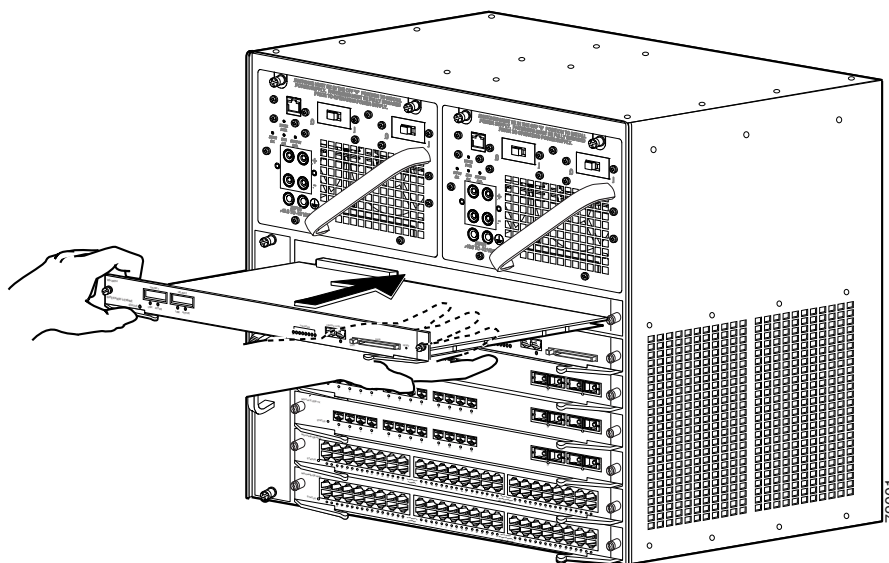
**Caution**

To prevent ESD damage, handle supervisor engines by the carrier edges only.

To install a supervisor engine in a Catalyst 4500 series switch, follow this procedure:

-
- Step 1** Take the necessary precautions to prevent ESD damage.
 - Step 2** Ensure that you have enough clearance to accommodate any interface equipment that you will connect directly to the supervisor engine ports.
 - Step 3** Loosen the captive installation screws that secure the switching-module filler plate or the existing supervisor engine (whichever is present), and remove it.
 - Step 4** Remove the supervisor engine filler plate or the existing supervisor engine from slot 1. If a switching module filler plate was installed, save it for future use. If you are removing an existing supervisor engine, see the [“Removing the Supervisor Engine”](#) section on page 12.
 - Step 5** To install the new supervisor engine, grasp the switching module front panel with one hand and place your other hand under the carrier to support the supervisor engine, as shown in [Figure 2](#). Do not touch the printed circuit boards or connector pins.
 - Step 6** Align the edges of the supervisor engine carrier with the slot guides on the sides of the switch chassis, as shown in [Figure 2](#).

Figure 2 *Installing the Supervisor Engine in the Chassis*



- Step 7** Pivot the two module ejector levers out and away from the faceplate.
- Step 8** Carefully slide the supervisor engine into the slot until the notches on both ejector levers engage the chassis sides.
- Step 9** Using the thumb and forefinger of each hand, simultaneously pivot in both ejector levers to fully seat the supervisor engine in the backplane connector.



Caution

Always use the ejector levers when installing or removing a supervisor engine. A supervisor engine that is partially seated in the backplane will not function correctly.

- Step 10** Use a screwdriver to tighten the captive installation screws on each end of the supervisor engine faceplate.
-

To check the status of the module, perform these steps:

- Step 1** Ensure that the LED labeled Status is green (module operational).
- Step 2** When the switch is online, enter the **show module** command. Verify that the system acknowledges the new module and that the module status is good.
- Step 3** If the module is not operational, reseal it. If the module is still not operational, contact your customer service representative.
-

Removing the Supervisor Engine



Warning

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



Warning

Hazardous voltage or energy is present on the backplane when the system is operating. Use caution when servicing.



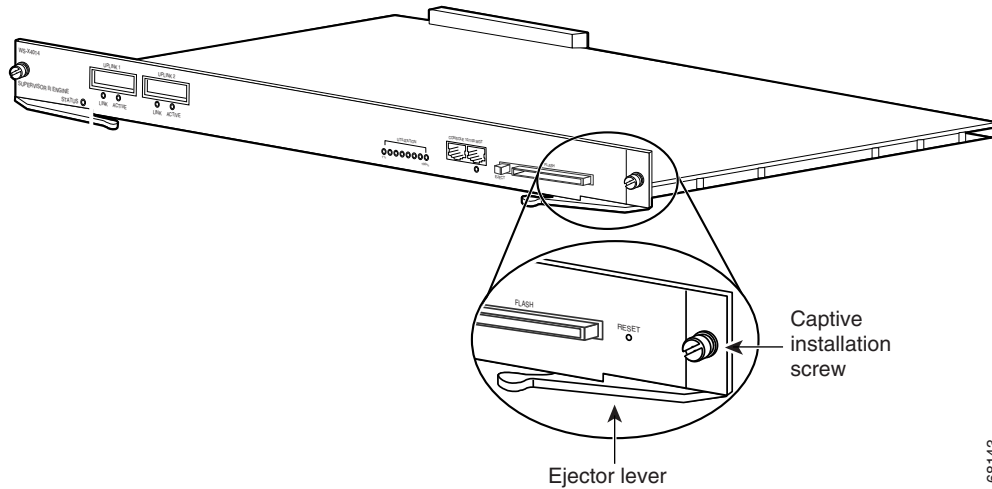
Caution

To prevent ESD damage, handle supervisor engines by the carrier edges only.

To remove a supervisor engine from a Catalyst 4500 series switch, perform these steps:

- Step 1** Disconnect any network interface cables attached to the ports on the supervisor engine that you intend to remove.
- Step 2** Loosen the captive installation screws. (See [Figure 3](#).)

Figure 3 Captive Installation Screws and Ejector Levers



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- Step 3** Grasp the left and right ejector levers, and simultaneously pivot the levers outward to release the supervisor engine from the backplane connector. [Figure 3](#) shows a close-up of the right ejector lever.
- Step 4** Grasp the front panel of the supervisor engine with one hand, and place your other hand under the carrier to support and guide it out of the slot. Do not touch the printed circuit boards or connector pins.
- Step 5** Carefully pull the supervisor engine straight out of the slot, keeping your other hand under the carrier to guide it.
- Step 6** Place the supervisor engine on an antistatic mat or antistatic foam, or immediately install it in another slot.



Warning

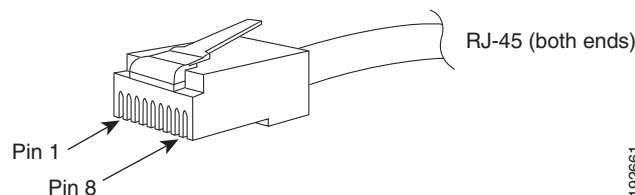
Blank faceplates and cover panels serve three important functions: they prevent exposure to hazardous voltages and currents inside the chassis; they contain electromagnetic interference (EMI) that might disrupt other equipment; and they direct the flow of cooling air through the chassis. Do not operate the system unless all cards, faceplates, front covers, and rear covers are in place.

- Step 7** If the slot is to remain empty, install a switching-module filler plate (part number 800-00292-01).

Attaching Module Interface Cables

[Figure 4](#) and [Figure 5](#) show the connector types used to attach interface cables to the supervisor engine.

Figure 4 RJ-45 Connector



192661

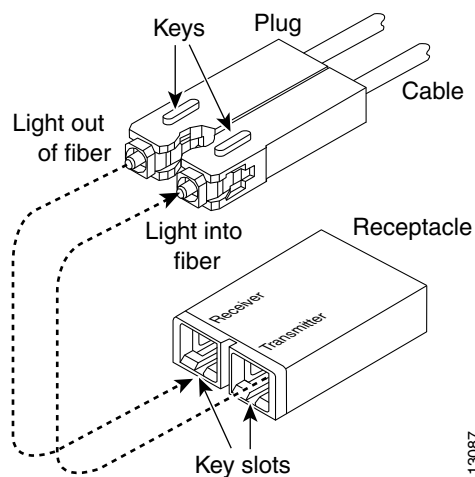
**Note**

Always keep caps and plugs on the fiber-optic connectors on the cable and the switch when they are not in use.

**Warning**

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

Figure 5 SC-Type Fiber-Optic Connector

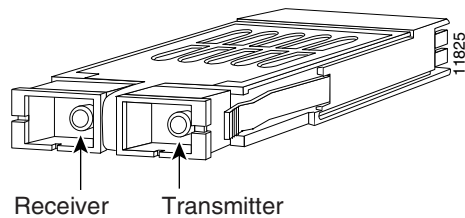


Configuring Your Supervisor Engine

For information and commands to configure your supervisor engine, refer to the *Software Configuration Guide* for your switch.

GBIC Handling Guidelines and Installation

A GBIC (see [Figure 6](#)) is a hot swappable input/output device that plugs into the Gigabit Ethernet port of a supervisor engine and links the supervisor engine with a fiber-optic network. GBICs are online swappable.

Figure 6 Gigabit Interface Converter

The following GBIC media types are supported:

- 1000BASE-SX (WS-G5484)
- 1000BASE-LX/LH (WS-G5486)
- 1000BASE-ZX (WS-G5487)
- 1000BASE-T (WS-G5483)
- CWDM (CWDM-GBIC-xxxx)

**Caution**

Because of interoperability issues, Cisco does not support GBICs purchased from third-party vendors.

Cisco 1000BASE-LX/LH interfaces fully comply with the IEEE 802.3z 1000BASE-LX standard. However, their higher optical quality allows them to reach 10 km over SMF cable instead of the 5 km specified in the standard.

If an LX/LH GBIC 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 4000 Family Module Installation Guide* for more information.

This section describes the following topics:

- [Installing a GBIC, page 15](#)
- [Removing a GBIC, page 17](#)
- [GBIC Maintenance Guidelines, page 17](#)

Installing a GBIC

A supervisor engine can be shipped with or without GBICs installed.

**Caution**

When removing or inserting a GBIC, always wear an ESD wrist strap connected to the ESD wrist strap connector.

**Caution**

Unnecessary removal or insertion of a GBIC can lead to premature failure of the GBIC. A GBIC has a lifetime of 100 to 500 removals and insertions.

**Note**

This product has been evaluated to and complies with acceptable-safety-emission limits for Class 1 lasers. However, you should still take general precautions when working with lasers.

**Warning**

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

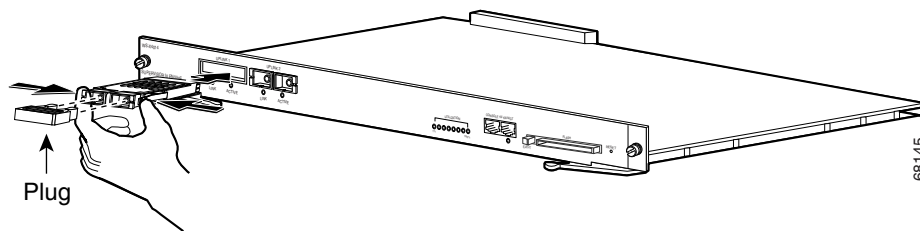
To install a GBIC, follow this procedure:

-
- Step 1** Remove the GBIC from its protective packaging.
- Step 2** Verify that the GBIC is the correct type for your network by checking the GBIC part number. The part number indicates whether it is 1000BASE-SX, 1000BASE-LX/LH, 1000BASE-T, CWDM, or 1000BASE-ZX.
- Step 3** Grasp the sides of the GBIC with your thumb and forefinger; insert the GBIC into the desired slot on the front of the module. (See [Figure 7](#).)

**Note**

GBICs are keyed to prevent incorrect insertion into a slot.

Figure 7 *Installing a GBIC*



- Step 4** Slide the GBIC into the slot until you hear a click. The click indicates that the GBIC is locked into the slot.
- Step 5** When you are ready to attach the fiber-optic cable, remove the plug from the GBIC and save it for future use.

**Caution**

Do not remove the plugs from the GBIC optical bores or the fiber-optic cable until you are ready to connect the cable. The plugs protect the GBIC optical bores and cable from contamination.

- Step 6** Remove the plugs from the SC-type connector on the fiber-optic cable (see [Figure 5](#) on page 14). Insert the connector into the GBIC.
-

**Note**

When you plug the SC-type connector into the GBIC, ensure that you fully insert the Tx and Rx fiber-optic cables into the SC-type connector.

**Note**

If you are using the LX/LH GBIC with MMF, you need to install a patch cord between the GBIC and the MMF cable. See the [“Using a Patch Cord” section on page 9](#) for details.

Removing a GBIC

**Warning**

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

To remove a GBIC, follow this procedure:

- Step 1** Disconnect the fiber-optic cable from the GBIC SC-type connector.
- Step 2** Release the GBIC from the slot by simultaneously squeezing the plastic tabs (one on each side of the GBIC).
- Step 3** Slide the GBIC out of the slot.
- Step 4** Install the two plugs into the GBIC optical bores, and place the GBIC in its protective packaging.

GBIC Maintenance Guidelines

To properly maintain GBICs, follow these guidelines:

- GBICs are sensitive to static. To prevent ESD damage, follow normal handling procedures.
- GBICs are sensitive to dust. When the GBIC 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.

Standards Compliance Specifications

When installed in a system, the Catalyst 4500 series modules comply with the standards listed in [Table 5](#):

Table 5 Standards Compliance Specifications

Item	Specification
Compliance	CE ¹ Marking
Safety	UL ² 60950, CSA ³ -C22.2 No. 60950, EN ⁴ 60950, IEC ⁵ 60950, TS001 ⁶ , AS/NZS ⁷ 3260
EMC⁸	FCC ⁹ Part 15, Class A (CFR ¹⁰ 47) (USA), ICES ¹¹ -003 Class A (Canada), EN 55022 Class A (Europe), CISPR22 ¹² Class A (International), AS/NZS 3548 Class A (Australia), and VCCI ¹³ Class A (Japan) with UTP ¹⁴

1. CE = European Compliance
2. UL = Underwriters Laboratory
3. CSA = Canadian Standards Association
4. EN = European Norm
5. IEC = International Electrotechnical Commission
6. TS = technical specifications
7. AS/NZS = Australia Standards/New Zealand Standards
8. EMC = electromagnetic compatibility
9. FCC = U.S. Federal Communications Commission
10. CFR = Code of Federal Regulations
11. ICES = Interference-Causing Equipment Standard
12. CISPR = Comite International Special des Perturbation Radioelectriques
13. VCCI = Voluntary Control Council for Information Technology Equipment
14. UTP = unshielded twisted-pair

The following modules have been found to comply with the limits for a Class A digital device per FCC (CFR 47) Part 15, ICES 003, EN55022, CISPR22, AS/NZS 3548, and VCCI with UTP cables, and complies with the limits for a Class B digital device per EN55022, CISPR22, AS/NZS 3548, and VCCI with shielded FTP cables with the following modules:

WS-X4012	WS-X4148-RJ21	WS-X4412-2GB-T
WS-X4013	WS-X4148-RJ45V	WS-X4418-GB
WS-X4014	WS-X4232-GB-RJ	WS-X4424-GB-RJ45
WS-X4019	WS-X4232-L3	WS-X4448-GB-LX
WS-X4124-FX-MT	WS-X4232-RJ-XX	WS-X4604-GWY
WS-X4148-FX-MT	WS-U4504-FX-MT	WS-X4013+
WS-X4148-RJ	WS-X4306-GB	WS-X4148-FE-LX-MT
WS-X4302-GB	WS-X4515	WS-X4448-GB-RJ45
WS-X4548-GB-RJ45		

Related Documentation

For more detailed installation and configuration information, refer to the following:

- [Catalyst 4000 Series Installation Guide](#)
- [Catalyst 4500 Series Installation Guide](#)
- [Catalyst 4000 Series Module Installation Guide](#)
- [Regulatory Compliance and Safety Information for the Catalyst 4500 Series Switches](#)
- [Software Configuration Guide—Catalyst 4000 Family, Catalyst 2948G, and Catalyst 2980G Switches](#)
- [Command Reference—Catalyst 4000 Family, Catalyst 2948G, and Catalyst 2980G Switches](#)
- [System Message Guide—Catalyst 6000 Family, Catalyst 5000 Family, Catalyst 4000 Family, Catalyst 2926G Series, Catalyst 2948G, and Catalyst 2980G Switches](#)

Obtaining Documentation and Submitting a Service Request

For information on obtaining documentation, submitting a service request, and gathering additional information, see the monthly *What's New in Cisco Product Documentation*, which also lists all new and revised Cisco technical documentation, at:

<http://www.cisco.com/en/US/docs/general/whatsnew/whatsnew.html>

Subscribe to the *What's New in Cisco Product Documentation* as a Really Simple Syndication (RSS) feed and set content to be delivered directly to your desktop using a reader application. The RSS feeds are a free service and Cisco currently supports RSS version 2.0.

This document is to be used in conjunction with the *Catalyst 4000 Series Installation Guide*, *Catalyst 4500 Series Installation Guide*, and the *Catalyst 4000 Family Module Installation Guide* publications.

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