Installation and Configuration Note for Cisco Catalyst 4500 E-Series Supervisor Engine 8L-E

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Product Numbers: WS-X45-Sup8L-E

This document describes how to install the Catalyst 4500 E-series Supervisor Engine 8L-E (WS-X45-Sup8L-E). Refer to the software configuration guide for your switch for configuration information about the supervisor engine and the switching modules.

Note Catalyst 4500 E-series switching modules require an E-series supervisor engine running a software image compatible with that supervisor engine. Refer to your switch's release notes for compatibility information.

Table 1: Supervisor Engine 8L-E Chassis Compatibility Information

Feature	Description
Chassis compatibility	Supervisor Engine 8L-E is supported on the Catalyst 4503-E, Catalyst 4506-E, Catalyst 4507R+E, and Catalyst 4507R-E[1] switch chassis. Supervisor Engine 8L-E is not supported on a 10-slot chassis.
Minimum software requirements	Refer to the Cisco IOS Release Notes for the Catalyst 4500-E Series Switches document for the latest software release requirements.
Chassis slot restrictions	• Catalyst 4503-E—Slot 1 only • Catalyst 4506-E—Slot 1 only • Catalyst 4507R+E—Slot 3 and slot 4 (redundant supervisor engines supported) • Catalyst 4507R-E—Slot 3 and 4 (redundant supervisor engines supported)
Bandwidth per slot	48-Gbps

[1] To support Supervisor Engine 8L-E, the Cisco Catalyst 4507R-E Switch chassis must have hardware revision 2.0 or higher.

Safety Warnings

Safety warnings appear throughout this publication in procedures that may harm you if you perform them incorrectly. A warning symbol precedes each warning statement. The warnings below are general warnings that are applicable to the entire publication.

Statement 1071—Warning Definition

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. 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** **SAVE THESE INSTRUCTIONS**
Waarschuwing	**BELANGRIJKE VEILIGHEIDSINSTRUCTIES** **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. Gebruik het nummer van de verklaring onderaan de waarschuwing als u een vertaling van de waarschuwing die bij het apparaat wordt geleverd, wilt raadplegen.** **BEWAAR DEZE INSTRUCTIES**
Varoitus	**TÄRKEITÄ TURVALLISUUSOHJEITA** **Tämä varoitusmerkki merkitsee vaaraa. Tilanne voi aiheuttaa ruumiillisia vammoja. Ennen kuin käsittelet laitteistoa, huomioi sähköpiirien käsittelemiseen liittyvät riskit ja tutustu onnettomuuksien yleisiin ehkäisytapoihin. Turvallisuusvaroitusten käännökset löytyvät laitteen mukana toimitettujen käännettyjen turvallisuusvaroitusten joukosta varoitusten lopussa näkyvien lausuntonumeroiden avulla.** **SÄILYTÄ NÄMÄ OHJEET**

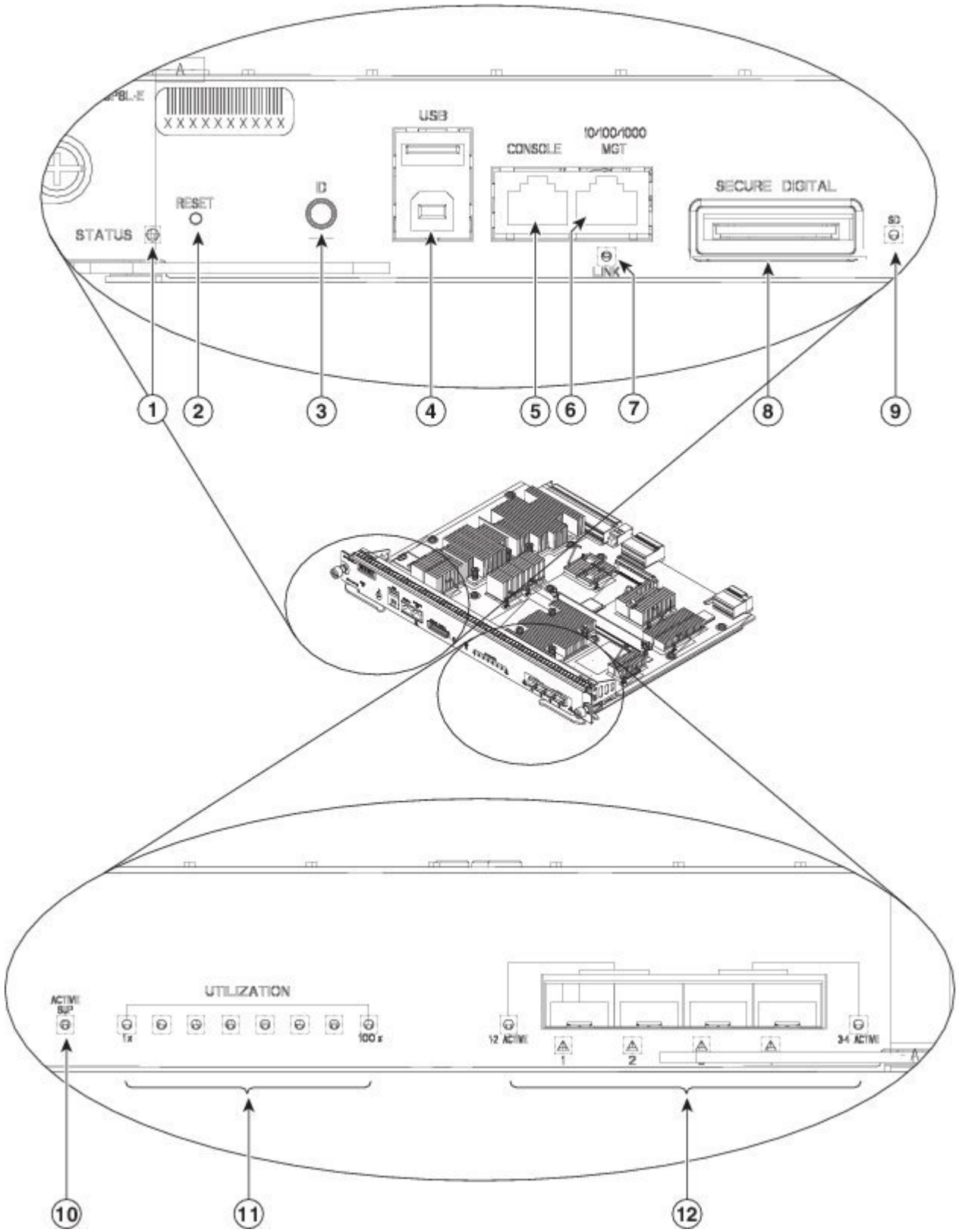
Attention	**IMPORTANTES INFORMATIONS DE SÉCURITÉ** **Ce symbole d'avertissement indique un danger. Vous vous trouvez dans une situation pouvant entraîner des blessures ou des dommages corporels. Avant de travailler sur un équipement, soyez conscient des dangers liés aux circuits électriques et familiarisez-vous avec les procédures couramment utilisées pour éviter les accidents. Pour prendre connaissance des traductions des avertissements figurant dans les consignes de sécurité traduites qui accompagnent cet appareil, référez-vous au numéro de l'instruction situé à la fin de chaque avertissement.** **CONSERVEZ CES INFORMATIONS**
Warnung	**WICHTIGE SICHERHEITSHINWEISE** **Dieses Warnsymbol bedeutet Gefahr. Sie befinden sich in einer Situation, die zu Verletzungen führen kann. Machen Sie sich vor der Arbeit mit Geräten mit den Gefahren elektrischer Schaltungen und den üblichen Verfahren zur Vorbeugung vor Unfällen vertraut. Suchen Sie mit der am Ende jeder Warnung angegebenen Anweisungsnummer nach der jeweiligen Übersetzung in den übersetzten Sicherheitshinweisen, die zusammen mit diesem Gerät ausgeliefert wurden.** **BEWAHREN SIE DIESE HINWEISE GUT AUF.**
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. Utilizzare il numero di istruzione presente alla fine di ciascuna avvertenza per individuare le traduzioni delle avvertenze riportate in questo documento.** **CONSERVARE QUESTE ISTRUZIONI**
Advarsel	**VIKTIGE SIKKERHETSINSTRUKSJONER** **Dette advarselssymbolet betyr fare. Du er i en situasjon som kan føre til skade på person. Før du begynner å arbeide med noe av utstyret, må du være oppmerksom på farene forbundet med elektriske kretser, og kjenne til standardprosedyrer for å forhindre ulykker. Bruk nummeret i slutten av hver advarsel for å finne oversettelsen i de oversatte sikkerhetsadvarslene som fulgte med denne enheten.** **TA VARE PÅ DISSE INSTRUKSJONENE**
Aviso	**INSTRUÇÕES IMPORTANTES DE SEGURANÇA .** **Este símbolo de aviso significa perigo. Você está em uma situação que poderá ser causadora de lesões corporais. Antes de iniciar a utilização de qualquer equipamento, tenha conhecimento dos perigos envolvidos no manuseio de circuitos elétricos e familiarize-se com as práticas habituais de prevenção de acidentes. Utilize o número da instrução fornecido ao final de cada aviso para localizar sua tradução nos avisos de segurança traduzidos que acompanham este dispositivo** **GUARDE ESTAS INSTRUÇÕES**

¡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. Al final de cada advertencia encontrará el número que le ayudará a encontrar el texto traducido en el apartado de traducciones que acompaña a este dispositivo.** **GUARDE ESTAS INSTRUCCIONES**
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. Använd det nummer som finns i slutet av varje varning för att hitta dess översättning i de översatta säkerhetsvarningar som medföljer denna anordning.** **SPARA DESSA ANVISNINGAR**
Figyelem	**FONTOS BIZTONSÁGI ELOÍRÁSOK** **Ez a figyelmezeto jel veszélyre utal. Sérülésveszélyt rejto helyzetben van. Mielott bármely berendezésen munkát végezte, legyen figyelemmel az elektromos áramkörök okozta kockázatokra, és ismerkedjen meg a szokásos balesetvédelmi eljárásokkal. A kiadványban szereplo figyelmeztetések fordítása a készülékhez mellékelt biztonsági figyelmeztetések között található; a fordítás az egyes figyelmeztetések végén látható szám alapján keresheto meg.** **ORIZZE MEG EZEKET AZ UTASÍTÁSOKAT!**
Предупреждение	**Для обеспечения соответствия требованиям по предельным значениям облучения радиочастотами (РЧ) антенны данного устройства должны располагаться на расстоянии не ближе 2 м от пользователей.**
警告	如果电源出现故障或中断，您将无法使用 Voice over IP (VoIP) 服务与紧急呼叫服务。电源恢复之后，您可能需要重新设置或重新配置设备，以便重新获得进入 VoIP 与紧急呼叫服务的权限。在美国，此紧急呼叫号码是 911。您必须知道本国的紧急呼叫号码。
警告	電源障害や停電の場合、ボイス オーバー アイピー (VoIP) サービスと緊急呼出しサービスは機能しません。電源の回復後、VoIP と緊急呼出しサービスにアクセスするには機器をリセットまたは再設定する必要があります。米国内の緊急呼出し番号は 911 です。お住まいの地域の緊急呼出し番号をあらかじめ調べておいてください。

Supervisor Engine 8L-E Features

The following figure shows the front view of Supervisor Engine 8L-E, with the major features identified.

Figure 1: Cisco Catalyst 4500 E-Series Supervisor Engine 8L-E


USB
10/100/1000
MGT
CONSOLE
SECURE DIGITAL
RESET
STATUS
LINK
1
2
3
4
5
6
7
8
9
UTILIZATION
10
11
12

1	STATUS LED	7	LINK LED (Management port)
2	RESET switch (recessed)	8	SECURE DIGITAL slot
3	UID LED and switch combination	9	SD LED
4	USB ports	10	ACTIVE SUP LED
5	CONSOLE port (RJ-45 connector)	11	UTILIZATION LEDs
6	10/100/1000 MGT port (RJ-45 connector)	12	1G or 10G UPLINKS (SFP/SFP+) ports and LEDs (port active and port status)

The following table describes the major features of Supervisor Engine 8L-E:

Feature	Description
STATUS LED	The status LED indicates the current health of the supervisor engine and the current software state.
RESET switch (recessed)	The RESET switch is used to reset and restart the switch. **Note** The reset switch is recessed into the front panel. Use a paper clip or a small, pointed object to press the RESET switch.
UID LED and switch combination	A combination push button switch and LED indicator. The blue LED can be turned on either by pressing the UID switch on the front panel or through software. The main purpose of the beacon LED is to enable identification from a remote location during configuration or troubleshooting. The ability to turn on/off the LED by pressing a switch allows you to walk to the other side of a fully populated rack and identify the switch. Pressing the blue beacon LED switch toggles the beacon LED on and off.
USB ports	USB ports are supported.
CONSOLE port (RJ-45 connector)	This is a 10/100/1000 port that uses an RJ-45 connector. The console port allows you to access the switch either locally (with a console terminal) or through a modem (remote). The port has an 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

Feature	Description
10/100/1000 MGT port (RJ-45 connector)	The Ethernet management port is a Layer 3 host port to which you can connect a PC. You can use the Ethernet management port instead of the switch console port for network management. When managing a switch, connect the PC to the Ethernet management port on a Catalyst 4500 E-series switch. **Note** When connecting a PC to the Ethernet management port, you must assign an IP address.
LINK LED (Management port)	The 10/100/1000 MGT port has a link LED associated with it. See callout 7 in Figure 1: Cisco Catalyst 4500 E-Series Supervisor Engine 8L-E, on page 5.
SECURE DIGITAL slot	A standard Secure Data (SD) memory card interface is provided on the front panel.
SD LED	The SD LED indicates the current status of the SD memory card slot.
ACTIVE SUP LED	The active supervisor engine LED indicates whether the supervisor engine is active or in standby mode in redundant supervisor engine configurations.
UTILIZATION LEDs	Eight LEDs indicate (as an approximate percentage) the current traffic load over the backplane.
1G/10G UPLINKS (SFP/SFP+) ports .	The Supervisor Engine 8L-E has four 1-G or 10-G ports that use either small form-factor pluggable (SFP) transceivers or SFP+ transceivers.
Uplink port LEDs	The uplink port LEDs display the status and activity of the uplink ports.

Supervisor Engine 8L-E Front Panel LEDs—Color and Meaning

Table 2: Supervisor Engine 8L-E Front Panel LEDs

LED	Color and Meaning
STATUS	Indicates the status of the Supervisor Engine: • Green—All diagniostic tests have passed. • Orange—System boot or a diagnostic test is in progress. • Red—A diagnostic test failed. • Off—The supervisor engine is disabled or is not powered up.

LED	Color and Meaning
LINK	Indicates the status of the 10/100/1000 BASE-T Ethernet management port: • Green—The link is operational. • Off—No signal is detected, or there is a link configuration failure, or the link is disabled by user.
SD	Indicates the status of the secure digital port: • Green—SD card is inserted. • Off—SD card has been removed, or the SD card is bad.
ACTIVE SUP	Indicates whether the Supervisor Engine is active or in standby mode: • Green—Supervisor engine is active (in redundant supervisor engine configurations) • Off—Supervisor engine is in standby mode (in redundant supervisor engine configurations)
UTILIZATION	When the switch is operational, the eight utilization LEDs indicate the current traffic load over the backplane as an approximate percentage value. Each LED-lit green indicates approximately 12.5 percent of load.
Uplink port status	Indicates the status of the uplink port: • Green—The link is operational. • Orange—The link is disabled by user. • Flashing orange—The power-on self-test indicates a faulty port. • Off—No signal is detected or there is a link configuration failure.
Uplink port active	Two LEDs on the front panel show the uplink port activity: • 1-2 ACTIVE indicates that ports 1 and 2 are active • 3-4 ACTIVE indicates that ports 3 and 4 are active In standalone supervisor engine configurations, all four uplink ports are active; all of the ACTIVE LEDs are lit green. In redundant supervisor engine configurations, only the 1-2 ACTIVE LED is lit green.

For additional specifications and features of the Supervisor Engine 8L-E, including physical and environmental specifications, refer to the Supervisor Engine 8L-E data sheet at:
http://www.cisco.com/c/en/us/products/switches/catalyst-4500-series-switches/datasheet-listing.html

Removing and Installing the Supervisor Engine

All Catalyst 4500 E-series switches support hot swapping, which lets you install, remove, replace, and rearrange supervisor engines and switching modules without powering the system off. 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.

Warning Only trained and qualified personnel should be allowed to install, replace, or service this equipment. **Statement 1030**

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

This section contains the following topics:

Required Tools

These tools are required to perform the installation or removal of a supervisor engine in a Catalyst 4500 Series Switch :

- Antistatic mat or foam pad to support the removed supervisor engine.
- 3/16-inch flat-blade screwdriver for the captive installation screws.
- Number 2 Phillips screwdriver for the captive installation screws.
- Your own ESD-prevention equipment or the disposable grounding wrist strap included with all upgrade kits, field-replaceable units (FRUs), and spares.

Note Whenever you handle supervisor engines, use a wrist strap or other grounding device to prevent electrostatic discharge (ESD) damage.

Preventing Electrostatic Discharge Damage

Electrostatic discharge (ESD) damage may occur when modules or other FRUs are improperly handled, and result in intermittent or complete failure of the modules or FRUs. Modules consist of printed circuit boards that are fixed in metal carriers. EMI shielding and connectors are integral components of a carrier. Although the metal carrier helps to protect the board from ESD, always use an ESD-grounding strap when handling modules. To prevent ESD damage, follow these guidelines:

- Always use an ESD wrist or ankle strap and ensure that it makes good skin contact.
- Connect the equipment end of the strap to an unfinished chassis surface.

- When installing a component, use any available ejector levers or captive installation screws to properly seat the bus connectors in the backplane or midplane. These devices prevent accidental removal, provide proper grounding for the system, and help to ensure that bus connectors are properly seated.
- When removing a component, use any available ejector levers or captive installation screws to release the bus connectors from the backplane or midplane.
- Handle carriers by available handles or edges only; avoid touching the printed circuit boards or connectors.
- Place a removed component board-side-up on an antistatic surface or in a static shielding container. If you plan to return the component to the factory, immediately place it in a static shielding container.
- Avoid contact between the printed circuit boards and clothing. The wrist strap only protects components from ESD voltages on the body; ESD voltages on clothing can still cause damage.
- Never attempt to remove the printed circuit board from the metal carrier.

Installing the Supervisor Engine

Before You Begin

Follow these guidelines:

- Verify chassis compatibility using Table 1: Supervisor Engine 8L-E Chassis Compatibility Information, on page 1.
- Verify that both the supervisor engines (in a redundant configuration) are of the same type.

Warning Hazardous voltage or energy is present on the backplane when the system is operating. Use caution when servicing. **Statement 1034**

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

Step 1 Take the necessary precautions, as described in the installation guide for your switch, to prevent ESD damage.

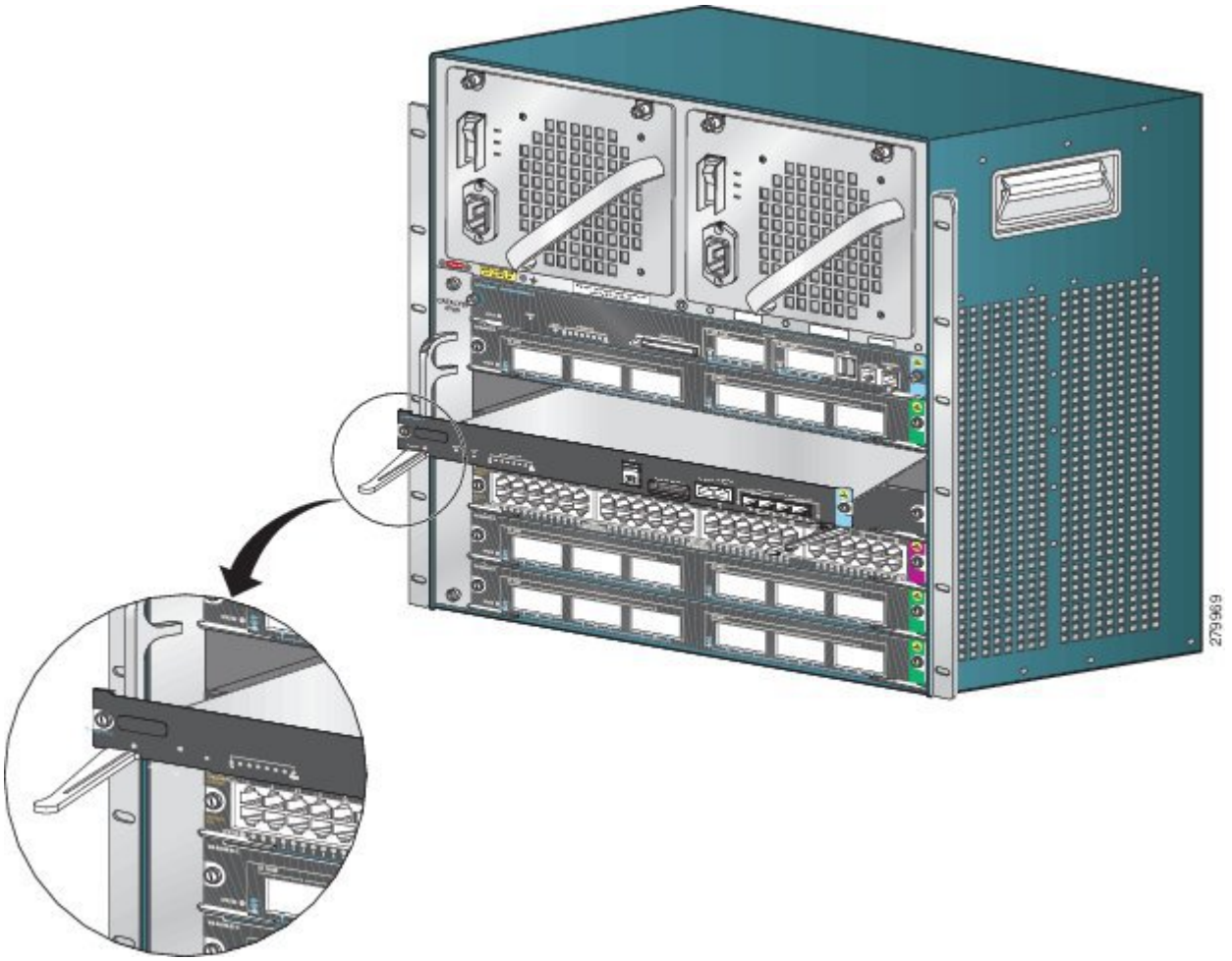
Step 2 Ensure that you have enough clearance to accommodate any interface equipment that you will connect directly to the supervisor engine ports.

Step 3 Loosen the two captive installation screws that secure the switching-module filler plate or the existing supervisor engine (whichever is present) and remove it. If a switching module filler plate is being removed, set it aside and save it for future use.

Step 4 Remove the new supervisor engine from the shipping packaging.

Step 5 Pivot the two-module ejector levers out and away from the faceplate

Figure 2: Installing the Supervisor Engine in the Chassis (Catalyst 4507R+E Shown)



Step 6 Grasp the switching module's front panel with one hand and place your other hand under the carrier to support the supervisor engine. Do not touch the printed circuit boards or connector pins.

Step 7 Position the new module in the slot. Make sure that you align the sides of the module carrier with the slot guides on each side of the chassis slot.

Step 8 Carefully slide the supervisor engine into the slot. Pivot both ejector levers in simultaneously.
When installed correctly

- The notches on both the ejector levers engage the chassis sides.
- Both the ejector levers are parallel with the supervisor engine faceplate to fully seat the supervisor engine in the backplane connector.

Note 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 9 Use a screwdriver to tighten the two captive installation screws on the supervisor engine. Do not over tighten the captive installation screws.

Step 10 Check the status of the module:

a) Verify that the supervisor engine STATUS LED is lit.
b) Periodically check the STATUS LED.
If the STATUS LED changes from orange to green, it means that the supervisor engine has completed the boot process successfully, and is now online.

If the STATUS LED remains orange or turns red, it means that the supervisor engine has not completed the boot process successfully, and may have encountered an error.

c) When the switch is online, enter the **show module** command. Verify that the system acknowledges the new supervisor engine and that the supervisor engine status is OK.
d) If the module is not operational, reseat it. If the module is still not operational, contact your Cisco customer service representative.

What to Do Next

Install switching-module filler plates in empty slots, if any, to maintain consistent airflow through the switch chassis.

Removing the Supervisor Engine

Before You Begin

Follow these guidelines:

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**

Warning Hazardous voltage or energy is present on the backplane when the system is operating. Use caution when servicing. **Statement 1034**

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

Step 1 Disconnect any network interface cables attached to the ports on the supervisor engine that you intend to remove

Step 2 Loosen the two captive installation screws on either end of the supervisor engine faceplate.

Step 3 Grasp the left and right ejector levers at either end of the supervisor engine faceplate and simultaneously pivot the levers outward to disengage the supervisor engine from the backplane connector.

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 slide 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 in an antistatic bag, or immediately install the supervisor engine in another chassis slot.

Step 7 In a chassis configured with redundant supervisor engines, if the chassis slot is to remain empty, you must install a blank line card (C4K-SLOT-CVR-E).

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. **Statement 1029**

Attaching Module Interface Cables

Module Interfaces

The supervisor engine module has the following interfaces or ports:

Interface	Connection Information
USB ports	USB ports are supported.
Console port	The console port allows you to access the switch either locally (through a console terminal) or remotely (through a modem). The console is an EIA/TIA-232 asynchronous, serial connection with hardware flow control and an RJ-45 connector.

Interface	Connection Information
Management port	By default, the Ethernet management port is enabled. The switch cannot route packets from the Ethernet management port to a network port, and from the network port to the Ethernet port. To obtain these, the Fa1 interface is automatically placed in a separate routing domain (or VRF domain), called mgmtVrf. (Observe the ip Vrf forwarding mgmtVrf line in the running configuration when you boot.) The specific implementation of Ethernet management port depends on the redundancy model you are applying. 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. In Cisco IOS software releases earlier than 12.2(50)SG, this port is not active while the switch is operating normally.
Uplink port	The Supervisor Engine 8L-E has four Ethernet uplink ports available on the front panel. The ports can be used to provide additional port capacity for a fully configured switch or can reduce the need to use a chassis slot for a module. These ports use the hot-swappable SFP or SFP+ optical transceivers. The ports can be configured with either SFP transceivers for 1-GB operations or SFP+ transceivers for 10-GB operations. 1-Gigabit and 10-Gigabit Ethernet uplink ports operate in full-duplex mode only. Both transceivers use LC-type connectors (optical) or RJ-45 (copper). The SFP transceivers have LC connectors to interface with multimode fiber (MMF) cable and single-mode fiber (SMF) cable and RJ-45 connectors for the copper interfaces.

Warning To avoid electric shock, do not connect safety extra-low voltage (SELV) circuits to telephone-network voltage (TNV) circuits. LAN ports contain SELV circuits, and WAN ports contain TNV circuits. Some LAN and WAN ports both use RJ-45 connectors. Use caution when connecting cables. **Statement 1021**

Attaching Optical Network Interface Cables

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

Step 1 Remove the dust plugs from the network interface cable optical connectors. Save the dust plugs for future use.

Step 2 Immediately inspect and clean the optical connector's fiber-optic end-faces.
Follow these guidelines:

- Always inspect and clean the SC or the LC connector end-faces just before making any connections. Contaminated connectors can damage the fiber and cause data errors.

- Always install protective covers on unused or disconnected components to prevent contamination.

Step 3 Remove the dust plugs from the transceiver optical bores.

Step 4 Immediately attach the network interface cable optical connector to the transceiver.
Follow these guidelines:

- Always grasp the SC or the LC connector housing rather than the fiber-optic cable to plug or unplug the fiber-optic cable.
- 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 insert the network connector completely into the socket. A secure connection is especially important when you are establishing a connection between a module and a long distance (1.24 miles or 2 km) network or a module and a suspected highly attenuated network. If the link LED does not light up, try removing the network cable plug and reinserting it firmly into the module socket. It is possible that dirt or skin oils have accumulated on the plug faceplate (around the optical-fiber openings), generating significant attenuation and reducing the optical power levels below threshold levels so that a link cannot be made.

Cleaning the Fiber-Optic Connectors

Fiber-optic connectors are used to connect two fibers together. When these connectors are used in a communications system, proper connection becomes a critical factor.

Fiber-optic cable connectors can be damaged by improper cleaning and connection procedures. Dirty or damaged fiber-optic connectors can result in communication that is not repeatable or is inaccurate.

Fiber-optic connectors differ from electrical or microwave connectors. In a fiber-optic system, light is transmitted through an extremely small fiber core. Because fiber cores are often 62.5 microns or less in diameter, and 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. 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 two factors: 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.

Guidelines

Connectors that are used inside the system are cleaned by the manufacturer and connected to the adapters in a proper manner. The operation of the system will be error free if the customer provides clean connectors on the application side and follows these guidelines:

- Does not clean the inside of the connector adapters.
- Does not use force or quick movements when connecting the fiber-optic connectors in the adapters.
- Covers the connectors and adapters to keep the inside of the adapters or the surface of the connectors from getting dirty when not using the connectors or while cleaning the chassis.

How to Clean the Fiber-Optic Connectors

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.

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**

SUMMARY STEPS

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

DETAILED 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.

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.

Connecting Transceivers to a Copper Network

Caution To comply with GR-1089 intrabuilding lightning immunity requirements, you must use grounded, shielded, twisted-pair Category 5 cabling.

Step 1 Insert the network cable RJ-45 connector into the RJ-45 connector on the transceiver.
When connecting to a 1000BASE-T-compatible switch or repeater, use four-twisted-pair, crossover Category 5 cabling.

Step 2 Insert the other end of the network cable into an RJ-45 connector on a 1000BASE-T-compatible target device.

SFP Modules and Cables

Use only Cisco SFP modules on your Cisco device. Each SFP 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 SFP module meets the requirements for the device.

For supported SFP transceiver media types, refer to these documents on Cisco.com:

- Cisco Wavelength Division Multiplexing Transceivers Compatibility Matrix
- Cisco 100-Megabit Ethernet SFP Modules Compatibility Matrix
- Cisco Gigabit Ethernet Transceiver Modules Compatibility Matrix

For cabling specifications, see the Cisco SFP and SFP+ Transceiver Module Installation Notes. 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. Copper 1000BASE-T SFP module transceivers use standard four twisted-pair, Category 5 cable at lengths up to 328 feet (100 meters).

For installation information, see the Cisco SFP and SFP+ Transceiver Module Installation Notes.

Configuring Your Supervisor Engine

For information about commands that you can use to configure your supervisor engine, refer to the software configuration guide for your switch under:Cisco Catalyst 4500 Series Switches Configuration Guides.

Related Documentation

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

- Catalyst 4500 E-Series Switches Installation Guide
- Catalyst 4500 Series Module Installation Guide
- Regulatory Compliance and Safety Information for the Catalyst 4500 Series Switches

- Software Configuration Guides
- Command Reference Guides
- System Message Guides
- Cisco Transceiver Modules Compatibility Information
- Inspection and Cleaning Procedures for Fiber-Optic Connections

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/c/en/us/td/docs/general/whatsnew/whatsnew.html

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