



## CHAPTER 2

# Introduction to the Cisco SCE8000 Platform

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This chapter provides an introduction to the Cisco SCE8000 10GBE platform, the Service Control hardware component.

- [SCE Platform Information, page 2-1](#)
- [Service Control Module—SCE8000-SCM-E, page 2-3](#)
- [SIP and SPA Introduction, page 2-4](#)
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- [1-Port 10 GBE SPA Interface Module, page 2-7](#)
- [Cisco SCE8000 Optical Bypass Module, page 2-9](#)
- [Checking the Shipping Container Contents, page 2-14](#)
- [Cisco SCE8000 Installation Checklist, page 2-15](#)

## SCE Platform Information

The Service Control Engine (SCE) platform, which is the hardware component of the Cisco service control solution, is designed to support observation, analysis, and control of Internet and IP traffic ([Figure 2-1](#)).

**Figure 2-1 Cisco SCE8000 Platform**

Table 2-1 summarizes model information for the Cisco SCE8000 platform.

**Table 2-1 SCE Platform Model Information**

Model number	Cisco SCE8000 10 GBE
Link Type	10 Gigabit Ethernet
Number of Ports	2 or 4
Number of Links	1 or 2

The Cisco SCE8000 is a transparent element with 10 GBE links service throughput. It can be installed inline in the network where all traffic passes through it, or in receive-only mode where it receives replication of the traffic through SPAN ports or optical splitters.

The Cisco SCE8000 supports the following network insertion models:

- Single appliance (inline)
- Single appliance (receive-only)
- MGSCP configuration

The Cisco SCE8000 platform is a 4-slot chassis hosting the following modules:

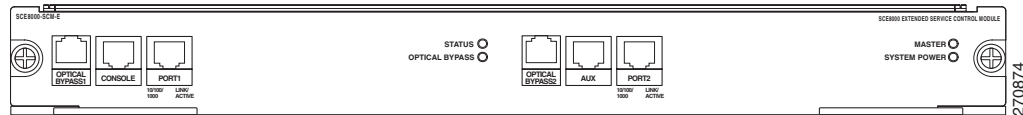
- One or two service control modules (SCE8000-SCM-E) that each contain special-purpose, fast-path chipset, traffic processors, and control processor.
- One SPA Interface Processor card (SCE8000-SIP) that holds up to four SPA 10 GBE interface modules.
- One optional optical bypass module hosting panel that holds up to two optical bypass modules.

In addition, the Cisco SCE8000 chassis contains two power supply modules in a 1+1 configuration, as well as a fan tray module.

# Service Control Module—SCE8000-SCM-E

The Cisco SCE8000 contains one or two SCE8000-SCMs located in slots#1 and #2 (the top two slots). The service control module contains ports and LEDs as shown in [Figure 2-2](#), [Table 2-2](#), and [Table 2-3](#).

**Figure 2-2 SCE8000-SCM-E**



**Table 2-2 SCE8000-SCM-E Ports**

Port	Quantity	Description	Connect This Port to...
GBE port	2 Currently only 1 GBE port is supported.	Gigabit Ethernet RJ-45 ports for management of the Cisco SCE8000. CLI designation: interface GigabitEthernet 1/1, 1/2.	A LAN using a GBE cable with an RJ-45 connector.
Console	1	RS-232 RJ-45 port for use by technicians	A local terminal (console) using an RS-232 cable with an RJ-45 connector, as provided in the Cisco SCE8000 kit.
AUX	1	RS-232 RJ-45 port used by technicians	—
Bypass	2	RJ-11 port	The control connector on the optical bypass module.

**Table 2-3 SCE8000-SCM-E LED Description**

LED	Description
Power	<ul style="list-style-type: none"> <li>Steady green—Installed power supplies are functioning normally.</li> <li>Steady amber—Only one power supply is functioning normally.</li> <li>Unlit—No power from either power supply.</li> </ul> <p>On a slave SCE8000-SMC_E module (in the second slot), this LED is always off.</p>
Status	<p>The Status LED indicates the operational status of the Cisco SCE8000 system, as follows:</p> <ul style="list-style-type: none"> <li>Unlit—No power from either power unit.</li> <li>Steady amber—System is booting up.</li> <li>Flashing amber—System is operational, but is in a warning state.</li> <li>Flashing green—System is fully operational.</li> <li>Steady red—Problem or failure.</li> </ul> <p>Alarms are hierarchical: Failure takes precedence over Warning, which takes precedence over Operational.</p>

**Table 2-3 SCE8000-SCM-E LED Description (continued)**

LED	Description
Optical Bypass	<ul style="list-style-type: none"> <li>Steady amber—The optic bypass module is directed to pass traffic through the Cisco SCE8000.</li> <li>Unlit—The optic bypass module (if present) connects link fibers directly, and traffic bypasses the Cisco SCE8000.</li> </ul> <p>On a slave SCE8000-SMC_E module (in slot 2), this LED is always off.</p> <p>This functionality is consistent even when the Cisco SCE8000 is powered off.</p>
Master	<p>Indicates the master service control module</p> <ul style="list-style-type: none"> <li>Steady green—Master service control module</li> <li>Unlit—Slave service control module</li> </ul>
Mng interface	<p>The Mng interface LEDs indicate the operational status of the Cisco SCE8000 out-of-band LAN-based management port, as follows:</p> <ul style="list-style-type: none"> <li>Link/Active <ul style="list-style-type: none"> <li>Steady green—Port link is up</li> <li>Flashing green—Activity on the port link</li> <li>Unlit—Port link is down</li> </ul> </li> <li>Speed <ul style="list-style-type: none"> <li>Unlit—Port is set to 10 Mbps</li> <li>Steady green—Port is set to 100 Mbps</li> <li>Steady amber—Port is set to 1000 Mbps</li> </ul> </li> </ul> <p>On a slave SCE8000-SMC_E module (in the second slot), this LED is always off.</p>

## SIP and SPA Introduction

SIPs and SPAs are carrier card and port adapter architectures used to increase modularity, flexibility, and density across Cisco routers for network connectivity. This section describes SIPs and SPAs and provides some guidelines for their use.

- [SPA Interface Processors, page 2-4](#)
- [Specifying a SIP Subslot Location for a SPA, page 2-5](#)
- [Shared Port Adapters, page 2-5](#)
- [Modular Optics, page 2-6](#)
- [XFP Connections, page 2-6](#)

## SPA Interface Processors

The SIP module supported by the Cisco SCE8000 chassis is the SCE8000-SIP. General characteristics of a SIP include:

- A SIP is a carrier card that inserts into a slot in the chassis like a line card. It provides no network connectivity on its own.

- A SIP contains one or more subslots (bays), which are used to house one or more SPAs. The SPA provides interface ports for network connectivity.
- During normal operation, the SIP should reside in the router fully populated either with functional SPAs in all subslots, or with a blank filler plate (SPA-BLANK=) inserted in all empty subslots.

## Specifying a SIP Subslot Location for a SPA

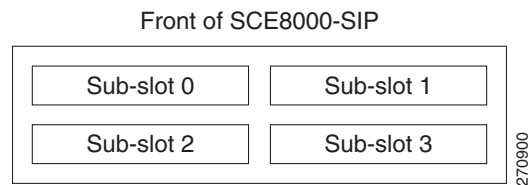
Cisco SCE8000-SIP subslots begin their numbering with “0” and have a horizontal orientation.

Figure 2-3 shows the subslot numbering for the Cisco SCE8000-SIP.

The Cisco SCE8000-SIP supports four subslots for the installation of SPAs, as follows:

- SIP subslot 0—Top-left subslot
- SIP subslot 1—Top-right subslot
- SIP subslot 2—Bottom-left subslot
- SIP subslot 3—Bottom-right subslot

**Figure 2-3 SPA Module Subslot Location**



## Shared Port Adapters

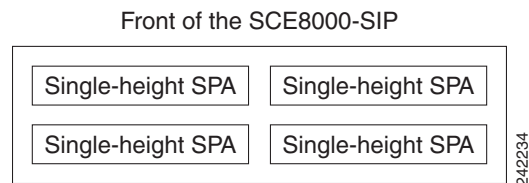
The SPA supported by the Cisco SCE8000-SIP is the 1-port 10-Gigabit Ethernet SPA (SPA-1X10GE-L-V2). Characteristics of a SPA include:

- A SPA is a modular type of port adapter that inserts into a subslot of a compatible SIP carrier card to provide network connectivity and increased interface port density. The Cisco SCE8000-SIP can hold up to four SPAs.

Because interfaces are connected in subscriber or network pairs, either two or four SPAs must be installed.

- The supported SPA is a single-height SPA which inserts into one SIP subslot (Figure 2-4).

**Figure 2-4 Single-Height SPA Size**



- Each SPA provides one 10 GBE port, which is the interface to either subscriber or network traffic. The interfaces can be individually configured using the Cisco command-line interface (CLI).
  - Either a blank filler plate or a functional SPA should reside in every subslot of an SIP during normal operation to maintain cooling integrity. Blank filler plates are available in single-height form only.
- Since the interfaces are connected in subscriber/network pairs, the SCE8000-SIP must be either fully populated or have both the bottom bays covered with blank filler plates.

## Modular Optics

SPAs implement 10 GBE small form-factor pluggable (XFP) optical transceivers to provide network connectivity. An XFP module is a transceiver device that mounts into the front panel to provide network connectivity.

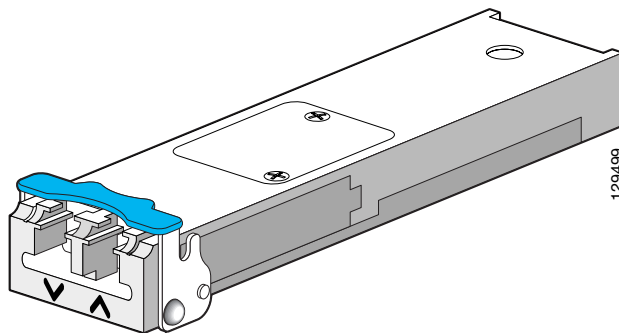


### Note

We recommend only using the XFP modules listed as supported in this document. Use of unsupported or unqualified XFP modules may affect reliability or operation.

Figure 2-5 illustrates a 10 GBE small form-factor pluggable (XFP) optical transceiver.

**Figure 2-5** 10 GBE Small Form-factor Pluggable Transceiver—XFP



The interface connector on the 1-port 10-Gigabit Ethernet SPA is a fiber optic receiver that supports one XFP.

Optics modules that are qualified for use with the 1-port 10-Gigabit Ethernet SPA on the Cisco SCE8000 platform are:

- XFP-10GLR-OC192SR
- XFP-10GER-OC192IR
- XFP-10GZR-OC192LR
- XFP-10G-MM-SR

## XFP Connections

Table 2-4 lists XFP port cabling specifications.

**Table 2-4 XFP Port Cabling Specifications**

XFP	Wavelength (nm)	Fiber Type
XFP-10GLR-OC192SR	1310	SMF
XFP-10GER-OC192IR	1550	SMF
XFP-10GZR-OC192LR	1550	SMF
XFP-10G-MM-SR	850	MMF

Qualified XFPs include an optical transmitter and receiver pair integrated with clock and data recovery (CDR) integrated circuits. XFPs provide high-speed serial links at 10.3125 Gbps on single-mode fibers.

The transmit side recovers and retimes the 10 Gbps serial data and passes it to a laser driver. The laser driver biases and modulates a laser, enabling data transmission over fiber through an LC connector. The receive side recovers and retimes the 10 Gbps optical data stream from a photo detector trans impedance amplifier and passes it to an output driver.

To identify technology type and model, see the label on the XFP. XFP dimensions are:

- Height—12.5 mm
- Width—18.35 mm
- Length—71.1 mm

The XFP operating temperature range is 0°C to 70°C.

## SCE8000-SIP Status LEDs

Table 2-5 describes the SCE8000 status LEDs.

**Table 2-5 SCE8000-SIP LED**

LEDs	Description
Status	<ul style="list-style-type: none"> <li>• Green—Operational</li> <li>• Flashing Amber—Electrical bypass in operation</li> <li>• Red—Not initialized or failed</li> <li>• Unlit—No power</li> </ul>

## 1-Port 10 GBE SPA Interface Module

The SCE8000-SIP:

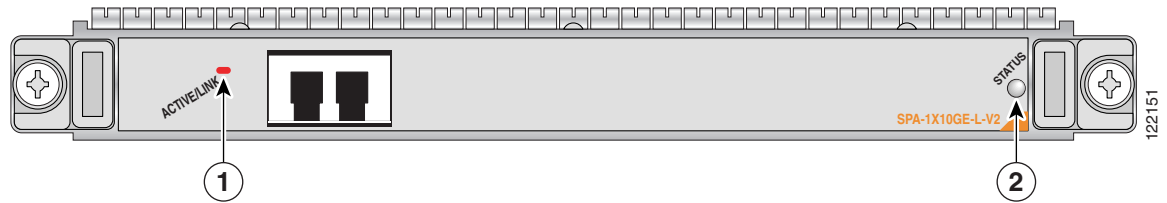
- Is installed in slot 3 of the Cisco SCE8000 chassis.
- Hosts up to 4 single-width, single-height 1-port 10 GBE SPA interface modules (Figure 2-6).

In the Cisco SCE8000, the SPA interface module must be configured with either:

- Two 1-port 10 GBE SPAs (in the upper two subslots), or
- Four 1-port 10 GBE SPAs

This provides interfaces for either one or two complete traffic links. [Table 2-6](#) and [Table 2-7](#) list SPA ports and LEDs.

**Figure 2-6** 1-Port 10 GBE SPA Interface Module



**Table 2-6** SPA Ports

Port	Quantity	Description	Connect This Port To...
10 GBE Line port	1 on each SPA	Any one of the following: <ul style="list-style-type: none"> <li>XFP-10GLR-OC192SR (10 km)</li> <li>XFP-10GER-OC192IR (40 km)</li> <li>XFP-10GZR-OC192LR (80 km)</li> <li>XFP-10G-MM-SR (200 m)</li> </ul> CLI designation: interface TenGigabitEthernet 3/0/0, 3/1/0/, 3/2/0, 3/3/0.	Any one of the following: <ul style="list-style-type: none"> <li>Subscriber side network component</li> <li>Network side network component</li> <li>Optical bypass 10 GBE line port</li> <li>EtherChannel port of a Cisco 7600 series router (MGSCP topology)</li> </ul> Refer to <a href="#">Connecting Line Ports to the Network, page 6-1</a> for further information.

**Table 2-7** SPA LEDs

LEDs	Description
Active/Link (1)	<ul style="list-style-type: none"> <li>Green—Port is enabled by software and the link is up.</li> <li>Amber—Port is enabled by software and the link is down.</li> <li>Unlit—Port is not enabled by software.</li> </ul>
Status (2)	The Status LED indicates the operational status of the SPA module, as follows: <ul style="list-style-type: none"> <li>Green—SPA is ready and operational.</li> <li>Amber—SPA power is on and good, and SPA is being configured.</li> <li>Off—SPA power is off.</li> </ul>



# Cisco SCE8000 Optical Bypass Module

- [Optical Bypass Functionality, page 2-9](#)
- [Optical Bypass Module: OPB-SCE8K, page 2-10](#)

The Cisco SCE8000 platform optical bypass module preserves the service provider 10 GBE links under all circumstances. Upon power failure, the bypass is automatically activated. It can also be activated by the Cisco SCE8000 software.

The Cisco SCE8000 platform already includes an internal electrical bypass, but we recommended that you use the optical bypass module for addressing the following scenarios:

- During platform reboot (SW reload)—If the external bypass module is not used, there is a 5-second period (at most) during which the link is forced down (cutoff functionality).
- During a power failure—The Cisco SCE8000 has two power supplies. A power failure occurs only if both of them fail.

If the Cisco SCE8000 platform must be replaced, it is possible to remove the bypass modules from the SCE8000 chassis without disconnecting them from the network and then reinstall them in the new SCE platform. Traffic links are preserved even in a case of complete failure and replacement of the Cisco SCE8000 platform. See the [“Replacing Optical Bypass Module without Disrupting Traffic on Link” section on page 9-26](#).

## Optical Bypass Functionality

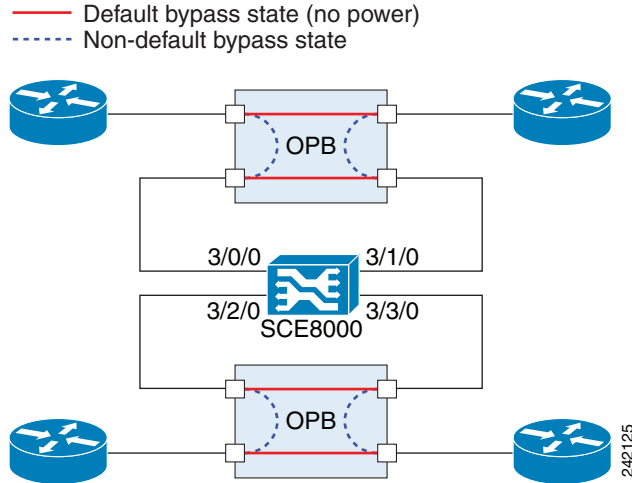
The optical bypass module is connected bump-in-the-wire in the 10-GBE link. It is then connected to the Cisco SCE8000 platform with two types of connections:

- 10GBE optical connections for data link traffic—10 GBE connections from the optical bypass module to one pair of the 10 GBE SPA ports.
- Control connection—Connection to the RJ-11 External Bypass connector on the SCE8000-SCM, so the optical bypass is activated if the Cisco SCE8000 platform fails.

## Optical Bypass Module Connectivity

The optical bypass module functions as follows ([Figure 2-7](#)):

- Under normal conditions, the bypass module directs traffic to flow through the Cisco SCE8000.
- Under failure conditions, the optical bypass shortcuts the interfaces that are connected to the traffic link, and all traffic flows through the optical bypass module, bypassing the SCE platform.

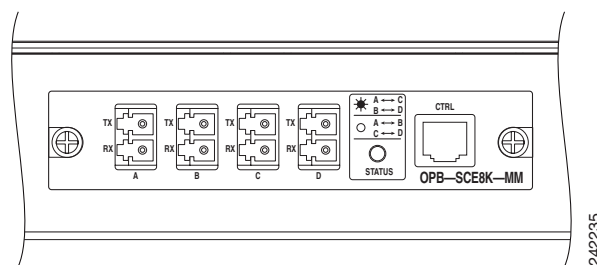
**Figure 2-7** Optical Bypass Module Connectivity

## Optical Bypass Module: OPB-SCE8K

Two types of optical bypass modules support different optic types:

- OPB-SCE8K-SM—Supports single-mode optics and is used with the SCE8000 equipped with single-mode optics.
- OPB-SCE8K-MM—Supports multimode optics and is used with an SCE8000 equipped with multimode optics.

The optical bypass module is installed either internally, in slot 4 of the Cisco SCE8000 chassis or in an external mounting panel in the rack (Figure 2-8).

**Figure 2-8** Optical Bypass Module

Up to two optical bypass modules can be mounted internally, supporting inline insertion into two links.

Up to four optical bypass modules can be mounted using an external mount panel (OPB-SCE8K-EXT-PNL). One panel can serve two SCE8000 platforms, each cutting two links; or up to four SCE8000 platforms, each cutting one link.

Table 2-8 lists the optical bypass module port connections. Table 2-9 lists optical bypass module LEDs.

**Table 2-8** *Optical Bypass Module Ports*

Port	Quantity	Description	Connect This Port to...
10 GBE line port	4	10GBE ports A through D Duplex LC, panel mount adaptor for LC/UPC connectors	SPA interfaces on the Cisco SCE8000.  Refer to the <a href="#">“Cabling the 10 GBE Line Interface Ports: Using the External Optical Bypass Module”</a> section on page 6-10 for information.
CTRL	1	RJ-11 port	RJ-11 optical bypass port on the SCE8000-SCM-E

**Table 2-9** *Optical Bypass Module LEDs*

LEDs	Description
Status	The Status LED indicates the operational status of the optical bypass module, as follows: <ul style="list-style-type: none"> <li>• Green—Bypass module has been de-activated (traffic flows through the Cisco SCE8000 platform)</li> <li>• Off—Bypass module is active (traffic does not flow through the Cisco SCE8000 platform)</li> </ul>

## Optical Bypass Module Specifications

### Fiber Cable Type

The fiber cable type within the Optical Bypass Module area as follows:

- OPB-SCE8K-MM: 50 um core.
- OPB-SCE8K-SM: SMF-28

Maximum optical path (fiber length of two ports) is 600m.

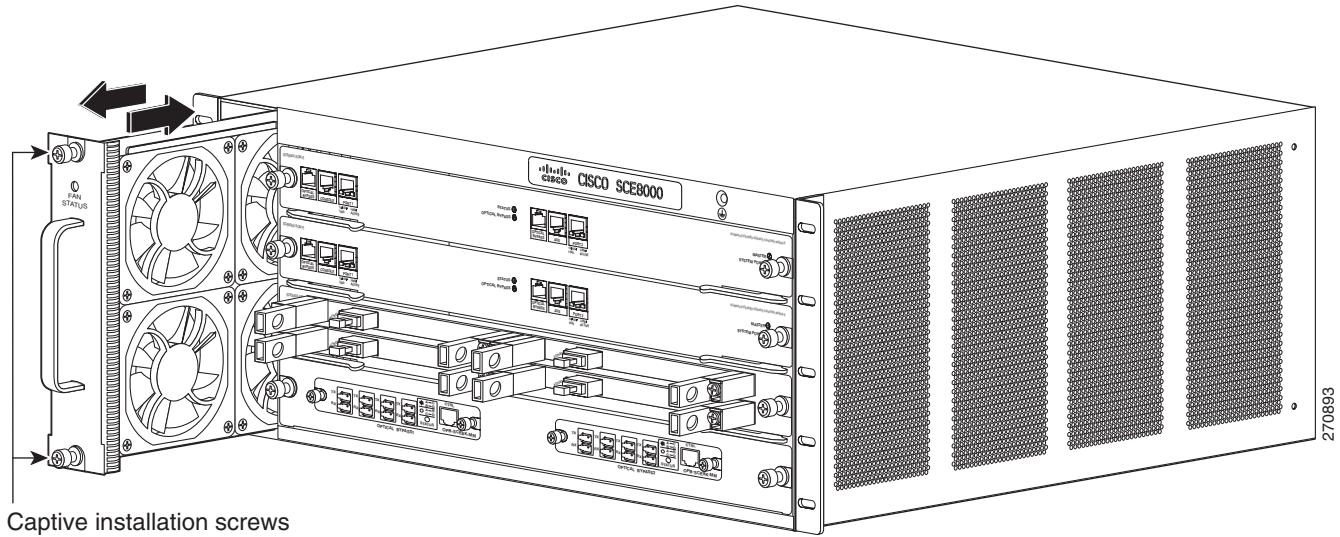
### Switching Time

Switching time is measured from trigger to stable 90% optical output.

- Typical switching time: 3 ms
- Maximal switching time: 10ms

## Fan Assembly

The system fan assembly, located in the chassis, provides cooling air for the installed modules ([Figure 2-9](#)).

**Figure 2-9 Fan Assembly**

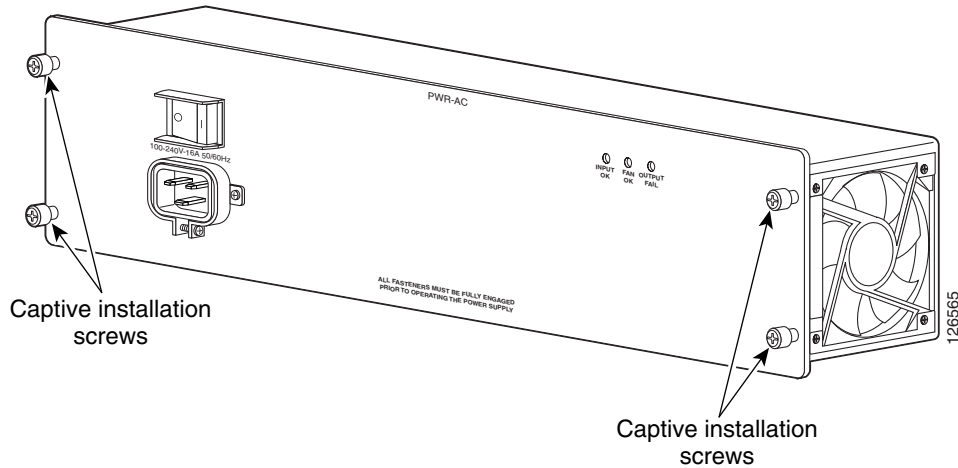
Sensors on the fan assembly and within the system monitor the internal air temperatures. If the air temperature exceeds a preset threshold, the environmental monitor displays warning messages. If an individual fan within the assembly fails, the FAN STATUS LED turns red. To replace a fan assembly, see the [“Removing and Replacing the Fan Assembly”](#) section on page 9-11.

## Power Supplies

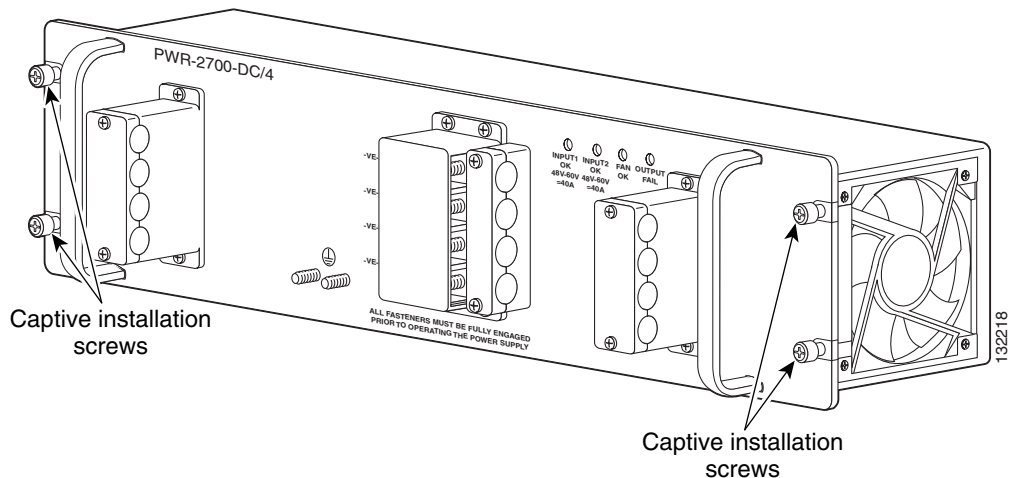
The Cisco SCE8000 platform supports redundant AC- or DC-input power supplies. The following power supplies are available for the Cisco SCE8000 platform:

- 2700 W AC input (PWR-2700-AC/4)—(Figure 2-10) Uses an external power cord directly connected to the AC power supply.
- 2700 W DC input (PWR-2700-DC/4)—(Figure 2-11) Uses an external terminal block on the back side of the chassis for input power connection.

**Figure 2-10** PWR-2700-AC/4



**Figure 2-11** PWR-2700-DC/4



The AC-input and DC-input power supplies support redundancy. When power is removed from one supply, the redundant power feature causes the second supply to produce full power.

## Power Supply Cooling

Power supplies have built-in fans and are completely self-cooling. Air enters from the right of the fan and exits through the left.

## Load-Sharing

With two power supplies, each power supply concurrently provides approximately half of the required power to the system. If one power supply fails, the second power supply immediately assumes full power to maintain uninterrupted system operation. The second power supply enables load sharing and fault tolerance automatically; no software configuration is required.

# Checking the Shipping Container Contents

Use the Cisco SCE8000 Component List to check the contents of the Cisco SCE8000 platform shipping container.



### Tip

When you unpack the Cisco SCE8000, do not discard the shipping container. Flatten the shipping cartons and store them with the pallet. You may need these containers if you move or ship the Cisco SCE8000 in the future.

## Cisco SCE8000 Components

Table 2-10 lists the components of the SCE8000 system.

**Table 2-10** Cisco SCE8000 Component List

Component	Description
<b>Cisco SCE8000 platform</b> <ul style="list-style-type: none"> <li>• Cisco SCE8000-SCM-E</li> <li>• Cisco SCE8000-SIP</li> <li>• 2 or 4 SPA Jacket cards</li> <li>• 2 or 4 XFP OpticsXFP optic modules.</li> <li>• 2 Cisco PWR-2700-AC/4 or 2 Cisco PWR-2700-DC/4</li> <li>• SCE8000-FAN</li> </ul>	Cisco SCE8000 10 GBE chassis configured with the following components: <ul style="list-style-type: none"> <li>• Cisco SCE8000 service control module</li> <li>• Cisco SCE8000 SPA Jacket card Interface Processor</li> <li>• SPA Interface. See below the list of supported SPA models.</li> <li>• See below the list of supported XFP models</li> <li>• Cisco power supply units, AC or DC. Hot swappable, redundant power supply, compatible with Cisco 7604 router.</li> <li>• Redundant fan unit.</li> </ul>
<b>Accessories</b>	The following accessories might arrive in separate shipping containers:

**Table 2-10** Cisco SCE8000 Component List (continued)

Component	Description
Management cables	<ul style="list-style-type: none"> <li>Gigabit Ethernet cable for connecting to the Management ports</li> <li>RS-232 serial cables (DB-9 to RJ-45 and DB-25 to RJ-45) for connecting to a local terminal</li> </ul>
Power cables	Two AC power supply cords, if ordered with AC-input power supply units
Grounding kit 69-0815-01	<ul style="list-style-type: none"> <li>Grounding lug</li> <li>Two M4 hex-head screws with locking washers</li> </ul>
Optical Bypass module kit	<ul style="list-style-type: none"> <li>Optical Bypass Module</li> <li>Control Cable (2 m)</li> <li>Control Cable (40 cm)</li> </ul>

**Note**

We do not ship the entire Cisco SCE8000 documentation set automatically with each system. You must specifically order the documentation as part of the sales order. If you ordered documentation and did not receive it, we will ship the documents to you within 24 hours. To order documents, contact a customer service representative.

## Cisco SCE8000 Installation Checklist

To assist you with your installation and to provide a historical record of actions performed, photocopy the following Cisco SCE8000 Installation Checklist ([Table 2-11](#)). Indicate the date each procedure or verification is completed. When the checklist is completed, place it in your site log along with the other records for your Cisco SCE8000 platform.

**Table 2-11** Cisco SCE8000 Installation Checklist

Task	Verified By	Date
Date Cisco SCE8000 received		
Cisco SCE8000 and all accessories unpacked		
Safety recommendations and guidelines reviewed		
Topology verified—Quantity of Cisco SCE8000 platforms, number of links, and whether inline or receive-only		
Installation Checklist copied		
Site log established and background information entered		
Site power voltages verified		
Site environmental specifications verified		
Required passwords, IP addresses, device names, and so on, needed for initial configuration available (refer to the <a href="#">“Initial Setup Parameters”</a> section on page 5-2)		

Table 2-11 Cisco SCE8000 Installation Checklist (continued)

Task	Verified By	Date
Required tools available		
Network connection equipment available		
Cisco SCE8000 mounted in rack		
System grounding established, if required		
AC/DC power cables connected to AC/DC sources and Cisco SCE8000 chassis		
Optical bypass modules installed (optional)		
Console port set for 9600 baud, 8 data bits, no parity, and 1 stop bit (9600 8N1)		
ASCII terminal attached to console port		
Management port is operational		
Network interface cables and devices connected		
System power turned on		
System boot complete (Status LED is on)		
10 GBE line ports operational		
Correct hardware configuration displayed after system banner appears		