Cisco VPN Services Port Adapter Hardware Installation Guide

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CONTENTS

Preface

This preface describes the objectives and organization of this document and explains how to find additional information on related products and services. This preface contains the following sections:

Objectives

This document describes how to install the VPN Services Port Adapter (VSPA) and its associated Services SPA Carrier-600 (SSC-600) into the Catalyst 6500 Series switch. This document also describes how to troubleshoot the installation.

This document does not describe the configuration of the VSPA. For information on configuring the module, refer to the *Cisco VPN Services Port Adapter Configuration Guide*.

Audience

Only trained and qualified service personnel (as defined in IEC 60950 and AS/NZS3260) should install, replace, or service the equipment described in this publication.

Document Revision History

Table 1 records technical changes to this document. The table shows the Cisco IOS software release number and document revision number for the change, the date of the change, and a brief summary of the change.

Table 1 Document Revision History

Cisco IOS Release No.	Document Revision	Date	Change Summary
12.2(33)SXI	OL-16407-01	November 2008	First release.

Organization

This document contains the following chapters:

Section	Title	Description
Chapter 1	VPN Services Port Adapter Overview	Provides an introduction to the VSPA and its associated SSC-600.
Chapter 2	Preparing to Install the VSPA and the SSC-600	Describes the required tools, equipment, and safety guidelines for installing the VSPA and its associated SSC-600.
Chapter 3	Installing and Removing the Services SPA Carrier-600	Describes the procedures for installing and removing the SSC-600.
Chapter 4	Installing and Removing the VPN Services Port Adapter	Describes the procedures for installing and removing the VSPA. It also describes how to verify the installation.
Chapter 5	Troubleshooting the Installation	Provides information for troubleshooting the installation. It also describes helpful debug commands and error messages.

Conventions

This document uses the following conventions:

Convention	Description
boldface font	Commands, command options, and keywords are in **boldface**.
italic font	Arguments for which you supply values are in *italics*.
[ ]	Elements in square brackets are optional.
{ x | y | z }	Alternative keywords are grouped in braces and separated by vertical bars.
[x | y | z]	Optional alternative keywords are grouped in brackets and separated by vertical bars.
string	A nonquoted set of characters. Do not use quotation marks around the string or the string will include the quotation marks.
`screen` font	Terminal sessions and information the system displays are in `screen` font.
`boldface screen` font	Information you must enter is in **`boldface screen`** font.
`italic screen` font	Arguments for which you supply values are in *`italic screen`* font.

Convention	Description
——→	`This pointer highlights an important line of text in an example.`
^	The symbol ^ represents the key labeled Control—for example, the key combination ^D in a screen display means hold down the Control key while you press the D key.
< >	Nonprinting characters, such as passwords are in angle brackets.

Notes use the following conventions:

Note Means *reader take note*. Notes contain helpful suggestions or references to material not covered in the publication.

Cautions use the following conventions:

Caution Means *reader be careful*. In this situation, you might do something that could result in equipment damage or loss of data.

Warnings use the following conventions:

Statement 1071—Warning Definition

Safety warnings appear throughout this publication in procedures that, if performed incorrectly, might harm you. 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. 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

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

ВАЖНЫЕ ИНСТРУКЦИИ ПО СОБЛЮДЕНИЮ ТЕХНИКИ БЕЗОПАСНОСТИ

Этот символ предупреждения обозначает опасность. То есть имеет место ситуация, в которой следует опасаться телесных повреждений. Перед эксплуатацией оборудования выясните, каким опасностям может подвергаться пользователь при использовании электрических цепей, и ознакомьтесь с правилами техники безопасности для предотвращения возможных несчастных случаев. Воспользуйтесь номером заявления, приведенным в конце каждого предупреждения, чтобы найти его переведенный вариант в переводе предупреждений по безопасности, прилагаемом к данному устройству.

СОХРАНИТЕ ЭТИ ИНСТРУКЦИИ

警告　重要的安全性说明

此警告符号代表危险。您正处于可能受到严重伤害的工作环境中。在您使用设备开始工作之前，必须充分意识到触电的危险，并熟练掌握防止事故发生的标准工作程序。请根据每项警告结尾提供的声明号码来找到此设备的安全性警告说明的翻译文本。

请保存这些安全性说明

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、一般的な事故防止策に留意してください。警告の各国語版は、各注意事項の番号を基に、装置に付属の「Translated Safety Warnings」を参照してください。

これらの注意事項を保管しておいてください。

주의　중요 안전 지침

이 경고 기호는 위험을 나타냅니다. 작업자가 신체 부상을 일으킬 수 있는 위험한 환경에 있습니다. 장비에 작업을 수행하기 전에 전기 회로와 관련된 위험을 숙지하고 표준 작업 관례를 숙지하여 사고를 방지하십시오. 각 경고의 마지막 부분에 있는 경고문 번호를 참조하여 이 장치와 함께 제공되는 번역된 안전 경고문에서 해당 번역문을 찾으십시오.

이 지시 사항을 보관하십시오.

تحذير　**إرشادات الأمان الهامة**

يوضح رمز التحذير هذا وجود خطر. وهذا يعني أنك متواجد في مكان قد ينتج عنه التعرض لإصابات. قبل بدء العمل، احذر مخاطر التعرض للصدمات الكهربائية وكن على علم بالإجراءات القياسية للحيلولة دون وقوع أي حوادث. استخدم رقم البيان الموجود في أخر كل تحذير لتحديد مكان ترجمته داخل تحذيرات الأمان المترجمة التي تأتي مع الجهاز.

قم بحفظ هذه الإرشادات

Upozorenje　**VAŽNE SIGURNOSNE NAPOMENE**

Ovaj simbol upozorenja predstavlja opasnost. Nalazite se u situaciji koja može prouzročiti tjelesne ozljede. Prije rada s bilo kojim uređajem, morate razumjeti opasnosti vezane uz električne sklopove, te biti upoznati sa standardnim načinima izbjegavanja nesreća. U prevedenim sigurnosnim upozorenjima, priloženima uz uređaj, možete prema broju koji se nalazi uz pojedino upozorenje pronaći i njegov prijevod.

SAČUVAJTE OVE UPUTE

Upozornění

DŮLEŽITÉ BEZPEČNOSTNÍ POKYNY

Tento upozorňující symbol označuje nebezpečí. Jste v situaci, která by mohla způsobit nebezpečí úrazu. Před prací na jakémkoliv vybavení si uvědomte nebezpečí související s elektrickými obvody a seznamte se se standardními opatřeními pro předcházení úrazům. Podle čísla na konci každého upozornění vyhledejte jeho překlad v přeložených bezpečnostních upozorněních, která jsou přiložena k zařízení.

USCHOVEJTE TYTO POKYNY

Προειδοποίηση

ΣΗΜΑΝΤΙΚΕΣ ΟΔΗΓΙΕΣ ΑΣΦΑΛΕΙΑΣ

Αυτό το προειδοποιητικό σύμβολο σημαίνει κίνδυνο. Βρίσκεστε σε κατάσταση που μπορεί να προκαλέσει τραυματισμό. Πριν εργαστείτε σε οποιοδήποτε εξοπλισμό, να έχετε υπόψη σας τους κινδύνους που σχετίζονται με τα ηλεκτρικά κυκλώματα και να έχετε εξοικειωθεί με τις συνήθεις πρακτικές για την αποφυγή ατυχημάτων. Χρησιμοποιήστε τον αριθμό δήλωσης που παρέχεται στο τέλος κάθε προειδοποίησης, για να εντοπίσετε τη μετάφρασή της στις μεταφρασμένες προειδοποιήσεις ασφαλείας που συνοδεύουν τη συσκευή.

ΦΥΛΑΞΤΕ ΑΥΤΕΣ ΤΙΣ ΟΔΗΓΙΕΣ

אזהרה

הוראות בטיחות חשובות

סימן אזהרה זה מסמל סכנה. אתה נמצא במצב העלול לגרום לפציעה. לפני שתעבוד עם ציוד כלשהו, עליך להיות מודע לסכנות הכרוכות במעגלים חשמליים ולהכיר את הנהלים המקובלים למניעת תאונות. השתמש במספר ההוראה המסופק בסופה של כל אזהרה כד לאתר את התרגום באזהרות הבטיחות המתורגמות שמצורפות להתקן.

שמור הוראות אלה

Ostrzeżenie

WAŻNE INSTRUKCJE DOTYCZĄCE BEZPIECZEŃSTWA

Ten symbol ostrzeżenia oznacza niebezpieczeństwo. Zachodzi sytuacja, która może powodować obrażenia ciała. Przed przystąpieniem do prac przy urządzeniach należy zapoznać się z zagrożeniami związanymi z układami elektrycznymi oraz ze standardowymi środkami zapobiegania wypadkom. Na końcu każdego ostrzeżenia podano numer, na podstawie którego można odszukać tłumaczenie tego ostrzeżenia w dołączonym do urządzenia dokumencie z tłumaczeniami ostrzeżeń.

NINIEJSZE INSTRUKCJE NALEŻY ZACHOWAĆ

Upozornenie

DÔLEŽITÉ BEZPEČNOSTNÉ POKYNY

Tento varovný symbol označuje nebezpečenstvo. Nachádzate sa v situácii s nebezpečenstvom úrazu. Pred prácou na akomkoľvek vybavení si uvedomte nebezpečenstvo súvisiace s elektrickými obvodmi a oboznámte sa so štandardnými opatreniami na predchádzanie úrazom. Podľa čísla na konci každého upozornenia vyhľadajte jeho preklad v preložených bezpečnostných upozorneniach, ktoré sú priložené k zariadeniu.

USCHOVAJTE SI TENTO NÁVOD

Related Documentation

The following resources provide additional information that may be useful in the installation and configuration of the VSPA and the SSC-600:

- *Cisco VPN Services Port Adapter Configuration Guide*
- *Catalyst 6500 Series Switch Installation Guide*
- *Catalyst 6500 Release 12.2SXH and Later Software Configuration Guide*
- *Cisco IOS Software Releases 12.2SX Command References*
- *Catalyst 6500 Series Switch Cisco IOS System Message Guide, Release 12.2SXH*
- *Cisco IOS Release 12.2SX System Message Guide*
- For international agency compliance, safety, and statutory information for WAN interfaces:
  - *Regulatory Compliance and Safety Information for the Catalyst 6500 Series Switch*
  - *Site Preparation and Safety Guide*

Note You can access Cisco IOS software configuration and hardware installation and maintenance documentation on the World Wide Web at http://www.cisco.com. Translated documentation is available at the following URL: http://www.cisco.com/public/countries_languages.shtml.

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.

CHAPTER 1

VPN Services Port Adapter Overview

This chapter provides an introduction to the VPN Services Port Adapter (VSPA) and its associated Services SPA Carrier-600 (SSC-600). It includes the following sections:

For software details for the VSPA, see the *Cisco VPN Services Port Adapter Configuration Guide*.

About the VSPA

The VSPA and its associated SSC-600 comprise a Gigabit Ethernet IP Security (IPsec) cryptographic module that you can install in the Catalyst 6500 Series switch. This section describes the VSPA and provides some guidelines for its use. The IPsec cryptographic module described in this document is composed of these components:

Description	Model Number
Services SPA Carrier-600 (SSC-600)	WS-SSC-600
VPN Services Port Adapter (VSPA)	WS-IPSEC-3

SSC-600

The SSC-600 inserts into a switch chassis slot in the same manner as a line card and provides two subslots that are used to contain one or two VSPAs. During normal operation, the SSC-600 should reside in a switch that is fully populated either with functional VSPAs in both subslots, or with a blank filler plate (SPA-BLANK=) inserted in any empty subslots.

The SSC-600 supports online insertion and removal (OIR) with VSPAs present in the subslots. The VSPA also supports OIR and can be inserted or removed independently from the SSC-600.

VSPA

The VSPA provides IP Security (IPsec) encryption and decryption, generic routing encapsulation (GRE), and Internet Key Exchange (IKE) key generation.

The VSPA inserts into a subslot of the SSC-600. The SSC-600 can hold one or two VSPAs. To maintain cooling integrity, either a blank filler plate or a functional VSPA must reside in each subslot of a SSC-600 during normal operation.

The VSPA supports online insertion and removal (OIR). VSPAs can be inserted or removed independently from the SSC-600. The SSC-600 also supports online insertion and removal (OIR) with VSPAs inserted in its subslots.

System and Environmental Requirements

The following sections describe the system and environmental requirements for the VSPA:

Software Requirements

Table 1-1 lists the minimum Cisco IOS software release that supports the VSPA and SSC-600.

Table 1-1 Supported Hardware and Software

Description	Product Number	Cisco IOS Release for the Catalyst 6500 Series Switch
VSPA	WS-IPSEC-3	Cisco IOS Release 12.2(33)SXI or later
SSC-600	WS-SSC-600	

Supported Hardware

The hardware requirements for the VSPA and SSC-600 are as follows:

- You can install the VSPA and SSC-600 in all Catalyst 6500 Series switch models, including the E and non-E switch chassis, except the Catalyst 6503.

  For more information on the Catalyst 6500 Series switch, see the *Catalyst 6500 Series Switch Installation Guide* at this URL:

  http://www.cisco.com/en/US/docs/switches/lan/catalyst6500/hardware/Chassis_Installation/Cat6500/6500_ins.html

- Up to 10 VSPAs per chassis are supported.

- The VSPA supervisor engine support is described in Table 1-2 for each release.

Table 1-2 Supervisor Engine Support for the VSPA by Release

Release	Supervisor Supported
Cisco IOS Release 12.2(33)SXI	Supervisor Engine 720 (minimum 512 MB memory) Supervisor Engine 720-10G Supervisor Engine 32

Memory Requirements

Although the VSPA and SSC-600 memory is not configurable, the number of VPN tunnels supported by the system is determined by the available MSFC DRAM.

The number of VPN tunnels supported is as follows:

- Up to [TBD] tunnels with 512 MB DRAM
- Up to 16,000 tunnels with 1 GB DRAM

The number of tunnels is limited to provide some available memory for routing protocols and other applications. However, your particular use of the MSFC may demand more memory than the quantities that are listed above. In an extreme case, you could have one tunnel but still require 512 MB DRAM for other protocols and applications running on the MSFC.

Note Although the VSPA contains an internal CompactFlash socket, it is not supported. Do not install any device in the CompactFlash socket.

Checking Hardware and Software Compatibility

To check the minimum software requirements of Cisco IOS software with the hardware installed on your switch, Cisco maintains the Software Advisor tool on Cisco.com. This tool does not verify whether modules within a system are compatible, but it does provide the minimum Cisco IOS requirements for individual hardware modules or components.

Note Access to this tool is limited to users with Cisco.com login accounts.

To access Software Advisor, click **Login** at Cisco.com, type “Software Advisor” in the SEARCH box, and click **GO**. Click the link for the Software Advisor tool.

Choose a product family or enter a specific product number to search for the minimum supported software release needed for your hardware.

Power Management

Because the VSPA and SSC-600 consume chassis power, you must make sure that the chassis is within the power budget. As shown in Table 1-3, the SSC-600 reserves enough power for itself and two VSPAs, regardless of whether any VSPAs are installed.

Table 1-3 Module Power Reservation

Configuration	Power Reserved (Maximum in Watts)
SSC-600 with or without VSPAs installed	274.68 W

If the power limit is exceeded, the VSPA and SSC-600 are not powered up and the following error message is displayed:

```
Router#%C7KPWR-SP-4-POWERDENIED:insufficient power, module in slot 3 power denied.
```

Enter the **show power** command to determine how much power is available in the chassis and how much is being used or reserved by line cards, supervisor engines, and fan trays.

The following example shows the **show power** command output:

```
Router# show power

system power redundancy mode = combined
system power total =     1921.92 Watts (45.76 Amps @ 42V)
system power used =      1477.98 Watts (35.19 Amps @ 42V)
system power available =  443.94 Watts (10.57 Amps @ 42V)
                      Power-Capacity PS-Fan Output Oper
PS   Type              Watts   A @42V Status Status State
---- ----------------- ------- ------ ------ ------ -----
1    WS-CAC-2500W      1153.32 27.46  OK     OK     on
2    WS-CAC-1300W      1153.32 27.46  OK     OK     on
                      Pwr-Requested  Pwr-Allocated  Admin Oper
Slot Card-Type         Watts   A @42V Watts   A @42V State State
---- ----------------- ------- ------ ------- ------ ----- -----
3    WS-X6516-GBIC      142.80  3.40   142.80  3.40  on    on
4    WS-X6548-GE-TX     142.80  3.40   142.80  3.40  on    on
5    WS-SUP720-3BXL     328.44  7.82   328.44  7.82  on    on
6    7600-SIP-400       313.74  7.47   313.74  7.47  on    on
7    WS-SSC-600         274.68  6.54   274.68  6.54  on    on
9    7600-SSC-400       226.80  5.40   226.80  5.40  on    on
                      Inline         Inline         Inline         Inline
                      Pwr-Requested  Pwr-Allocated  Local-Pwr-Pool Power
Slot Card-Type         Watts   A @42V Watts   A @42V Watts   A @42V Status
---- ----------------- ------- ------ ------- ------ ------- ------ ----------
4    WS-F6K-VPWR-GE       -      -       -      -       34.61  0.82  On
```

Environmental Requirements

Table 1-4 lists the environmental requirements for the VSPA and SSC-600.

Table 1-4 Environmental Requirements

Item	Specification
Temperature, ambient operating	0° to 40°C (32° to 104°F)
Temperature, ambient nonoperating	–40° to 70°C (–40° to 158°F)
Humidity (RH), ambient (noncondensing) operating	10% to 85%
Nonoperating relative humidity (noncondensing)	5% to 95%

SSC-600 Overview

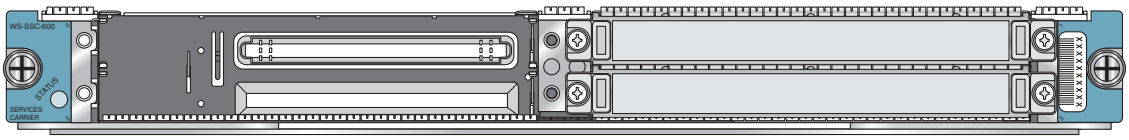
The following sections describe the SSC-600:

- SSC-600 Front Panel, page 1-5
- SSC-600 LED, page 1-6
- SSC-600 Physical Specifications, page 1-6

SSC-600 Front Panel

Figure 1-1 shows the SSC-600 front panel.

Figure 1-1 SSC-600 Faceplate



The SSC-600 front panel contains these items:

- One STATUS LED
- Two subslots, each capable of holding one VSPA

SSC-600 LED

Table 1-5 describes the operation of the SSC-600 LED.

Table 1-5 SSC-600 LED

LED Label	Color	State	Meaning
STATUS	Off	Off	The SSC-600 power is off.
	Orange	On	The card is booting or running diagnostics, or an overtemperature condition has been detected (minor threshold exceeded).
	Green	On	The card is ready and operational.
	Red	On	A diagnostic test has failed, or an overtemperature condition has been detected (major threshold exceeded).

SSC-600 Physical Specifications

Table 1-6 describes the SSC-600 physical specifications.

Table 1-6 SSC-600 Physical Specifications

Description	Specification
Physical dimensions	The SSC-600 occupies one module slot of a Catalyst 6500 Series switch chassis.
Shipping weight	8.5 lb (3.86 kg)
Operating temperature	0° to 40°C (32° to 104°F)
Storage temperature	–20° to 65°C (–4° to 149°F)
Relative humidity	10% to 90%, noncondensing

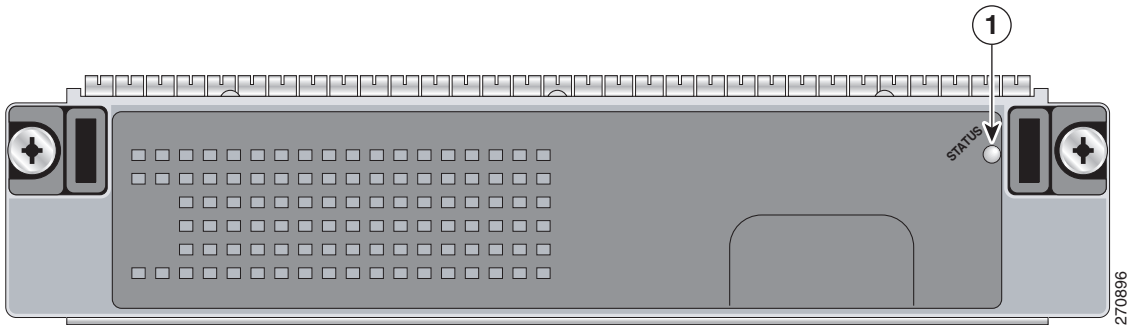
VSPA Overview

The following sections describe the VSPA:

VSPA Front Panel

Figure 1-2 shows the VSPA front panel.

Figure 1-2 VSPA Faceplate



1	STATUS LED

VSPA LED

Table 1-7 describes the operation of the VSPA LED.

Table 1-7 VSPA LED

LED Label	Color	State	Meaning
STATUS	Off	Off	The VSPA power is off.
	Orange	On	The VSPA is booting or running diagnostics, or an overtemperature condition has been detected (minor threshold exceeded).
	Green	On	The VSPA is ready and operational.
	Red	On	A diagnostic test has failed, or an overtemperature condition has been detected (major threshold exceeded).

VSPA Physical Specifications

Table 1-8 describes the VSPA physical specifications.

Table 1-8 VSPA Physical Specifications

Description	Specification
Physical dimensions	The VSPA occupies one subslot on the SSC-600.
Weight	2.0 lb (0.91 kg)
Operating temperature	0° to 40°C (32° to 104°F)
Storage temperature	–20° to 65°C (–4° to 149°F)
Relative humidity	10% to 90%, noncondensing

Using the Command-Line Interface

The installation verification procedures described in this document use the Cisco IOS command-line interface (CLI) of the Catalyst 6500 Series switch. To understand the CLI and Cisco IOS command modes, see the *Cisco IOS Configuration Fundamentals Command Reference* at this URL:

http://www.cisco.com/en/US/docs/ios/fundamentals/command/reference/cf_book.html

For detailed information on configuring the Catalyst 6500 Series switch, see the *Catalyst 6500 Release 12.2SXH and Later Software Configuration Guide* at this URL:

http://www.cisco.com/en/US/docs/switches/lan/catalyst6500/ios/12.2SX/configuration/guide/book.html

Identifying Slots and Subslots

Some CLI commands, such as the **show hw-module subslot** command, allow you to display information about the VSPA and the SSC-600. These commands require you to specify the physical location of the SSC-600 using the *slot* variable, or the physical location of the VSPA using the *slot/subslot* variable.

- *slot*—Specifies the chassis slot number in the Catalyst 6500 Series switch where the SSC-600 is installed.
- *subslot*—Specifies the secondary slot of the SSC-600 where the VSPA is installed.

The subslot numbering is indicated by a small numeric label beside the subslot on the faceplate of the SSC-600. In the horizontal card orientation shown in Figure 1-1, the SSC-600 subslot locations are as follows:

- Subslot 0—Left subslot
- Subslot 1—Right subslot

For example, to display the operational status of the VSPA installed in the first subslot (subslot 0) of the SSC-600 in chassis slot 3 of a Catalyst 6500 Series switch, enter the following command:

```
Router# show hw-module subslot 3/0 oir
Module        Model                Operational Status
------------- -------------------- ------------------------
subslot 3/0   WS-IPSEC-3           ok
```

CHAPTER 2

Preparing to Install the VSPA and the SSC-600

This chapter describes the safety, general equipment, and site preparation requirements for installing the VSPA and the SSC-600. This chapter contains the following sections:

Safety Guidelines

This section provides safety guidelines that you should follow when working with any equipment that connects to electrical power or telephone wiring.

Safety Overview

Safety warnings appear in the Preface and throughout these procedures indicating tasks that may harm you if performed incorrectly. A warning symbol precedes each warning statement.

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

Warning **During this procedure, wear grounding wrist straps to avoid ESD damage to the card. Do not directly touch the backplane with your hand or any metal tool, or you could shock yourself.** Statement 94.

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

Electrical Equipment Guidelines

Follow these basic guidelines when working with any electrical equipment:

- Before beginning any procedures requiring access to the chassis interior, locate the emergency power-off switch for the room in which you are working.
- Disconnect all power and external cables before moving a chassis.
- Do not work alone when potentially hazardous conditions exist.
- Never assume that power has been disconnected from a circuit; always check.
- Do not perform any action that creates a potential hazard to people or makes the equipment unsafe; carefully examine your work area for possible hazards such as moist floors, ungrounded power extension cables, and missing safety grounds.

Required Tools and Equipment

You need the following tools and parts to install the VSPA and the SSC-600. If you need additional equipment, contact a service representative for ordering information.

- Number 1 Phillips screwdriver
- Number 2 Phillips screwdriver
- 3/16-inch flat-blade screwdriver
- Torque screwdriver with range from 6 to 12 inch-pounds (65 to 135 Newton-centimeters)
- Your own electrostatic discharge (ESD)-prevention equipment or the disposable grounding wrist strap supplied with the VSPA or the SSC-600
- Antistatic mat
- Antistatic container

Preventing Electrostatic Discharge Damage

Electrostatic discharge (ESD) damage, which can occur when electronic cards or components are improperly handled, results in complete or intermittent failures. Service modules comprise printed circuit boards that are fixed in metal carriers. Electromagnetic interference (EMI) shielding and connectors are integral components of the carrier. Although the metal carrier helps to protect the board from ESD, use a preventive antistatic strap during handling.

Following are guidelines for preventing ESD damage:

- 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 board component-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.

Caution For safety, periodically check the resistance value of the antistatic strap. The measurement should be between 1 and 10 megohms (Mohms).

CHAPTER 3

Installing and Removing the Services SPA Carrier-600

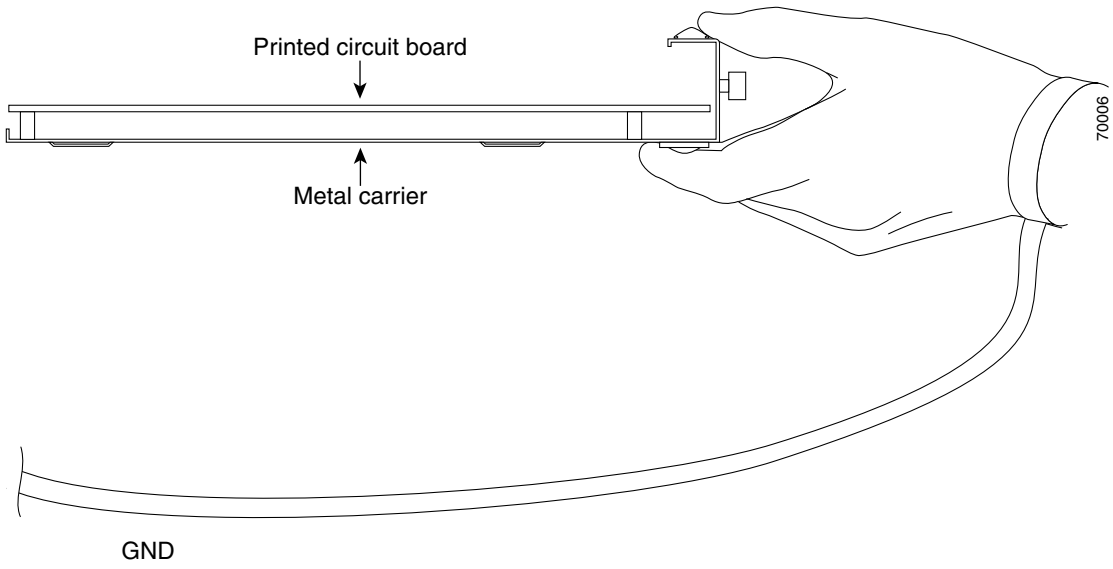
This chapter describes how to install or remove the SSC-600 on the Catalyst 6500 Series switch. This chapter contains the following sections:

Handling the SSC-600

The SSC-600 circuit board is mounted to a metal carrier and is sensitive to electrostatic discharge (ESD) damage. Before you begin installation, read Chapter 2, "Preparing to Install the VSPA and the SSC-600," for a list of parts and tools required for installation.

Caution Always handle the SSC-600 by the carrier edges and handle as shown in Figure 3-1. Never touch the SSC-600 components or connector pins.

Figure 3-1 Handling the SSC-600



Installing and Removing the SSC-600

This section provides instructions for installing and removing the SSC-600.

Note To ensure compliance with electromagnetic interference (EMI) approvals by providing a tight EMI-preventive seal for the chassis, we recommend that you first install SSC-600s in the slots closest to the supervisor engine slots, and then work out to the slots furthest from the supervisor engine slots.

Caution When the SSC-600 is installed next to an empty chassis slot, a blank filler plate must be installed in the empty slot to allow the chassis to conform to electromagnetic interference (EMI) emissions requirements and to allow proper airflow across the SSC-600 and VSPAs. For more information, see the "Using Blank Filler Plates" section on page 3-7.

Warning **During this procedure, wear grounding wrist straps to avoid ESD damage to the card. Do not directly touch the backplane with your hand or any metal tool, or you could shock yourself.** Statement 94

To install and remove the SSC-600, refer to Figure 3-2 and follow these steps:

Step 1 To insert the SSC-600, carefully align the edges of the SSC-600 between the upper and lower edges of the module slot, as shown in C of Figure 3-2.

Step 2 Carefully slide the SSC-600 into the module slot until the SSC-600 makes contact with the backplane.

Note The SSC-600 ejector levers must be positioned at a 45-degree angle before the SSC-600 makes contact with the backplane.

Step 3 Push the SSC-600 ejector levers in until the SSC-600 is fully seated in the router backplane.

Note When the switch chassis is fully populated, seating the SSC-600 can be difficult. To properly seat the SSC-600 and avoid physical damage, loosen the locking thumbscrews on the neighboring cards.

Caution Use of excessive force can damage the chassis or the SSC-600.

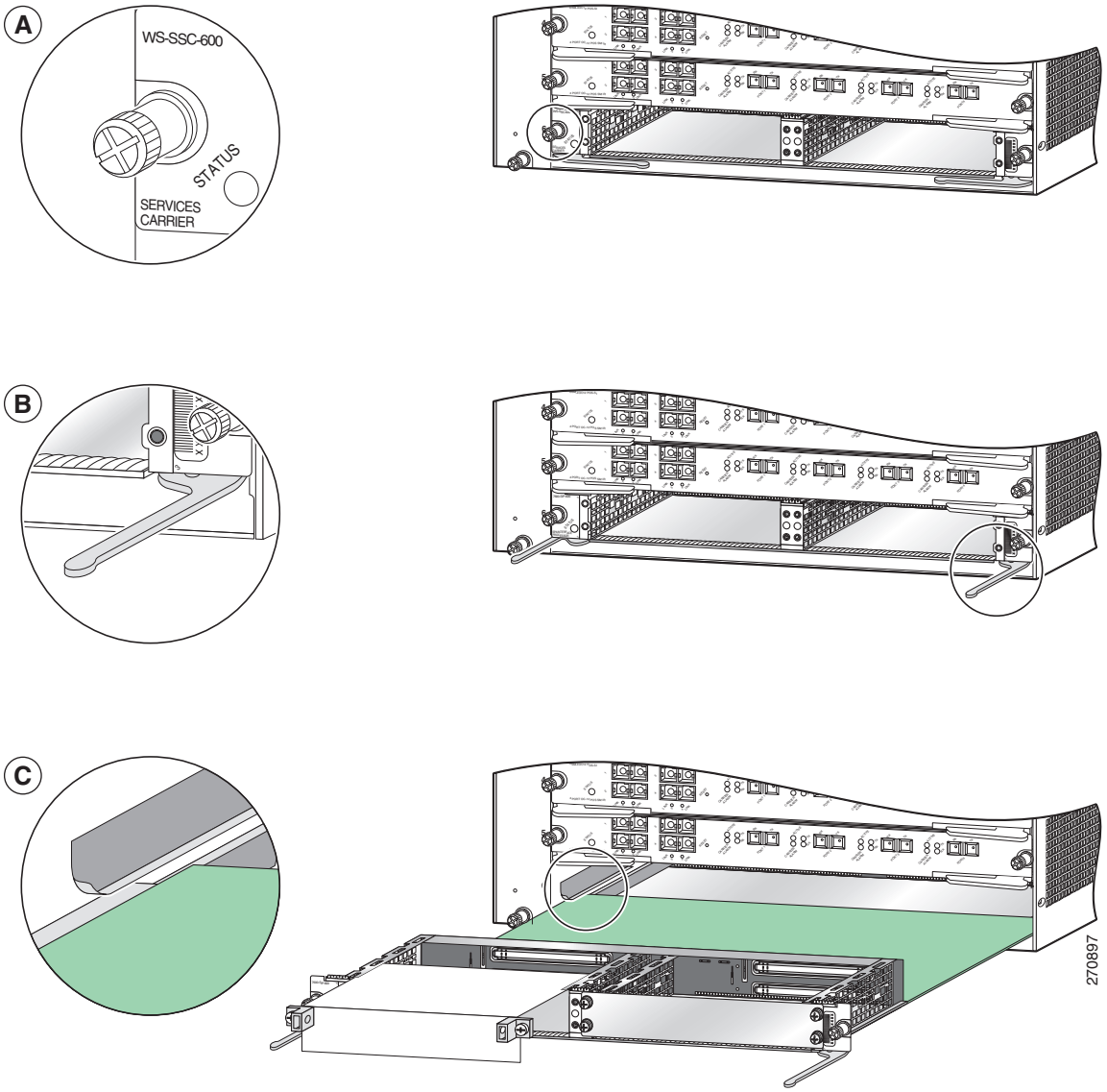
Step 4 Tighten the locking thumbscrews on both sides of the SSC-600 to a torque of between 8.3 and 11 inch-pounds (94 to 124 N-cm). Do not overtighten.

Step 5 To remove the SSC-600, loosen the locking thumbscrews on both sides of the SSC-600, as shown in A of Figure 3-2.

Step 6 Pull out the SSC-600 ejector levers, as shown in B of Figure 3-2, and carefully slide the SSC-600 out of the module slot. If you are removing a blank filler plate, pull the blank filler plate completely out of the module slot.

Figure 3-2 illustrates how to install and remove the SSC-600 in a Catalyst 6500 Series switch.

Figure 3-2 SSC-600 Installation and Removal



Preparing for Online Removal of the SSC-600

The Catalyst 6500 Series switch supports online insertion and removal (OIR) of the SSC-600. You can power down the SSC-600 (which automatically deactivates any installed VSPAs) and remove the SSC-600 with the VSPAs still intact, or you can first remove an VSPA before removing the SSC-600 from the switch. To remove the VSPA, see the "Preparing for Online Removal of the VSPA" section on page 4-5.

Before you remove the SSC-600, we recommend deactivating the SSC-600 using the **no power enable module** global configuration command. When you deactivate the SSC-600 using this command, it automatically deactivates each of the VSPAs that are installed in that SSC-600. It is not necessary to deactivate each of the VSPAs prior to deactivating the SSC-600. Although we recommend graceful deactivation of the SSC-600 using the **no power enable module** command, the Catalyst 6500 Series switch supports removal of the SSC-600 without deactivating it first.

Either a blank filler plate or a functional VSPA should reside in every subslot of the SSC-600 during normal operation.

This section includes the following topics on OIR support:

Deactivating the SSC-600

To deactivate the SSC-600 and its installed VSPAs before removal of the SSC-600, enter the following command in global configuration mode:

Command	Purpose
`Router(config)# no power enable module` *slot*	Shuts down any installed interfaces, and deactivates the SSC-600 in the specified slot. • *slot*—Specifies the chassis slot number where the SSC-600 is installed.

For more information about chassis slot numbering, refer to the "Identifying Slots and Subslots" section on page 1-8.

The following example deactivates the SSC-600 that is installed in slot 5 of the switch, its VSPAs, and all of the interfaces. The corresponding console messages are shown here:

```
Router# configure terminal
Router(config)# no power enable module 5
1w4d: %OIR-6-REMCARD: Card removed from slot 5, interfaces disabled
1w4d: %C6KPWR-SP-4-DISABLED: power to module in slot 5 set off (admin request)
```

Reactivating the SSC-600

Once you deactivate the SSC-600, whether or not you have performed an OIR, you must use the **power enable module** global configuration command to reactivate the SSC-600.

If you did not enter a command to deactivate the VSPAs installed in the SSC-600, but you did deactivate the SSC-600 using the **no power enable module** command, then you do not need to reactivate the VSPAs after an OIR of the SSC-600. The installed VSPAs automatically reactivate upon reactivation of the SSC-600 in the switch.

For example, consider the case where you remove the SSC-600 from the switch to replace it with another SSC-600. You reinstall the same VSPAs into the new SSC-600. When you enter the **power enable module** command on the switch, the VSPAs will automatically reactivate with the new SSC-600.

To activate the SSC-600 and its installed VSPAs after the SSC-600 has been deactivated, use the following command in global configuration mode:

Command	Purpose
`Router(config)# power enable module slot`	Activates the SSC-600 in the specified slot and its installed VSPAs. • *slot*—Specifies the chassis slot number where the SSC-600 is installed.

For more information about chassis slot numbering, refer to the "Identifying Slots and Subslots" section on page 1-8.

The following example activates the SSC-600 that is installed in slot 5 of the chassis, its VSPA, and all of the interfaces (provided that you did not enter the **hw-module subslot shutdown** command to also deactivate the VSPA):

```
Router# configure terminal
Router(config)# power enable module 5
```

Notice that there are no corresponding console messages shown with activation. If you reenter the **power enable module** command, a message is displayed indicating that the module is already enabled:

```
Router(config)# power enable module 5
% module is already enabled
```

Verifying Deactivation and Activation of the SSC-600

To verify the deactivation of the SSC-600, enter the **show module** command in privileged EXEC configuration mode. Observe the Status field associated with the SSC-600 that you want to verify.

Command	Purpose
`Router(config)# show module slot`	Displays the type and status of a module and submodules in the specified slot. • *slot*—Specifies the chassis slot number where the SSC-600 is installed.

The following example shows that the SSC-600 located in slot 4 is deactivated. This state is indicated by its PwrDown status in the Status field.

```
Router# show module 4
Mod Ports Card Type                                  Model              Serial No.
--- ----- -------------------------------------- ------------------ -----------
  4     0  2-subslot Services SPA Carrier-600     WS-SSC-600         JAB113100EN

Mod MAC addresses                       Hw    Fw           Sw           Status
--- ----------------------------------- ------ ------------ ------------ -------
  4  001a.a2ff.1320 to 001a.a2ff.1327   0.302 12.2(SIERRA_ 12.2(SIERRA_ PwrDown

Mod  Sub-Module                  Model              Serial       Hw     Status
---- --------------------------- ------------------ ----------- ------- -------

Mod  Online Diag Status
```

```
---- -------------------
  4  Not Applicable

Router#
```

To verify activation and proper operation of the SSC-600, enter the **show module** command. Ok should appear in the Status field as shown in the following example:

```
Router# show module 4
Mod Ports Card Type                                Model              Serial No.
--- ----- ---------------------------------------- ------------------ -----------
  4    0  2-subslot Services SPA Carrier-600     WS-SSC-600         JAB113100EN

Mod MAC addresses                       Hw    Fw           Sw           Status
--- ----------------------------------- ------ ------------ ------------ -------
  4  001a.a2ff.1320 to 001a.a2ff.1327   0.302 12.2(SIERRA_ 12.2(SIERRA_ Ok

Mod  Sub-Module                  Model              Serial       Hw     Status
---- --------------------------- ------------------ ----------- ------- -------

Mod  Online Diag Status
---- -------------------
  4  Pass

Router#
```

Using Blank Filler Plates

When the SSC-600 is installed in a vertical chassis, the chassis slot immediately next to the SSC-600 must be filled with either another module or a blank filler plate. When the SSC-600 is installed in a horizontal chassis, all chassis slots must be filled with either another module or a blank filler plate. For information about blank filler plates, refer to the hardware installation guide for your chassis.

In addition, each subslot on the SSC-600 must be filled with either a VSPA or a blank filler plate, as described in the "Using VSPA Blank Filler Plates" section on page 4-7.

Caution Blank filler plates must be installed in empty chassis slots and subslots to allow the chassis to conform to electromagnetic interference (EMI) emissions requirements and to allow proper airflow across the SSC-600 and VSPAs.

CHAPTER 4

Installing and Removing the VPN Services Port Adapter

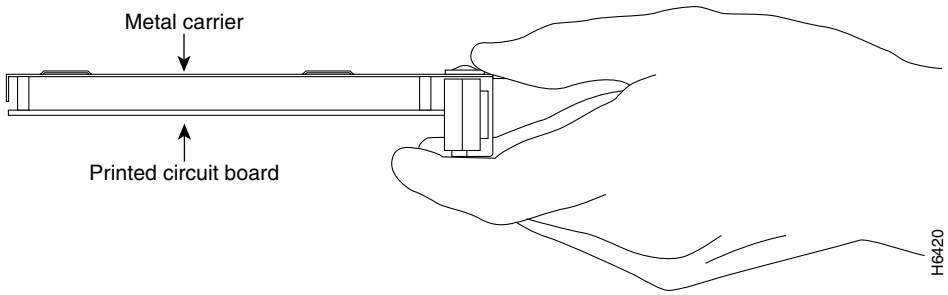
This chapter describes how to install or remove the VSPA on the Catalyst 6500 Series switch. This chapter includes the following sections:

Handling the VSPA

The VSPA circuit board is mounted to a metal carrier and is sensitive to electrostatic discharge (ESD) damage. Before you begin installation, read Chapter 2, "Preparing to Install the VSPA and the SSC-600" for a list of parts and tools required for installation.

Caution Always handle the VSPA by the carrier edges and handle as shown in Figure 4-1. Never touch the VSPA components or connector pins.

Figure 4-1 Handling the VSPA



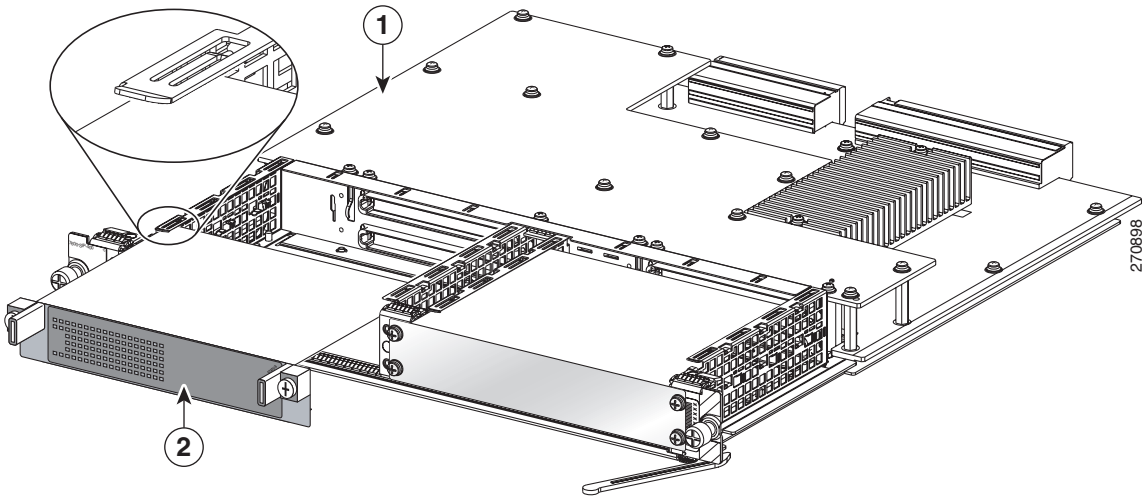
Installing and Removing the VSPA

This section provides instructions for installing and removing the VSPA in the SSC-600.

Warning **During this procedure, wear grounding wrist straps to avoid ESD damage to the card. Do not directly touch the backplane with your hand or any metal tool, or you could shock yourself.** Statement 94

Figure 4-2 shows how to install and remove the VSPA in the SSC-600.

Figure 4-2 VSPA Installation and Removal



1	SSC-600	**2**	VSPA

Installing the VSPA in the SSC-600

To install the VSPA in a subslot of the SSC-600, refer to Figure 4-2 and follow these steps:

Step 1 Choose an unused subslot of the SSC-600 and remove the blank filler plate covering the subslot.

Step 2 Locate the guide rails inside the SSC-600 that hold the VSPA in place. The guide rails are at the top left and top right of the VSPA subslot and are recessed about an inch, as shown in the detail of Figure 4-2

Step 3 Carefully slide the VSPA all the way into the SSC-600 subslot until the VSPA is firmly seated in the interface connector.

Note The guide rails of the SSC-600 are not continuous. Be careful to keep the VSPA level to stay within the guide rails as the module slides into the card.

Step 4 After the VSPA is properly seated, fasten the VSPA in place with the captive installation screws. Tighten the screws to a torque of 6 inch-pounds (69 N-cm). Do not overtighten these screws.

Caution When a subslot is not in use, a blank filler plate must fill the empty subslot to allow the chassis to conform to electromagnetic interference (EMI) emissions requirements and to allow proper airflow across the installed modules. For more information, see the "Using VSPA Blank Filler Plates" section on page 4-7.

Removing the VSPA from the SSC-600

To remove the VSPA from the SSC-600, refer to Figure 4-2 and follow these steps:

Step 1 Unfasten the captive installation screws on the VSPA.

Step 2 Grasp the handles of the VSPA and pull the VSPA from the SSC-600.

Checking the Installation

This section describes the procedures you can use to verify the SSC-600 and VSPA installation, and includes information on the following topics:

Verifying the SSC-600 and VSPA Installation

This section describes how to verify the SSC-600 and VSPA installation by observing the SSC-600 LED states, VSPA LED states, and the information displayed on the console terminal.

When the system has initialized, the SSC-600 STATUS LED should be green (on) and the VSPA STATUS LED should be green (on).

The following sample display shows the events logged by the system as the SSC-600 with the VSPA was removed from module slot 4 in the chassis:

```
Router#
00:06:17:%WS_ALARM-6-INFO:ASSERT CRITICAL slot 4 Active Card Removed OIR Alarm
00:06:17:%OIR-6-REMCARD:Card removed from slot 4, interfaces disabled
```

The following sample display shows the events logged by the system when you reinsert the SSC-600 with the installed VSPA:

```
Router#
00:07:29:%OIR-6-INSCARD:Card inserted in slot 4, interfaces administratively shut down
00:07:32:%WS_ALARM-6-INFO:CLEAR CRITICAL slot 4 Active Card Removed OIR Alarm
```

To verify that the SSC-600 and VSPA are installed correctly, follow these steps:

Step 1 Observe the console display messages and verify that the system discovers and reinitializes the SSC-600, as follows:

- As the SSC-600 is initialized, the STATUS LED will first be orange, indicating that power is on, but the SSC-600 is being configured. When the SSC-600 is active, the STATUS LED will illuminate green.
- VSPAs will follow the same sequence once the SSC-600 has completed its initialization. The VSPA STATUS LED will illuminate orange, turning to green when the VSPA becomes active.
- When the SSC-600 and VSPA STATUS LEDs are green, all associated interfaces are configurable.

Refer to the *Cisco VPN Services Port Adapter Configuration Guide* for configuration instructions.

- If the SSC-600 or VSPA is replaced with a module of the same type (as in an OIR or hardware swap), the previous configuration will be reinstated when the SSC-600 and VSPA become active.
- If the SSC-600 or VSPA has not been previously installed in the same slot or subslot, then the configuration for all associated interfaces will be empty.

Step 2 If the SSC-600 and VSPAs have not become active within three minutes, refer to the system console messages as follows:

- If the SSC-600 or VSPA is undergoing an FPD upgrade, then console messages will indicate that the FPD process has been initiated. The upgrade process might take several minutes. Use the **show upgrade fpd progress** command to obtain information about the FPD process. SSC-600s or VSPAs that have received an FPD upgrade will automatically be rebooted. Return to Step 1.
- If there is no indication that an FPD upgrade is occurring, see Chapter 5, "Troubleshooting the Installation."

Using the show module Command to Verify SSC-600 and VSPA Status

Use the **show module** command to display the type and status of the installed modules. Verify that the status of the new VSPA and SSC-600 is displayed as "Ok." If the **show module** command indicates that the VSPA or SSC-600 has not initialized, see Chapter 5, "Troubleshooting the Installation."

Command	Purpose
`Router(config)# show module slot`	Displays the type and status of a module and submodules in the specified slot. • *slot*—Specifies the chassis slot number where the SSC-600 is installed.

The following example of the **show module** command reports an operational SSC-600 in slot 4 and an operational VSPA in slot 4, subslot 0:

```
Router# show module 4
Mod Ports Card Type                                Model              Serial No.
--- ----- ---------------------------------------- ------------------ -----------
  4     0  2-subslot Services SPA Carrier-600     WS-SSC-600         JAB113100EN

Mod MAC addresses                       Hw    Fw           Sw           Status
--- ----------------------------------- ------ ------------ ------------ -------
  4  001a.a2ff.1320 to 001a.a2ff.1327   0.302 12.2(SIERRA_ 12.2(SIERRA_ Ok

Mod  Sub-Module                  Model              Serial       Hw     Status
---- --------------------------- ------------------ ------------ ------- -------
 4/0 IPSec Accelerator 3         WS-IPSEC-3         PRTA6104008  0.38   Ok
```

```
Mod  Online Diag Status
---- -------------------
  4  Pass
 4/0 Pass
```

Preparing for Online Removal of the VSPA

The Catalyst 6500 Series switch supports online insertion and removal (OIR) of an VSPA independent of removing the SSC-600. The SSC-600 can remain installed in the chassis with one VSPA remaining active while you remove another VSPA from one of the SSC-600 subslots. If you are not planning to immediately replace the VSPA into the SSC-600, then you must install a blank filler plate in the subslot. The SSC-600 should always be fully installed with either functional VSPAs or blank filler plates.

The interface configuration is retained (recalled) when an VSPA is removed and then replaced with one of the same type.

If you are planning to remove the SSC-600 along with its VSPAs, then you do not need to follow the procedures in this section. To remove the SSC-600, see the "Preparing for Online Removal of the SSC-600" section on page 3-4.

This section includes the following topics:

Deactivating the VSPA

Although graceful deactivation of the VSPA is preferred by using the **hw-module subslot shutdown** command, the Catalyst 6500 Series switch does support removal of the VSPA without deactivating it first. Before deactivating the VSPA, ensure that the SSC-600 is seated securely into the slot before pulling out the VSPA itself.

Note If you are preparing for an OIR of the VSPA, it is not necessary to independently shut down each of the interfaces prior to deactivation of the VSPA. The **hw-module subslot shutdown** command automatically stops traffic on the interfaces and deactivates them along with the VSPA in preparation for OIR. You also do not need to independently restart any interfaces on the VSPA after OIR of the VSPA or SSC-600.

To deactivate the VSPA and all of its interfaces prior to removal of the VSPA, use the following command in global configuration mode:

Command	Purpose
`Router(config)# hw-module subslot` *slot/subslot* **shutdown**	Deactivates the VSPA in the specified slot and subslot of the SSC-600. • *slot*—Specifies the chassis slot number where the SSC-600 is installed. • *subslot*—Specifies subslot number on the SSC-600 where the VSPA is installed.

For more information about chassis slot numbering, refer to the "Identifying Slots and Subslots" section on page 1-8.

The following example deactivates the VSPA (and its interfaces) that is installed in subslot 0 of the SSC-600 located in slot 2 of the chassis and removes power to the VSPA. Notice that no corresponding console messages are shown:

```
Router# configure terminal
Router(config)# hw-module subslot 2/0 shutdown
```

Reactivating the VSPA

Note You do not need to reactivate the VSPA after an OIR of either the SSC-600 or the VSPA if you did not deactivate the VSPA prior to removal. If the chassis is running, then the VSPAs automatically start upon insertion into the SSC-600 or with insertion of the SSC-600 into the chassis.

If you deactivate the VSPA using the **hw-module subslot shutdown** global configuration command and need to reactivate it without performing an OIR, enter the **no hw-module subslot shutdown** global configuration command to reactivate the VSPA and its interfaces.

To activate the VSPA and its interfaces after the VSPA has been deactivated, enter the following command in global configuration mode:

Command	Purpose
`Router(config)# no hw-module subslot` *slot/subslot* **shutdown**	Activates the VSPA and its interfaces in the specified slot and subslot of the SSC-600. • *slot*—Specifies the chassis slot number where the SSC-600 is installed. • *subslot*—Specifies subslot number on the SSC-600 where an VSPA is installed.

The following example activates the VSPA that is installed in slot 2 of the chasssis and all of its interfaces:

```
Router# configure terminal
Router(config)# no hw-module subslot 2/0 shutdown
```

Verifying Deactivation and Activation of the VSPA

When you deactivate the VSPA, the corresponding interfaces are also deactivated. This means that these interfaces will no longer appear in the output of the **show interface** command.

To verify the deactivation of the VSPA, enter the **show module** command in privileged EXEC configuration mode, as described in the "Using the show module Command to Verify SSC-600 and VSPA Status" section on page 4-4. Observe the Operational Status field associated with the VSPA that you want to verify.

Using VSPA Blank Filler Plates

Blank filler plates are available to fill an unused VSPA subslot on the SSC-600. The following blank filler plate covers an unused subslot:

800-25580-02: ASY, MECH, BLANK, HHSPA

Caution When a subslot of the SSC-600 is not in use, a blank filler plate must be installed in the empty subslot to allow the chassis to conform to electromagnetic interference (EMI) emissions requirements and to allow proper airflow across the SSC-600 and VSPA. If you plan to install a new VSPA in a subslot that is not in use, you must first remove the blank filler plate.

CHAPTER 5

Troubleshooting the Installation

This chapter describes how to troubleshoot the installation of VSPAs and SSC-600s on the Catalyst 6500 Series switch. This chapter contains the following sections:

Troubleshooting

The table in this section describes troubleshooting the SSC-600s and VSPAs. Possible problems, observations and comments, and solutions are indicated for the following troubleshooting symptoms:

- SSC-600 transitions repeatedly from on to off
- SSC-600 is deactivated
- SSC-600 is activated, VSPA is deactivated

SSC-600 Transitions Repeatedly From On to Off		
Possible Problem	**Observations and Comments**	**Solutions**
SSC-600 is booting up; this is normal operation.	SSC-600 STATUS LED alternates green, orange, or off.	Wait 30 seconds until the boot process completes and the STATUS LED stays green.
SSC-600 does not go beyond the bootup stage.	SSC-600 STATUS LED transitions continue and alternates green, orange, or off.	Follow the recommended action for the displayed error message.
SSC-600 FPGA is not up to date.	During SSC-600 initalization, the need to update the FPGA is automatically detected.	Follow the system prompts to update the FPGA image. If the SSC-600 is cycling because of an FPD problem, the most likely cause is a FPD failure or that the FPD package file is not present. For more information about performing FPD upgrades, refer to the “Upgrading Field-Programmable Devices” chapter in the *Cisco VPN Services Port Adapter Configuration Guide*.

SSC-600 Is Deactivated		
Possible Problem	**Observations and Comments**	**Solutions**
Insufficient power is available from the chassis.	Error message indicating that power was denied to the VSPA. Enter the **show power** command to determine how much power is reserved or available in the chassis. Output of the **show module** *slot* command indicates that power was denied to the VSPA. SSC-600 STATUS LED is off.	Upgrade the chassis power. Remove other modules in chassis to make more power available.
Chassis is not running the minimum Cisco IOS software release.	Error message indicating that the SSC-600 is not supported by this release. SSC-600 STATUS LED is off.	Upgrade the system software to a Cisco IOS software release that supports your hardware.
SSC-600 has exceeded the maximum temperature threshold.	Error message indicating a temperature alarm on the SSC-600. SSC-600 STATUS LED is off.	Make sure that blank plates are installed to cover any empty slots and subslots.

SSC-600 Is Activated, VSPA Is Deactivated		
Possible Problem	**Observations and Comments**	**Solutions**
VSPA is booting up; this is normal operation.	VSPA STATUS LED is orange.	Wait 3 minutes until the boot process completes and the STATUS LED stays green.
VSPA is not fully seated in the SSC-600.	Output of the **show diag** *slot* command. VSPA STATUS LED is off.	Follow this procedure: • Remove the VSPA from the SSC-600. • Inspect the SSC-600 and the VSPA. Verify there are no bent pins or parts and that there is nothing lodged in the two devices that could prevent a good connection. • Insert the VSPA in the SSC-600 by sliding the VSPA all the way into the SSC-600 until the VSPA is firmly seated in the VSPA interface connector. • Make sure the captive installation screws are tightened snugly. Do not over-tighten these screws.
VSPA is not supported on the SSC-600.	Error message indicating the VSPA is not supported. Output of the **show module** *slot* command. VSPA STATUS LED is off.	Install a VSPA supported by the SSC-600.

SSC-600 Is Activated, VSPA Is Deactivated (continued)		
Possible Problem	**Observations and Comments**	**Solutions**
VSPA is not at the minimum hardware revision level.	Error message indicating the VSPA is not at the minimum FPGA revision level. Output of the **show hw-module subslot fpd** command. Output of the **show diag** *slot* command. VSPA STATUS LED is off.	Follow the FPD upgrade process to update the FPGA. For more information about performing FPD upgrades, refer to the *Catalyst 6500 Release 12.2SXH and Later Software Configuration Guide*.
Chassis is not running the minimum Cisco IOS software release.	Error message indicating the VSPA is not supported by this release. VSPA STATUS LED is off.	Upgrade the system software to a Cisco IOS software release that supports your hardware.
VSPA has exceeded the maximum temperature threshold.	Error message indicating a temperature alarm on the VSPA. VSPA STATUS LED is off.	Make sure that blank plates are installed to cover any empty slots and subslots.

Supported Hardware and Software

Table 5-1 lists the minimum Cisco IOS software release that supports the VSPA and SSC-600.

Table 5-1 Supported Hardware and Software

Description	Product Number	Cisco IOS Release for the Catalyst 6500 Series Switch
VSPA	WS-IPSEC-3	Cisco IOS Release 12.2(33)SXI or later
SSC-600	WS-SSC-600	

Interpreting System Error Messages

The system software sends system messages to the console during operation, indicating status and error conditions. If you connect to the system by Telnet instead of by a console connection, you must use the **show logging** command to view system messages.

To view the explanations and recommended actions for the Catalyst 6500 Series switch error messages, refer to the *Cisco IOS Release 12.2SX System Message Guide* at the following URL:

http://www.cisco.com/en/US/docs/ios/12_2sx/system/messages/122sxsms.html

You can also refer to the Cisco Error Message Decoder Tool at the following URL:

http://www.cisco.com/cgi-bin/Support/Errordecoder/index.cgi

You must be a registered user on Cisco.com to access the Cisco Error Message Decoder Tool.

Packing the VSPA for Shipment

This section provides instructions for packing an VSPA for shipment. Before beginning this procedure, you should have the following original Cisco Systems packaging materials:

- Thermoform container (transparent plastic-molded clamshell)
- Carton

Caution Use Cisco Systems original packaging for the shipment of all VSPAs. Failure to properly use Cisco Systems packaging can result in damage or loss of product.

Warning **During this procedure, wear grounding wrist straps to avoid ESD damage to the card. Do not directly touch the backplane with your hand or any metal tool, or you could shock yourself.** Statement 94

Note These instructions assume that the VSPA has been removed from the chassis according to the recommended procedures specified in this guide.

To pack the VSPA for shipment, follow these steps:

Step 1 Open the Thermoform container and place the VSPA into the appropriate cavity.

Caution Always handle the VSPA by the carrier edges and handle; never touch the VSPA components or connector pins.

Step 2 Close the Thermoform container. Be sure to lock the snaps securely.

Step 3 Check that the Thermoform container is fully closed. Apply tape or a label closure over the opening to ensure that the container stays closed during shipping.

Step 4 Place the Thermoform container into the carton.

Step 5 Close the carton.

Step 6 Apply tape over the carton flap to ensure that the carton stays closed during shipping.

Packing the SSC-600 for Shipment

This section provides instructions for packing the SSC-600 for shipment. Before beginning this procedure, you should have the following original Cisco Systems packaging materials:

- Static-shielding bag
- Smaller inner carton
- Larger exterior carton
- Two foam packing cushions

Caution Use Cisco Systems original packaging for the shipment of all SSC-600s. Failure to properly use Cisco Systems packaging can result in damage or loss of product.

Warning **During this procedure, wear grounding wrist straps to avoid ESD damage to the card. Do not directly touch the backplane with your hand or any metal tool, or you could shock yourself.** Statement 94

Note These instructions assume that the SSC-600 has been removed from the chassis according to the recommended procedures specified in this guide.

To pack the SSC-600 for shipment, follow these steps:

Step 1 Insert the SSC-600 into the static-shielding bag.

Step 2 Insert the bagged SSC-600 into the smaller inner carton. Be careful to position the SSC-600 so that the bottom motherboard lip is held by the packaging cutout.

Step 3 Close the smaller inner carton and tape the sides closed.

Step 4 Place the sealed smaller inner carton containing the SSC-600 into the two foam packing cushions (they only fit one way).

Step 5 Place the sealed smaller inner carton and packing cushions into the larger exterior carton, and seal the larger exterior carton with tape for shipment.

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