



Introduction to Cisco 3800 Series Routers Hardware Documentation

This introduction discusses the objectives, audience, and conventions of hardware documentation for Cisco 3800 series integrated services routers, and describes related documents where you can find additional information. It contains the following sections:

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Objectives and Organization

This series of documents provides comprehensive hardware information for Cisco 3800 series integrated services routers. It includes the following modules:

- [Overview of Cisco 3800 Series Routers](#)
- [Preinstallation Requirements and Planning for Cisco 3800 Series Routers](#)
- [Installing Cisco 3800 Series Routers in an Equipment Rack](#)
- [Connecting Cables to Cisco 3800 Series Routers](#)
- [Powering Up Cisco 3800 Series Routers](#)
- [Troubleshooting Cisco 3800 Series Routers](#)
- [Installing Network Modules in Cisco 3800 Series Routers](#)
- [Installing Interface Cards in Cisco 3800 Series Routers](#)
- [Installing SFP Modules in Cisco 3800 Series Routers](#)

- [Installing CompactFlash Memory Cards in Cisco 3800 Series Routers](#)
- [Installing and Upgrading Internal Components in Cisco 3800 Series Routers](#)

For software configuration information, see the Cisco 3800 series software configuration documents and the Cisco IOS configuration guides and command references. These publications are available online on Cisco.com. See the [“Obtaining Documentation” section on page 11](#) for more information.

For warranty, service, and support information, see the [“Cisco 90-Day Limited Hardware Warranty Terms” section on page 10](#).

These documents describe several router models that are similar in functionality, but differ in certain respects. Some information may not apply to all router models.

Audience

These documents are intended for the person installing, configuring, and maintaining the router, who should be familiar with electronic circuitry and wiring practices and have experience as an electronic or electromechanical technician. Certain identified procedures should be performed only by trained and qualified personnel.

Conventions

These documents use the conventions listed in [Table 1](#).

Table 1 Document Conventions

Convention	Description
boldface font	Commands and keywords.
<i>italic font</i>	Variables for which you supply values.
[]	Optional keywords or arguments.
{ x y z }	A choice of required keywords. You must select exactly one.
screen font	Information displayed on the screen.
boldface screen font	Information you must enter.
< >	Nonprinting characters, such as passwords, appear in angle brackets in contexts where italics are not available.
[]	Default responses to system prompts.



Note

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



Timesaver

Means *the described action saves time*. You can save time by performing the action described in the paragraph.

**Tip**

Means *the following information will help you solve a problem*. The tips information might not be troubleshooting or even an action, but could be useful information, similar to a Timesaver.

**Caution**

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

Safety Warnings

Safety warnings appear throughout these documents in procedures that, if performed incorrectly, may harm you. A warning symbol precedes each warning statement. To see translations of the warnings that appear in this publication, see the *Cisco 3800 Series Routers Regulatory Compliance and Safety Information* document that accompanied your router.

**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 VEILIGHEIDSLINSTRUCTIES**

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 figyelmeztető jel veszélyre utal. Sérülésveszélyt rejtő helyzetben van. Mielőtt bármely berendezésen munkát végezte, legyen figyelemmel az elektromos áramkörök okozta kockázatokra, és ismerkedjen meg a szokásos balesetvédelmi eljárásokkal. A kiadványban szereplő figyelmeztetések fordítása a készülékhez mellékelte biztonsági figyelmeztetések között található; a fordítás az egyes figyelmeztetések végén látható szám alapján kereshető 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.

Aviso INSTRUÇÕES IMPORTANTES DE SEGURANÇA

Este símbolo de aviso significa perigo. Você se encontra em uma situação em que há risco de lesões corporais. Antes de trabalhar com qualquer equipamento, esteja ciente dos riscos que envolvem os circuitos elétricos e familiarize-se com as práticas padrão de prevenção de acidentes. Use o número da declaração fornecido ao final de cada aviso para localizar sua tradução nos avisos de segurança traduzidos que acompanham o dispositivo.

GUARDE ESTAS INSTRUÇÕES**Advarsel** VIGTIGE SIKKERHEDSANVISNINGER

Dette advarselssymbol betyder fare. Du befinder dig i en situation med risiko for legemesbeskadigelse. Før du begynder arbejde på udstyr, skal du være opmærksom på de involverede risici, der er ved elektriske kredsløb, og du skal sætte dig ind i standardprocedurer til undgåelse af ulykker. Brug erklæringsnummeret efter hver advarsel for at finde oversættelsen i de oversatte advarsler, der fulgte med denne enhed.

GEM DISSE ANVISNINGER**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 آخر 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 συνήθειες 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 כדי לאתר את התרגום באזהרות הבטיחות המתורגמות שמצורפות להתקן.

שמור הוראות אלה**Opomena VAŽNI BEZBEDNOSNI NAPATCTBIJA**

Симболот за предупредување значи опасност. Се наоѓате во ситуација што може да предизвика телесни повреди. Пред да работите со опремата, бидете свесни за ризикот што постои кај електричните кола и треба да ги познавате стандардните постапки за спречување на несреќни случаи. Искористете го бројот на изјавата што се наоѓа на крајот на секое предупредување за да го најдете неговиот период во преведените безбедносни предупредувања што се испорачани со уредот.

ЧУВАЈТЕ ГИ ОБИЕ НАПАТСТБИЈА

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 Cisco IOS software that runs on your Cisco 3800 series router includes extensive features and functionality. For information beyond the scope of these hardware documents, see the resources listed in [Table 2](#).



Timesaver

Make sure that you have access to the documents listed in [Table 2](#). Some of these documents are available in print, and all are on the World Wide Web at Cisco.com, <http://www.cisco.com>. If you need to order printed documents, see the “[Obtaining Documentation](#)” section on page 11.

Table 2 **Related and Referenced Documents**

Cisco Product	Document
Cisco 3800 series routers	Cisco 3800 Series Integrated Services Routers Quick Start Guide
	Cisco 3800 Series Software Configuration
	Cisco 3800 Series Cards and Modules
	Cisco 2800 Series and Cisco 3800 Series Integrated Services Routers Regulatory Compliance and Safety Information
	Quick Start Guide: Network Modules for Cisco Access Routers
	Cisco Network Modules Hardware Installation Guide
	Quick Start Guide: Interface Cards for Cisco Access Routers
	Cisco Interface Cards Installation Guide
	Cisco Modular Access Router Cable Specifications
	Cisco RPS-675 Redundant Power System Hardware Installation Guide
Network management system	Network management software documentation
Cisco IOS software	Cisco IOS software documentation, all releases
	Refer to documentation for the Cisco IOS software release installed on your router.

Cisco 90-Day Limited Hardware Warranty Terms

There are special terms applicable to your hardware warranty and various services that you can use during the warranty period. Your formal Warranty Statement, including the warranties and license agreements applicable to Cisco software, is available on Cisco.com. Follow these steps to access and download the *Cisco Information Packet* and your warranty and license agreements from Cisco.com.

1. Launch your browser, and go to this URL:

http://www.cisco.com/univercd/cc/td/doc/es_inpk/cetrans.htm

The Warranties and License Agreements page appears.

2. To read the *Cisco Information Packet*, follow these steps:

- a. Click the **Information Packet Number** field, and make sure that the part number 78-5235-03A0 is highlighted.
- b. Select the language in which you would like to read the document.
- c. Click **Go**.

The Cisco Limited Warranty and Software License page from the Information Packet appears.

- d. Read the document online, or click the **PDF** icon to download and print the document in Adobe Portable Document Format (PDF).



Note

You must have Adobe Acrobat Reader to view and print PDF files. You can download the reader from Adobe's website: <http://www.adobe.com>

3. To read translated and localized warranty information about your product, follow these steps:

- a. Enter this part number in the Warranty Document Number field:
78-5236-01C0
- b. Select the language in which you would like to read the document.
- c. Click **Go**.

The Cisco warranty page appears.

- d. Review the document online, or click the **PDF** icon to download and print the document in Adobe Portable Document Format (PDF).

You can also contact the Cisco service and support website for assistance:

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

Duration of Hardware Warranty

Ninety (90) days.

Replacement, Repair, or Refund Policy for Hardware

Cisco or its service center will use commercially reasonable efforts to ship a replacement part within ten (10) working days after receipt of a Return Materials Authorization (RMA) request. Actual delivery times can vary, depending on the customer location.

Cisco reserves the right to refund the purchase price as its exclusive warranty remedy.

To Receive a Return Materials Authorization (RMA) Number

Contact the company from whom you purchased the product. If you purchased the product directly from Cisco, contact your Cisco Sales and Service Representative.

Complete the information below, and keep it for reference:

Company product purchased from	
Company telephone number	
Product model number	
Product serial number	
Maintenance contract number	

Obtaining Documentation

Cisco documentation and additional literature are available on Cisco.com. Cisco also provides several ways to obtain technical assistance and other technical resources. These sections explain how to obtain technical information from Cisco Systems.

Cisco.com

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

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

You can access the Cisco website at this URL:

<http://www.cisco.com>

You can access international Cisco websites at this URL:

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

Ordering Documentation

You can find instructions for ordering documentation at this URL:

http://www.cisco.com/univercd/cc/td/doc/es_inpc/pdi.htm

You can order Cisco documentation in these ways:

- Registered Cisco.com users (Cisco direct customers) can order Cisco product documentation from the Ordering tool:
<http://www.cisco.com/en/US/partner/ordering/index.shtml>
- Nonregistered Cisco.com users can order documentation through a local account representative by calling Cisco Systems Corporate Headquarters (California, USA) at 408 526-7208 or, elsewhere in North America, by calling 800 553-NETS (6387).

Documentation Feedback

You can send comments about technical documentation to bug-doc@cisco.com.

You can submit comments by using the response card (if present) behind the front cover of your document or by writing to the following address:

Cisco Systems
Attn: Customer Document Ordering
170 West Tasman Drive
San Jose, CA 95134-9883

We appreciate your comments.

Obtaining Technical Assistance

For all customers, partners, resellers, and distributors who hold valid Cisco service contracts, Cisco Technical Support provides 24-hour-a-day, award-winning technical assistance. The Cisco Technical Support Website on [Cisco.com](http://www.cisco.com) features extensive online support resources. In addition, Cisco Technical Assistance Center (TAC) engineers provide telephone support. If you do not hold a valid Cisco service contract, contact your reseller.

Cisco Technical Support Website

The Cisco Technical Support Website provides online documents and tools for troubleshooting and resolving technical issues with Cisco products and technologies. The website is available 24 hours a day, 365 days a year at this URL:

<http://www.cisco.com/techsupport>

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

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

Submitting a Service Request

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

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

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

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

Asia-Pacific: +61 2 8446 7411 (Australia: 1 800 805 227)

EMEA: +32 2 704 55 55

USA: 1 800 553 2447

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

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

Definitions of Service Request Severity

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

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

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

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

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

Obtaining Additional Publications and Information

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

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

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

- The Cisco *Product Catalog* describes the networking products offered by Cisco Systems, as well as ordering and customer support services. Access the Cisco Product Catalog at this URL:

<http://cisco.com/univercd/cc/td/doc/pcat/>

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

<http://www.ciscopress.com>

- *Packet* magazine is the Cisco Systems technical user magazine for maximizing Internet and networking investments. Each quarter, Packet delivers coverage of the latest industry trends, technology breakthroughs, and Cisco products and solutions, as well as network deployment and troubleshooting tips, configuration examples, customer case studies, certification and training information, and links to scores of in-depth online resources. You can access Packet magazine at this URL:

<http://www.cisco.com/packet>

- *iQ Magazine* is the quarterly publication from Cisco Systems designed to help growing companies learn how they can use technology to increase revenue, streamline their business, and expand services. The publication identifies the challenges facing these companies and the technologies to help solve them, using real-world case studies and business strategies to help readers make sound technology investment decisions. You can access iQ Magazine at this URL:

<http://www.cisco.com/go/iqmagazine>

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

<http://www.cisco.com/ipj>

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

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

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Overview of Cisco 3800 Series Routers

Cisco 3800 series integrated services routers are part of a new generation of routers that incorporate high-performance integrated data, voice, video, and virtual private network (VPN) capability, including hardware-based VPN encryption acceleration, in a modular design that provides the flexibility to configure your router according to your needs. These routers provide built-in Gigabit Ethernet LAN interface ports, and you can add a wide variety of LAN and WAN ports with interchangeable network modules and interface cards. Cisco 3800 series routers are designed for branch office installations that need integrated low-density switching, security, voice, IP telephony, video, content networking, and concurrent applications.

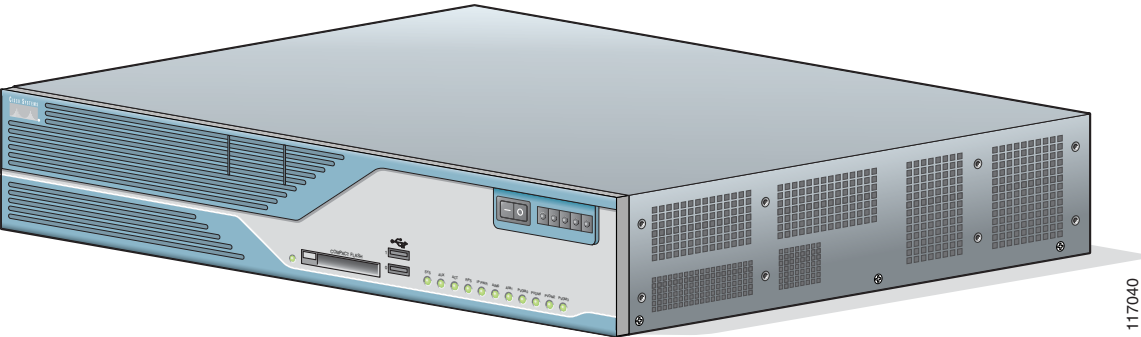
This document describes the features and specifications of Cisco 3800 series routers, and includes the following sections:

- [Router Descriptions, page 1](#)
- [Product Identification, page 5](#)
- [Built-In Ports, page 6](#)
- [Module and Interface Card Capacity, page 7](#)
- [Port Numbering, page 9](#)
- [Memory, page 11](#)
- [Power, page 11](#)
- [LED Indicators, page 12](#)
- [Ventilation, page 12](#)
- [Real-Time Clock and Battery, page 12](#)
- [Technical Specifications, page 12](#)
- [Regulatory Compliance, page 15](#)

Router Descriptions

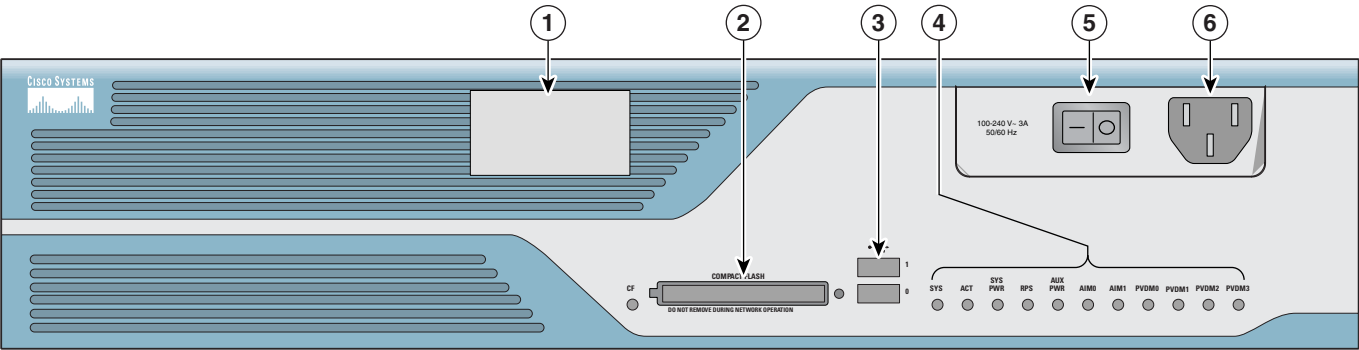
There are two routers in the Cisco 3800 series—the Cisco 3825 router and the Cisco 3845 router. The Cisco 3825 router (shown in [Figure 1](#) to [Figure 4](#)) is two rack units (3.5 inches) high. The Cisco 3845 router (shown in [Figure 5](#) to [Figure 8](#)) is three rack units (5.25 inches) high.

Figure 1 Front View of Cisco 3825 Router



117040

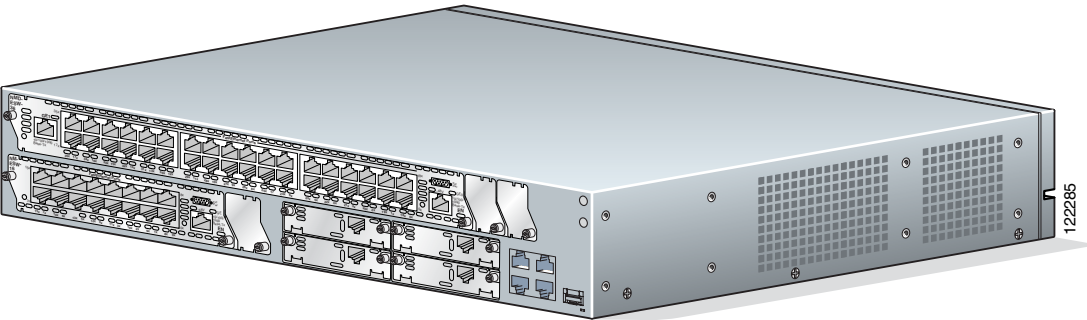
Figure 2 Front Panel of Cisco 3825 Router



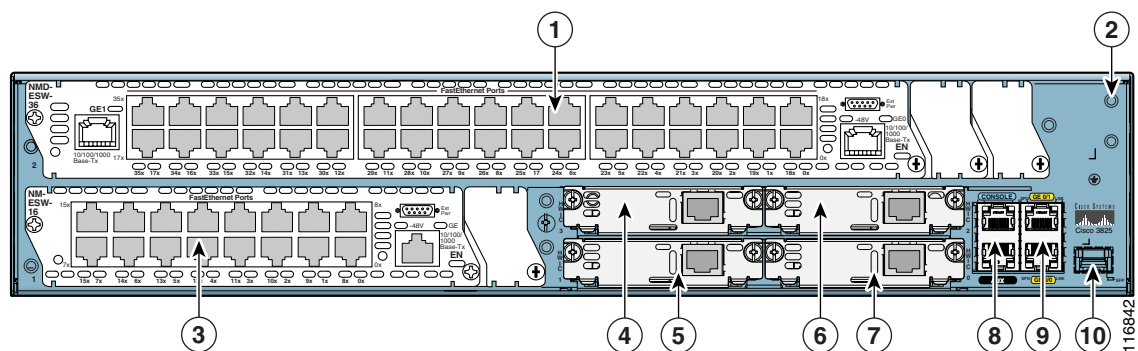
116841

1	Cisco Redundant Power System (RPS) connector	4	LED indicators
2	CompactFlash memory card slot	5	Power switch
3	USB ports	6	Power connector (AC shown)

Figure 3 Rear View of Cisco 3825 Router



122285

Figure 4 Rear Panel of Cisco 3825 Router

1	Network module slot 2	6	HWIC slot 2
2	Screw holes for grounding lug	7	HWIC slot 0
3	Network module slot 1	8	Console and auxiliary ports
4	HWIC slot 3	9	Gigabit Ethernet ports
5	HWIC slot 1	10	Slot for optional SFP module

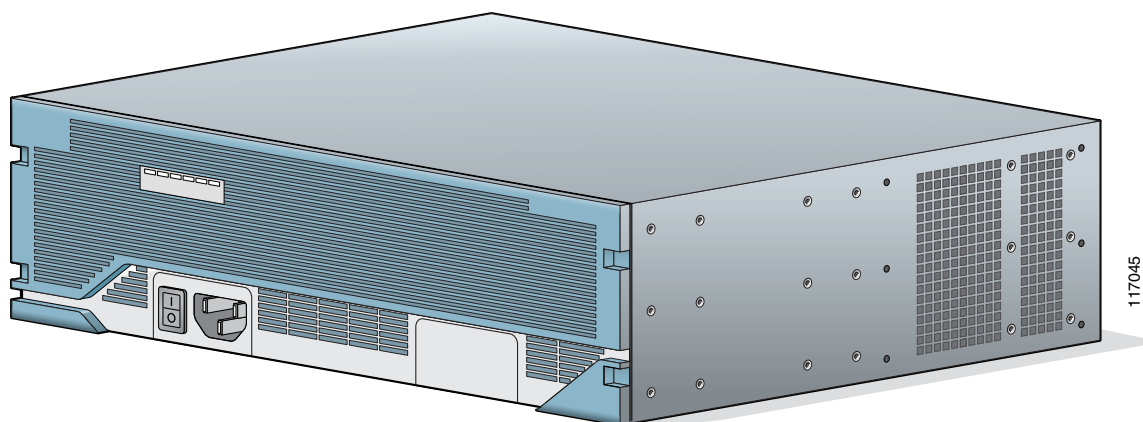
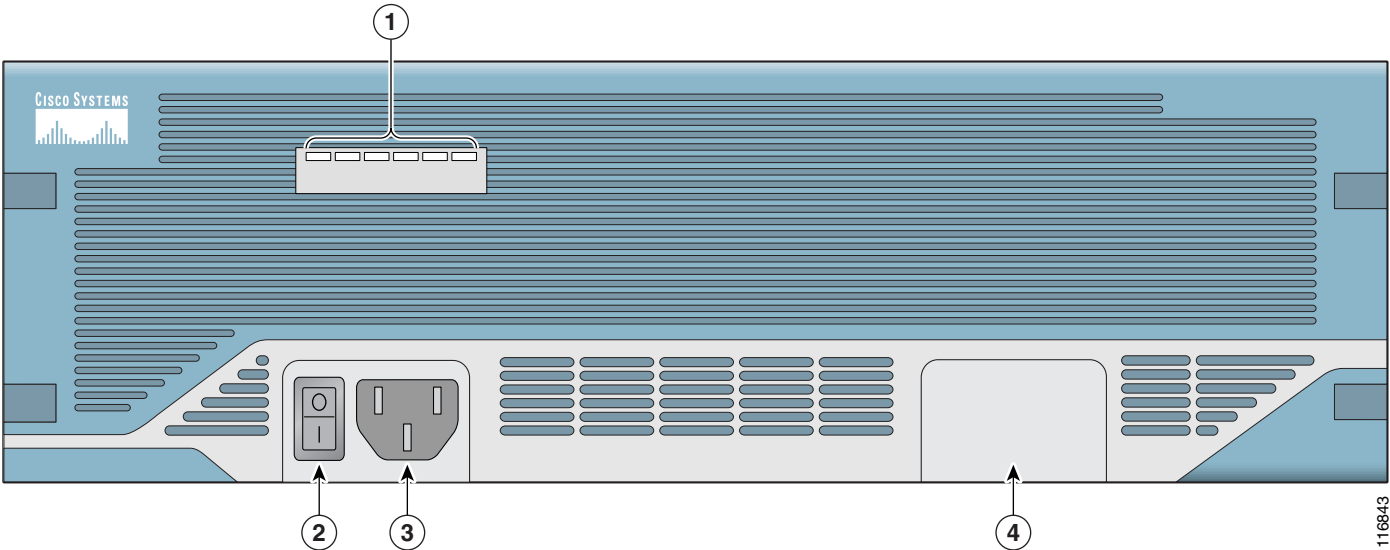
Figure 5 Front View of Cisco 3845 Router

Figure 6 Front Panel of Cisco 3845 Router



1	LED indicators	3	Power connector (AC shown)
2	Power switch	4	Location of optional second power supply

Figure 7 Rear View of Cisco 3845 Router

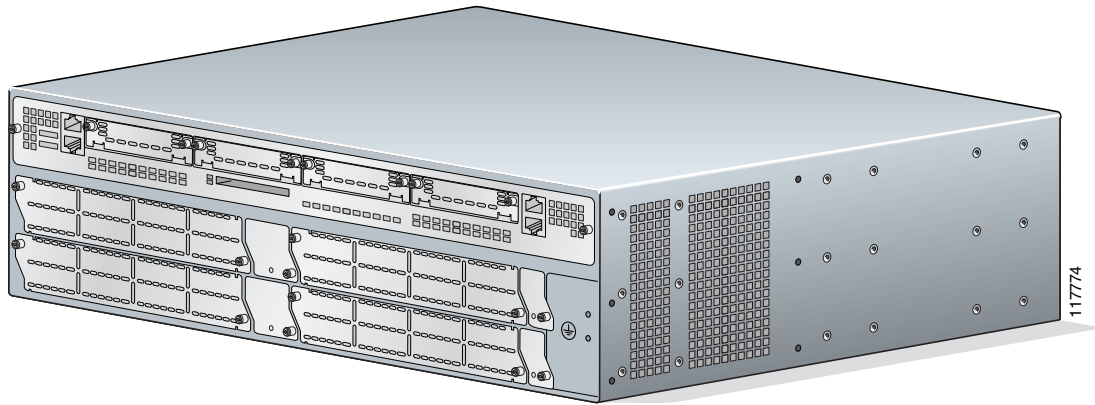
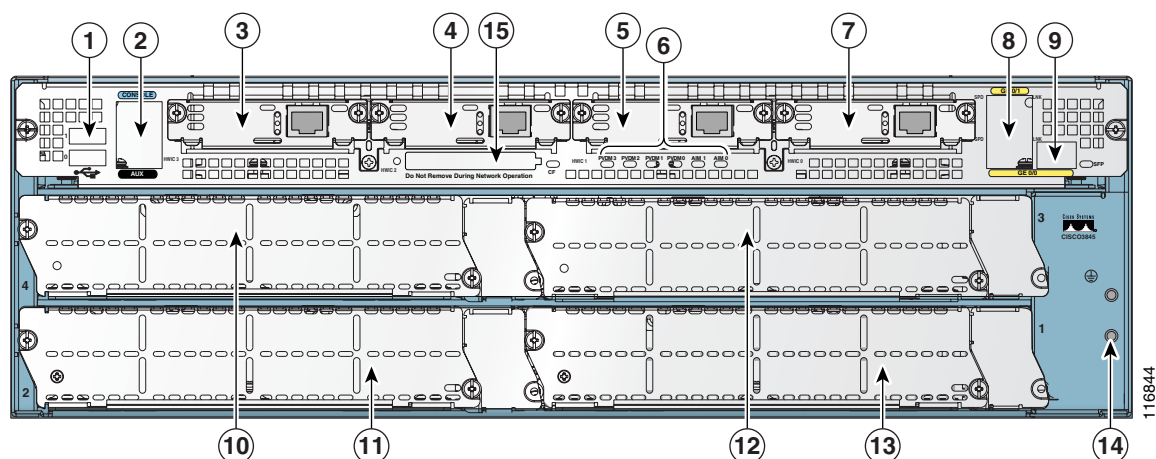


Figure 8 Rear Panel of Cisco 3845 Router

1	USB ports	8	Gigabit Ethernet ports
2	Console and auxiliary ports	9	Slot for optional SFP module
3	HWIC slot 3	10	Network module slot 4
4	HWIC slot 2	11	Network module slot 2
5	HWIC slot 1	12	Network module slot 3
6	LED indicators	13	Network module slot 1
7	HWIC slot 0	14	Screw holes for grounding lug

Product Identification

The serial number for Cisco 3800 series routers is located near the right edge of the rear panel. [Figure 9](#) shows the location on Cisco 3825 routers. [Figure 10](#) shows the location on Cisco 3845 routers.

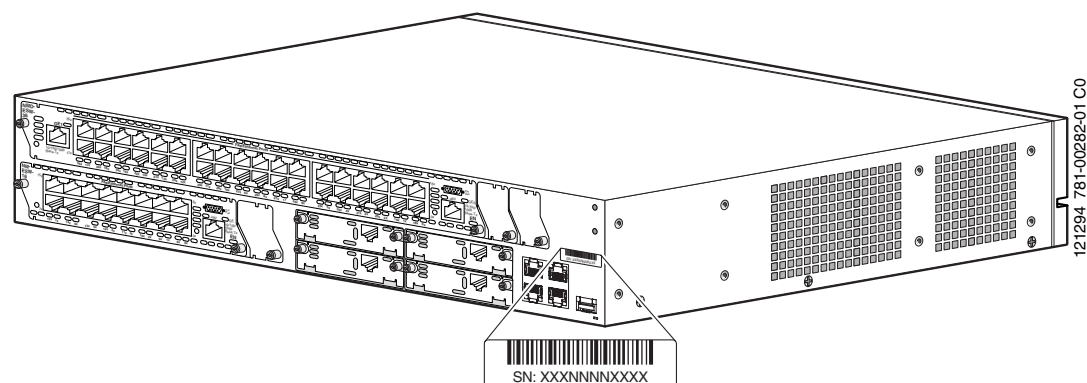
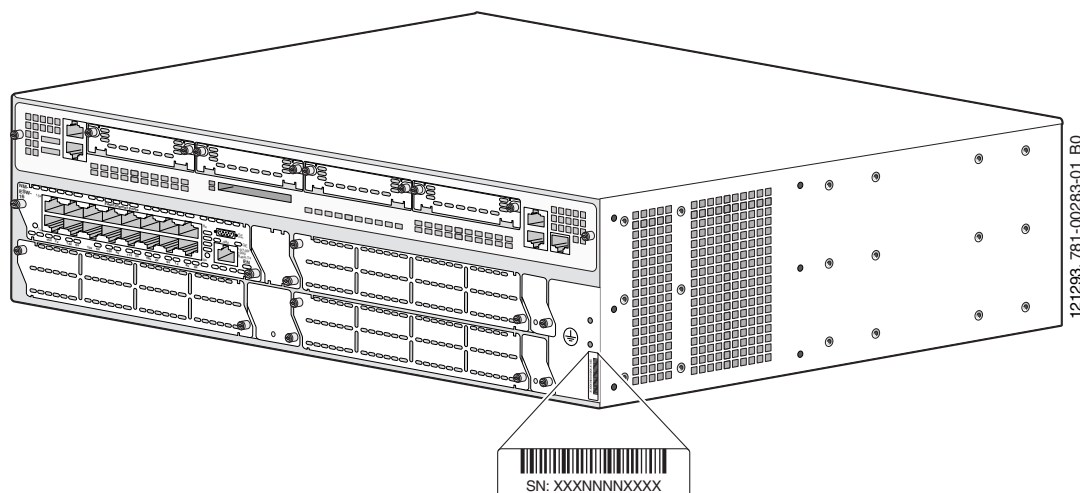
Figure 9 Cisco 3825 Router Serial Number Location

Figure 10 Cisco 3845 Router Serial Number Location**Note**

The serial number for Cisco 3825 and Cisco 3845 routers is 11 characters long.

Cisco Product Identification Tool

The Cisco Product Identification tool provides detailed illustrations and descriptions showing where to locate serial number labels on Cisco products. It includes the following features:

- A search option that allows browsing for models using a tree-structured product hierarchy
- A search field on the final results page making it easier to look up multiple products
- End-of-sale products are clearly identified in results lists

The tool streamlines the process of locating serial number labels and identifying products. Serial number information expedites the entitlement process and is important for access to support services.

The Cisco Product Identification tool can be accessed at the following URL:

<http://tools.cisco.com/Support/CPI/index.do>

Built-In Ports

Cisco 3800 series routers provide the following built-in ports:

- Two 1000BASE-T Gigabit Ethernet ports with RJ-45 connectors for shielded twisted pair. One of these ports provides a slot for an optional small-form-factor pluggable (SFP) module.
- One RJ-45 console port for connecting to a terminal.
- One RJ-45 auxiliary port for connecting to a modem.
- Two built-in USB 1.1 ports to support USB devices qualified and approved by Cisco. No approved USB devices are currently available, but enhancements are planned to provide additional flexibility and functionality.
- Cisco Redundant Power System connector (Cisco 3825 router only).

Module and Interface Card Capacity

Optional network modules and interface cards provide Cisco 3800 series routers with additional interfaces or functionality.

Network Modules

Network modules install directly into slots in the rear of the router. The Cisco 3845 router supports online insertion and removal (OIR, or hot swap) of network modules. The Cisco 3825 router does not support OIR.



Caution

The Cisco 3845 router supports OIR with similar modules only. If you remove a network module, along with any installed WAN or voice interface cards, install another module and card combination exactly like it.



Caution

The Cisco 3825 router does not support OIR of network modules. To avoid damaging the module, you must turn off electrical power and disconnect network cables before you insert the module into a router slot.

The Cisco 3825 router provides two slots for network modules. The lower network module slot of this router, labeled 1 on the rear panel, can hold either of the following sizes of network modules:

- One single-wide network module
- One extended single-wide network module

The upper network module slot of the Cisco 3825 router, labeled 2 on the rear panel, can hold any of the following sizes of network modules:

- One single-wide network module
- One extended single-wide network module
- One double-wide network module
- One extended double-wide network module

The Cisco 3845 router provides four slots for network modules, labeled 1, 2, 3, and 4 on the rear panel. Each slot can hold either of the following sizes of network modules:

- One single-wide network module
- One extended single-wide network module

Slots 1 and 2 can also be combined to hold either of the following sizes of network modules:

- One double-wide network module
- One extended double-wide network module

Slots 3 and 4 can be combined in the same way to hold one double-wide or extended double-wide network module.

**Note**

The terms *single-wide*, *extended single-wide*, *double-wide*, and *extended double-wide* refer to the physical size of a network module. *Enhanced* network modules offer additional functionality; this functionality is not directly related to the module's size.

**Note**

The Cisco 3825 router supports one high-density analog-digital extension module for voice and fax. The Cisco 3845 module supports two of these modules.

Certain network module configurations require the installation or removal of a slot divider in the module slot. All configurations require blank faceplates or slot adapters to be installed over unused slots for cooling, electromagnetic interference (EMI) reduction, and safety. Procedures for installing network modules, slot dividers, slot adapters, and blank faceplates are described in [“Installing Network Modules in Cisco 3800 Series Routers”](#) and the [Cisco Network Modules Hardware Installation Guide](#).

Interface Cards

Interface cards install either into slots in the rear of the router, or into slots in network modules. Interface cards come in the following types:

- WAN interface card (WIC)
- Voice interface card (VIC)
- Voice/data T1/E1 WAN interface card (VWIC)
- High-speed WAN interface card (HWIC)

**Note**

You can insert any kind of interface card—WIC, VIC, VWIC, or HWIC—into a router HWIC slot. HWICs must be installed directly into router slots, not into network modules.

The Cisco 3825 router and the Cisco 3845 router each provide four interface card slots, labeled on the rear panel by HWIC and a number. Each slot can be occupied by one single-wide WIC, VIC, VWIC, or HWIC.

In addition, the HWIC 0 and HWIC 1 slots can be combined to hold one double-wide HWIC. The HWIC 2 and HWIC 3 slots can also be combined to hold one double-wide HWIC.

**Note**

Although the HWIC 1 and HWIC 2 slots on the Cisco 3845 router are adjacent to each other, they cannot be combined to hold a double-wide HWIC.

The maximum capacity of Cisco 3800 series routers for interface cards inserted directly into the chassis is four WICs, VICs, VWICs, or HWICs, or two double-wide HWICs.

**Caution**

Cisco 3800 series routers do not support OIR (hot swap) of interface cards inserted directly into router slots. You must turn off the router before installing or removing an interface card.

Certain interface card configurations require the installation or removal of a slot divider in the router's interface card slot. All slots must be covered by interface cards or blank faceplates for cooling, electromagnetic interference (EMI) reduction, and safety. Procedures for installing interface cards, slot dividers, and blank faceplates are described in [“Installing Interface Cards in Cisco 3800 Series Routers”](#) and the [Cisco Interface Cards Installation Guide](#).

AIMS and PVDMs

Advanced integration modules (AIMs) and packet voice data modules (PVDMs) install into connectors on the router motherboard. AIMs provide hardware-based support for additional features. PVDMs are digital signal processor (DSP) SIMMs that provide voice support. The Cisco 3825 router and the Cisco 3845 router can each accommodate two AIMs and four PVDMs.

Installation, replacement, and removal of AIMs and PVDMs require opening the cover of the Cisco 3825 router, or removing the motherboard of the Cisco 3845 router. For more information, see [“Installing and Upgrading Internal Components in Cisco 3800 Series Routers.”](#)

Port Numbering

Each built-in network port on a Cisco 3800 series router, and each port or interface on a network module or interface card, is identified in Cisco IOS software by an interface type and a number or series of numbers separated by forward slashes (/). Port numbers for Cisco 3800 series routers follow the rules in this section.



Note

Port numbering conventions differ for different router series. For routers that are not part of the Cisco 3800 series, consult your router documentation for port numbering information.

Built-In Ports

Cisco 3800 series routers have two Gigabit Ethernet ports built into the router's rear panel, labeled 0/0 and 0/1. These numbers are used with the interface-type keyword **gigabitethernet** to identify the ports in Cisco IOS commands—**gigabitethernet 0/0** and **gigabitethernet 0/1**.



Note

If an optional SFP module is installed and selected, it is assigned **gigabitethernet 0/0**.

Network Module Ports

Ports on network modules inserted into a router slot are numbered *slot/port*, where *slot* is the slot number in the router and *port* is the port number in the network module. For example, port 1 of a Fast Ethernet network module inserted into router slot 2 would be identified as **fastethernet 2/1**.

The Cisco 3825 router has two slots for network modules. The lower slot is numbered 1 and the upper slot is numbered 2, as labeled on the router's rear panel. (See [Figure 4 on page 3](#).) The Cisco 3845 router has four slots: 1 at lower right, 2 at lower left, 3 at upper right, and 4 at upper left. (See [Figure 8 on page 5](#).)

**Note**

In the Cisco 3845 router, double-wide or extended double-wide network modules are identified by slot numbers 1 and 3.

Ports in a network module are normally numbered from right to left and bottom to top, starting at 0. See the [Cisco Network Modules Hardware Installation Guide](#) for more information.

Interface Card Ports

Interface cards can be inserted either directly into a router slot, or into a slot in a network module.

Interface Card in Router

Interface cards inserted directly into a router slot are numbered *0/HWIC-slot/port*. *HWIC-slot* is the HWIC slot in the router—0, 1, 2, or 3, as labeled on the router's rear panel; *port* is the port number in the interface card. For example, port 0 of a T1 WIC inserted into router HWIC slot 3 would be identified as **t1 0/3/1**.

**Note**

Double-wide interface cards use HWIC slot numbers 1 and 3.

Ports in an interface card are normally numbered from right to left and bottom to top, starting at 0. See the [Cisco Interface Cards Installation Guide](#) for more information.

Interface Card in Network Module

Some network modules provide their own slots for interface cards. Ports in these interface cards are numbered *router-slot/module-slot/port*, where *router-slot* is 1 or 2 for the Cisco 3825 router and 1, 2, 3, or 4 for the Cisco 3845 router; *module-slot* is the slot in the network module for the interface card; and *port* is the port number in the interface card. For example, port 0 of a voice interface card in slot 1 of a voice network module in slot 4 of a Cisco 3845 router would be identified as **voice 4/1/0**.

**Note**

Double-wide or extended double-wide network modules use router slot numbers 2 and 4.

Slots in network modules for interface cards are normally numbered from right to left, starting at 0. Ports in an interface card are normally numbered from right to left and bottom to top, starting at 0. For more information, see the [Cisco Network Modules Hardware Installation Guide](#) and [Cisco Interface Cards Installation Guide](#).

Asynchronous Interface Numbering

For Cisco 3825 and Cisco 3845 routers, interface numbering for asynchronous interfaces is the same as for other interfaces. Use the interface number to specify the asynchronous line. For example, the command to configure port 1 of a 2-port asynchronous/synchronous WAN interface card in router HWIC slot 3 is **interface serial 0/3/1**. The command to configure the line associated with this port is **line 0/3/1**.

Similarly, **line 1/22** specifies the line associated with interface **async 1/22** on a 32-port asynchronous network module in router slot 1.

Memory

Cisco 3800 series routers contain the following types of memory:

- Main memory consists of ECC DDR SDRAM. It stores the running configuration and routing tables, and buffers packets at the network interfaces. Both routers ship with 256 MB of main memory. The two DIMM slots can be upgraded with 128-MB, 256-MB, or 512-MB DIMMs to a maximum of 1024 MB (1 GB).
- An external CompactFlash memory card stores the Cisco IOS software image. The routers are shipped with a 64-MB CompactFlash memory card, which can be upgraded to 128 MB or 256 MB.
- The routers boot from 4 MB of internal flash memory. This memory cannot be upgraded.

Power

[Table 1](#) summarizes power options for Cisco 3800 series routers. Both the Cisco 3825 router and the Cisco 3845 router support an AC input power supply, an AC input power supply with IP phone power output, or a DC input power supply. The Cisco 3825 router has one internal power supply and also provides a connector for the optional Cisco Redundant Power System (RPS) external backup power source. The Cisco 3845 router supports two internal power supplies and operates in redundant mode both are installed.

Table 1 *Cisco 3800 Series Routers Power Options*

Router	Power Option	Input	IP Phone Power Output
Cisco 3825	AC input without IP phone power output	100–240 VAC, 3 A	None
	AC input with 24 ports of IP phone power output	100–240 VAC, 8 A	–48 VDC, 360 W
	DC input without IP phone power output	24–60 VDC, 12 A	None
	Cisco Redundant Power System	100 VAC, 10 A 240 VAC, 6 A	If supported by router power supply
Cisco 3845	AC input without IP phone power output	100–240 VAC, 5 A	None
	AC input with 48 ports of IP phone power output	100–240 VAC, 9 A	–48 VDC, 360 W
	DC input without IP phone power output	24–60 VDC, 19 A	None
	Second internal power supply	Any option above	

LED Indicators

LEDs can help you monitor your router's performance and operation by providing power, activity, and status information. For an explanation of LED activity during power-up, see the [“Verifying LED Indications” section on page 34 of “Powering Up Cisco 3800 Series Routers.”](#) To use LEDs for troubleshooting, see [Table 1 in “Troubleshooting Cisco 3800 Series Routers.”](#)

For descriptions of LEDs on network modules or interface cards, see the [Cisco Network Modules Hardware Installation Guide](#) and the [Cisco Interface Cards Installation Guide](#).

Ventilation

Three internal multispeed fans cool the routers, controlled by a temperature sensor. At ambient temperatures below 40 degrees C, they operate at low speed to conserve power and reduce noise. At 40 degrees C or above they operate at high speed. The power supply has its own integrated fan.



Note

On the Cisco 3825 router, when the router is installed with a Inline Power (ILP) power supply, the internal multispeed fans will operate at high speed only. To verify the fan speed, use the **show environment** command.

Real-Time Clock and Battery

An internal real-time clock (RTC) with battery backup allows the routers to check the validity of the certification authority (CA) certificate. The RTC is accurate under the operating environmental conditions specified for the router.

The clock and battery are permanently installed. Under the specified operating environmental conditions, the battery lasts the life of the router and does not need to be replaced.

Technical Specifications

[Table 2](#) and [Table 3](#) list Cisco 3800 series system specifications.

Table 2 Cisco 3825 Router Specifications

Specification	Value
Dimensions (H x W x D)	3.5 x 17.1 x 14.7 in. (8.9 x 43.4 x 37.3 cm) 2 rack unit height
Weight (minimum)	23 lb (10.5 kg)

Table 2 Cisco 3825 Router Specifications (continued)

Specification	Value
AC input power • Input voltage • Frequency • Input current • Inrush surge current	100–240 VAC, autoranging 47–63 Hz 3 A (8 A for IP phone support) at 110 V 2 A (4 A for IP phone support) at 230 V 50 A maximum, one cycle (–48V IP phone power included)
DC input power • Input voltage • Input current • Inrush surge current	24–60 VDC, positive or negative, autoranging 12 A at 24 V; 5 A at 60 V 50 A maximum, <10 ms
Power dissipation (maximum) • AC without IP phone support • AC with IP phone support: – System only – IP phones • DC	300 W (1025 BTU/hr) 370 W (1260 BTU/hr) 360 W (1230 BTU/hr) 325 W (1110 BTU/hr)
Console and auxiliary ports	RJ-45 connector
Operating temperature	32 to 104°F (0 to 40°C)
Nonoperating temperature	–40 to 185°F (–40 to 85°C)
Operating humidity	5–95%, noncondensing
Operating altitude	Up to 6,500 ft (2,000 m); derate temperature 1°C per 1,000 ft
Noise level	50 dBA typical, 53 dBA maximum
Regulatory compliance	FCC Part 15 Class A. For additional compliance information, see the <i>Cisco 2800 Series and Cisco 3800 Series Integrated Services Routers Regulatory Compliance and Safety Information</i> document that accompanied the router.
Safety compliance	UL 60950; CAN/CSA C22.2 No. 60950-00; EN 60950; AS/NZS 3260

Table 3 Cisco 3845 Router Specifications

Specification	Value
Dimensions (H x W x D)	5.25 x 17.25 x 16.0 in. (13.3 x 43.8 x 40.6 cm) 3 rack unit height
Weight (minimum)	45 lb (20 kg)
AC input power - Input voltage - Frequency - Input current - Inrush surge current	100–240 VAC, autoranging 47–63 Hz 4 A (8 A for IP phone support) at 110 V 2 A (4 A for IP phone support) at 230 V 50 A maximum, one cycle (–48V IP phone power included)
DC input power - Input voltage - Input current - Inrush surge current	24–60 VDC, positive or negative, autoranging 18 A at 24 V; 7 A at 60 V 50 A maximum, <10 ms
Power dissipation (maximum) - AC without IP phone support - AC with IP phone support: - System only - IP phones - DC	435 W (1485 BTU/hr) 555 W (1890 BTU/hr) 360 W (1230 BTU/hr) 460 W (1570 BTU/hr)
Console and auxiliary ports	RJ-45 connector
Operating temperature	32 to 104°F (0 to 40°C)
Nonoperating temperature	–40 to 185°F (–40 to 85°C)
Operating humidity	5–95%, noncondensing
Operating altitude	Up to 6,500 ft (2,000 m); derate 1°C per 1,000 ft
Noise level	56 dBA typical, 58 dBA maximum
EMC compliance	FCC Part 15 Class A. For additional compliance information, see the Cisco 2800 Series and Cisco 3800 Series Integrated Services Routers Regulatory Compliance and Safety Information document.
Safety compliance	UL 60950; CAN/CSA C22.2 No. 60950-00; EN 60950; AS/NZS 3260. For additional compliance information, see the Cisco 2800 Series and Cisco 3800 Series Integrated Services Routers Regulatory Compliance and Safety Information document.

Regulatory Compliance

For complete regulatory compliance information, see the [*Cisco 2800 Series and Cisco 3800 Series Integrated Services Routers Regulatory Compliance and Safety Information*](#) document that accompanied the router.



Preinstallation Requirements and Planning for Cisco 3800 Series Routers

This document describes preinstallation requirements and planning for Cisco 3800 series integrated services routers. It contains the following sections:

- [Safety Recommendations, page 1](#)
- [General Site Requirements, page 3](#)
- [Installation Checklist, page 6](#)
- [Creating a Site Log, page 7](#)
- [Inspecting the Router, page 7](#)
- [Required Tools and Equipment for Installation and Maintenance, page 8](#)

Safety Recommendations

Follow these guidelines to ensure general safety:

- Keep the router area clear and dust-free during and after installation.
- If you remove the router cover, put it in a safe place.
- Keep tools and components away from walk areas.
- Do not wear loose clothing that could get caught in the router. Fasten your tie or scarf and roll up your sleeves.
- Wear safety glasses when working under conditions that might be hazardous to your eyes.
- Do not perform any action that creates a hazard to people or makes the equipment unsafe.



Warning

Read the installation instructions before connecting the system to the power source. Statement 1004



Warning

This unit is intended for installation in restricted access areas. A restricted access area can be accessed only through the use of a special tool, lock and key, or other means of security. Statement 1017



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



Warning

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



Warning

To prevent personal injury or damage to the chassis, never attempt to lift or tilt the chassis using the handles on modules (such as power supplies, fans, or cards); these types of handles are not designed to support the weight of the unit. Statement 1032



Warning

This equipment must be installed and maintained by service personnel as defined by AS/NZS 3260. Incorrectly connecting this equipment to a general-purpose outlet could be hazardous. The telecommunications lines must be disconnected 1) before unplugging the main power connector or 2) while the housing is open, or both. Statement 1043



Warning

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



Warning

To prevent the system from overheating, do not operate it in an area that exceeds the maximum recommended ambient temperature of 40 deg. C Statement 1047

Safety with Electricity

Follow these guidelines when working on equipment powered by electricity:



Warning

Read the installation instructions before connecting the system to the power source. Statement 1004

- Locate the emergency power-off switch in the room in which you are working. Then, if an electrical accident occurs, you can quickly turn off the power.
- Disconnect all power before doing the following:
 - Installing or removing a router
 - Working near power supplies
- Look carefully for possible hazards in your work area, such as moist floors, ungrounded power extension cables, frayed power cords, and missing safety grounds.
- Do not work alone if hazardous conditions exist.
- Never assume that power is disconnected from a circuit. Always check.

- If an electrical accident occurs, proceed as follows:
 - Use caution; do not become a victim yourself.
 - Turn off power to the device.
 - If possible, send another person to get medical aid. Otherwise, assess the victim's condition and then call for help.
 - Determine if the person needs rescue breathing or external cardiac compressions; then take appropriate action.

In addition, use the following guidelines when working with any equipment that is disconnected from a power source, but still connected to telephone wiring or other network cabling:

- Never install telephone wiring during a lightning storm.
- Never install telephone jacks in wet locations unless the jack is specifically designed for it.
- Never touch uninsulated telephone wires or terminals unless the telephone line is disconnected at the network interface.
- Use caution when installing or modifying telephone lines.

Preventing Electrostatic Discharge Damage

Electrostatic discharge (ESD) can damage equipment and impair electrical circuitry. It can occur if electronic printed circuit cards are improperly handled and can cause complete or intermittent failures. Always follow ESD prevention procedures when removing and replacing modules:

- Ensure that the router is electrically connected to earth ground.
- Wear an ESD-preventive wrist strap, ensuring that it makes good skin contact. Connect the clip to an unpainted surface of the router frame to channel unwanted ESD voltages safely to ground. To guard against ESD damage and shocks, the wrist strap and cord must operate effectively.
- If no wrist strap is available, ground yourself by touching a metal part of the router.



Caution

For the safety of your equipment, periodically check the resistance value of the antistatic strap. It should be between 1 and 10 megohms (Mohm).

General Site Requirements

This section describes the requirements your site must meet for safe installation and operation of your router. Ensure that the site is properly prepared before beginning installation. If you are experiencing shutdowns or unusually high errors with your existing equipment, this section can also help you isolate the cause of failures and prevent future problems.

Power Supply Considerations

Check the power at your site to ensure that you are receiving clean power (free of spikes and noise). Install a power conditioner if necessary.

**Warning**

The device is designed for connection to TN and IT power systems. Statement 1007

The AC power supply autoselects either 110 V or 220 V operation. All routers include a 6-foot (1.8-meter) electrical power cord. A label near the power inlet indicates the correct voltage, frequency (AC-powered systems only), and current draw for the router.

[Table 1](#) lists power requirements for Cisco 3800 series routers.

Table 1 Power Requirements for Cisco 3800 Series Routers

Router	Power Supply	Input Power	Input Voltage Tolerance Limits
Cisco 3825 without IP phone power output	AC	100 to 240 VAC 3 A at 110 V; 2 A at 230 V 47 to 63 Hz	85–264 VAC
	DC	24 to 60 VDC, positive or negative, autoranging 12 A at 24 V; 5 A at 60 V	18–72 VDC
Cisco 3825 with IP phone power output	AC	100 to 240 VAC 8 A at 110 V; 4 A at 230 V 47 to 63 Hz	85–264 VAC
Cisco 3845 without IP phone power output	AC	100 to 240 VAC 4 A at 110 V; 2 A at 230 V 47 to 63 Hz	85–264 VAC
	DC	24 to 60 VDC, positive or negative, autoranging 19 A at 24 V; 8 A at 60 V	18–72 VDC
Cisco 3845 with IP phone power output	AC	100 to 240 VAC 9 A at 110 V; 4 A at 230 V 47 to 63 Hz	85–264 VAC

Site Environment

Cisco 3800 series routers should normally be installed in an equipment rack. (For instructions, see [“Installing Cisco 3800 Series Routers in an Equipment Rack.”](#)) The location of your router and the layout of your equipment rack or wiring room are extremely important considerations for proper operation. Equipment placed too close together, inadequate ventilation, and inaccessible panels can cause malfunctions and shutdowns, and can make maintenance difficult. Plan for access to both front and rear panels of the router.

Cisco 3800 series routers operate at a temperature of 32 to 104 degrees F (0 to 40 degrees C) and a humidity of 5 to 95 percent (noncondensing).

When planning your site layout and equipment locations, remember the precautions described in the next section, [“Site Configuration,”](#) to help avoid equipment failures and reduce the likelihood of environmentally caused shutdowns. If you are experiencing shutdowns or an unusually high number of errors with your existing equipment, these precautions may help you isolate the cause of the failures and prevent future problems.

Site Configuration

The following precautions help you plan the operating environment for your router and help avoid environmentally caused equipment failures:

- Ensure that the room where your router operates has adequate circulation. Electrical equipment generates heat. Without adequate circulation, ambient air temperature may not cool equipment to acceptable operating temperatures.
- Always follow ESD-prevention procedures described in the [“Preventing Electrostatic Discharge Damage” section on page 3](#) to avoid damage to equipment. Damage from static discharge can cause immediate or intermittent equipment failure.
- Ensure that the router cover or motherboard tray and module rear panels are secure. All empty network module slots, interface card slots, and power supply bays must have filler panels installed. The router is designed to allow cooling air to flow within it through specially designed cooling slots. A router with uncovered openings creates leaks that may interrupt and reduce the flow of air across internal components.

Equipment Racks

You can install Cisco 3800 series routers in a 19-inch rack, or in a 23-inch rack with adapters from your rack manufacturer. For mounting procedures, see the [“Rack-Mounting the Router” section on page 10](#) of [“Installing Cisco 3800 Series Routers in an Equipment Rack.”](#)

Consider the following information when planning your equipment rack configuration:

- Allow clearance around the rack for maintenance.
- Enclosed racks must have adequate ventilation. Ensure that the rack is not congested, because each router generates heat. An enclosed rack should have louvered sides and a fan to provide cooling air. Heat generated by equipment near the bottom of the rack can be drawn upward into the intake ports of the equipment above.
- When mounting a router in an open rack, ensure that the rack frame does not block the intake ports or exhaust ports. If the router is installed on slides, check the router’s position when it is seated into the rack.
- Baffles can help to isolate exhaust air from intake air, which also helps to draw cooling air through the router. The best placement of the baffles depends on the airflow patterns in the rack, which can be found by experimenting with different configurations.
- When equipment installed in a rack (particularly in an enclosed rack) fails, try operating the equipment by itself, if possible. Power off other equipment in the rack (and in adjacent racks) to allow the router being tested a maximum of cooling air and clean power.

Installation Checklist

This sample installation checklist lists steps in installing a new router. Make a copy of it and mark the entries when completed. Include a copy of the checklist for each router in your site log (described in the next section, “[Creating a Site Log](#)”).

Installation checklist for site _____

Router name _____

Task	Verified by	Date
Installation Checklist copied		
Background information placed in site log		
Site power voltages verified		
Installation site power check completed		
Required tools available		
Additional equipment available		
Router received		
Product registration card received		
Cisco.com contact information label received		
Router components verified		
Initial electrical connections established		
ASCII terminal (for local configuration) or modem (for remote configuration) available		
Signal distance limits verified		
Startup sequence steps completed		
Initial operation verified		
Software image verified		

Creating a Site Log

The site log contains a record of all actions related to the router. Keep it in an accessible place near the router, where anyone who performs these actions has access to it. Site log entries might include the following information:

- Installation progress—Make a copy of the installation checklist and insert it into the site log. Make an entry as each procedure is completed.
- Upgrade and maintenance procedures—Use the site log as a record of ongoing router maintenance and expansion history, such as the following events:
 - Installation of network modules
 - Removal or replacement of network modules
 - Other upgrades
 - Configuration changes
 - Maintenance schedules and requirements
 - Maintenance procedures performed
 - Intermittent problems
 - Comments and notes

Inspecting the Router

Do not unpack the router until you are ready to install it. If the final installation site will not be ready for some time, keep the router in its shipping container to prevent accidental damage.

The router, cables, publications, and any optional equipment you ordered may be shipped in more than one container. When you unpack the containers, check the packing list to ensure that you received all the following items:

- Router
- 6-ft (1.8-m) AC power cord (for AC-powered routers)
- Ethernet cable for Gigabit Ethernet interface
- One pair of rack-mount brackets for a 19-inch rack, with screws to attach the brackets to the router
- NEBS-compliant two-hole barrel grounding lug and two mounting screws
- Cable management bracket (Cisco 3825 router only)
- RJ-45-to-DB-9 adapter cable for console port
- RJ-45-to-DB-25 adapter cable for auxiliary port
- Any optional equipment that you ordered
- Cisco product registration card and Cisco.com card

Inspect all items for shipping damage. If anything appears to be damaged, or if you encounter problems installing or configuring your router, contact customer service. For warranty information, see the [“Cisco 90-Day Limited Hardware Warranty Terms”](#) section on page 10 of [“Introduction to Cisco 3800 Series Routers Hardware Documentation.”](#) For technical support, see the [“Obtaining Technical Assistance”](#) section on page 12 of that document.

Required Tools and Equipment for Installation and Maintenance

You need the following tools and equipment to install and upgrade the router and its components:

- Number 1 and number 2 Phillips screwdrivers
- Equipment rack and screws to attach router mounting brackets to the rack
- Wire and wire-crimping tool for connecting the router chassis to earth ground
 - – AWG 6 (13 mm²) wire for NEBS-compliant chassis grounding
 - – AWG 14 (2 mm²) or larger wire for NEC-compliant chassis grounding
 - – AWG 18 (1 mm²) or larger wire for EN/IEC 60950-compliant chassis grounding
- For NEC-compliant grounding, a ring terminal with an inner diameter of 1/4 inch (5 to 7 mm)
- Cables for connection to WAN and LAN ports



Note For information on cables and cable specifications for WAN and LAN ports on network modules and interface cards, refer to the [Cisco Network Modules Hardware Installation Guide](#), the [Cisco Interface Cards Installation Guide](#), and the [Cisco Modular Access Router Cable Specifications](#).

- Console (ASCII terminal or PC running HyperTerminal or similar terminal emulation software) configured for 9600 bps, 8 data bits, no parity, and 1 stop bit
- Modem for remote administrative access (optional)
- ESD-preventive cord and wrist strap for procedures that require access to internal components



Installing Cisco 3800 Series Routers in an Equipment Rack

This document describes how to install Cisco 3800 series integrated services routers in an equipment rack. After mounting the router in the rack, you must connect the chassis to a reliable earth ground. These procedures are described in the following sections:

- [Rack-Mounting the Router, page 10](#)
- [Grounding the Router, page 14](#)

Before working on your Cisco router, refer to the safety information in the “[Safety Recommendations](#)” section on page 1 of “[Preinstallation Requirements and Planning for Cisco 3800 Series Routers](#),” and in the *Cisco 2800 Series and Cisco 3800 Series Integrated Services Routers Regulatory Compliance and Safety Information* document that accompanied the router.



Note

Cisco 3800 series routers are not designed to be placed on a desktop or table.

Cisco 3800 series routers are shipped with network modules, WAN interface cards (WICs), voice interface cards (VICs), power supplies, and other optional equipment that you ordered already installed. If you need to remove or install these or other items, we recommend that you do so before installing the router in a rack, when you have the best access and do not need to disconnect it from the network. For procedures, see the following documents:

- [Installing Network Modules in Cisco 3800 Series Routers](#)
- [Installing Interface Cards in Cisco 3800 Series Routers](#)
- [Installing and Upgrading Internal Components in Cisco 3800 Series Routers](#)

You will also be able to remove and install components while the router is in the rack, with the following exceptions for the Cisco 3825 router:

- SDRAM memory
- Advanced integration modules (AIMs)
- Packet voice data modules (PVDMs)
- Internal power supply

Rack-Mounting the Router

Mount the router in the equipment rack before making network and power connections.



Warning

To prevent personal injury or damage to the chassis, never attempt to lift or tilt the chassis using the handles on modules (such as power supplies, fans, or cards); these types of handles are not designed to support the weight of the unit. Statement 1032



Caution

To prevent damage to the router, never attempt to lift or tilt it by the plastic panel (bezel) on the front. Always hold the router by the metal body.

Cisco 3800 series routers can be installed in 19-inch and 23-inch racks using the brackets supplied with the router. These brackets are shown in [Figure 1](#) and [Figure 2](#). The left and right brackets are interchangeable.



Note

Mounting the routers in a 23-inch rack requires a bracket adapter from the rack manufacturer.

Figure 1 *Rack-Mounting Brackets for Cisco 3825 Routers*

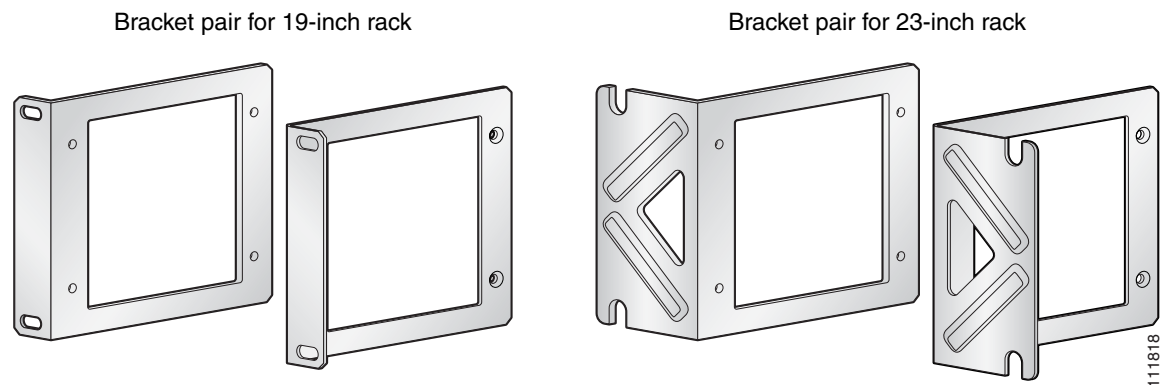
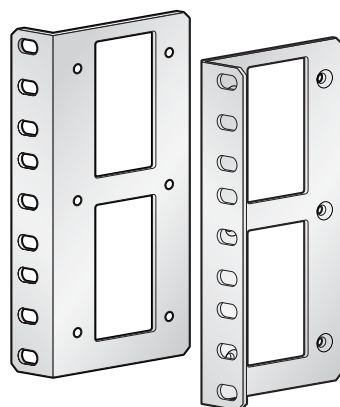
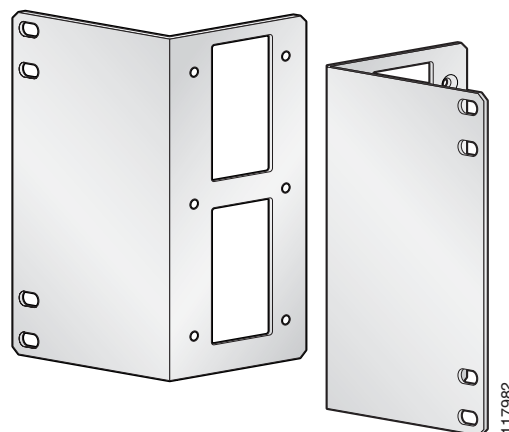


Figure 2 Rack-Mounting Brackets for Cisco 3845 Routers

Bracket pair for 19-inch rack



Bracket pair for 23-inch rack



You can mount the router in the following ways:

- Center mounting—Brackets attached in the center of the router with either the front panel or the rear panel facing forward
- Front mounting—Brackets attached at the front of the router with the front panel facing forward
- Rear mounting—Brackets attached at the rear of the router with the rear panel facing forward

Attaching Brackets to the Router for Rack Mounting

Attach the mounting brackets to the router, using a number 2 Phillips screwdriver to install the screws provided with the brackets. [Figure 3](#) through [Figure 6](#) show bracket attachment locations, using a Cisco 3845 router as an example.

**Caution**

Do not overtighten the screws. The recommended torque is 10–12 inch-lb (1.1–1.4 N-m) for the Cisco 3825 router and 15–18 inch-lb (1.7–2.0 N-m) for the Cisco 3845 router.

**Caution**

Your installation must allow unrestricted airflow for router cooling.

Figure 3 *Bracket Installation for Front Mounting*

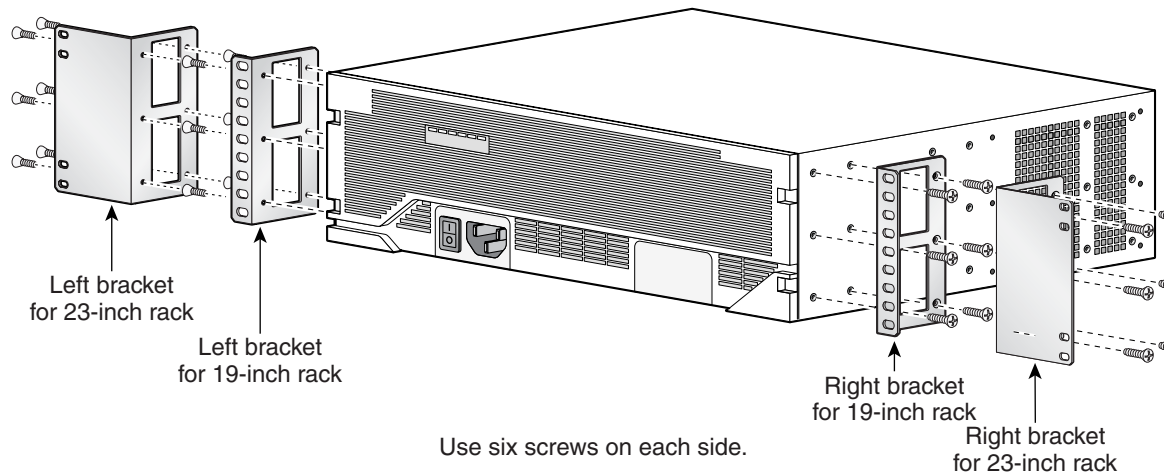


Figure 4 *Bracket Installation for Rear Mounting*

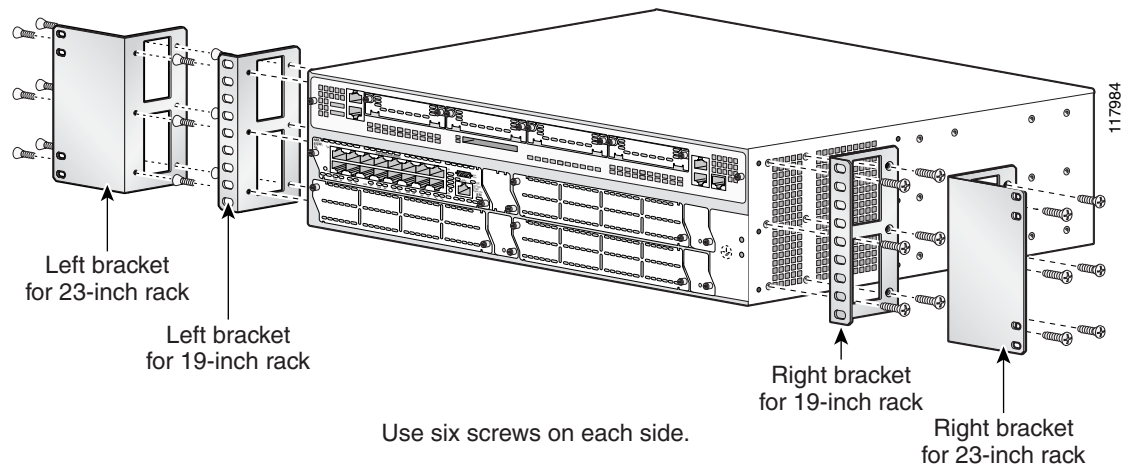
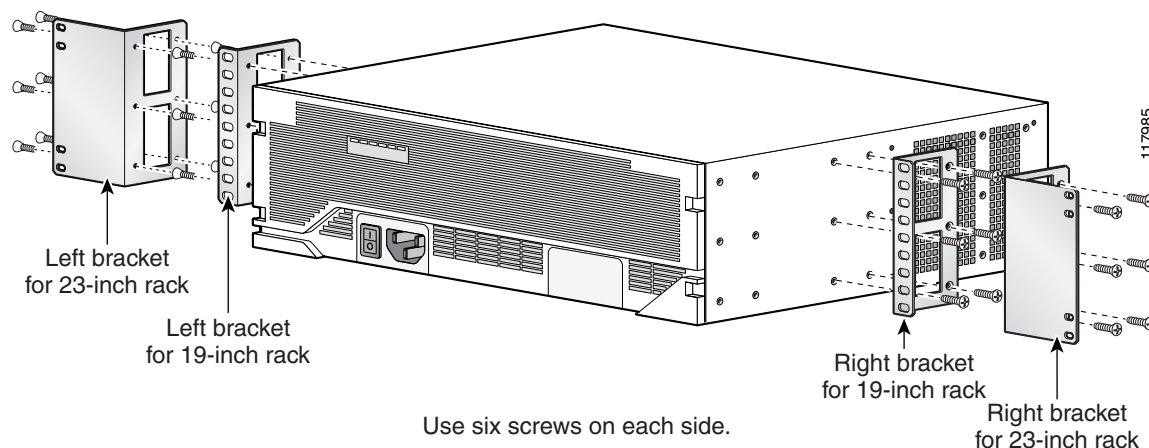
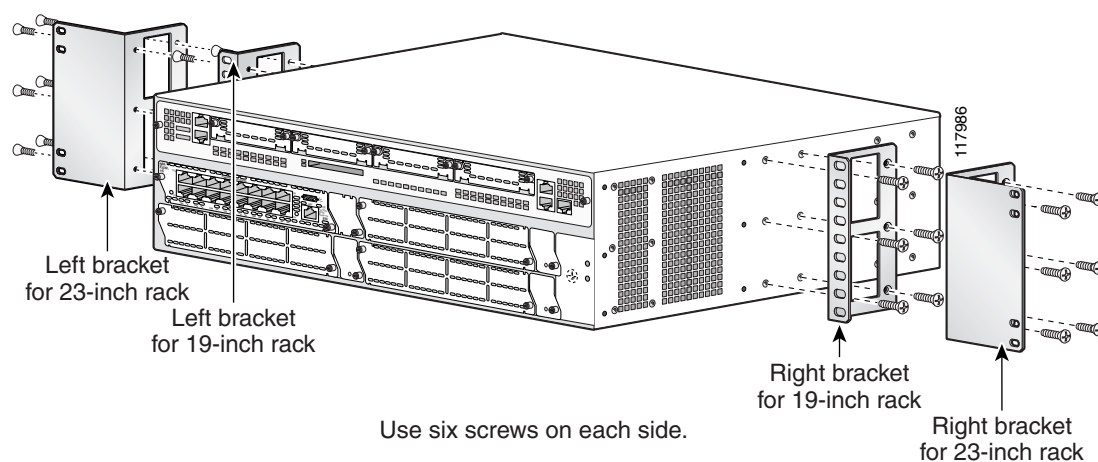


Figure 5 Bracket Installation for Center Mounting with Front Panel Forward**Figure 6** Bracket Installation for Center Mounting with Rear Panel Forward

Installing the Router in a Rack



To prevent bodily injury when mounting or servicing this unit in a rack, you must take special precautions to ensure that the system remains stable. The following guidelines are provided to ensure your safety:

This unit should be mounted at the bottom of the rack if it is the only unit in the rack.

When mounting this unit in a partially filled rack, load the rack from the bottom to the top with the heaviest component at the bottom of the rack.

If the rack is provided with stabilizing devices, install the stabilizers before mounting or servicing the unit in the rack.
Statement 1006

Install the router in the rack, using two screws for each side. Rack-mounting screws should be supplied with the rack; they are not provided with the router.

**Caution**

Be sure to leave space above and below each router in a rack, to allow for cooling air circulation.

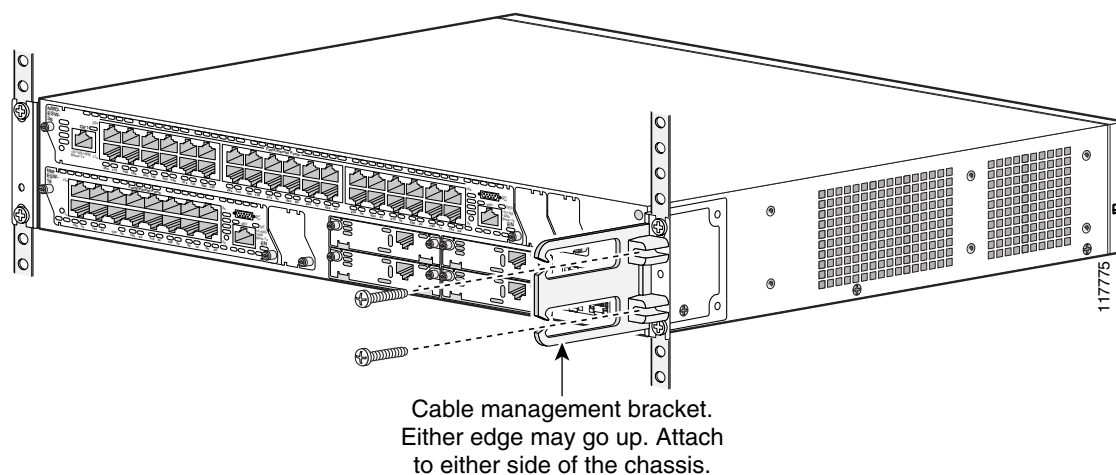
**Tip**

Start the lower pair of screws first. Rest the brackets on the lower screws while you insert the upper pair of screws.

Attaching the Optional Cable Management Bracket

The optional cable management bracket (Cisco 3825 router only) provides attachment points for organizing and routing cables. Attach the cable management bracket to the left or right rack-mount bracket using the screw provided. You can attach the cable management bracket to either the upper or lower threaded hole. See [Figure 7](#) for attachment locations.

Figure 7 Attaching the Optional Cable Management Bracket



Grounding the Router

**Warning**

This equipment must be grounded. Never defeat the ground conductor or operate the equipment in the absence of a suitably installed ground conductor. Contact the appropriate electrical inspection authority or an electrician if you are uncertain that suitable grounding is available. Statement 1024

**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

You must connect the router chassis to a reliable earth ground. The ground wire must be installed in accordance with local electrical safety standards.

- For NEBS-compliant grounding, use size AWG 6 (13 mm²) wire and the two-hole barrel lug provided in the router accessory kit.
- For NEC-compliant grounding, use size AWG 14 (2 mm²) or larger wire and an appropriate user-supplied ring terminal.
- For EN/IEC 60950-compliant grounding, use size AWG 18 (1 mm²) or larger wire and an appropriate user-supplied ring terminal.

To connect the router to a reliable earth ground, follow these steps:

-
- Step 1** Strip one end of the ground wire to the length required for the two-hole barrel lug or terminal.
- For the NEBS two-hole barrel lug, approximately 0.75 in. (20 mm)
 - For a user-provided ring terminal, as required
- Step 2** Crimp the ground wire to the two-hole barrel lug or ring terminal, using a crimping tool of the appropriate size.
- Step 3** Attach the two-hole barrel lug or ring terminal to the router chassis as shown in [Figure 8](#), [Figure 9](#), [Figure 10](#), or [Figure 11](#). For a two-hole barrel lug, use the two screws with captive locking washers provided. For a ring terminal, use one of the screws provided. Tighten the screws to a torque of 8 to 10 in-lb (0.9 to 1.1 N-m).
- Step 4** Connect the other end of the ground wire to a suitable grounding point at your site.

Figure 8 NEBS-Compliant Two-Hole Barrel Lug Ground Connection on Cisco 3825 Router

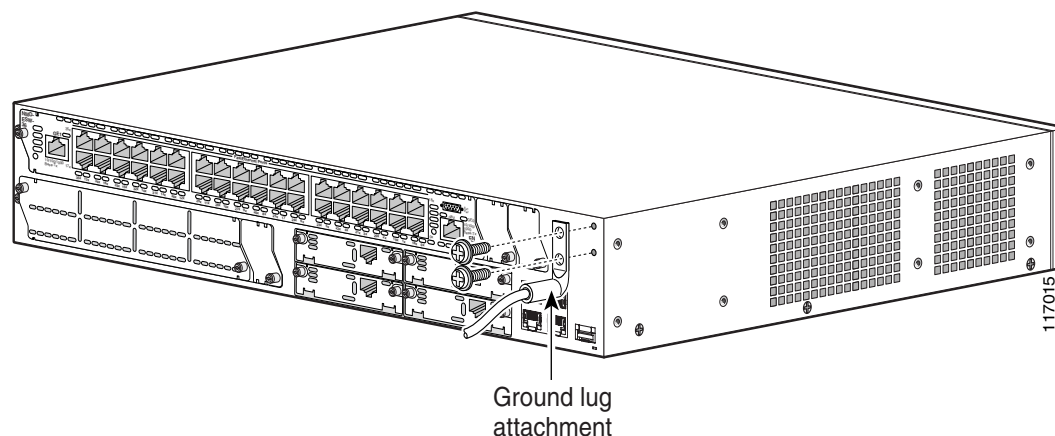


Figure 9 NEBS-Compliant Two-Hole Barrel Lug Ground Connection on Cisco 3845 Router

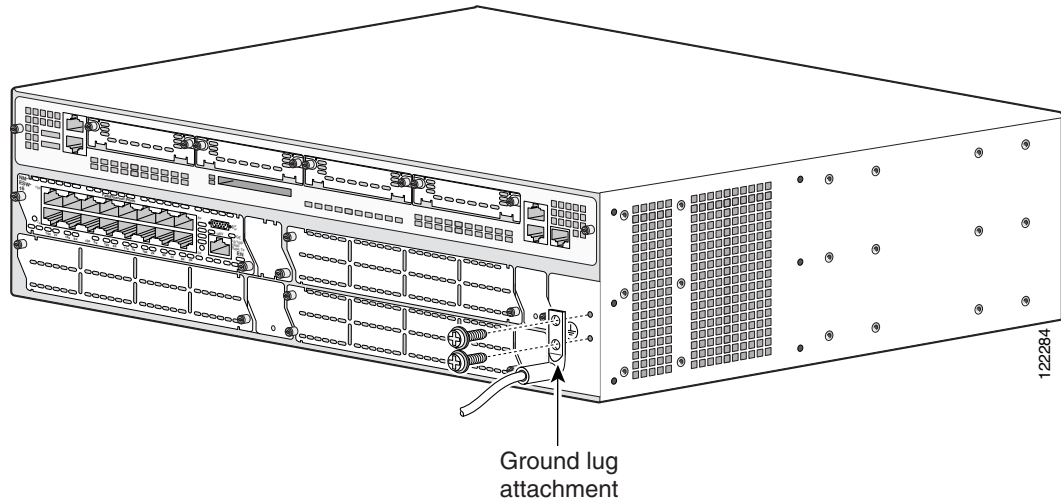


Figure 10 Ring Terminal Ground Connection on Cisco 3825 Router

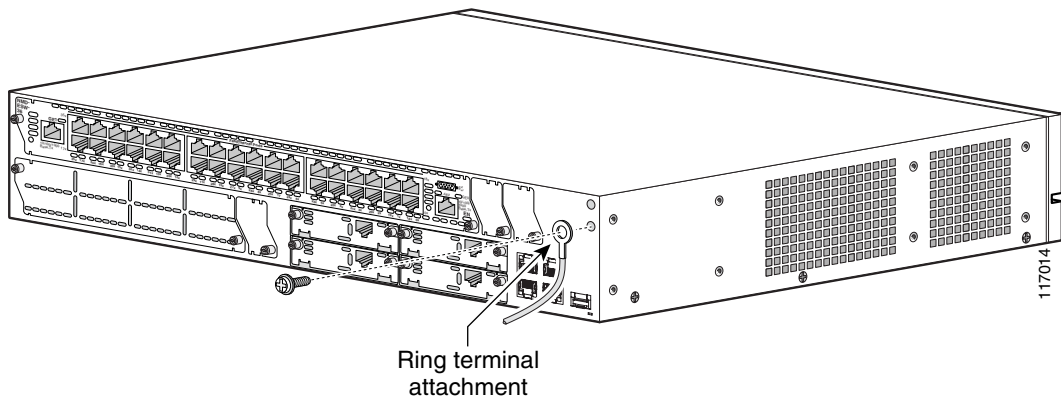
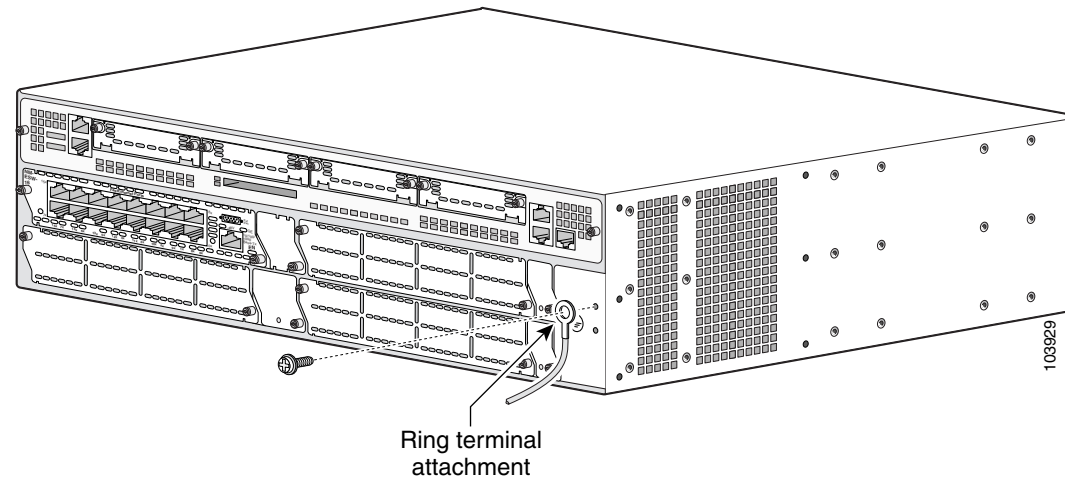


Figure 11 Ring Terminal Ground Connection on Cisco 3845 Router



After the router has been installed and grounded, you can connect power cables; WAN, LAN, and voice cables; and cables for administrative access, as required for your installation. For cable connection procedures, see these sections of the [“Connecting Cables to Cisco 3800 Series Routers”](#) document:

- [Power Connections](#), page 19
- [Connecting WAN, LAN, and Voice Cables](#), page 28
- [Connecting a Console or Modem](#), page 29



Connecting Cables to Cisco 3800 Series Routers

This document describes how to connect your Cisco 3800 series integrated services router to a power source and to networks and external devices. It includes the following sections:

- [Power Connections, page 19](#)
- [Connecting WAN, LAN, and Voice Cables, page 28](#)
- [Connecting a Console or Modem, page 29](#)


Warning

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


Warning

This unit is intended for installation in restricted access areas. A restricted access area can be accessed only through the use of a special tool, lock and key, or other means of security.
Statement 1017


Warning

Do not work on the system or connect or disconnect cables during periods of lightning activity.
Statement 1001

Power Connections

This section explains how to connect AC or DC power inputs to Cisco 3825 and Cisco 3845 routers. It covers the following topics:

- [Connecting Routers to AC Power, page 20](#)
- [Connecting Routers to DC Power, page 20](#)
- [Connecting Routers to Backup Power, page 27](#)


Warning

Read the installation instructions before connecting the system to the power source. Statement 1004


Note

The installation must comply with all required electrical codes applicable at the installation site.

Connecting Routers to AC Power

If your router uses AC power, connect it to a 15 A, 120 VAC (or 10 A, 240 VAC) circuit with overcurrent protection. If backup power is required, see the [“Connecting Routers to Backup Power”](#) section on page 27.



Note

The input voltage tolerance limits for AC power are 85 and 264 VAC.



Warning

AC connected units must have a permanent ground connection in addition to the power cable ground wire. NEBS-compliant grounding satisfies this requirement. Statement 284



Warning

This product requires short-circuit (overcurrent) protection, to be provided as part of the building installation. Install only in accordance with national and local wiring regulations. Statement 1045

The following warning applies to both AC power supplies and AC power supplies with IP phone power in the Cisco 3825 router:



Warning

This product relies on the building's installation for short-circuit (overcurrent) protection. Ensure that the protective device is rated not greater than: 120 VAC, 45 A (240 VAC, 30 A). Statement 1005

The following warning applies to both AC power supplies and AC power supplies with IP phone power in the Cisco 3845 router:



Warning

This product relies on the building's installation for short-circuit (overcurrent) protection. Ensure that the protective device is rated not greater than: 120 VAC, 30 A (240 VAC, 20 A). Statement 1005

Connecting Routers to DC Power

If your router has a DC-input power supply, follow the directions in this section for proper wiring. If backup power is required, see the [“Connecting Routers to Backup Power”](#) section on page 27.

DC Wiring Requirements for Cisco 3800 Series Routers



Warning

Use copper conductors only. Statement 1025



Warning

This product requires short-circuit (overcurrent) protection, to be provided as part of the building installation. Install only in accordance with national and local wiring regulations. Statement 1045

The following warning applies to the Cisco 3825 router only:



Warning

This product relies on the building's installation for short-circuit (overcurrent) protection. Ensure that the protective device is rated not greater than: 60 VDC, 20 A. Statement 1005

The following warning applies to the Cisco 3845 router only:



Warning

This product relies on the building's installation for short-circuit (overcurrent) protection. Ensure that the protective device is rated not greater than: 60 VDC, 30 A. Statement 1005

Table 2 and Table 3 summarize DC wiring requirements for Cisco 3825 and Cisco 3845 routers.

For a Cisco 3845 router, the safety ground wire connection must be at the same potential as the 0 V (return) connection.

Table 2 DC Wiring Requirements for Cisco 3825 Routers

DC Input ¹	DC Input Wire Size	Safety Ground Wire Size	Wire Terminal (Lug)	Overcurrent Protection
24–36 VDC, 12 A, positive or negative, single or dual source	AWG 14 (2.0 mm ²)	AWG 14 (2.0 mm ²), minimum	Amp/Tyco No. 32957 or equivalent	20 A
36–60 VDC, 8 A, positive or negative, single or dual source				

1. The input voltage tolerance limits for DC power are 18 and 72 VDC.

Table 3 DC Wiring Requirements for Cisco 3845 Routers

DC Input ¹	DC Input Wire Size	Safety Ground Wire Size	Wire Terminal (Lug)	Overcurrent Protection
24–36 V, 19 A, positive or negative, single or dual source	AWG 12 (3.0 mm ²)	AWG 12 (3.0 mm ²) minimum	Amp/Tyco No. 34852 or equivalent	30 A
36–60 V, 13 A, positive or negative, single or dual source	AWG 12 or 14 (3.0 or 2.0 mm ²)	AWG 12 (3.0 mm ²) minimum	AWG 12: Amp/Tyco No. 34852 or equivalent AWG 14: Amp/Tyco No. 32957 or equivalent	20–30 A

1. The input voltage tolerance limits for DC power are 18 and 72 VDC.

DC Input Wiring Procedure

To connect the router to a DC power source, follow these steps:

- Step 1** Remove power from the DC circuit. To ensure that power is removed from the DC circuit, locate the circuit breaker for the DC circuit, switch the circuit breaker to the OFF position, and tape the circuit-breaker switch in the OFF position.



Warning

Before performing any of the following procedures, ensure that power is removed from the DC circuit. Statement 1003



Tip

Secure all power cabling when installing this unit to avoid disturbing field-wiring connections.



Warning

When stranded wiring is required, use approved wiring terminations, such as closed-loop or spade-type with upturned lugs. These terminations should be the appropriate size for the wires and should clamp both the insulation and conductor. Statement 1002

- Step 2** Strip the wires to the appropriate length for the terminals. The length is 3/16 to 1/4 inch (5 to 6 mm) for Amp/Tyco number 32957 terminals and 5/16 to 3/8 inch (8 to 9 mm) for Amp/Tyco number 34852 terminals.

- Step 3** Crimp the terminals onto the DC power input and safety ground wires.

- Step 4** Remove the plastic covers from the terminal block. Save the covers for reinstallation after you finish wiring.

- Step 5** Connect the wires to the terminal block, starting with the safety ground wire. Connect each wire to the appropriate terminal as shown in [Figure 12](#).



Warning

The illustration shows the DC power supply terminal block. Wire the DC power supply as illustrated. The proper wiring sequence is ground to ground, positive to positive, and negative to negative. The ground wire should always be connected first and disconnected last. Statement 239



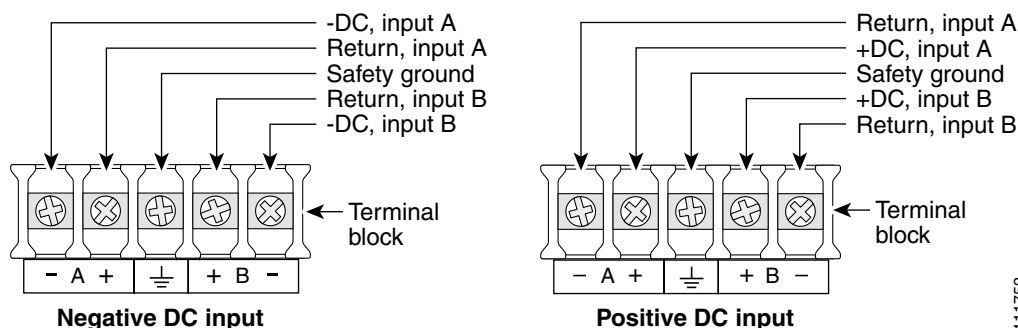
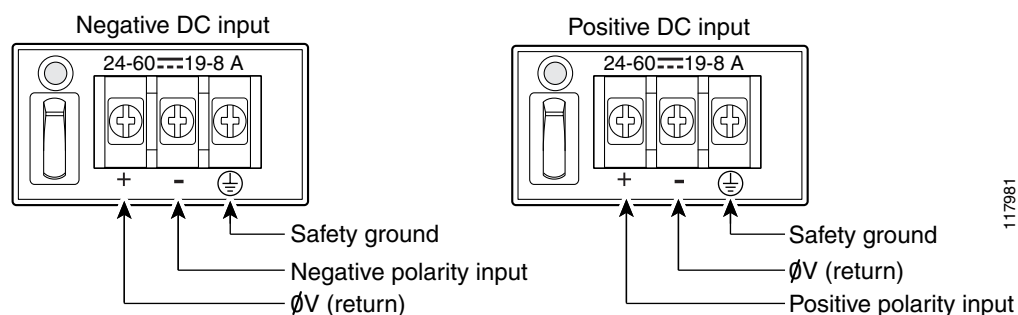
Warning

An exposed wire lead from a DC-input power source can conduct harmful levels of electricity. Be sure that no exposed portion of the DC-input power source wire extends from the terminal block plug. Statement 122



Caution

Do not overtorque the terminal block screws. The recommended torque is 10.0 ± 0.5 in-lb (1.1 ± 0.05 N-m).

Figure 12 DC Power Connections for Cisco 3825 Routers**Figure 13 DC Power Connections for Cisco 3845 Routers**

Step 6 Install the plastic cover over the terminals. (See [Figure 14](#).)

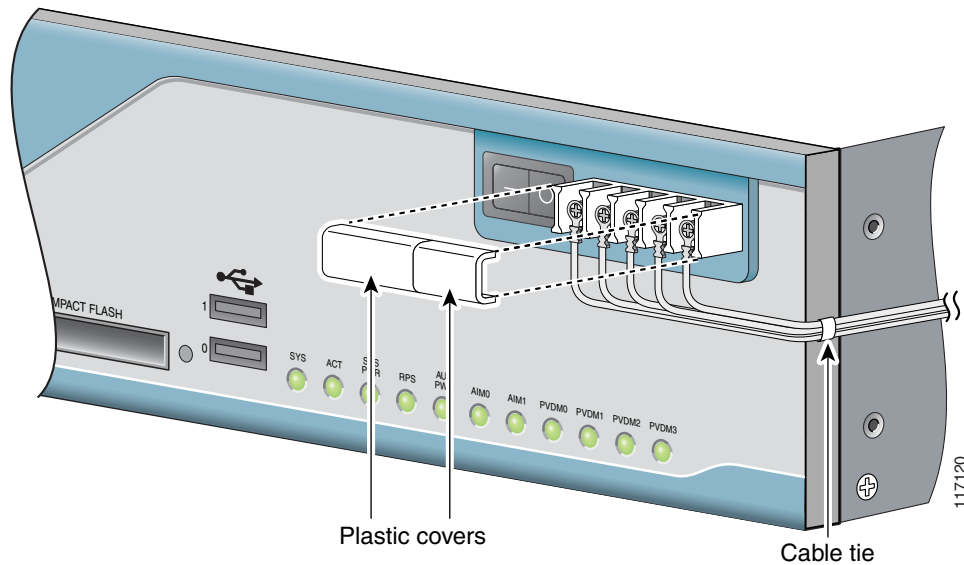
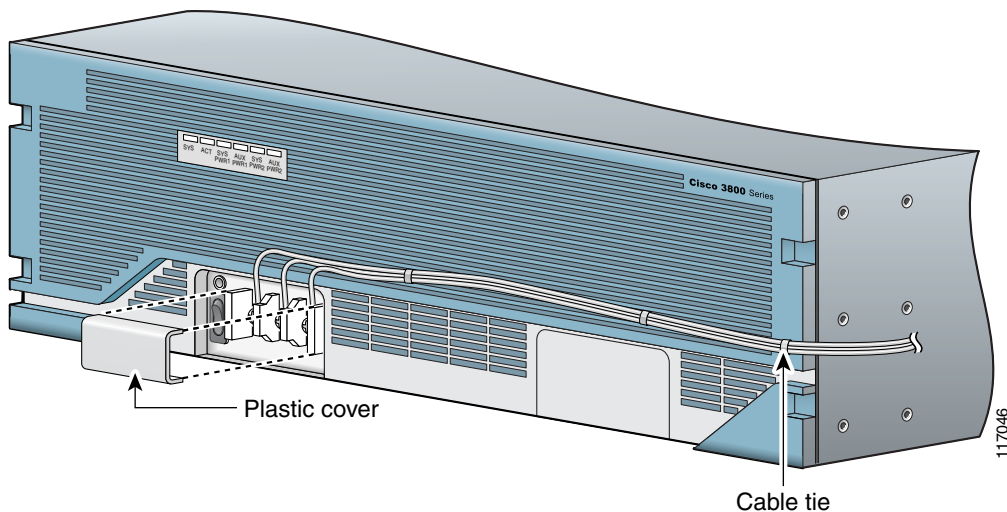
**Warning**

The safety cover is an integral part of the product. Do not operate the unit without the safety cover installed. Operating the unit without the cover in place will invalidate the safety approvals and pose a risk of fire and electrical hazards. Statement 117

Step 7 Organize and bundle the wires using cable ties as shown in [Figure 14](#) or [Figure 15](#).

Step 8 If you are installing a second DC power supply, repeat [Step 1](#) through [Step 7](#) for the second supply (input B).

Step 9 Turn on power to the DC circuit. Be sure to remove tape used to secure the circuit-breaker switch in the OFF position.

Figure 14 DC Wire Routing and Attachment for Cisco 3825 Router**Figure 15** DC Wire Routing and Attachment for Cisco 3845 Router

Dual DC Power Supply Configuration in Cisco 3825 Routers

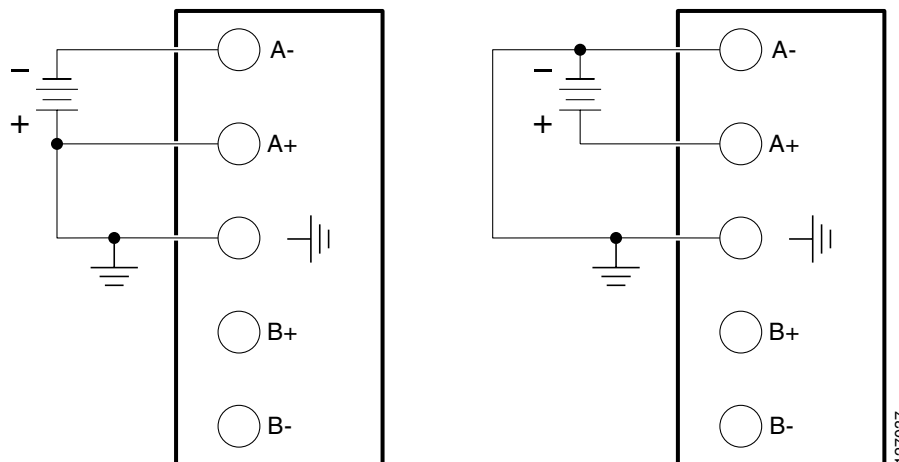
You can connect a single DC power source to either the A input or the B input. If there are dual power sources, connect one source to the A input and one source to the B input. Both sources must have the same polarity (with respect to ground) and voltage (within 0.25 V). Do not connect –DC-grounded and +DC-grounded dual sources to a Cisco 3825 router.

**Caution**

Dual sources with opposite-polarity grounding damage equipment.

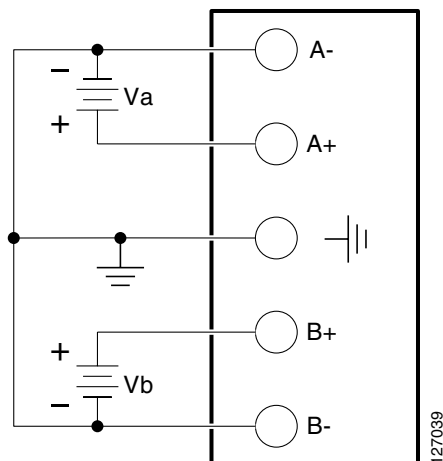
In Figure 16, either the positive source terminal or the negative source terminal is tied to ground.

Figure 16 Connecting to One Source Only—Source A or Source B



In Figure 17, source A and source B share common negative terminal connections.

Figure 17 Connecting Source A and Source B with Common Negative Terminals



In Figure 18, source A and source B share common positive terminal connections. This configuration is allowed only if V_a equals V_b (within 0.25 V).

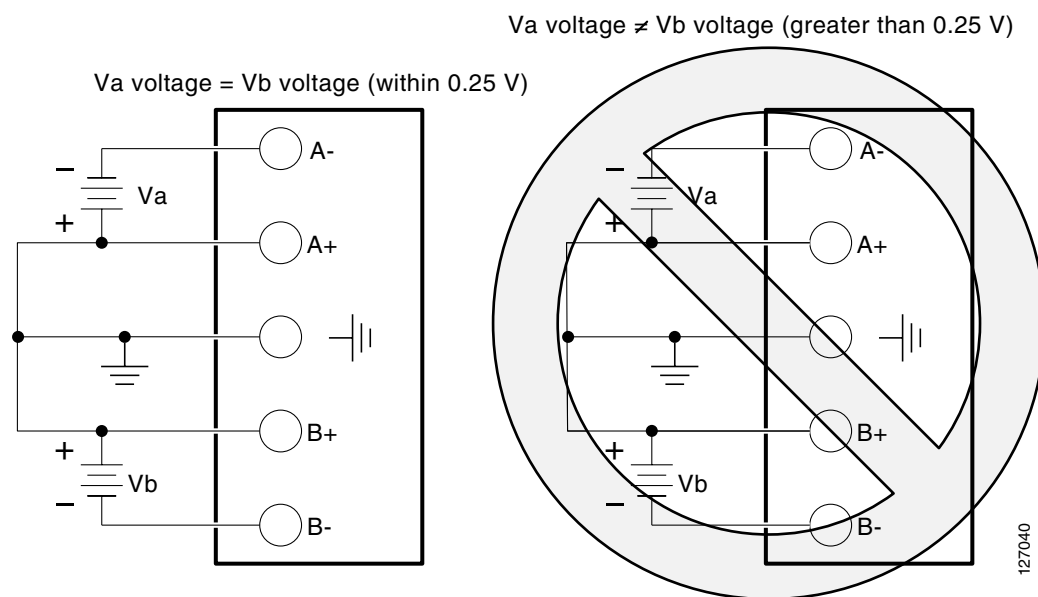
**Caution**

If source A and source B are wired with common positive terminals and their voltages are unequal by more than 0.25 V, the higher-voltage source can discharge into the lower-voltage source through the negative terminals. Excessive discharging currents through these terminals can actuate one or both of the dual-input DC power supply's internal A- or B- fuses, resulting in lack of redundancy or system failure. When source A and source B are within 0.25 V, discharge current is minimal.

**Note**

When source A and source B are wired with common negative terminals, as in [Figure 17](#), discharging does not occur and there is no requirement that source A and source B voltages be equal.

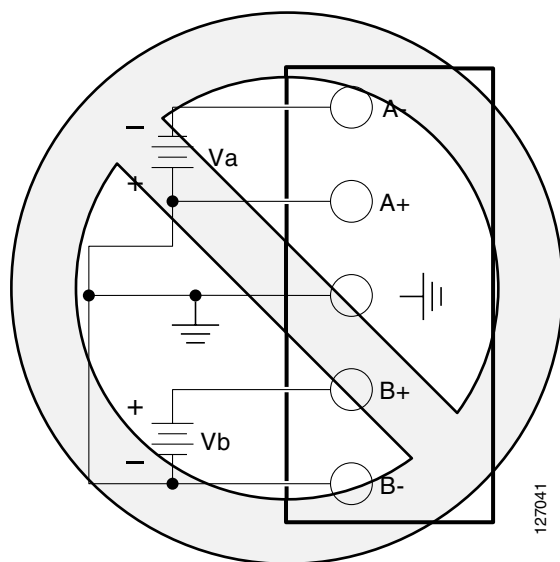
Figure 18 Connecting Source A and Source B with Common Positive Terminals



In [Figure 19](#), source A and source B are wired with opposite polarity grounds. *Do not* use this configuration.

**Caution**

Do not use the DC input configuration shown in [Figure 19](#).

Figure 19 Source A and Source B Wired with Opposite-Polarity Grounds

Connecting Routers to Backup Power

The Cisco 3845 router accommodates two hot-swappable power supplies in bays at the front of the router. A single power supply meets router requirements. The second power supply provides redundancy, load sharing, and increased router availability. Either power supply can be removed without affecting router operation. Any combination of two power supplies is permitted.

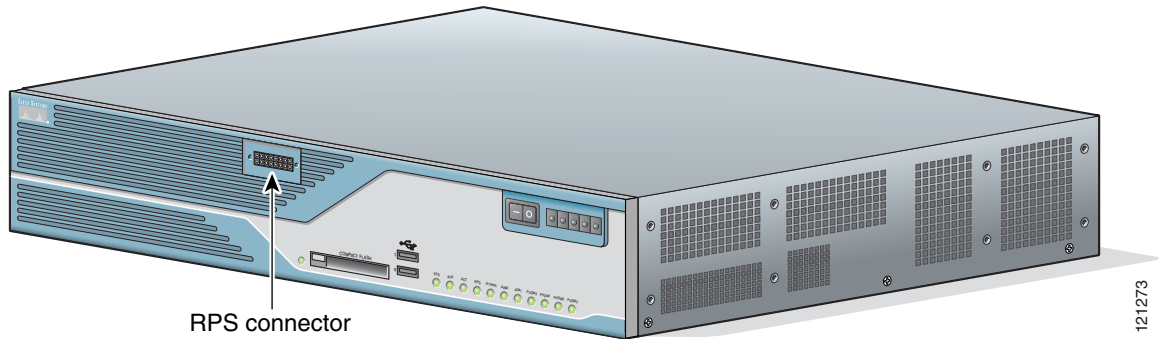
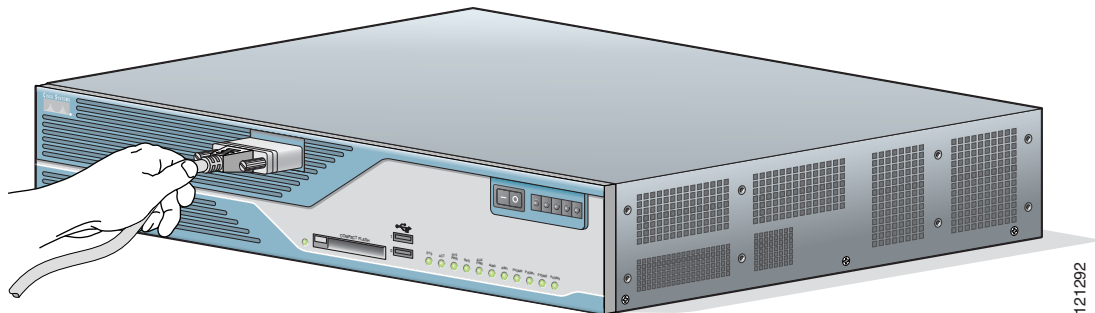
For instructions for installing a second power supply in a Cisco 3845 router, see the “[Installing and Upgrading Internal Components in Cisco 3800 Series Routers](#)” section.

The Cisco 3825 router has one internal power supply and provides a connector to an optional Cisco Redundant Power System (RPS) external backup source. [Figure 20](#) and [Figure 21](#) illustrate this connection. Use a flat-blade screwdriver to pry off the door over the RPS connector before connecting the cable. See the [Cisco RPS-675 Hardware Installation Guide](#) for complete RPS power connection instructions.



Caution

Before connecting the RPS to the router, make sure that either the RPS is in standby mode or the RPS AC power is disconnected. Connecting the RPS to AC power automatically places the RPS in active mode.

Figure 20 RPS Connector on Cisco 3825 Router**Figure 21 Connecting RPS to Cisco 3825 Router**

Connecting WAN, LAN, and Voice Cables

This section describes how to connect WAN, LAN, and voice interface cables to your Cisco 3800 series integrated services router.

One Ethernet cable is provided with the router for a Gigabit Ethernet connection. These ports use Category 5, 5e, or 6 UTP 1000BASE-T cable. Additional cables and transceivers can be ordered from Cisco. For ordering information, see the [Cisco Product Catalog](http://www.cisco.com/en/US/partner/products/index.html) at <http://www.cisco.com/en/US/partner/products/index.html>.

Connect each WAN, LAN, or voice cable to the appropriate connector on the router or on a network module or interface card, following these precautions:

- Position the cables carefully, so that they do not put strain on the connectors.
- Organize cables in bundles so that they do not tangle.
- Inspect the cables to make sure that the routing and bend radiuses are satisfactory. Reposition cables if necessary.
- Install cable ties in accordance with site requirements.

Cable connections to network modules and interface cards are described in detail in the following documents:

- [Cisco Network Modules Hardware Installation Guide](#)
- [Cisco Interface Cards Installation Guide](#)

For cable pinouts, see the [Cisco Modular Access Router Cable Specifications](#) document.



Warning

Do not work on the system, or connect or disconnect cables during periods of lightning activity.
Statement 1001



Warning

The ISDN connection is regarded as a source of voltage that should be inaccessible to user contact. Do not attempt to tamper with or open any public telephone operator (PTO)-provided equipment or connection hardware. Any hardwired connection (other than by a nonremovable, connect-one-time-only plug) must be made only by PTO staff or suitably trained engineers.
Statement 23



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



Warning

Hazardous network voltages are present in WAN ports regardless of whether power to the router is OFF or ON. To avoid electric shock, use caution when working near WAN ports. When detaching cables, detach the end away from the router first. Statement 1026

Connecting a Console or Modem

Cisco 3800 series routers provide EIA/TIA-232 asynchronous serial console and auxiliary ports. These ports provide administrative access to the router either locally, using an ASCII terminal or PC running HyperTerminal or similar terminal emulation software connected to the console port, or remotely, using a modem connected to the auxiliary port.

The principal difference between the console and auxiliary ports is that the auxiliary port supports hardware flow control, but the console port does not. Flow control paces the transmission of data between a sending device and a receiving device, ensuring that the receiving device can absorb the data sent to it before the sending device sends more. When the buffers on the receiving device are full, a message is sent to the sending device to suspend transmission until the data in the buffers has been processed.

Because the auxiliary port supports flow control, it is best suited for use with the high-speed transmissions of a modem. Terminals send data at slower speeds than modems; therefore, the console port is best suited for use with terminals.

Cisco provides the following cables and adapters for connecting the router to a console or modem:

- Console adapter cable (RJ-45-to-DB-9, light blue)
- Modem adapter cable (RJ-45-to-DB-25, black)

This section describes how to connect a console to the console port and how to connect a modem to the auxiliary port.

Connecting a Console to the Console Port

To connect a console (ASCII terminal or a PC running HyperTerminal or similar terminal emulation software) to the console port on the router, follow these steps:

- Step 1** Use the blue RJ-45-to-DB-9 console adapter cable to connect the router to a terminal. (See [Figure 22](#) and [Figure 23](#).)

For information about cable pinouts, see the [Cisco Modular Access Router Cable Specifications](#) document.



Note On Cisco routers, the console port is color-coded blue.

- Step 2** Configure your terminal or terminal emulation software for a data rate of 9600 bps, 8 data bits, no parity, and 1 stop bit.



Note Because hardware flow control is not possible on the console port, Cisco does not recommend connecting modems to this port. Always connect modems to the auxiliary port.

Figure 22 Connecting a Computer to the Cisco 3825 Router Console Port

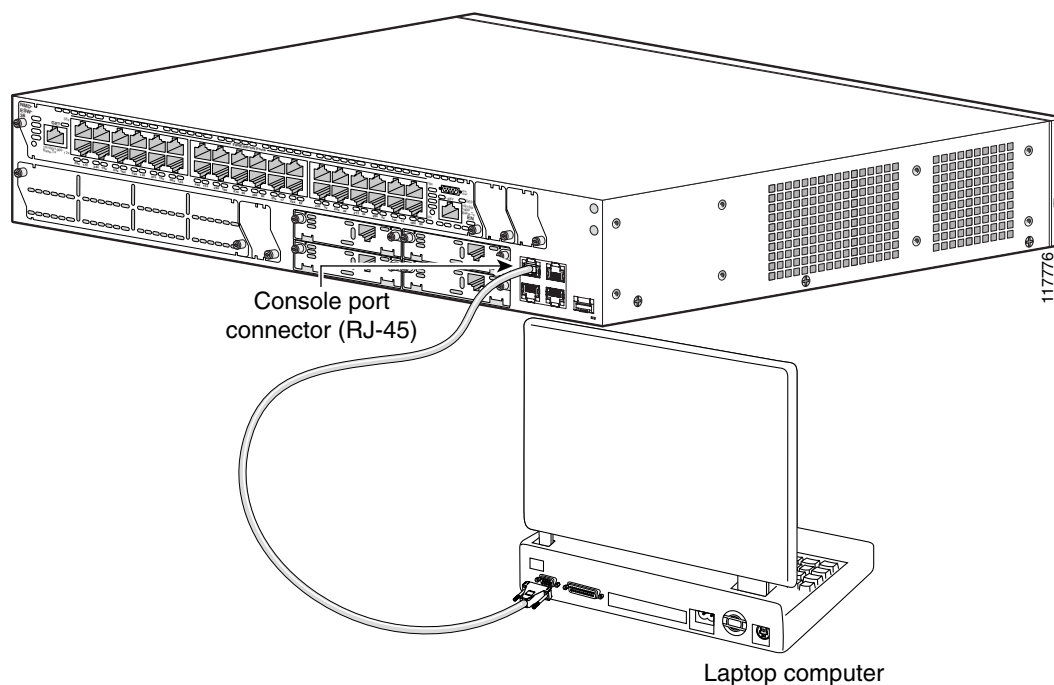
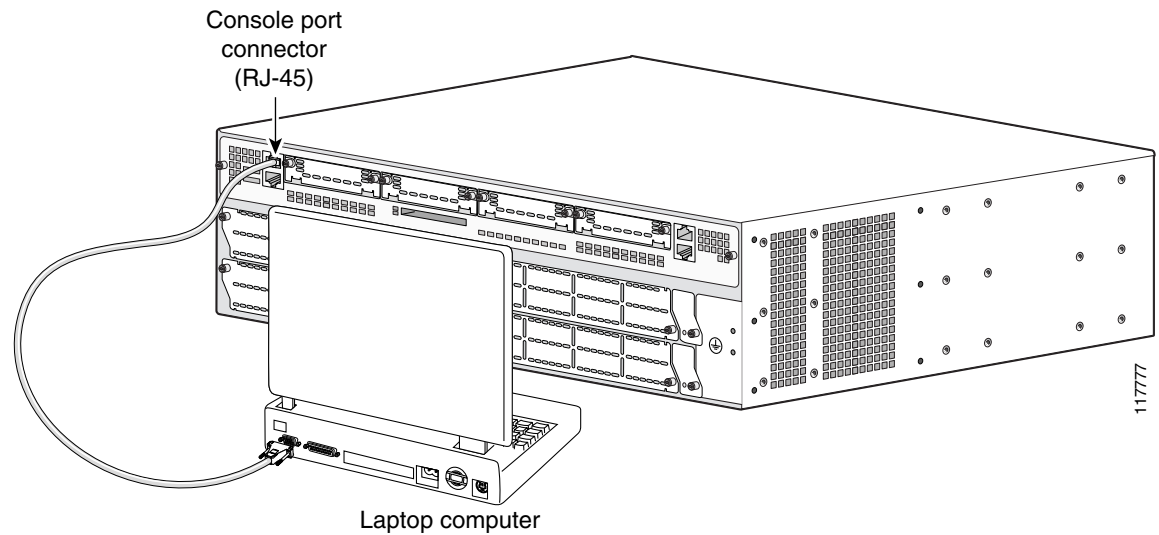


Figure 23 Connecting a Computer to the Cisco 3845 Router Console Port



Connecting a Modem to the Auxiliary Port

To connect a modem to the auxiliary port on the router, follow these steps:

- Step 1** Use the black RJ-45-to-DB-25 modem adapter cable to connect the router to a modem. (See [Figure 24](#) and [Figure 25](#).)
- Step 2** Make sure that your modem and the router auxiliary port are configured for the same transmission speed (up to 115,200 bps is supported) and hardware flow control, with data carrier detect (DCD) and data terminal ready (DTR) enabled.

Figure 24 Connecting a Modem to the Auxiliary Port on a Cisco 3825 Router

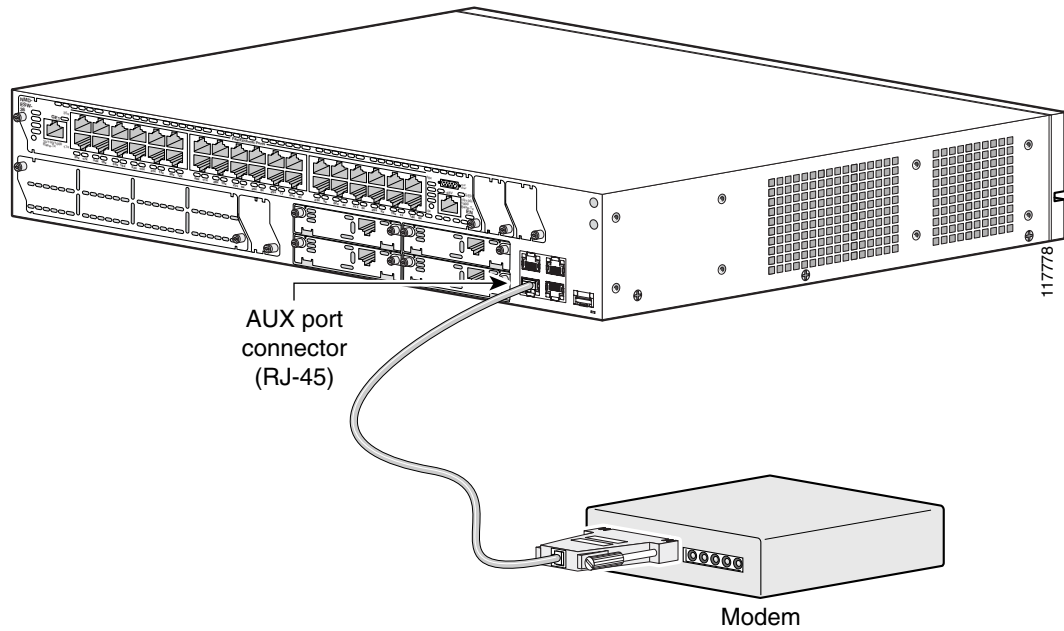
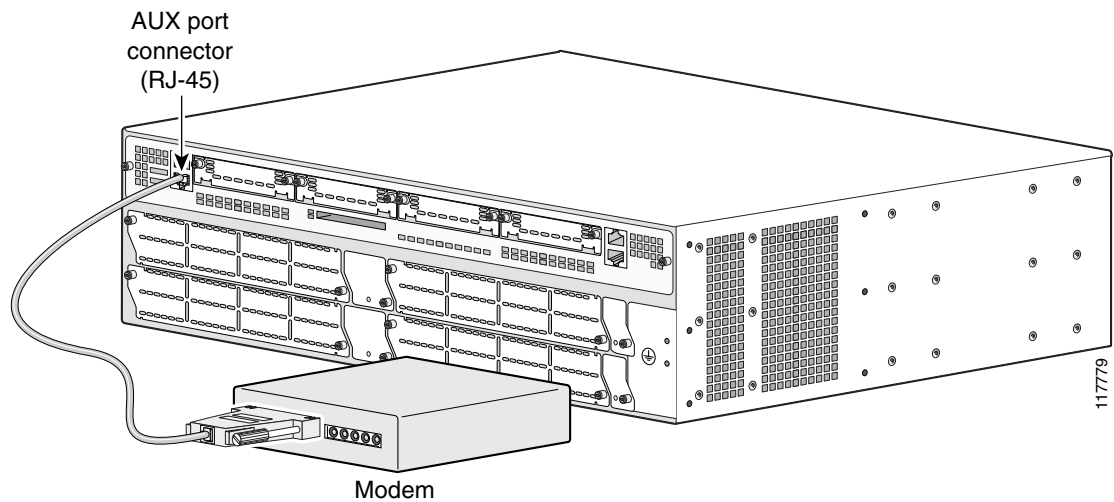


Figure 25 Connecting a Modem to the Auxiliary Port on a Cisco 3845 Router





Powering Up Cisco 3800 Series Routers

This document describes how to power up your Cisco 3800 series integrated services router.



Caution

To ensure adequate cooling, electromagnetic interference (EMI) reduction, and safety, never operate the router unless the cover and all modules and cover plates are installed.



Warning

The plug-socket combination must be accessible at all times because it serves as the main disconnecting device. Statement 1019

This document contains the following sections:

- [Prerequisites, page 33](#)
- [Power-Up Procedure, page 34](#)

Prerequisites

Before you power up the router, make sure you have done the following:

- Securely mounted and grounded the router. See [“Installing Cisco 3800 Series Routers in an Equipment Rack”](#) for instructions.
- Connected power and interface cables. See [“Connecting Cables to Cisco 3800 Series Routers.”](#)
- Connected a PC running HyperTerminal or a similar terminal emulation program to the console port, configured for 9600 bps, 8 data bits, 1 stop bit, no flow control, and no parity. See the [“Connecting a Console or Modem”](#) section on page 29 of [“Connecting Cables to Cisco 3800 Series Routers.”](#)



Note

For initial power-up, a direct console connection is recommended. After the initial configuration is completed, a remote modem connection can be used for router management.

- Chosen passwords for access control.
- Determined IP addresses for Ethernet and serial interfaces.

Power-Up Procedure

To power up your router and verify that it has gone through its initialization and self-test, follow these steps. After you are finished, the router is ready for software configuration.


Note

To view the boot sequence, you must have a console connection to the router before it powers up.

- Step 1** Make sure that your PC is powered up and connected as described in the [“Prerequisites” section on page 33](#).
- Step 2** Turn the router power switch on.
- Step 3** The SYS LED on the front of the router immediately begins blinking green and the fans operate. On the Cisco 3825 router, the SYS PWR LED shows steady green. The SYS PWR1 and SYS PWR2 LEDs on the Cisco 3845 router do not come on yet.
- If these events do not happen, see [“Troubleshooting Cisco 3800 Series Routers.” Table 4](#) describes the behavior of other LEDs during the power-up sequence.
- Step 4** Startup messages appear on your console. When the startup messages end, the SYS LED shows a steady green. The SYS PWR1 or SYS PWR2 LED on the Cisco 3845 router comes on (depending on which power supply is installed).


Caution

Do not press any keys on the keyboard until the messages stop and the SYS LED is steady green. Any keys pressed during this time are interpreted as the first command typed when the messages stop, which might cause the router to reboot. It takes several minutes for the messages to stop.


Note

If the `rommon 1>` prompt appears, your router has booted in ROM monitor mode. For information on the ROM monitor, see [Using the ROM Monitor](#).

Verifying LED Indications

The LEDs described in [Table 4](#) provide power, activity, and status information. For detailed information about LEDs, see the [“LEDs” section on page 41](#) of [“Troubleshooting Cisco 3800 Series Routers.”](#)


Note

The Cisco 3845 router has two SYS PWR and two AUX PWR LEDs. These LEDs do not come on until the router has booted. Each power supply also has its own LED, which shows steady green to indicate normal operation as soon as router power is turned on.

Table 4 LED Indications During Power-up

LED Label	Color and State	Meaning
SYS	Off	Router not receiving power
	Steady green	Normal operation (power-up complete)
	Blinking green	Booting or in ROM monitor mode (immediately after power-up)
	Amber	Powered but malfunctioning
SYS PWR (Cisco 3825)	Off	Router not receiving power
	Steady green	Normal operation (immediately after power-up)
SYS PWR1 or SYS PWR2 (Cisco 3845)	Off	Router not receiving power, power supply not present, or power-up not completed
	Steady green	Normal operation of indicated power supply (power-up completed)
AUX PWR (Cisco 3825) AUX PWR1 AUX PWR2 (Cisco 3845)	Off	IP phone power off or not present, or power-up not completed
	Steady green	Normal operation (power-up completed)
	Amber	Powered but malfunctioning
ACT	Off	No packet activity or power-up not completed
	Steady or blinking green	Packets transmitted or received on any WAN or LAN port, or router is monitoring internal activities (power-up completed)
RPS (Cisco 3825)	Off	Connected to primary power source or power-up not completed
	Steady green	Connected to Cisco Redundant Power System (power-up completed)
CF	Off	CompactFlash memory card not being accessed
	Steady green	CompactFlash memory card being accessed; do not eject
	Blinking green	CompactFlash memory card being accessed; do not eject
GE0: Link	Off	No link
	Green	Ethernet cable present, link established
GE0: Speed	Blinking green	Blink frequency indicates port speed: 1 blink per second: 10 Mbps 2 blinks per second: 100 Mbps 3 blinks per second: 1000 Mbps
GE1: Link	Off	No link
	Green	Ethernet cable present, link established
GE1: Speed	Blinking green	Blink frequency indicates port speed: 1 blink per second: 10 Mbps 2 blinks per second: 100 Mbps 3 blinks per second: 1000 Mbps

Verifying the Hardware Configuration

To display and verify hardware features, enter the following commands:

- **show version**—Displays the system hardware version; the installed software version; the names and sources of configuration files; the boot images; and the amount of installed DRAM, NVRAM, and flash memory.
- **show diag**—Lists and displays diagnostic information about the installed controllers, interface processors, and port adapters; typical examples are network modules, interface cards (VICs, WICs, HWICs), and advanced integration modules (AIMs).

After your router is powered up, you are ready to begin the initial software configuration. For basic configuration procedures, see [Cisco 3800 Series Software Configuration](#).

Setting the Date and Time

If the router has been exposed to nonoperating environmental conditions, its internal real-time clock (RTC) may not display the correct date and time. To set the RTC manually, use one of the forms of the **calendar set** command in EXEC mode:

```
calendar set hh:mm:ss day month year
calendar set hh:mm:ss month day year
```

Syntax Description	<i>hh:mm:ss</i>	Current time in hours (using 24-hour notation), minutes, and seconds.
	<i>day</i>	Current day (by date) in the month.
	<i>month</i>	Current month (by name).
	<i>year</i>	Current year (no abbreviation).

The following example sets the RTC to 1:32 p.m. on November 19, 2004:

```
Router# calendar set 13:32:00 November 19 2004
```



Troubleshooting Cisco 3800 Series Routers

Your Cisco 3800 series integrated services router goes through extensive testing and burn-in before leaving the factory. If you encounter problems, use this document to help isolate problems or to eliminate the router as the source of the problem.

This document contains the following sections:

- [Solving Problems, page 38](#)
- [LEDs, page 41](#)
- [The show environment Command, page 45](#)
- [Error Messages, page 46](#)
- [Jumper Settings, page 48](#)
- [Recovering a Lost Password, page 49](#)
- [More Troubleshooting Help, page 49](#)



Note

To troubleshoot network modules, see the [Cisco Network Modules Hardware Installation Guide](#). To troubleshoot interface cards, see the [Cisco Interface Cards Installation Guide](#). These documents are available on Cisco.com.

If you cannot find the source of the problem, contact a customer service representative. For information about obtaining technical support, see the “[Obtaining Technical Assistance](#)” section on page 12 of “[Introduction to Cisco 3800 Series Routers Hardware Documentation](#).” Before you call, have the following information ready:

- Router type and serial number (for serial number locations, see the “[Product Identification](#)” section on page 5 of “[Overview of Cisco 3800 Series Routers](#)”)
- Maintenance agreement or warranty information
- Type of software and version number
- Date you received the router
- Brief description of the problem
- Brief explanation of the steps taken to isolate the problem

Solving Problems

The key to solving problems is to isolate the problem to a specific subsystem by comparing what the router is doing to what it should be doing.

The LEDs on the front and rear panel of the router enable you to determine router performance and operation. LEDs are described in the [“LEDs” section on page 41](#).

When solving problems, consider the following subsystems:

- Power and cooling systems—External power source, power cable, router power supply and circuit breaker, and router blower and fan. Also consider inadequate ventilation or air circulation.
- Network modules and interface cards—LEDs on the modules and interface cards help identify a failure.
- Cables—External cables that connect the router to the network.

Troubleshooting the Power and Cooling Systems

Both the system power LED and the fans can help you troubleshoot a power problem. Check the following items.



Note

The Cisco 3845 router has two system power LEDs, one for each power supply, labeled SYS PWR1 and SYS PWR2.

Normal Indications

With the power switch on, normal indications are:

- SYS LED steady green
- SYS PWR LED steady green for the Cisco 3825 router, or SYS PWR1 or SYS PWR2 LED steady green for the Cisco 3845 router (depending on which power supply is active)
- Fans operating

Fault Indications

Check the following symptoms to locate or eliminate faults in the power and cooling systems:

- With the power switch on, what color is the SYS LED?
 - If the LED is steady green, the router is receiving power and is functional.
 - If the LED is amber, the router is receiving power but is not functional.
 - If the LED is off, check the power source and power cable.
- With the power switch on, the SYS LED steady green, and the SYS PWR LED (Cisco 3825) or SYS PWR1 or SYS PWR2 LED (Cisco 3845) steady green, do the fans operate?
 - If yes, the power system is functioning.
 - If no, check the fans.

- With the power switch on and the SYS LED steady green, do the fans operate?
 - If yes, the power system is functioning.
 - If no, check the fans.
- With the power switch on and the SYS PWR LED (Cisco 3825) or SYS PWR1 or SYS PWR2 LED (Cisco 3845) off, do the fans operate?
 - If yes, the router is receiving power. The fans are connected directly to the DC outputs of the power supply.
 - If no, check the power source and power cable.
- Does the router shut down after being on a short time?
 - Check for an environmentally induced shutdown. See the next section, [“Environmental Reporting Features.”](#)
 - Check the environmental site requirements in the [“General Site Requirements”](#) section on page 3 of [“Preinstallation Requirements and Planning for Cisco 3800 Series Routers.”](#)
 - Check for a power supply failure by inspecting the SYS PWR LED on the Cisco 3825 router, or the SYS PWR1 or SYS PWR2 LED on the Cisco 3845 router (depending on which power supply is active). If the LED is green, the power supply is functional.
- Router partially boots, but LEDs do not come on.
 - Check for a power supply failure by inspecting the SYS PWR LED on the Cisco 3825 router or the SYS PWR1 LED or SYS PWR2 LED on the Cisco 3845 router (depending on which power supply is active). If the LED is green, the power supply is functional.
 - If the SYS PWR LED is not on, see the [“Obtaining Technical Assistance”](#) section on page 12 of [“Introduction to Cisco 3800 Series Routers Hardware Documentation”](#) for information about customer service. For warranty information, see the [“Cisco 90-Day Limited Hardware Warranty Terms”](#) section on page 10 of [“Introduction to Cisco 3800 Series Routers Hardware Documentation.”](#)

Environmental Reporting Features

If the router is operating at an abnormally high temperature, the following message is displayed on the console screen:

```
System detected OVERTEMPERATURE condition. Please resolve cooling problem immediately!
```

Some causes of abnormally high router temperature are:

- Fan failure
- Air conditioning failure in the room
- Air blockage to cooling vents

Take steps to correct the problem. See also the [“Site Environment”](#) section on page 4 and the [“Equipment Racks”](#) section on page 5 of [“Preinstallation Requirements and Planning for Cisco 3800 Series Routers.”](#)

Troubleshooting Modules, Cables, and Connections

Network problems can be caused by a module; cables or cable connections; or external devices such as a modem, transceiver, hub, wall jack, WAN interface, or terminal. Check for the following symptoms to help isolate the problem:

- Network module or interface card is not recognized by the router.
 - Make sure that the module or interface card is firmly seated in its slot.
 - Check the LEDs on the module or interface card. For information on these LEDs, see the [Cisco Network Modules Hardware Installation Guide](#) and the [Cisco Interface Cards Installation Guide](#).
 - Make sure that you have a version of Cisco IOS software that supports the network module or interface card. To determine which Cisco IOS releases support your router, network modules, and interface cards, go to the Software Advisor at <http://tools.cisco.com/Support/Fusion/>. You must have an account on Cisco.com.
- Module or card is recognized, but interface ports do not initialize.
 - Make sure that the module or card is firmly seated in its slot.
 - Check external cable connections.
 - Make sure that you have a version of Cisco IOS software that supports network module or interface card. To determine which Cisco IOS releases support your router, network modules, and interface cards, go to the Software Advisor at <http://tools.cisco.com/Support/Fusion/>. You must have an account on Cisco.com.
- Router does not boot properly, or constantly or intermittently reboots.
 - Make sure that all modules are firmly seated in their slots.
 - Check the router chassis or software. For information about customer service, see the “Obtaining Technical Assistance” section on page 12 of “[Introduction to Cisco 3800 Series Routers Hardware Documentation](#).” For warranty information, see the “Cisco 90-Day Limited Hardware Warranty Terms” section on page 10 of “[Introduction to Cisco 3800 Series Routers Hardware Documentation](#).”
- Router boots, but the console screen is frozen.
 - Check the external console connection.
 - Verify that the parameters for your terminal are set as follows:
 - The data rate matches the one configured for the router (9600 bps is the default)
 - 8 data bits
 - No parity
 - 1 stop bit
- Router powers on and boots only when a particular network module or interface card is removed.
 - Check the network module or interface card. For information about customer service, see the “Obtaining Technical Assistance” section on page 12 of “[Introduction to Cisco 3800 Series Routers Hardware Documentation](#).” For warranty information, see the “Cisco 90-Day Limited Hardware Warranty Terms” section on page 10 of “[Introduction to Cisco 3800 Series Routers Hardware Documentation](#).”

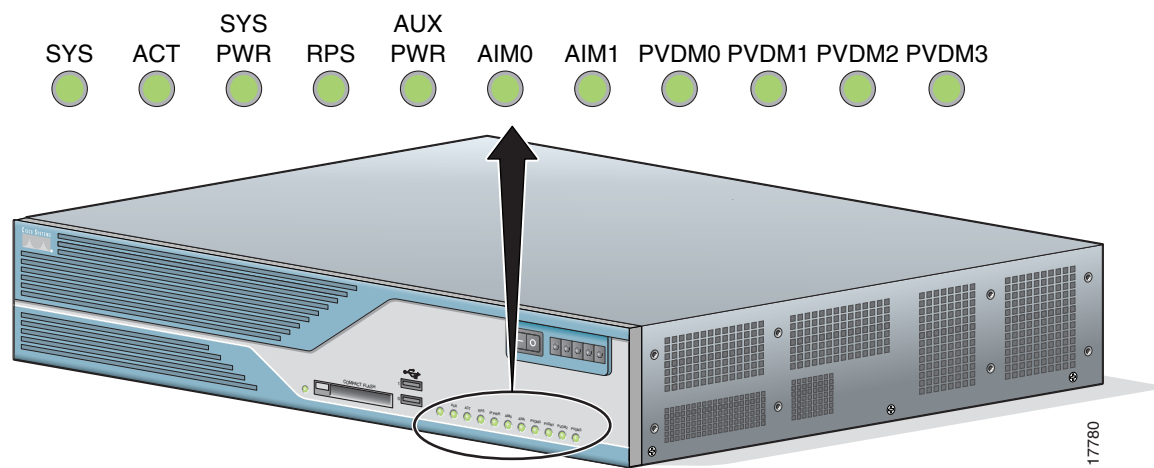
- Router powers on and boots only when a particular cable is disconnected.
 - There may be a problem with the module, interface card, or cable. For information about customer service, see the [“Obtaining Technical Assistance”](#) section on page 12 of [“Introduction to Cisco 3800 Series Routers Hardware Documentation.”](#) For warranty information, see the [“Cisco 90-Day Limited Hardware Warranty Terms”](#) section on page 10 of [“Introduction to Cisco 3800 Series Routers Hardware Documentation.”](#)

LEDs

LEDs enable you to determine router performance and operation. [Figure 26](#) and [Figure 27](#) show the LEDs on the Cisco 3825 router. [Figure 28](#) and [Figure 29](#) show the LEDs on the Cisco 3845 router. Each power supply in a Cisco 3845 router also has its own LED.

For an explanation of these LEDs, see [Table 5](#).

Figure 26 Cisco 3825 Front-Panel LEDs



117780

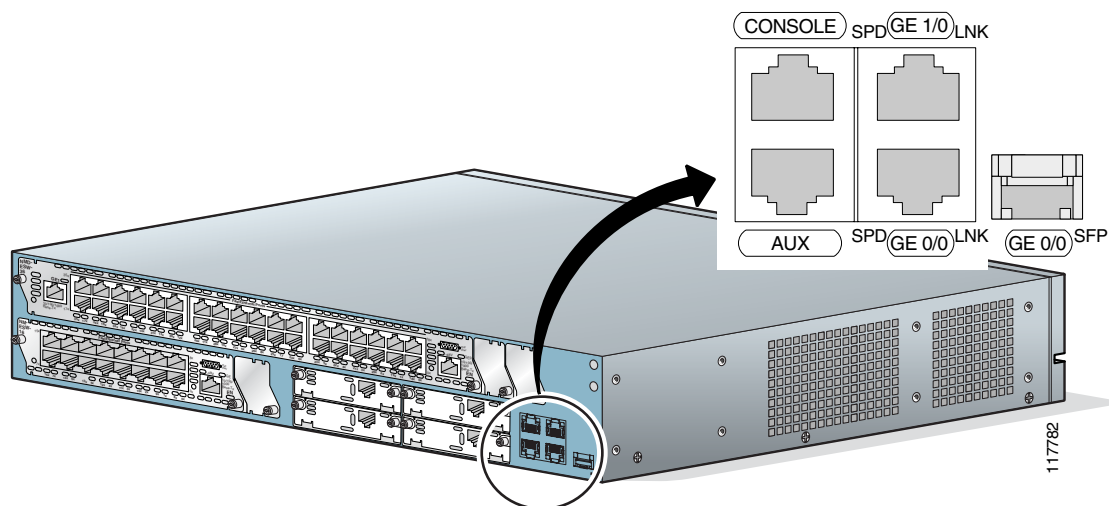
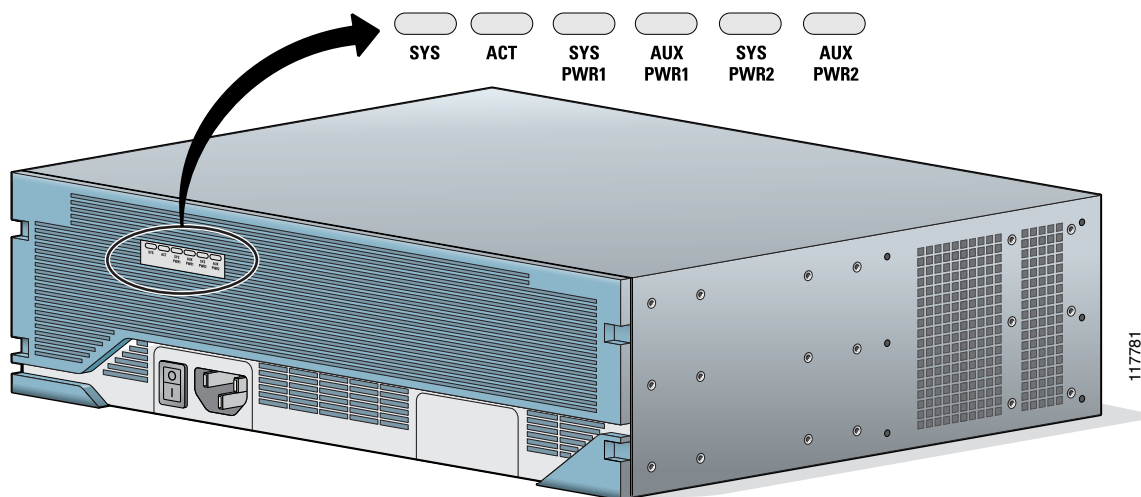
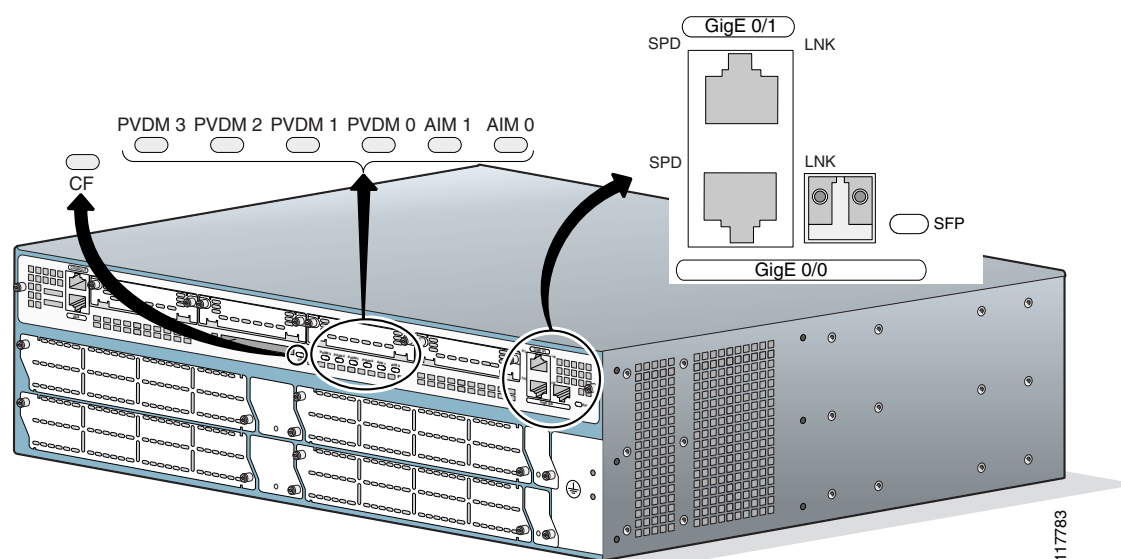
Figure 27 Cisco 3825 Rear-Panel LEDs**Figure 28 Cisco 3845 Front-Panel LEDs**

Figure 29 Cisco 3845 Router Rear-Panel LEDs**Table 5 Cisco 3800 Series LED Indicators**

LED	3825	3845	Color and State	Meaning
SYS	Front	Front	Off	Router not receiving power
			Steady green	Normal operation (power-up complete)
			Blinking green	Booting or in ROM monitor mode (immediately after power-up)
			Amber	Powered but malfunctioning
ACT	Front	Front	Off	No packet activity
			Steady or blinking green	Packets transmitted or received on any WAN or LAN port, or router is monitoring internal activities (power-up completed)
SYS PWR	Front	—	Off	Router not receiving power
			Steady green	Normal operation (immediately after power-up)
RPS	Front	—	Off	Connected to primary power system
			Steady green	Connected to redundant power system
SYS PWR1	—	Front	Off	Router not receiving power, power supply 1 not present, or power-up not completed
			Steady green	Present and enabled (power-up completed)
			Amber	Present and off or malfunctioning
SYS PWR2	—	Front	Off	Router not receiving power, power supply 2 not present, or power-up not completed
			Steady green	Present and enabled (power-up completed)
			Amber	Present and off or malfunctioning

Table 5 Cisco 3800 Series LED Indicators (continued)

LED	3825	3845	Color and State	Meaning
AUX PWR	Front	—	Off	IP phone power off or not present, or power-up not completed
			Steady green	Present and enabled (power-up completed)
			Amber	Powered but malfunctioning
AUX PWR1	—	Front	Off	IP phone power supply 1 off or not present, or power-up not completed
			Steady green	Present and enabled (power-up completed)
			Amber	Powered but malfunctioning
AUX PWR2	—	Front	Off	IP phone power supply 2 off or not present, or power-up not completed
			Steady green	Present and enabled (power-up completed)
			Amber	Powered but malfunctioning
AIM0	Front	Rear	Off	AIM0 not present
			Green	Present and enabled
			Amber	Present but malfunctioning
AIM1	Front	Rear	Off	AIM1 not present
			Green	Present and enabled
			Amber	Present but malfunctioning
PVDM0	Front	Rear	Off	PVDM0 not present
			Green	Present and enabled
			Amber	Present but malfunctioning
PVDM1	Front	Rear	Off	PVDM1 not present
			Green	Present and enabled
			Amber	Present but malfunctioning
PVDM2	Front	Rear	Off	PVDM2 not present
			Green	Present and enabled
			Amber	Present but malfunctioning
PVDM3	Front	Rear	Off	PVDM3 not present
			Green	Present and enabled
			Amber	Present but malfunctioning
CF	Front	Rear	Off	CompactFlash memory card not being accessed
			Steady green	CompactFlash card being accessed; do not eject
			Blinking green	CompactFlash card being accessed; do not eject
SFP	Rear	Rear	Off	SFP link not established
			Green	SFP port active, link established
GE0: Link	Rear	Rear	Off	No link
			Green	Ethernet cable present, link established

Table 5 Cisco 3800 Series LED Indicators (continued)

LED	3825	3845	Color and State	Meaning
GE0: Speed	Rear	Rear	Blinking green	Blink frequency indicates port speed 1 blink per second: 10 Mbps 2 blinks per second: 100 Mbps 3 blinks per second: 1000 Mbps
GE1: Link	Rear	Rear	Off	No link
			Green	Ethernet cable present, link established
GE1: Speed	Rear	Rear	Blinking green	Blink frequency indicates port speed 1 blink per second: 10 Mbps 2 blinks per second: 100 Mbps 3 blinks per second: 1000 Mbps
PS1	—	Front	Off	Power supply 1 not present
			Steady green	Present and enabled
			Amber	Present and off or malfunctioning
PS2	—	Front	Off	Power supply 2 not present
			Steady green	Present and enabled
			Amber	Present and off or malfunctioning

The show environment Command

The **show environment** command can help you monitor and troubleshoot router power and ventilation status.

This is an example of the output of the **show environment** command for a Cisco 3825 router with an AC power supply and no Redundant Power System:

```
Router# show environment
```

```
Redundant Power System is not present.
SYS PS1 is present.
    Type: AC
AUX (-48V) PS1 is absent.
Fan 1 Normal
Fan 2 Normal
Fan 3 Normal
Fan Speed is Normal
Alert settings:
    Intake temperature warning: Enabled, Threshold: 50
    Core temperature warning: Enabled, Threshold: 70 (CPU: 95)
Board Temperature: Normal
    Internal-ambient temperature = 29, Normal
    CPU temperature = 46, Normal
    Intake temperature = 31, Normal
Voltage 1(3300) is Normal, Current voltage = 3316 mV
Voltage 2(5150) is Normal, Current voltage = 5210 mV
Voltage 3(2500) is Normal, Current voltage = 2525 mV
Voltage 4(1200) is Normal, Current voltage = 1191 mV
```

This is an example of the output of the **show environment** command for a Cisco 3845 router that has one AC power supply with IP phone power output installed:

```
Router# show environment

SYS PS1 is present
  Fan status: Normal
    Input Voltage status: Normal
    DC Output Voltage status: Normal
    Type: AC
    Thermal status: Normal
SYS PS2 is absent
AUX (-48V) PS1 is present
AUX (-48V) PS2 is absent
Fan 1 Normal
Fan 2 Normal
Fan 3 Normal
Fan Speed is Normal

Alert settings:
Intake temperature warning: Enabled, Threshold: 50
Core temperature warning: Enabled, Threshold: 70 (CPU: 90)
Board Temperature: Normal
  Internal-ambient temperature = 31, Normal
  CPU temperature = 50, Normal
  Intake temperature = 25, Normal
  Backplane temperature = 24, Normal
Voltage 1(3300) is Normal, Current voltage = 3284 mV
Voltage 2(5150) is Normal, Current voltage = 5210 mV
Voltage 3(2500) is Normal, Current voltage = 2549 mV
Voltage 4(1200) is Normal, Current voltage = 1215 mV
```

Error Messages

This section describes error messages that may appear on an external console screen. (For more information about consoles, see the [“Connecting a Console or Modem”](#) section on page 29 of [“Connecting Cables to Cisco 3800 Series Routers.”](#))

Cisco IOS software checks the system once every 30 seconds. If an error still exists, the error message is displayed again; if the error has cleared, a recovery message is displayed.

Error Message System detected OVERTEMPERATURE condition. Please resolve cooling problem immediately!

Explanation The router is operating at a temperature higher than the user-set threshold, possibly caused by fan failure, air-conditioning failure in the room, or air blockage to cooling vents.

Recommended Action Make sure that the ambient room temperature does not exceed 40 degrees C and that airflow to the router is not blocked. See the [“Site Environment”](#) section on page 4 and the [“Equipment Racks”](#) section on page 5 of [“Preinstallation Requirements and Planning for Cisco 3800 Series Routers.”](#)

If this condition persists, the power-supply thermal monitor automatically shuts down the router. Call your Cisco technical support representative for help, if necessary.

Error Message Fan 1|2|3 had a rotation error reported.

Explanation The specified fan is not rotating at the desired speed.

Recommended Action If this error is detected, the router system software automatically increases the fan speed to high. If the rotation error disappears, fan speed is kept at high. If this error appears repeatedly, there is something wrong with the fan. The error will reappear until action is taken.

Error Message Voltage 1|2|3|4 (3300 mv|5150 mv|2500 mv|1200 mv) has exceeded recommended operating limits.

Explanation One of the internal voltage outputs is outside its operating limits.

Recommended Action System failure. See the [“Obtaining Technical Assistance”](#) section on page 12 of [“Introduction to Cisco 3800 Series Routers Hardware Documentation”](#) for information about customer service.

Cisco 3845 Router Error Messages

The Cisco 3845 router supports two internal power supplies and returns the following error messages for them.

Error Message System detected SYS PS 1|2 input voltage fail condition.

Explanation Power to the indicated power supply has failed.

Recommended Action Check the input power source and power cable.

Error Message System detected SYS PS 1|2 output voltage fail condition.

Explanation The indicated power supply has failed.

Recommended Action Replace the power supply. See [“Installing and Upgrading Internal Components in Cisco 3800 Series Routers.”](#)

Error Message System detected AUX (-48V) PS 1|2 fail condition.

Explanation The indicated AC power supply with IP phone power output has failed.

Recommended Action Replace the power supply. See [“Installing and Upgrading Internal Components in Cisco 3800 Series Routers.”](#)

Error Message System detected thermal warning on SYS PS 1|2. System is close to auto shutdown limit.

Explanation The power supply is operating at an abnormally high temperature.

Recommended Action Make sure that the ambient room temperature does not exceed 40 degrees C and that air flow to the router is not blocked. See the [“Site Environment” section on page 4](#) and the [“Equipment Racks” section on page 5](#) of [“Preinstallation Requirements and Planning for Cisco 3800 Series Routers.”](#)

The power supply fan may have failed or be about to fail. Replace the power supply. See [“Installing and Upgrading Internal Components in Cisco 3800 Series Routers.”](#)

If this condition persists, the power-supply thermal monitor automatically shuts down the router. Call your Cisco technical support representative for help, if necessary.

Error Message System detected SYS PS 1|2 fan fail condition.

Explanation The fan on the indicated power supply has failed.

Recommended Action Replace the power supply. See [“Installing and Upgrading Internal Components in Cisco 3800 Series Routers.”](#)

Error Message There is more than one failure with power system 1|2 or this power system has been turned off.

Explanation Multiple failures have occurred in the indicated power supply. This message can also appear if you have installed two power supplies in a Cisco 3845 router, but only one is powered on.

Recommended Action If the power supply is turned off, turn it on. If it has failed, replace it. See [“Installing and Upgrading Internal Components in Cisco 3800 Series Routers.”](#)

Jumper Settings

If a ROM monitor failure occurs, you may need to change a jumper setting on the motherboard so the router can boot for troubleshooting. Procedures for accessing the motherboard are described and jumper locations are shown in [“Installing and Upgrading Internal Components in Cisco 3800 Series Routers.”](#) You may need to set one of the following jumpers:

- DUART DFLT—Sets the console connection data rate to 9600 regardless of user configuration
Change this setting if the console displays garbage characters. The jumper forces the data rate to a known good value.
- BOOT DFLT—Boots from the read-only boot image in case an upgrade is corrupted
Change this setting if the router consistently hangs or crashes after a ROM monitor upgrade.
- WDOG DIS—Disables the watchdog timer

If you change either of the first two settings as shown, the router stays in the new configuration during subsequent power cycles and the jumper can be removed.

**Note**

The jumpers are not needed to troubleshoot Cisco IOS problems. If the Cisco IOS software becomes corrupted, remove the CompactFlash memory card to force the router to boot in ROM monitor mode.

Change these settings only after consulting with your service representative or Cisco technical support.

Recovering a Lost Password

You can recover a lost enable password, but an enable secret password is encrypted and is not recoverable. If you lose an enable secret password configured on your router, you can replace it with a new enable secret password.

For password recovery and replacement procedures, see <http://www.cisco.com/warp/public/474/index.shtml>.

More Troubleshooting Help

For information about obtaining technical support, see the “[Obtaining Technical Assistance](#)” section on page 12 of “[Introduction to Cisco 3800 Series Routers Hardware Documentation](#).”



Installing Network Modules in Cisco 3800 Series Routers

This document describes how to install network modules in Cisco 3800 series routers. It contains the following sections:

- [Installing Network Modules, page 51](#)
- [Modifying the Width of Network Module Slots, page 53](#)
- [Installing and Removing Slot Dividers, page 55](#)
- [Installing and Removing Slot Adapters, page 59](#)
- [Installing Blank Faceplates, page 60](#)

Installing Network Modules

Network modules install directly into slots in the rear of the router. The Cisco 3845 router supports online insertion and removal (OIR, or hot swap) of network modules. The Cisco 3825 router does not support OIR.



Caution

The Cisco 3845 router supports OIR with similar modules only. If you remove a network module, along with any installed WAN or voice interface cards, install another module and card combination exactly like it.



Caution

The Cisco 3825 router does not support OIR of network modules. To avoid damaging the module, you must turn off electrical power and disconnect network cables before you insert the module into a router slot.

The Cisco 3825 router provides two slots for network modules. The lower network module slot of this router, labeled 1 on the rear panel, can hold either of the following sizes of network modules:

- One single-wide network module
- One extended single-wide network module

The upper network module slot of the Cisco 3825 router, labeled 2 on the rear panel, can hold any of the following sizes of network modules:

- One single-wide network module
- One extended single-wide network module
- One double-wide network module
- One extended double-wide network module

The Cisco 3845 router provides four slots for network modules, labeled 1, 2, 3, and 4 on the rear panel. Each slot can hold either of the following sizes of network modules:

- One single-wide network module
- One extended single-wide network module

Slots 1 and 2 can also be combined to hold either of the following sizes of network modules:

- One double-wide network module
- One extended double-wide network module

Slots 3 and 4 can be combined in the same way to hold one double-wide or extended double-wide network module.


Note

The terms *single-wide*, *extended single-wide*, *double-wide*, and *extended double-wide* refer to the physical size of a network module. *Enhanced* network modules offer additional functionality; this functionality is not directly related to the module's size.


Note

The Cisco 3825 router supports one high-density analog-digital extension module for voice and fax. The Cisco 3845 module supports two of these modules.

For detailed information about installing network modules in external router slots, see the following documents:

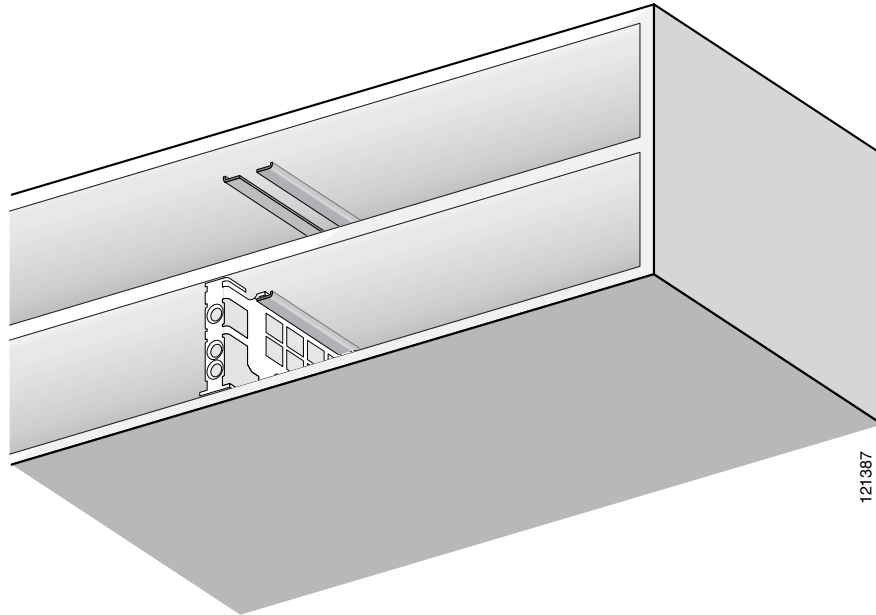
- [Cisco Network Modules Hardware Installation Guide](#)
- [Cisco 3800 Series Routers Cards and Modules](#)

Some network module configurations require the installation or removal of a slot divider in the module slot. See [Figure 30](#).


Note

[Figure 30](#), [Figure 31](#), and [Figure 32](#) show a generic router. They do not represent the details of Cisco 3800 series routers.

Figure 30 Slot Divider for Double-Wide Network Module Slots (Generic Router)



All network module slots must be covered by network module faceplates, blank faceplates, or slot adapters for cooling, electromagnetic interference (EMI) reduction, and safety. The network module hardware kit for Cisco 3800 series routers contains four blank faceplates. Each blank faceplate covers one standard single-wide network module slot.



Warning

Blank faceplates and cover panels serve three important functions: they prevent exposure to hazardous voltages and currents inside the chassis; they contain electromagnetic interference (EMI) that might disrupt other equipment; and they direct the flow of cooling air through the chassis. Do not operate the system unless all cards, faceplates, front covers, and rear covers are in place. Statement 1029

Modifying the Width of Network Module Slots

To reduce extended single-wide and extended double-wide network module slots in width to hold smaller network modules, or to cover unused slots, you may need a combination of blank faceplates, slot dividers, and slot adapters.

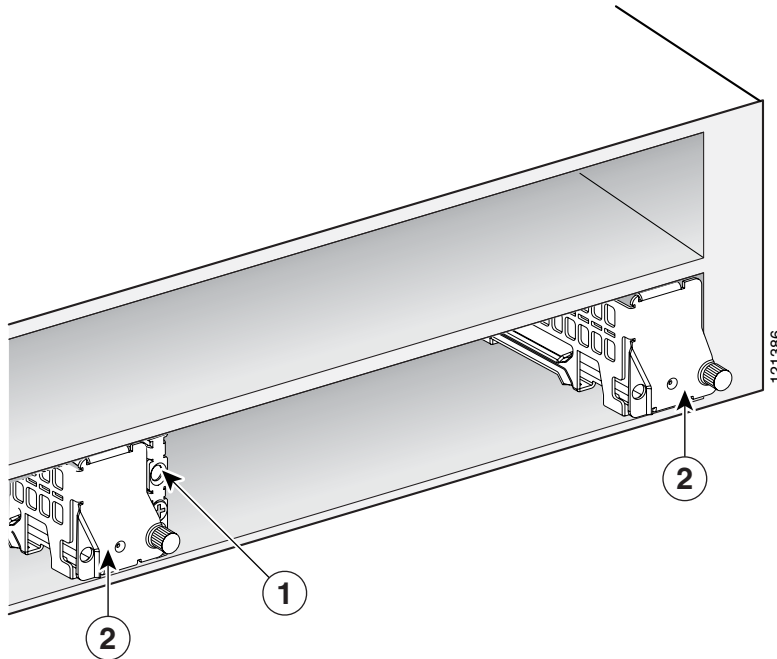
To reduce a slot in width:

- To reduce an extended single-wide slot to standard single-wide, install one slot adapter on the right. See [Figure 31](#).
- To reduce an extended double-wide slot to standard double-wide, install two slot adapters on the right. See [Figure 32](#).

To cover an empty network module slot:

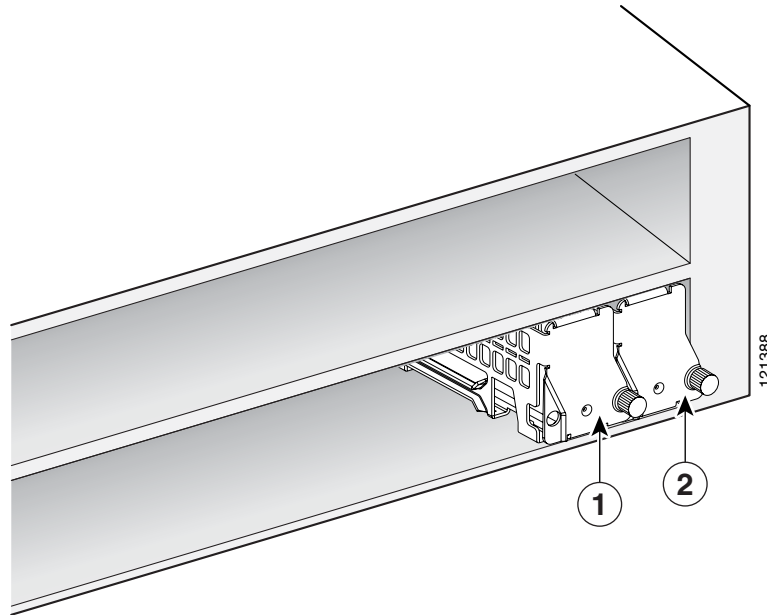
- Extended single-wide slot—Install a slot adapter as described in the [“Installing and Removing Slot Adapters” section on page 59](#). Then attach a blank faceplate and tighten the two screws.
- Extended double-wide slot—Install a slot divider as described in the [“Installing and Removing Slot Dividers” section on page 55](#). Install a slot adapter in each single-wide slot as described in the [“Installing and Removing Slot Adapters” section on page 59](#). Then attach a blank faceplate in each slot and tighten the two screws.

Figure 31 Slot Divider and Adapters for Standard Single-Wide Network Modules (Generic Router)



1	Slot divider	2	Slot adapters
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Figure 32 Slot Adapters for Double-Wide Network Modules (Generic Router)



1	Slot adapter	2	Second slot adapter
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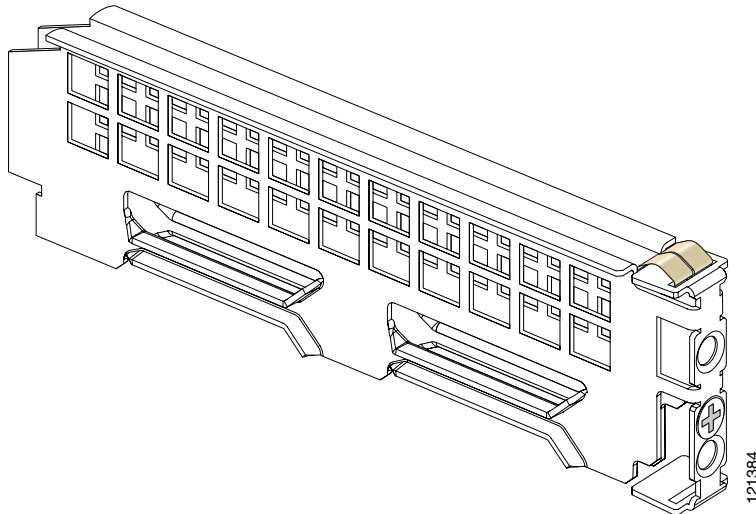
Installing and Removing Slot Dividers

On the Cisco 3845 router, you can remove a slot divider to combine two extended single-wide network module slots into an extended double-wide slot, or install a slot divider to divide an extended double-wide slot into two extended single-wide slots.

Installing Slot Dividers

Figure 33 shows a slot divider for a double-wide or extended double-wide network module slot.

Figure 33 Slot Divider for Network Module Slot



To install slot dividers in network module slots, follow these steps. You need a number 1 Phillips screwdriver.

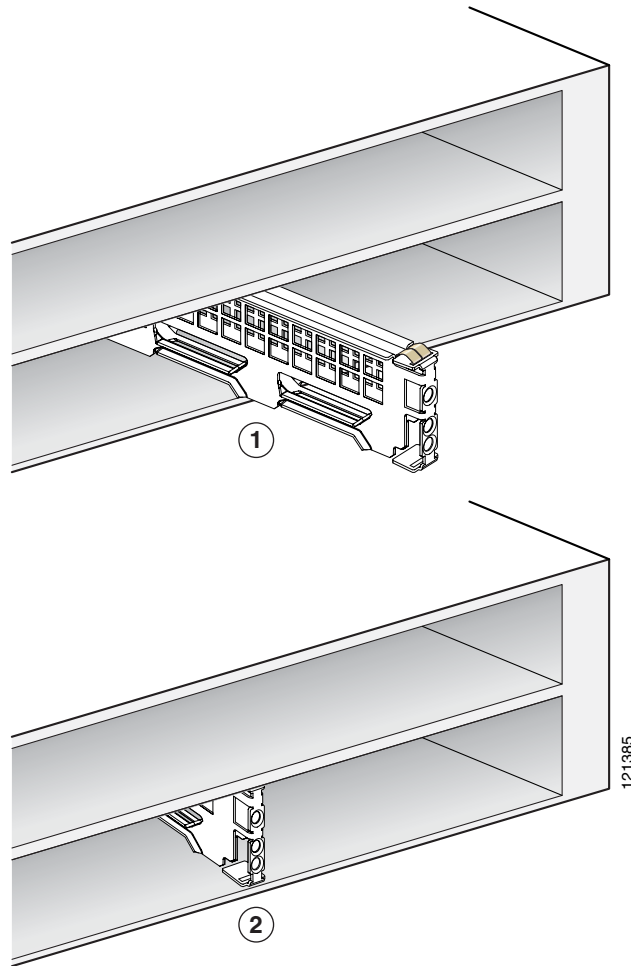
- Step 1** Insert the top rails of the slot divider between the guide rails in the top of the network module slot. See Figure 34.



Note Figure 34 shows a generic router. It does not represent a detailed view of a Cisco 3800 series routers.



Note The guide rails begin approximately 1 inch (3 cm) from the router's rear panel.

Figure 34 Inserting Slot Divider into Network Module Slot (Generic Router)

1	Insert slot divider	2	Tighten screw so front surface is flush with router rear panel
----------	---------------------	----------	--

- Step 2** Push the slot divider into the slot. The slot divider's screw tip and guide pin fit into holes at the back of the slot. Use the number 1 Phillips screwdriver to tighten the attachment screw. When it is fully seated, the slot divider's front surface is flush with the router's rear panel. See [Figure 34](#).
- Step 3** Pull gently on the slot divider to check that it is seated securely.

Removing Slot Dividers

**Note**

The network module slots on both sides of a slot divider must be empty of network modules and slot adapters before you remove the slot divider.

To remove slot dividers from network module slots, follow these steps:

Step 1

Using a number 1 Phillips screwdriver, loosen the slot divider attachment screw.

Step 2

Pull the slot divider straight out of the network module slot.

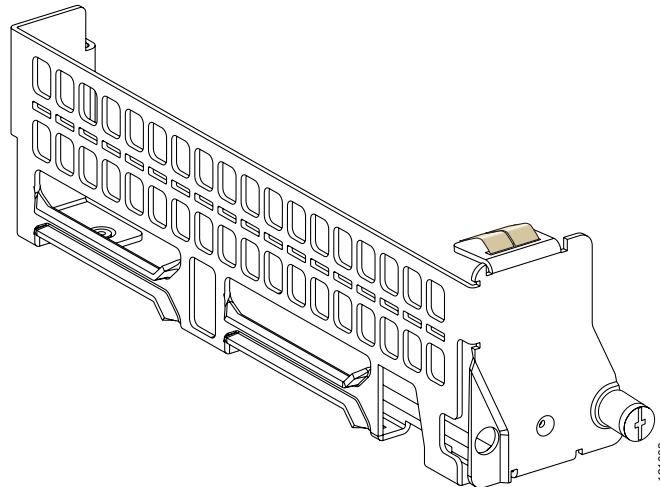
**Tip**

Save the slot divider for future use.

Installing and Removing Slot Adapters

Install slot adapters in extended-width network module slots to reduce the slot width. [Figure 31](#), [Figure 32](#), and [Figure 35](#) show slot adapters for network module slots.

Figure 35 Slot Adapter for Network Module Slot



Installing Slot Adapters



Note

A network module slot must be empty before you install a slot adapter.

To install a slot adapter, follow these steps. You need a number 2 Phillips screwdriver.

- Step 1** Orient the slot adapter for insertion, with the captive thumbscrew at the right side.
- Step 2** Insert the slot adapter into the far right edge of the network module slot.
- Step 3** Guide the triangular end of the slot adapter into the rectangular hole at the back of the slot, and align the captive thumbscrew with the threaded hole in the chassis, slot divider, or adjacent slot adapter.



Note

You may be fastening the slot adapter to the router chassis, to another slot adapter, or to a slot divider, depending on its installation location.

- Step 4** Use the number 2 Phillips screwdriver to tighten the thumbscrew.

Removing Slot Adapters

To remove a slot adapter, use a number 2 Phillips screwdriver to loosen the captive thumbscrew. Pull the slot adapter straight out of the slot.



Tip

Save the slot adapter for future use.

Installing Blank Faceplates

All network module slots must be covered by network module faceplates, blank faceplates, or slot adapters for cooling, electromagnetic interference (EMI) reduction, and safety. The network module hardware kit for Cisco 3800 series routers contains four blank faceplates. Each blank faceplate covers one standard single-wide network module slot.



Warning

Blank faceplates and cover panels serve three important functions: they prevent exposure to hazardous voltages and currents inside the chassis; they contain electromagnetic interference (EMI) that might disrupt other equipment; and they direct the flow of cooling air through the chassis. Do not operate the system unless all cards, faceplates, front covers, and rear covers are in place. Statement 1029

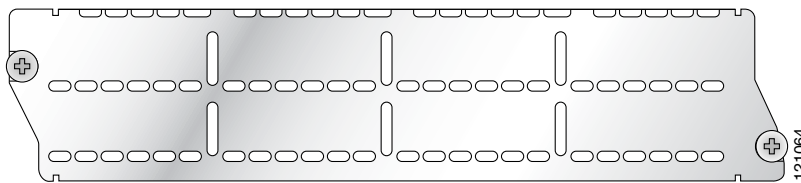
Figure 36 shows a blank faceplate for a network module slot.



Note

To cover network module slots on Cisco 3800 series routers, use only the blank faceplate with captive thumbscrews shown in Figure 36. Do not use blank faceplates with snap tabs.

Figure 36 Blank Faceplate for Standard Single-Wide Network Module Slot



To install a blank faceplate, align the captive screws with the screw holes on the router. Use a number 2 Phillips screwdriver to tighten the captive screws until the faceplate is flush with the chassis. To remove the faceplate, loosen the captive screws.



Tip

Save blank faceplates for future use.



Installing Interface Cards in Cisco 3800 Series Routers

This document describes how to install interface cards in Cisco 3800 series integrated services routers. It contains the following sections:

- [Installing Interface Cards, page 61](#)
- [Installing and Removing Slot Dividers, page 62](#)
- [Installing Blank Faceplates over Empty HWIC Slots, page 67](#)

Installing Interface Cards

Interface cards install either into slots in the rear of the router, or into slots in network modules. Interface cards come in the following types:

- WAN interface card (WIC)
- Voice interface card (VIC)
- Voice/data T1/E1 WAN interface card (VWIC)
- High-speed WAN interface card (HWIC)



Note

You can install any type of interface card—WIC, VIC, VWIC, or HWIC—into a router HWIC slot. HWICs must be installed directly into router slots, not into network modules.

The Cisco 3825 router and the Cisco 3845 router each provide four interface card slots, labeled on the rear panel by HWIC and a number. Each of these slots can be occupied by one single-wide WIC, VIC, VWIC, or HWIC.

In addition, the HWIC 0 and HWIC 1 slots can be combined to hold one double-wide HWIC. The HWIC 2 and HWIC 3 slots can also be combined to hold one double-wide HWIC.



Note

Although the HWIC 1 and HWIC 2 slots on the Cisco 3845 router are adjacent to each other, they cannot be combined to hold a double-wide HWIC.

The maximum capacity of Cisco 3800 series routers for interface cards inserted directly into the chassis is four WICs, VWICs, or HWICs, or two double-wide HWICs.

**Caution**

Cisco 3800 series routers do not support online insertion and removal (OIR, or hot swap) of interface cards inserted directly into router slots. You must turn off the router before installing or removing an interface card.

The [Cisco Interface Cards Installation Guide](#) describes how to install interface cards in router slots and network modules.

The [Cisco 3800 Series Routers Cards and Modules](#) document links to resources for understanding, installing, and configuring cards and modules for Cisco 3800 series routers.

Empty slots must be covered with blank faceplates for cooling, electromagnetic interference (EMI) reduction, and safety. Procedures for installing slot dividers and blank faceplates are described in the following sections.

**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

Installing and Removing Slot Dividers

You can remove a slot divider to combine two single-wide HWIC slots into a double-wide slot, or install a slot divider to convert a double-wide slot into two single-wide slots.

Installing Slot Dividers in HWIC Slots

Cisco 3800 series routers use two different type of HWIC slot dividers:

- The Cisco 3825 router uses a two-pronged metal slot divider. See [Figure 37](#).
- The Cisco 3845 router uses a slot divider with a plastic body and a screw tab. See [Figure 38](#).

Figure 37 Slot Divider for Cisco 3825 HWIC Slot

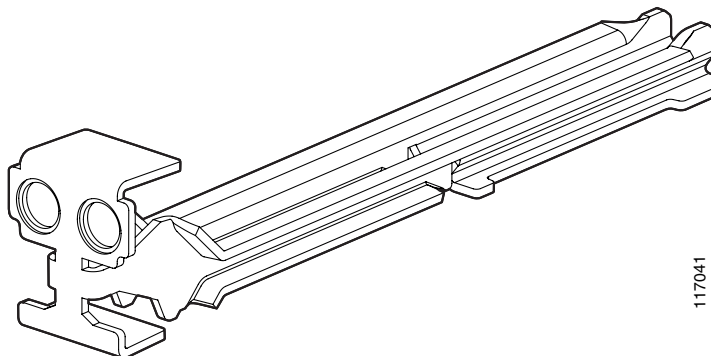
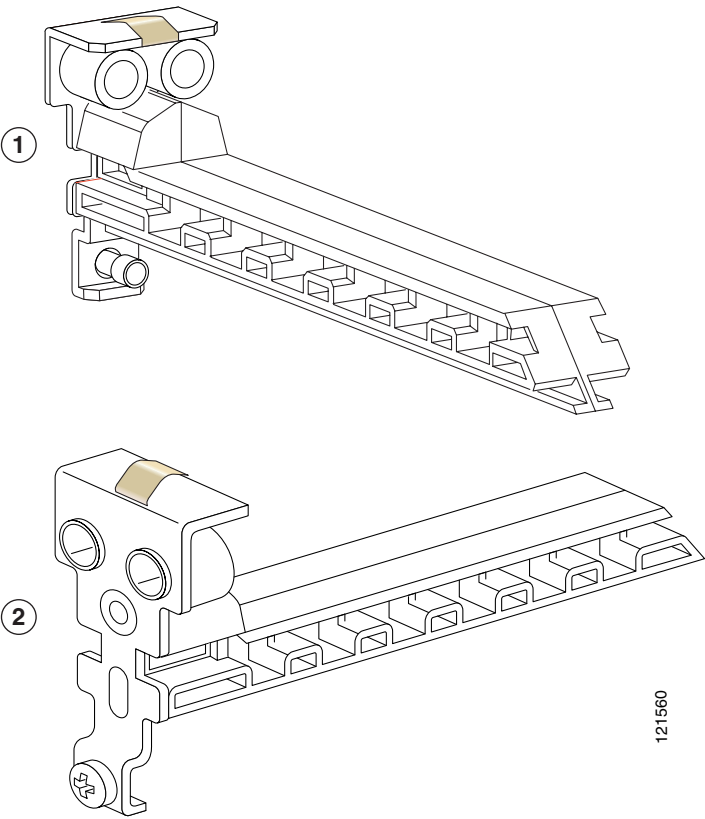


Figure 38 Slot Divider for Cisco 3845 HWIC Slot



1	Rear view	2	Front view
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To install slot dividers into HWIC slots, follow these steps:

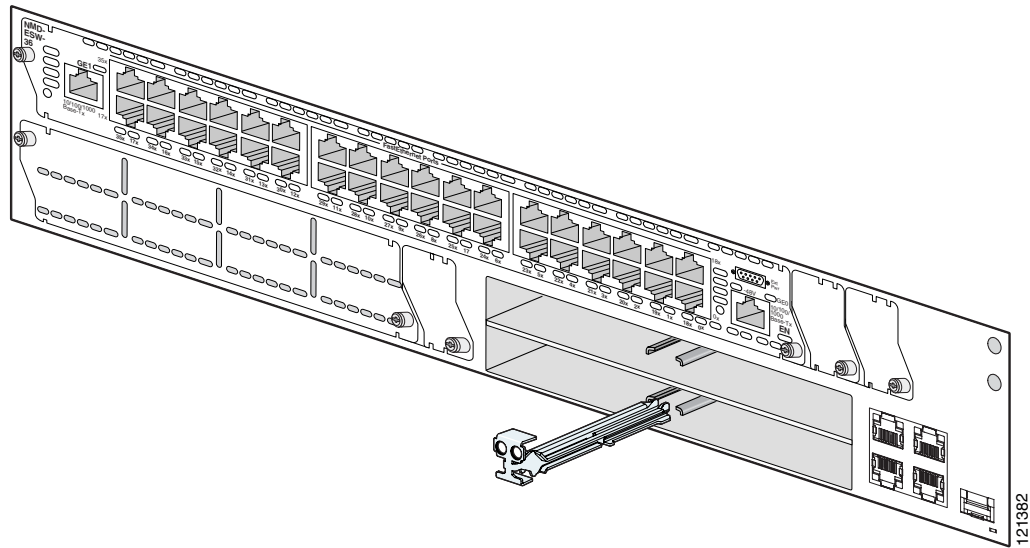
- Step 1** For a Cisco 3825 router, squeeze the prongs of the metal slot divider together and insert the ends between the guide rails on the bottom of the HWIC slot. Push the slot divider in until it locks into place. See [Figure 39](#).



Note The guide rails begin approximately 2.5 inch (6 cm) from the router's rear panel.

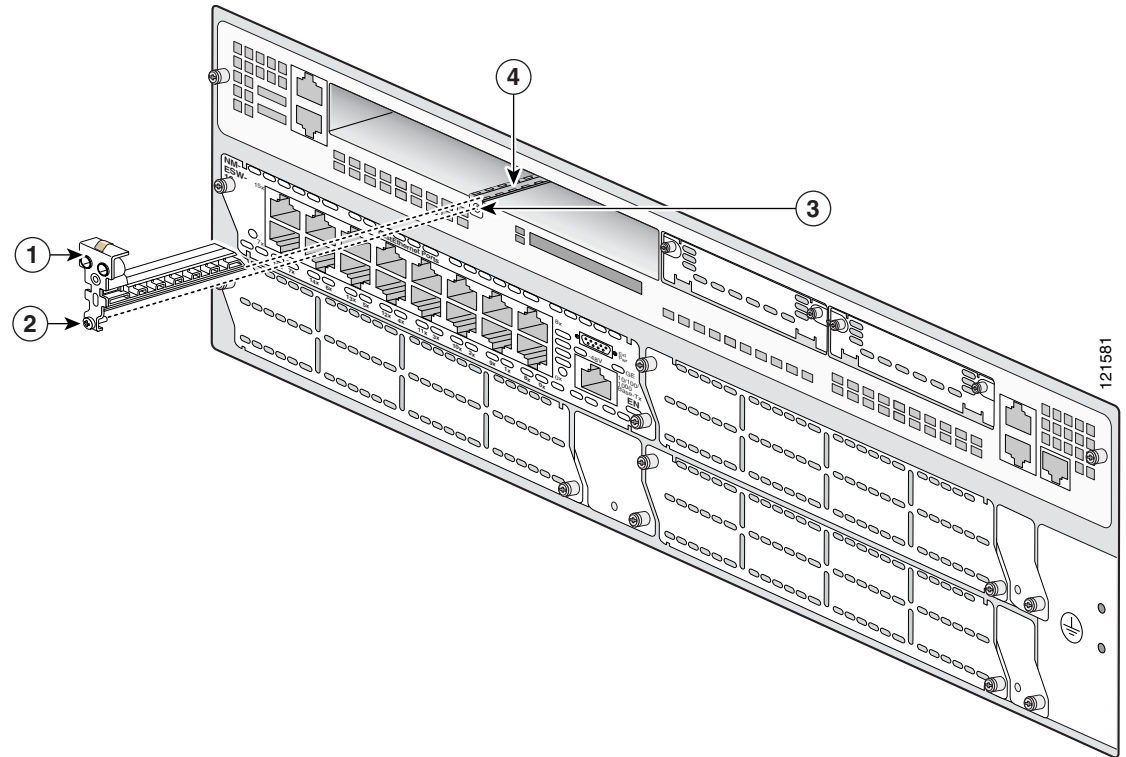
When the slot divider is fully seated, its outer end is flush with the router's rear panel.

Figure 39 Inserting Slot Divider into HWIC Slot (Cisco 3825 Router)



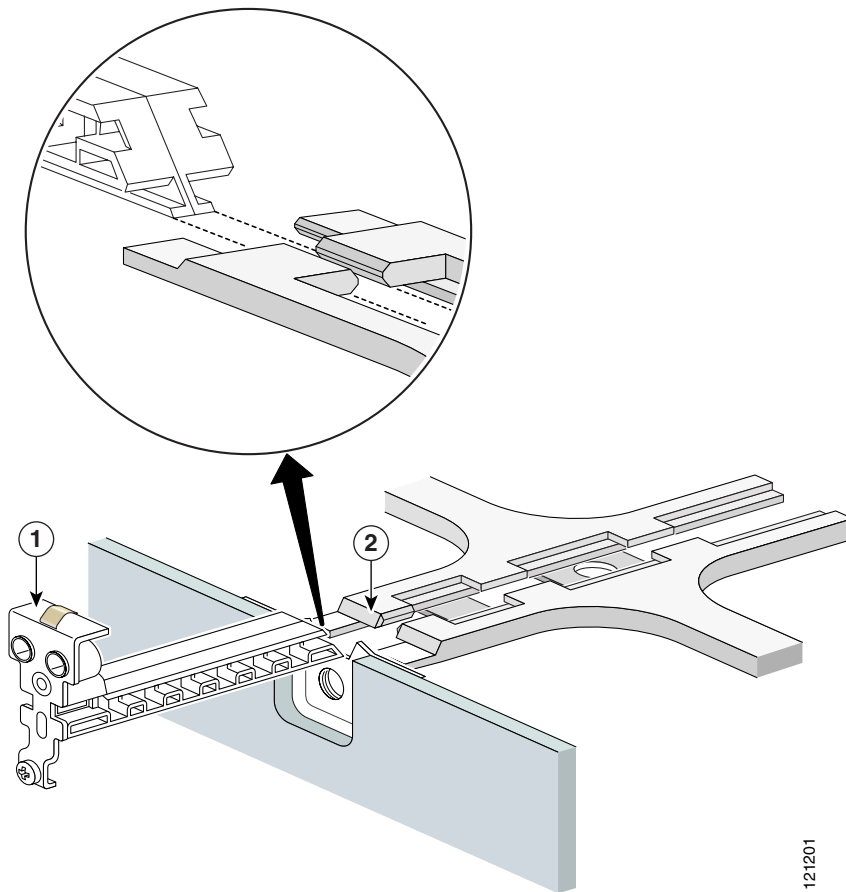
For a Cisco 3845 router, insert the plastic rail on the bottom of the slot divider into the track in the router slot. Tighten the screw with a number 1 Phillips screwdriver. See [Figure 40](#) and [Figure 41](#).

When the slot divider is fully seated, its outer end is flush with the router's rear panel.

Figure 40 Inserting Slot Divider into HWIC Slot (Cisco 3845 Router)

1	Slot divider	3	Screw hole
2	Screw tab	4	Track

Figure 41 Inserting Slot Divider into HWIC Slot (Cisco 3845 Router), Detail



Step 2 Pull gently on the slot divider to check that it is seated securely.

Removing Slot Dividers from HWIC Slots



Note

The HWIC slots on both sides of a slot divider must be empty before you remove the slot divider.

To remove slot dividers from HWIC slots, follow these steps:

Step 1 For a Cisco 3825 router, reach into the HWIC slot and squeeze the two halves of the slot divider together.

Step 1 For a Cisco 3845 router, loosen the screw.



Tip

Do not remove the screw from the slot divider.

Step 2 Pull the slot divider straight out of the HWIC slot.

**Tip**

Save the slot divider for future use.

Installing Blank Faceplates over Empty HWIC Slots

All interface card slots must be covered by interface cards or blank faceplates for cooling, electromagnetic interference (EMI) reduction, and safety.

**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

The high-speed WAN interface card (HWIC) hardware kit for Cisco 3800 series routers contains four blank faceplates. Each blank faceplate covers one single-wide HWIC slot.

[Figure 42](#) and [Figure 43](#) show a blank faceplate for an interface card slot.

Figure 42 Blank Faceplate for Interface Card Slot

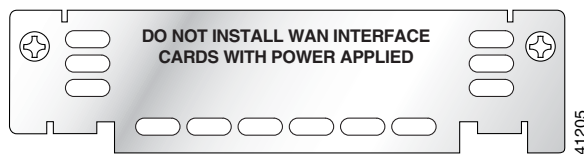
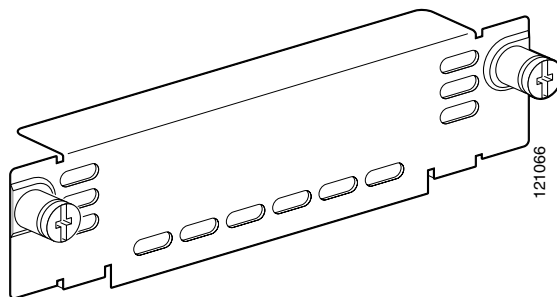


Figure 43 Blank Faceplate for Interface Card Slot (Perspective View)



To install blank faceplates over empty HWIC slots, follow these procedures:

- Single-wide slot—Attach a blank faceplate and tighten the two screws, using a number 1 Phillips screwdriver.
- Double-wide slot—Install a slot divider as described in the [“Installing and Removing Slot Dividers” section on page 62](#). Then install two blank faceplates and tighten the two screws in each blank faceplate.



Tip

Save blank faceplates for future use.



Installing SFP Modules in Cisco 3800 Series Routers

This document describes how to install optional small-form-factor pluggable (SFP) modules in Cisco 3800 series integrated services routers to provide optical Gigabit Ethernet connectivity. It contains the following sections:

- [Installing SFP Modules, page 70](#)
- [Removing SFP Modules, page 71](#)

The SFP module installs into a slot on the router's rear panel. When selected in Cisco IOS software, it is assigned port **gigabitethernet 0/0**. The default is for the built-in RJ-45 1000Base-T connector to be active on this port.

Only SFP modules certified by Cisco are supported on Cisco 3800 series routers. [Table 6](#) lists supported SFPs.

Table 6 SFPs Supported on Cisco 3800 Series Routers

Cisco Part Number	SFP Transceiver	Fiber Diameter (micrometer)	Wavelength (nm)	Mode	Maximum Distance
GLC-SX-MM=	1000Base-SX	50	850	Multi	550 m
GLC-LH-SM=	1000Base-LX/LH	9/125	1310	Single	10 km
GLC-ZX-SM=	1000Base-ZX	9/125	1550	Single	100 km
CWDM-SFP-1470=	1000Base-CWDM	50	1470	Single	100 km
CWDM-SFP-1490=			1490		
CWDM-SFP-1510=			1510		
CWDM-SFP-1530=			1530		
CWDM-SFP-1550=			1550		
CWDM-SFP-1570=			1570		
CWDM-SFP-1590=			1590		
CWDM-SFP-1610=			1610		



Use the **show controller** command at the Cisco IOS prompt to determine whether you are using an SFP certified by Cisco.

**Note**

Cisco 3800 series routers do not support 1000Base-T SFP modules in the router's SFP slot. 1000Base-T connectivity is provided by the Gigabit Ethernet ports built into the router.

Laser Safety Guidelines

Optical SFPs use a small laser to generate the fiber-optic signal. Keep the optical transmit and receive ports covered whenever a cable is not connected to the port.

**Warning**

Because invisible laser radiation may be emitted from the aperture of the port when no fiber cable is connected, avoid exposure to laser radiation and do not stare into open apertures.

**Warning**

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

Installing SFP Modules

Follow these steps to install an SFP module in a Cisco 3800 series router:

**Warning**

Because invisible laser radiation may be emitted from the aperture of the port when no fiber cable is connected, avoid exposure to laser radiation and do not stare into open apertures.

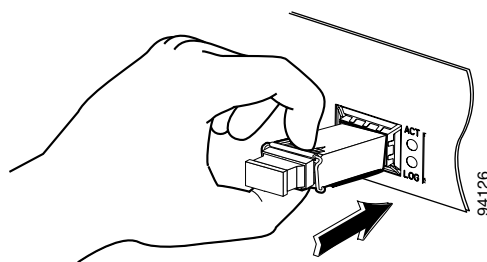
Step 1

Slide the SFP into the router slot until it locks into position (see [Figure 44](#)).

**Tip**

If the SFP uses a bale-clasp latch (see [Figure 45](#)), the handle should be on top of the SFP module.

Figure 44 Installing an SFP Module

**Caution**

Do not remove the optical port plugs from the SFP until you are ready to connect cabling.

Step 2

Connect the network cable to the SFP module.

Removing SFP Modules

Follow these steps to remove an SFP from a Cisco 3800 series router:

Step 1 Disconnect all cables from the SFP.


Warning

Because invisible laser radiation may be emitted from the aperture of the port when no fiber cable is connected, avoid exposure to laser radiation and do not stare into open apertures.


Caution

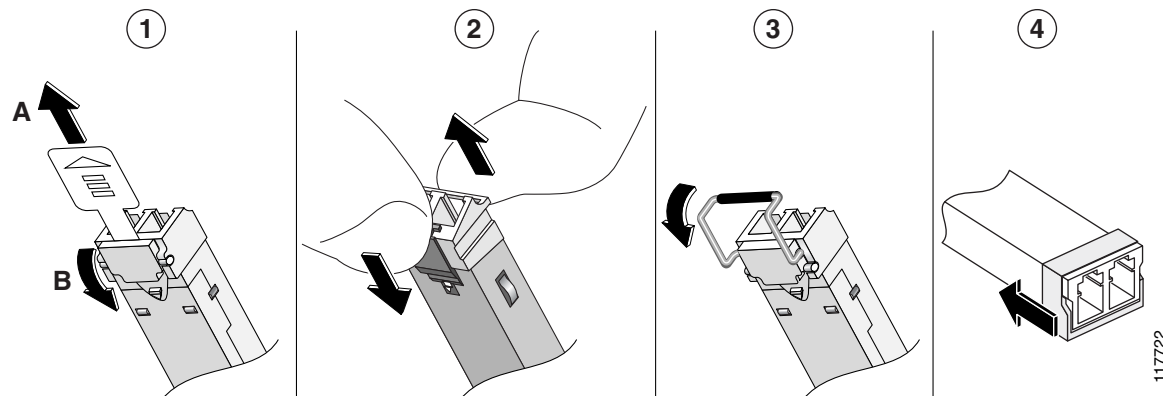
The latching mechanism used on many SFPs locks the SFP into place when cables are connected. Do not pull on the cabling in an attempt to remove the SFP.

Step 2 Disconnect the SFP latch. See [Figure 45](#).


Note

SFP modules use various latch designs to secure the module in the SFP port. Latch designs are not linked to SFP model or technology type. For information on the SFP technology type and model, see the label on the side of the SFP.

Figure 45 Disconnecting SFP Latch Mechanisms



1	Sliding latch	3	Bale-clasp latch
2	Swing and slide latch	4	Plastic collar latch


Tip

Use a pen, screwdriver, or other small straight tool to gently release a bale-clasp handle if you cannot reach it with your fingers.

Step 3 Grasp the SFP on both sides and remove it from the router.



Installing CompactFlash Memory Cards in Cisco 3800 Series Routers

This document describes how to remove and install CompactFlash memory cards in Cisco 3800 series integrated services routers. It contains the following sections:

- [Preventing Electrostatic Discharge Damage, page 73](#)
- [Removing CompactFlash Memory Cards, page 74](#)
- [Installing CompactFlash Memory Cards, page 75](#)

Preventing Electrostatic Discharge Damage

CompactFlash memory cards are sensitive to electrostatic discharge (ESD) damage. ESD damage, which can occur when electronic cards or components are handled improperly, results in complete or intermittent failures.

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.
- Place a removed CompactFlash memory card on an antistatic surface or in a static shielding bag. If the card will be returned to the factory, immediately place it in a static shielding bag.
- Avoid contact between the card and clothing. The wrist strap protects the card from ESD voltages on the body only; ESD voltages on clothing can still cause damage.
- Do not remove the wrist strap until the installation is complete.



Caution

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

Removing CompactFlash Memory Cards



Caution

Disconnect the router from the network before removing a CompactFlash memory card.

To remove a CompactFlash memory card from the router, follow these steps (see [Figure 46](#) and [Figure 47](#)):

- Step 1** Turn off power to the router to ensure that it does not attempt to read from or write to the CompactFlash memory card.
- Step 2** Press the ejector button next to the CompactFlash card. The ejector button moves outward so that it projects from the panel.
- Step 3** Press the ejector button again. This ejects the CompactFlash card partway out of its slot.
- Step 4** Carefully pull the card out of the slot.
- Step 5** Place the removed CompactFlash memory card on an antistatic surface or in a static shielding bag.
- Step 6** Push the ejector button in until it clicks.



Caution

To prevent damage to the ejector mechanism, the ejector button must remain fully seated when not being used to eject a CompactFlash card.

Figure 46 CompactFlash Slot Location in Cisco 3825 Router

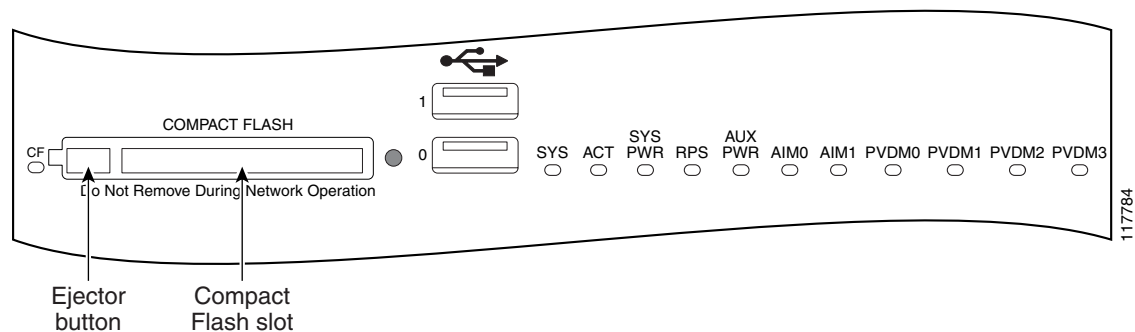
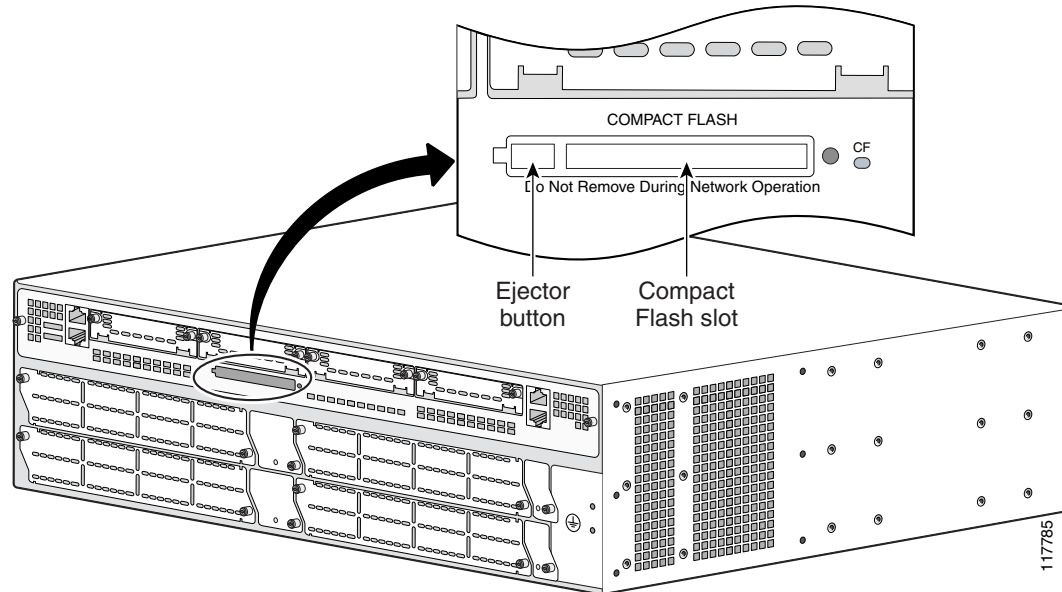


Figure 47 CompactFlash Slot Location in Cisco 3845 Router

Installing CompactFlash Memory Cards

To install a CompactFlash memory card, follow these steps (see [Figure 46](#) and [Figure 47](#)):

- Step 1** Make sure that the ejector button is fully seated so that it does not project from the panel.



Note If the ejector button projects from the panel, push it in until it clicks.

- Step 2** Insert the CompactFlash card into the slot until it is fully seated. The ejector button should remain flush with the panel.



Note If the ejector button projects from the panel after you insert the CompactFlash card, remove the card, press the ejector button until it clicks, and reinsert the card.



Caution

To prevent damage to the ejector mechanism, the ejector bottom must remain fully seated when not being used to eject a CompactFlash card.

Using the Compact Flash Guard

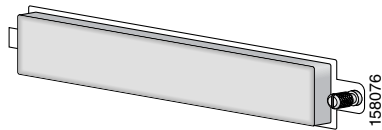
The Compact Flash guard (CF-guard) provides protection for the compact flash memory slot.

**Note**

A small flat-head screwdriver is required to attach the CF-guard.

To install the CF-guard, follow these steps:

-
- Step 1** Unpack the CF-guard.



- Step 2** Slip the CF-guard flap into the notch in the CompactFlash memory slot.
- Step 3** Screw the CF-guard into the screw hole.



Installing and Upgrading Internal Components in Cisco 3800 Series Routers

This document describes how to install or upgrade components located inside Cisco 3800 series integrated services routers:

- SDRAM DIMM memory modules
- Advanced integration modules (AIMs)
- Packet voice data modules (PVDMs)
- Power supplies
- Motherboard (Cisco 3845 router only)
- Fan tray (Cisco 3845 router only)

For information about router SDRAM, AIM, PVDM, and power supply capacity, see the following sections of the [“Overview of Cisco 3800 Series Routers”](#) document:

- The [“Module and Interface Card Capacity”](#) section on page 7
- The [“Memory”](#) section on page 11
- The [“Power”](#) section on page 11

The procedures for installing or removing these components depend on your router model:

- For the Cisco 3825 router, you must remove the router cover to access the power supply and motherboard. Follow the [“Removing the Cover from a Cisco 3825 Router”](#) procedure on page 80. You must then remove the power supply, together with its tray, to access memory modules, AIMs, and PVDMs on the motherboard, or to replace the power supply. Follow the [“Removing the Power Supply Assembly from a Cisco 3825 Router”](#) procedure on page 81.
- The Cisco 3845 router motherboard slides out from the rear of the router to give access to memory modules, AIMs, and PVDMs, or to replace the motherboard. Follow the [“Removing the Plug-In Motherboard from a Cisco 3845 Router”](#) procedure on page 82.
- The Cisco 3845 router fan tray and power supplies are reached from the front of the router. Follow the [“Removing and Installing the Fan Tray and Power Supplies in a Cisco 3845 Router”](#) procedure on page 106.

This document contains the following sections:

- [Safety Warnings, page 78](#)



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- [Safety with Electricity](#), page 79
- [Removing the Cover from a Cisco 3825 Router](#), page 80
- [Removing the Power Supply Assembly from a Cisco 3825 Router](#), page 81
- [Removing the Plug-In Motherboard from a Cisco 3845 Router](#), page 82
- [Component Locations on the Motherboard](#), page 83
- [SDRAM DIMM Removal and Installation](#), page 85
- [AIM Installation and Removal](#), page 88
- [PVDM Installation and Removal](#), page 96
- [Installing a Power Supply in a Cisco 3825 Router](#), page 98
- [Reinstalling the Cover on a Cisco 3825 Router](#), page 105
- [Installing or Replacing the Plug-In Motherboard in a Cisco 3845 Router](#), page 105
- [Removing and Installing the Fan Tray and Power Supplies in a Cisco 3845 Router](#), page 106

Before you perform any of these procedures, disconnect the power and remove the cover as described in the “Safety with Electricity” section on page 79.

Safety Warnings



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 93



Warning

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



Warning

This equipment must be installed and maintained by service personnel as defined by AS/NZS 3260. Incorrectly connecting this equipment to a general-purpose outlet could be hazardous. The telecommunications lines must be disconnected 1) before unplugging the main power connector or 2) while the housing is open, or both. Statement 1043



Warning

This unit is intended for installation in restricted access areas. A restricted access area can be accessed only through the use of a special tool, lock and key, or other means of security. Statement 1017



Warning

Before working on a system that has an on/off switch, turn OFF the power and unplug the power cord. Statement 1



Warning

Do not work on the system or connect or disconnect cables during periods of lightning activity. Statement 1001



Read the installation instructions before connecting the system to the power source. Statement 1004



Before working on equipment that is connected to power lines, remove jewelry (including rings, necklaces, and watches). Metal objects will heat up when connected to power and ground and can cause serious burns or weld the metal object to the terminals. Statement 43



Hazardous network voltages are present in WAN ports regardless of whether power to the unit is OFF or ON. To avoid electric shock, use caution when working near WAN ports. When detaching cables, detach the end away from the unit first. Statement 1026



To prevent personal injury or damage to the chassis, never attempt to lift or tilt the chassis using the handles on modules (such as power supplies, fans, or cards); these types of handles are not designed to support the weight of the unit. Statement 1032

Safety with Electricity

When working on equipment that is powered by electricity, follow these guidelines:

- Locate the emergency power-off switch in the room in which you are working. Then, if an electrical accident occurs, you can quickly shut the power off.
- Before working on the router, turn off the power and unplug the power cord.
- Disconnect all power before doing the following:
 - Installing or removing a router chassis
 - Working near power supplies
- Do not work alone if potentially hazardous conditions exist.
- Never assume that power is disconnected from a circuit. Always check.
- Look carefully for possible hazards in your work area, such as moist floors, ungrounded power extension cables, and missing safety grounds.

If an electrical accident occurs, proceed as follows:

- Use caution; do not become a victim yourself.
- Turn off power to the router.
- If possible, send another person to get medical aid. Otherwise, determine the condition of the victim and then call for help.
- Determine if the victim needs rescue breathing or external cardiac compressions; then take appropriate action.

Preventing Electrostatic Discharge Damage

Electrostatic discharge (ESD) can damage equipment and impair electrical circuitry. ESD can occur when printed circuit cards are improperly handled and can result in complete or intermittent failures. Always follow ESD prevention procedures when removing and replacing cards. Ensure that the router is electrically connected to earth ground. Wear an ESD-preventive wrist strap, ensuring that it makes good skin contact. Connect the clip to an unpainted surface of the router frame to safely channel unwanted ESD voltages to ground. To guard against ESD damage and shocks, the wrist strap and cord must be used properly. If no wrist strap is available, ground yourself by touching the metal part of the router.



Caution

For safety, periodically check the resistance value of the ESD-preventive wrist strap, which should be between 1 and 10 megohms (Mohm).

Removing the Cover from a Cisco 3825 Router

You must remove the cover from a Cisco 3825 router to access the power supply and motherboard. The router must be removed from the rack for this procedure. You will need number 1 and number 2 Phillips screwdrivers.

If your router uses AC or DC power, observe the following warning:



Warning

Do not touch the power supply when the power cord is connected. For systems with a power switch, line voltages are present within the power supply even when the power switch is off and the power cord is connected. For systems without a power switch, line voltages are present within the power supply when the power cord is connected. Statement 4

If your router uses DC power, observe the following warning:



Warning

Before performing any of the following procedures, ensure that power is removed from the DC circuit. Statement 1003



Caution

Before removing the cover, make sure that the CompactFlash memory card ejector button is flush with the front panel. If the button projects from the panel, removing the cover can damage it.



Caution

To prevent damage to the router, do not attempt to pry off the plastic bezel.

Step 1

Power down the router and disconnect the power cord from the front of the router.



Warning

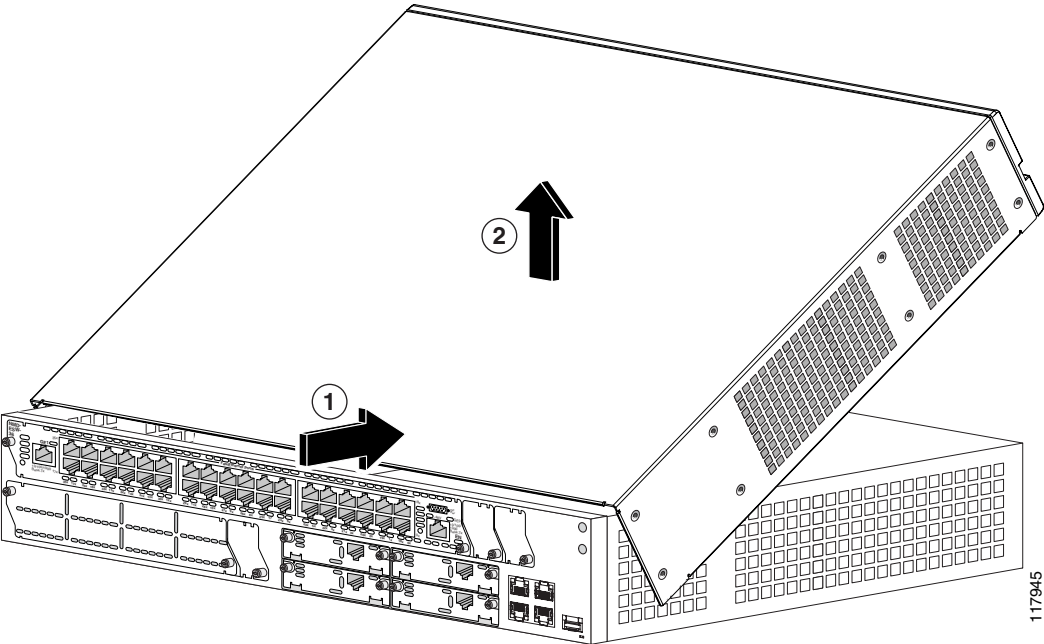
Before opening the unit, disconnect the telephone-network cables to avoid contact with telephone-network voltages. Statement 1041

Step 2

Disconnect all network interface cables from the rear panel of the router.

- Step 3** Remove the router from the rack. Remove the rack-mounting brackets from the router using the number 2 Phillips screwdriver.
- Step 4** Place the router on a flat surface. Remove the three screws from the top of the router and set them aside in a safe place.
- Step 5** Remove the three screws on each side panel and set them aside in a safe place.
- Step 6** Slide the cover toward the front of the chassis (about 1 inch [25 mm]). See [Figure 48](#).
- Step 7** Lift the cover away from the router base.
- Step 8** You must remove the Cisco 3825 power supply to replace it or to access components on the motherboard. Continue with the [“Removing the Power Supply Assembly from a Cisco 3825 Router” procedure on page 81](#).

Figure 48 Removing the Cover from a Cisco 3825 Router



1	Slide cover toward front	2	Remove cover from base
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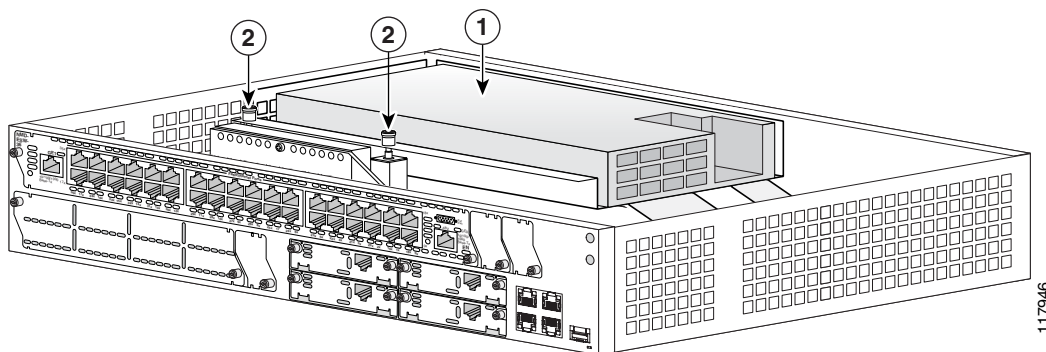
Removing the Power Supply Assembly from a Cisco 3825 Router

The power supply assembly in a Cisco 3825 router consists of the power supply and the tray on which it is mounted.

To remove the power supply assembly from a Cisco 3825 router, either to replace the supply or to access the motherboard, follow this procedure. You need a number 2 Phillips screwdriver.

- Step 1** Remove the router cover, following the procedure in the [“Removing the Cover from a Cisco 3825 Router”](#) section on page 80.
- Step 2** Locate the power supply assembly, shown in [Figure 49](#). Remove any internal power cables from the connectors at the corner of the power supply.

Figure 49 Cisco 3825 Power Supply



1	Power supply	2	Captive mounting screws
----------	--------------	----------	-------------------------

- Step 3** Using a number 2 Phillips screwdriver, loosen the captive mounting screws on the power supply tray. Lift the power supply assembly out of the router.
- Step 4** To install or replace SDRAM DIMMs, AIMs, or PVDMs on the motherboard, continue with the [“Component Locations on the Motherboard”](#) section on page 83. To install a new power supply, continue with the [“Installing a Power Supply in a Cisco 3825 Router”](#) procedure on page 98.

Removing the Plug-In Motherboard from a Cisco 3845 Router

To access memory modules, AIMs, and PVDMs mounted on the motherboard of a Cisco 3845 router, or to remove a motherboard to replace it with a new one, follow these steps. You need a number 2 Phillips screwdriver. You do not need to remove the router from the rack.

It is not necessary to power off the router to remove the motherboard, but the router does not operate until the motherboard is reinstalled.

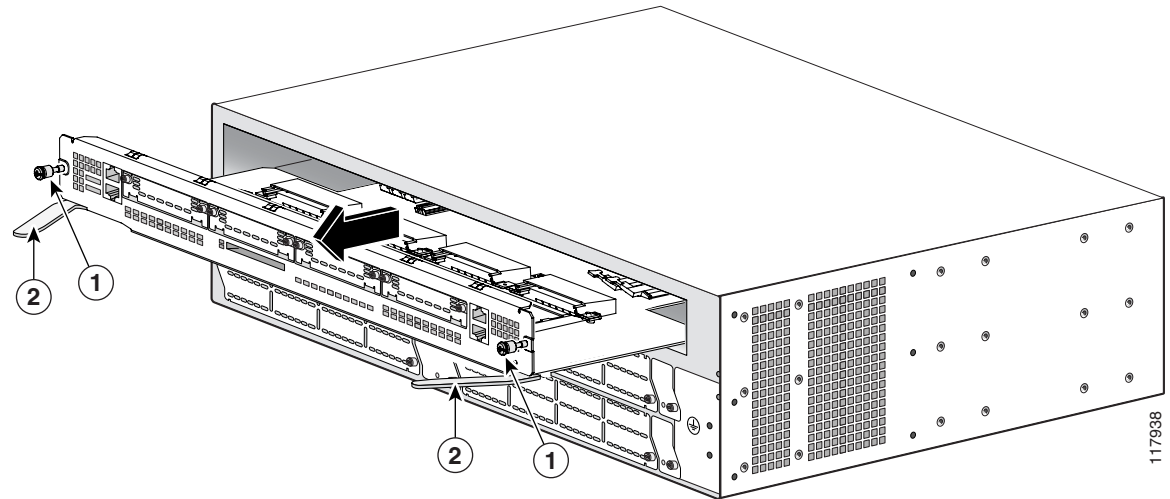
- Step 1** Using the number 2 Phillips screwdriver, loosen the two captive thumbscrews, one on each side of the motherboard. (See [Figure 50](#).)
- Step 2** Rotate the ejector levers on each side outward, and carefully pull the motherboard straight out of the router. Place it on an antistatic surface.



Caution

The motherboard is an ESD-sensitive component. To avoid damage, observe all ESD precautions.

Figure 50 **Removing the Motherboard from a Cisco 3845 Router**



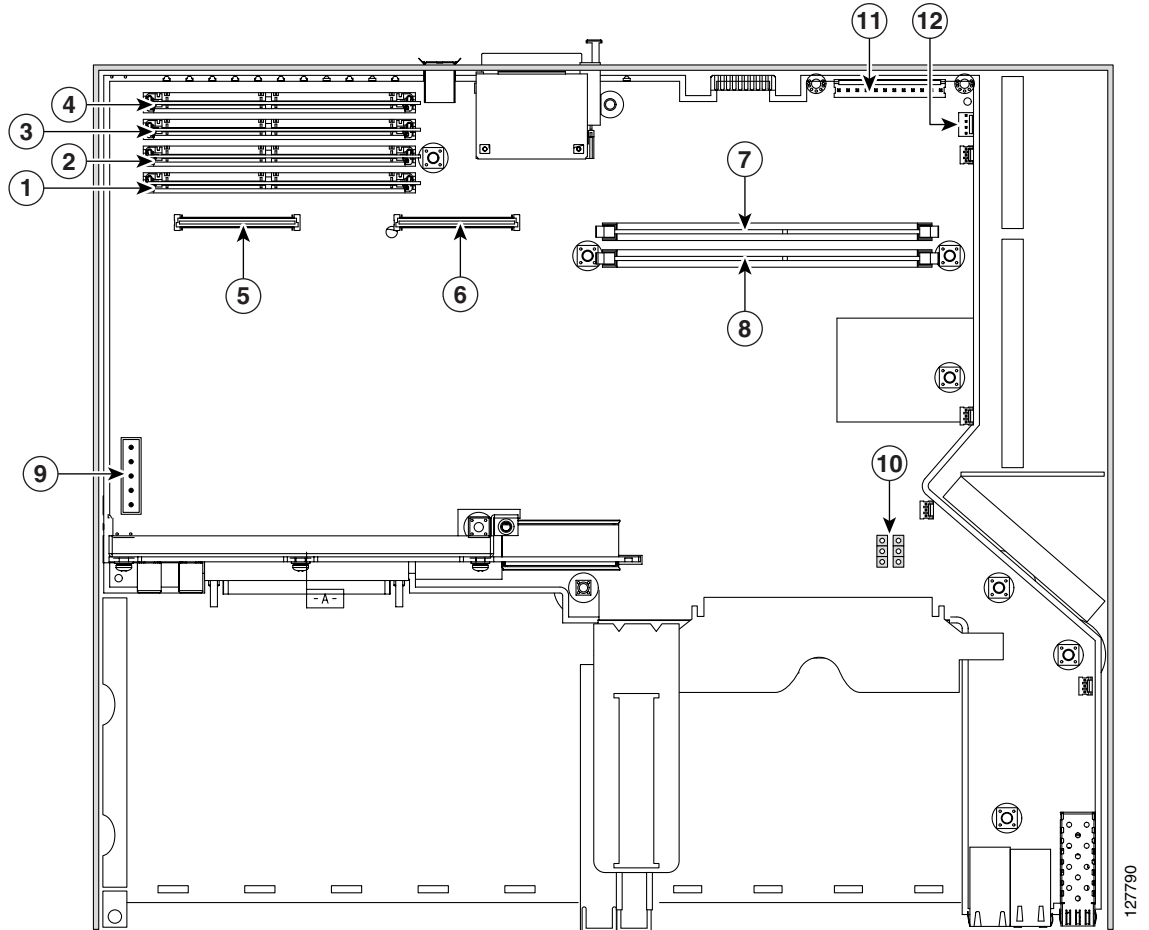
1	Loosen captive thumbscrews	2	Rotate ejector levers outward
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To install or replace SDRAM DIMMs, AIMs, or PVDMs on the motherboard, continue with the [“Component Locations on the Motherboard”](#) section on page 83.

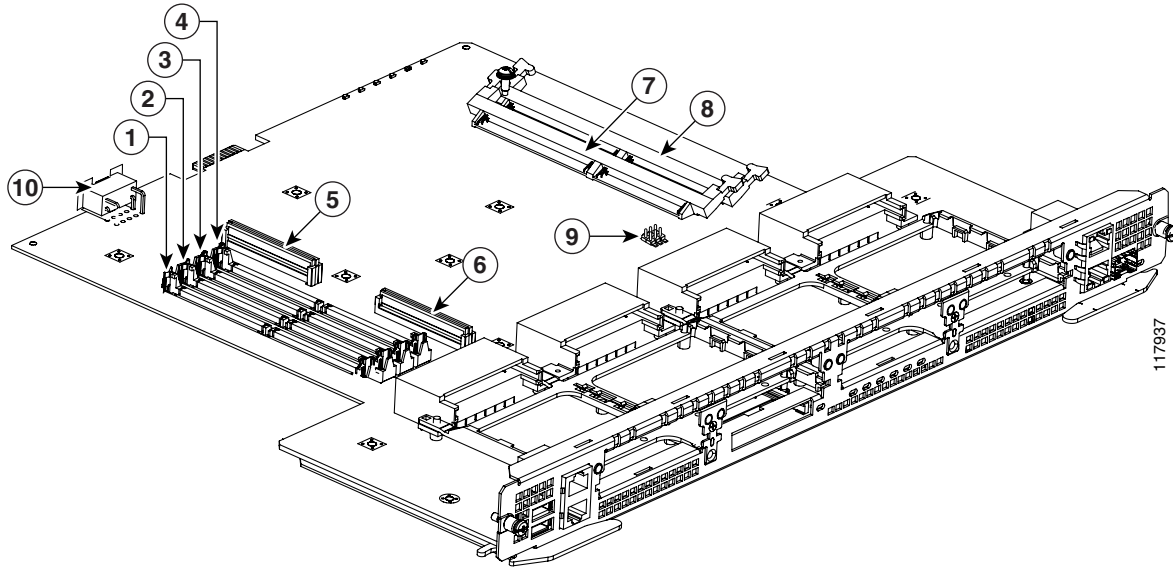
Component Locations on the Motherboard

[Figure 51](#) and [Figure 52](#) show the locations of SDRAM DIMMs, AIMs, and PVDMs on the motherboard of Cisco 3825 and Cisco 3845 routers.

Figure 51 *Component Locations on a Cisco 3825 Motherboard*



1	PVDM3	7	MEMORY 1
2	PVDM2	8	MEMORY 0
3	PVDM1	9	IP phone power connector
4	PVDM0	10	Jumper headers
5	AIM0	11	Primary power connector
6	AIM1	12	Secondary power connector

Figure 52 **Component Locations on a Cisco 3845 Motherboard**

1	PVDM3	6	AIM1
2	PVDM2	7	MEM0
3	PVDM1	8	MEM1
4	PVDM0	9	Jumper headers
5	AIM0	10	Power connector for fan tray assembly

SDRAM DIMM Removal and Installation

Cisco 3800 series routers ship with 256 MB of ECC DDR SDRAM. The two DIMM slots can be upgraded with 128-MB, 256-MB, or 512-MB DIMMs to a maximum of 1024 MB. If only one SDRAM DIMM is used, it can be installed in either DIMM connector.



Caution

When you remove or install DIMMs, always wear an ESD-preventive wrist strap, and ensure that it makes good contact with your skin. Connect the equipment end of the wrist strap to the metal part of the router.



Caution

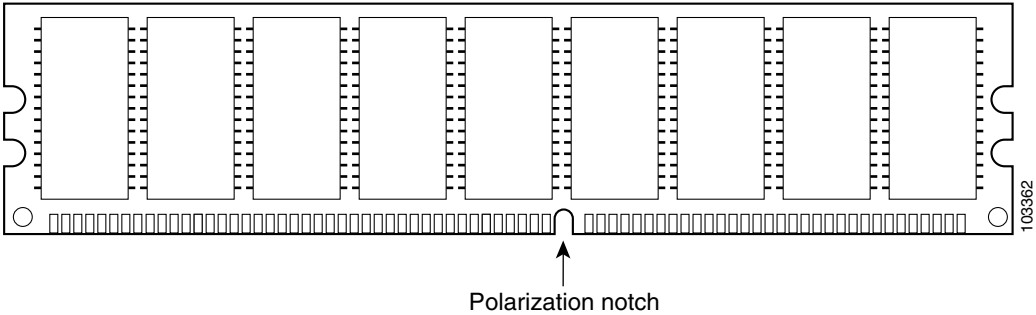
Handle DIMMs by the edges only. DIMMs are ESD-sensitive components and can be damaged by mishandling.

DIMM Location and Orientation

The two SDRAM DIMM connectors are located on the motherboard and are identified as MEMORY 0 and MEMORY 1 on the Cisco 3825 router, and as MEM0 and MEM1 on the Cisco 3845 router. See [Figure 51](#) and [Figure 52](#) for DIMM locations.

DRAM DIMMs have a polarization notch on the mating edge to prevent incorrect insertion. [Figure 53](#) shows the polarization notch on a DRAM DIMM.

Figure 53 DRAM DIMM Polarization Notch

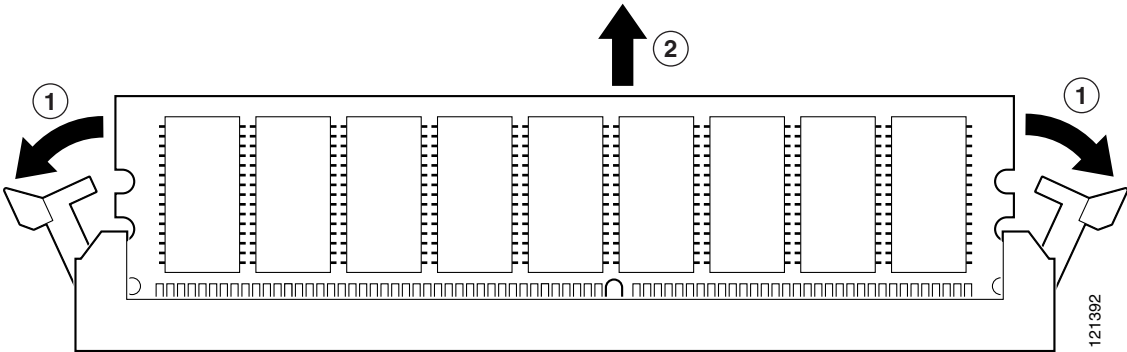


Removing an SDRAM DIMM

To remove an SDRAM DIMM from the motherboard, follow these steps:

- Step 1
- Pull the latches away from the DIMM at both ends. This lifts the DIMM slightly. Lift the DIMM completely out of the connector. See [Figure 54](#).

Figure 54 Removing a DRAM DIMM



1	Release the latches	2	Remove the DIMM
---	---------------------	---	-----------------

- Step 2** Place the DIMM in an antistatic bag to protect it from ESD damage.

Installing an SDRAM DIMM



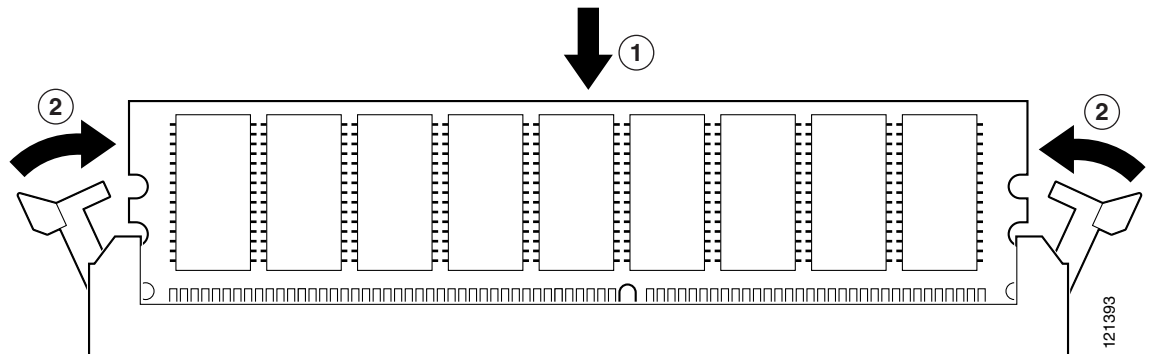
Caution

Do not insert DIMMs into the same connector more than 25 times. Overuse can damage the connector.

To install an SDRAM DIMM, follow these steps:

- Step 1** Make sure that both latches on the DIMM connector are open.
- Step 2** Orient the DIMM so that the polarization notch lines up with the key in the connector. See [Figure 55](#).
- Step 3** Carefully insert the DIMM into the connector.
- Step 4** Carefully and firmly press the DRAM DIMM into the connector until both latches rotate to the closed position against the DIMM.

Figure 55 Installing a DRAM DIMM



1	Insert the DIMM	2	Latches rotate to closed position
----------	-----------------	----------	-----------------------------------

To install an AIM, continue with the [“AIM Installation and Removal” procedure on page 88](#). To install a PVD, continue with the [“PVD Installation and Removal” procedure on page 96](#). If you are finished installing components, continue with the [“Reinstalling the Power Supply Assembly in a Cisco 3825 Router” procedure on page 105](#) or the [“Installing or Replacing the Plug-In Motherboard in a Cisco 3845 Router” procedure on page 105](#).

AIM Installation and Removal

Overview

Advanced integration modules (AIMs) provide hardware-based support for additional features. AIMs plug into a connector on the motherboard and require no external interfaces or connections. Each AIM sold as a spare is supplied with a label that identifies its type.

Cisco 3800 series routers have two AIM connectors, labeled AIM0 and AIM1. See [Figure 51](#) and [Figure 52](#) for AIM connector locations. [Table 7](#) lists the AIMs supported on Cisco 3800 series routers.

Table 7 *AIMs Supported on Cisco 3800 Routers*

Cisco Part Number	Type
AIM-ATM=	ATM
ATM-COMPR4=	Compression
AIM-CUE=	Unity Express
AIM-VPN/EPII-PLUS= (Cisco 3825 router only)	DES/3DES/AES VPN encryption/compression
AIM-VPN/HPII-PLUS= (Cisco 3845 router only)	DES/3DES/AES VPN encryption/compression

Accessory Kits

The mounting hardware required to install an AIM in a Cisco 3800 series router consists of two machine-thread metal standoffs, two machine-thread metal screws, and one plastic standoff with a snap fit on both ends.

Some AIMs are shipped with different accessory kits or more than one accessory kit. If necessary, use the plastic standoff with a snap fit on both ends from one kit and the machine-thread metal standoffs and machine-thread metal screws from a different kit.

Installing an AIM

The following procedure requires a 1/4-inch nut driver and a number 1 Phillips screwdriver.



Caution

When you remove or install an AIM, always wear an ESD-preventive wrist strap, and ensure that it makes good contact with your skin. Connect the equipment end of the wrist strap to the metal part of the router.



Caution

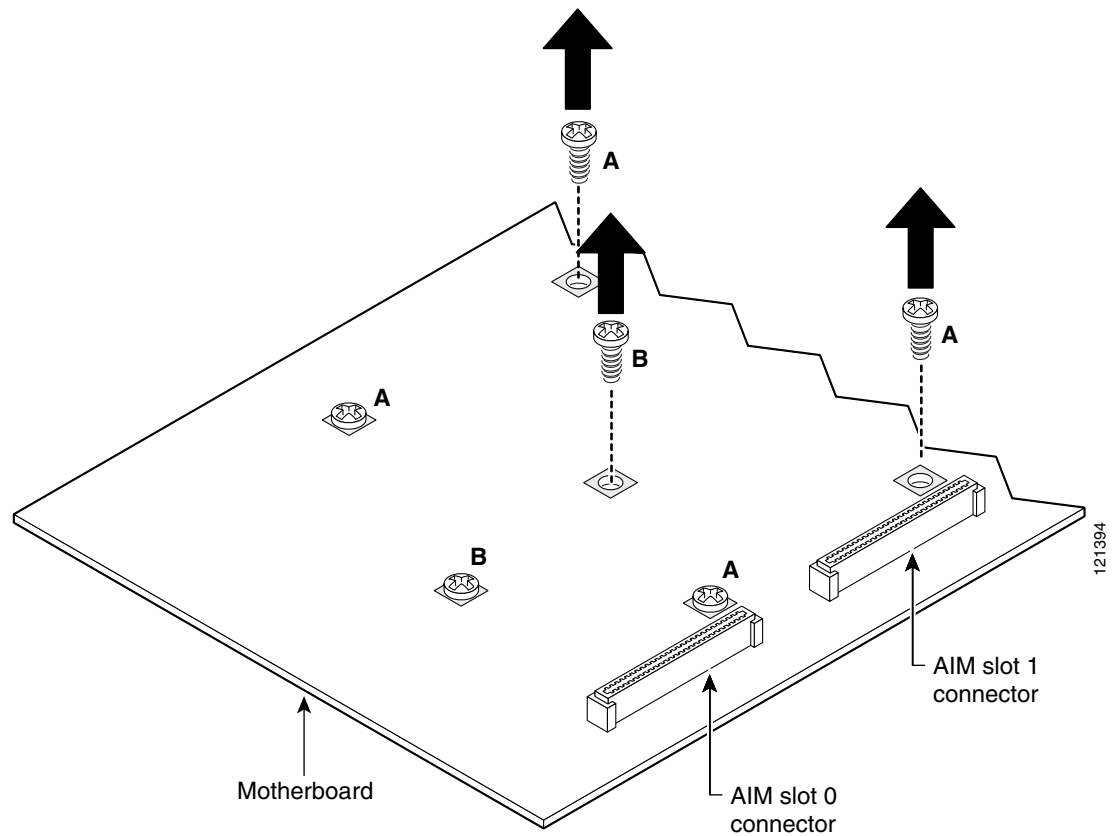
Handle AIMs by the edges only. AIMs are ESD-sensitive components and can be damaged by mishandling.

Connecting the AIM to the Motherboard

To connect an AIM to the motherboard, follow these steps:

- Step 1** Remove the three screws from the motherboard near the AIM connector that you are going to use. [Figure 56](#) shows a typical installation.

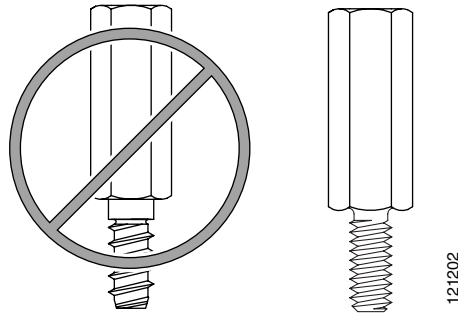
Figure 56 Removing Screws from a Motherboard for AIM Installation



A	Metal standoff locations	B	Plastic standoff location
----------	--------------------------	----------	---------------------------

- Step 2** Locate the two machine-thread metal standoffs from the accessory kit. Do not use sheet metal-thread standoffs. [Figure 57](#) shows these metal standoffs.

Figure 57 **Metal Standoffs**

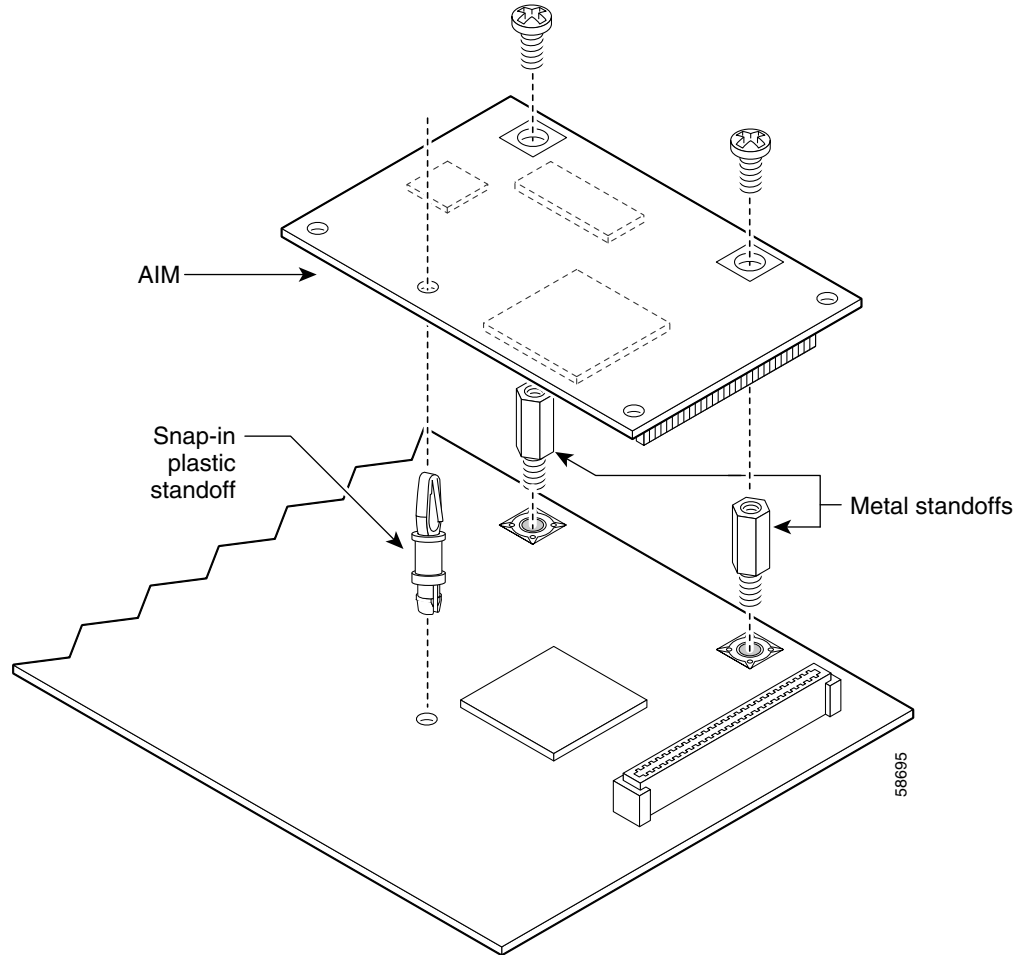


Step 3 Install the two machine-thread metal standoffs in place of the two screws labeled A in [Figure 56](#). Use a 1/4-inch nut driver to tighten the standoffs. See [Figure 58](#).

Caution

Make sure that the standoffs are straight when installed. Tighten them gently but firmly. The shoulder must be seated tight against the motherboard.

Figure 58 Attaching an AIM to a Motherboard

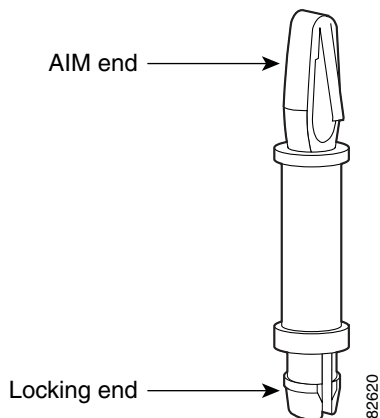


- Step 4** Insert the plastic standoff (see [Figure 59](#)) with a snap fit on the ends in place of the screw labeled B in [Figure 56](#). Press the standoff firmly to be sure that the shoulder is seated tight against the motherboard.



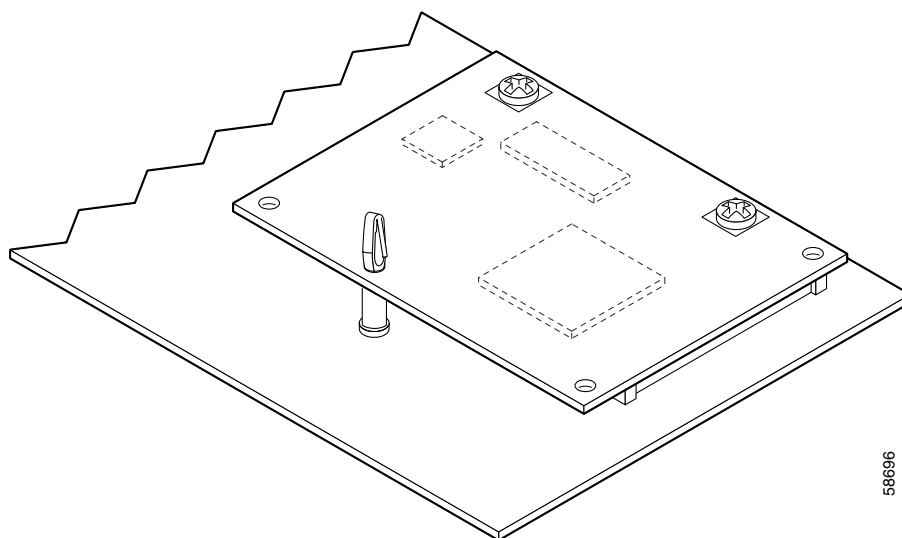
Note The plastic standoff snaps into the motherboard. The locking end is the shorter end of the standoff.

Figure 59 Plastic Standoff Orientation



- Step 5** Insert the connector on the AIM into the connector on the motherboard. Press firmly on the AIM until it seats onto the connector. The plastic standoff must snap into the hole in the AIM board. See [Figure 60](#).
- Step 6** Insert the machine-thread metal screws from the accessory kit through the AIM into the metal standoffs. See [Figure 60](#). Carefully tighten the screws with a number 1 Phillips screwdriver.
- Step 7** Check that the AIM is installed correctly on the motherboard. See [Figure 60](#).

Figure 60 AIM Installed on a Motherboard



Verifying AIM Installation

Use the **show diag 0** command to obtain hardware information about an installed AIM. The following example shows the hardware revision and additional information about ATM AIM 0:

```
Router# show diag 0
.
.
.
ATM AIM 0:
```

Applying the AIM Label

The AIM is supplied with a two-part adhesive label in the mounting kit or attached to the AIM card. Use one part of the label to identify the AIM on the motherboard, and apply the other part to the outside of the router. Apply the labels as follows:

-
- Step 1** If the label is attached to the AIM card, carefully tear off the label at the perforation. If the label is in the mounting kit, separate the two parts at the perforation, and apply one part to the AIM card.
 - Step 2** Position the other part of the label in a blank area on the rear panel of the router, near an edge. If no suitable space is available on the rear panel, apply the label to the cover at the rear edge.



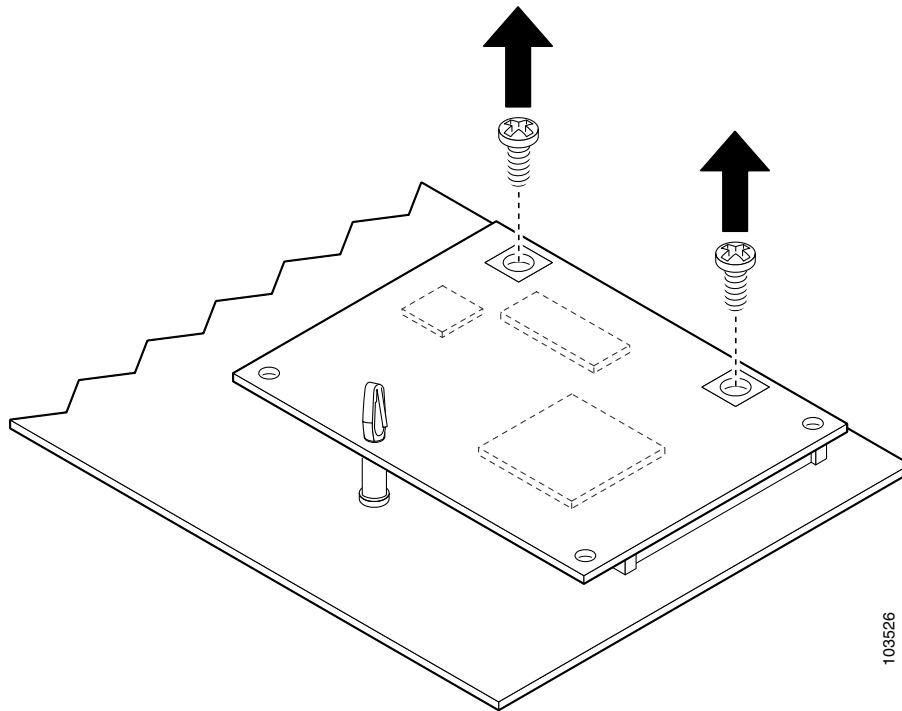
Note Do not apply the AIM label to a blank cover plate; to any removable network module or interface card; or over any holes, screws, or existing labels.

Removing an AIM

If you need to remove an AIM, follow this procedure. You need a number 2 Phillips screwdriver.

- Step 1** Locate the AIM to be removed.
- Step 2** Use a number 2 Phillips screwdriver to remove the two screws from the AIM as shown in [Figure 61](#).

Figure 61 *Removing Screws from an AIM*



- Step 3** Carefully lift the AIM from the connector and the plastic standoff. Keep the AIM parallel with the motherboard to prevent damage to the connector and plastic standoff. Place the AIM in an antistatic bag to protect it from ESD damage.

To install an SDRAM DIMM, continue with the [“SDRAM DIMM Removal and Installation”](#) procedure on page 85. To install a PVDM, continue with the [“PVDM Installation and Removal”](#) procedure on page 96. If you are finished installing components, continue with the [“Reinstalling the Power Supply Assembly in a Cisco 3825 Router”](#) procedure on page 105 or the [“Installing or Replacing the Plug-In Motherboard in a Cisco 3845 Router”](#) procedure on page 105.

Installing a CompactFlash Memory Card on the AIM

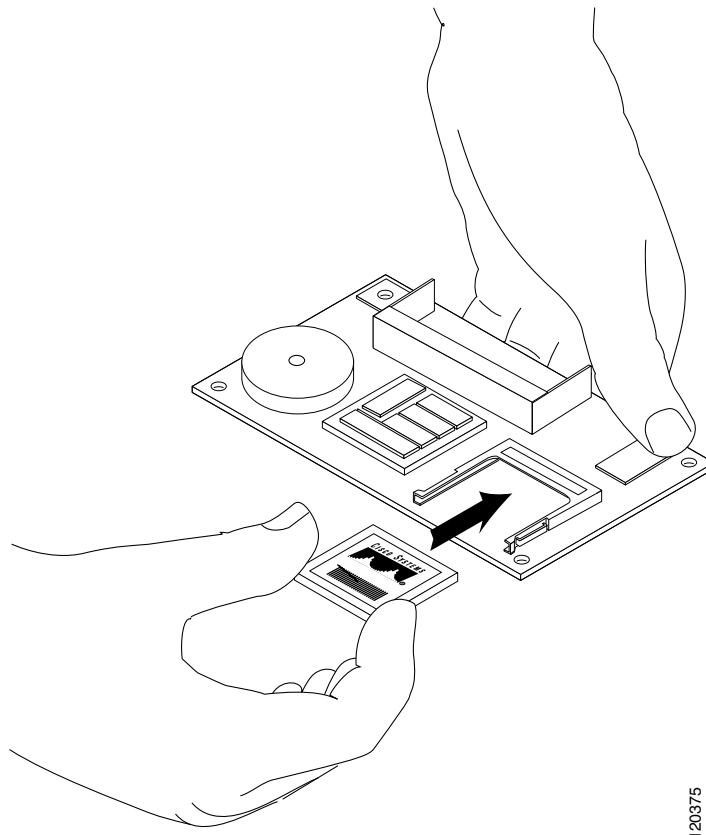
Complete the procedure below for installing a CompactFlash memory card mounted on the AIM.


Note

Not all AIMs require installation of a CompactFlash memory card.

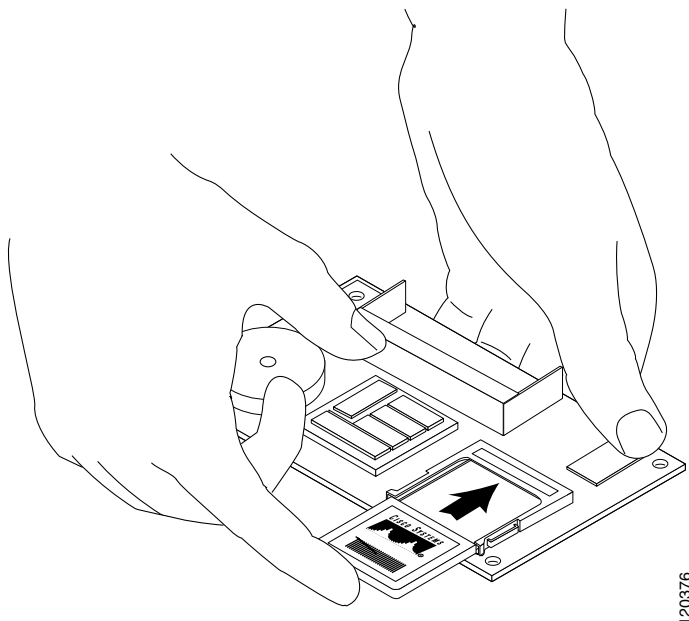
-
- Step 1** Locate the CompactFlash memory card on the AIM. (See [Figure 62](#).)
- Step 2** Insert the connector end of the CompactFlash memory card into the connector until the card is seated in the connector. (See [Figure 62](#) and [Figure 63](#).)
- Step 3** Reinstall the AIM as described in “[AIM Installation and Removal](#)” section on page 88.
- Step 4** Reinstall the chassis cover as described in the “[Reinstalling the Cover on a Cisco 3825 Router](#)” section on page 105 and “[Installing or Replacing the Plug-In Motherboard in a Cisco 3845 Router](#)” section on page 105.
- Step 5** Refer to the “[Verifying AIM Installation](#)” section on page 93.
-

Figure 62 CompactFlash Memory Card Location on the AIM



120375

Figure 63 *CompactFlash Memory Card Installation on the AIM*



120376

PVDM Installation and Removal

Cisco 3800 series routers hold up to four Cisco packet voice data modules, version II (PVDM-II), to support enhanced versions of digital signal processors (DSPs).



Caution

When you remove or install PVDMs, always wear an ESD-preventive wrist strap, and ensure that it makes good contact with your skin. Connect the equipment end of the wrist strap to the metal part of the router.



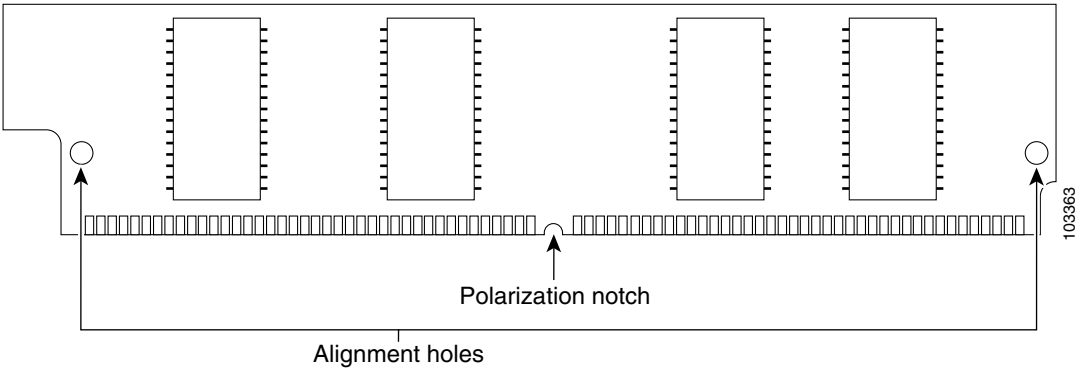
Caution

Handle PVDMs by the edges only. PVDMs are ESD-sensitive components and can be damaged by mishandling.

PVDM Location and Orientation

The four PVDM connectors are located on the motherboard and are identified as PVDM0, PVDM1, PVDM2, and PVDM3. See [Figure 51](#) and [Figure 52](#) for PVDM locations. PVDMs have a polarization notch on the mating edge to prevent incorrect insertion. [Figure 64](#) shows the polarization notch on a PVDM.

Figure 64 PVDM Polarization Notch



Installing a PVDM

To install a PVDM, follow these steps:

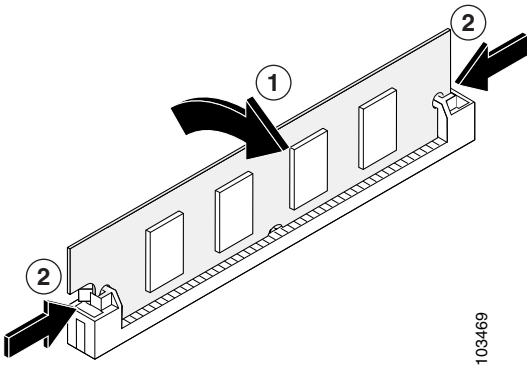


Note

Install PVDMs beginning with the PVDM 0 connector.

- Step 1** Locate the PVDM connector on the motherboard. See [Figure 51](#) and [Figure 52](#) for PVDM connector locations.
- Step 2** Orient the PVDM so that the polarization notch lines up with the key on the connector. See [Figure 64](#).
- Step 3** Hold the PVDM at an angle and insert it carefully into the PVDM connector. Tilt the PVDM up to the vertical position so that the clips snap into place at both ends. See [Figure 65](#).

Figure 65 Installing a PVDM



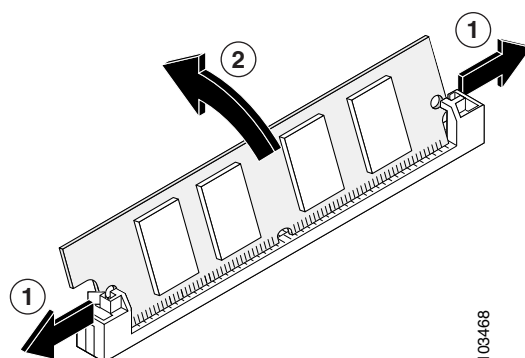
1	Tilt PVDM up to vertical	2	Clips snap into place
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Removing a PVDM

To remove a PVDM from the motherboard, follow these steps:

- Step 1** Pull the PVDM retaining clips away from the PVDM at both ends, and then tilt the PVDM until it can be removed from the connector. See [Figure 66](#).

Figure 66 *Removing a PVDM*



1	Release clips	2	Tilt the PVDM
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- Step 2** Place the PVDM in an antistatic bag to protect it from ESD damage.

To install an SDRAM DIMM, continue with the [“SDRAM DIMM Removal and Installation” procedure on page 85](#). To install an AIM, continue with the [“AIM Installation and Removal” procedure on page 88](#). If you are finished installing components, continue with the [“Reinstalling the Power Supply Assembly in a Cisco 3825 Router” procedure on page 105](#) or the [“Installing or Replacing the Plug-In Motherboard in a Cisco 3845 Router” procedure on page 105](#).

Installing a Power Supply in a Cisco 3825 Router

Three types of power supplies are available for the Cisco 3825 router:

- An AC power supply, driven by external AC power
- A DC power supply, driven by external DC power
- An IP phone power supply, driven by external AC power. This supply provides power for the router and a complement of IP phones attached to the router.

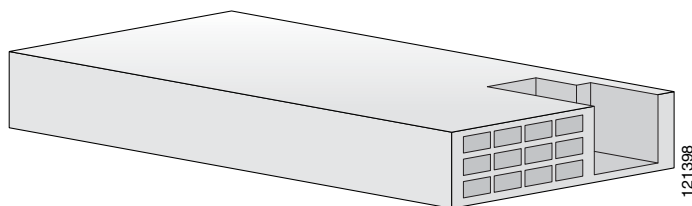
The following sections describe how to install each type of power supply.

Removing the Existing Power Supply

To remove the existing power supply from a Cisco 3825 router, follow these steps:

- Step 1** Remove the router cover, following the procedure in the [“Removing the Cover from a Cisco 3825 Router” section on page 80](#).
- Step 2** Remove the power supply and tray assembly, following the procedure in the [“Removing the Power Supply Assembly from a Cisco 3825 Router” section on page 81](#).
- Step 3** Turn the power supply assembly over so that the tray is on top.
- Step 4** Using a number 1 Phillips screwdriver, remove the two screws that hold the power supply to the tray. Separate the power supply from the tray. See [Figure 67](#).

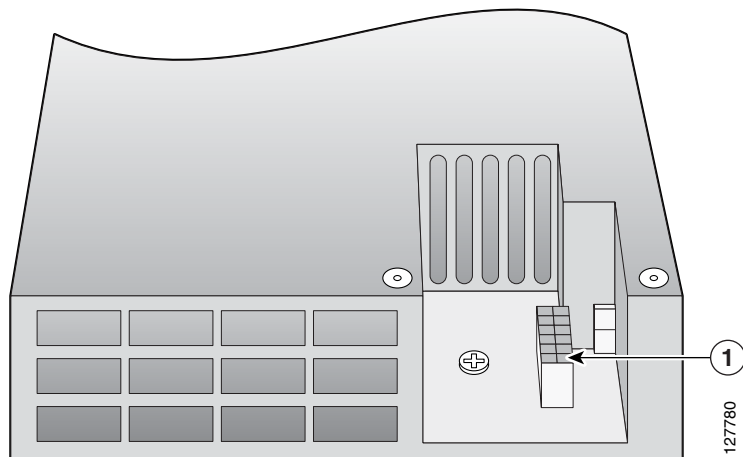
Figure 67 Cisco 3825 Power Supply Removed from the Tray



Installing an AC Power Supply

The AC power supply has a single power connector, as shown in [Figure 68](#).

Figure 68 AC Power Supply



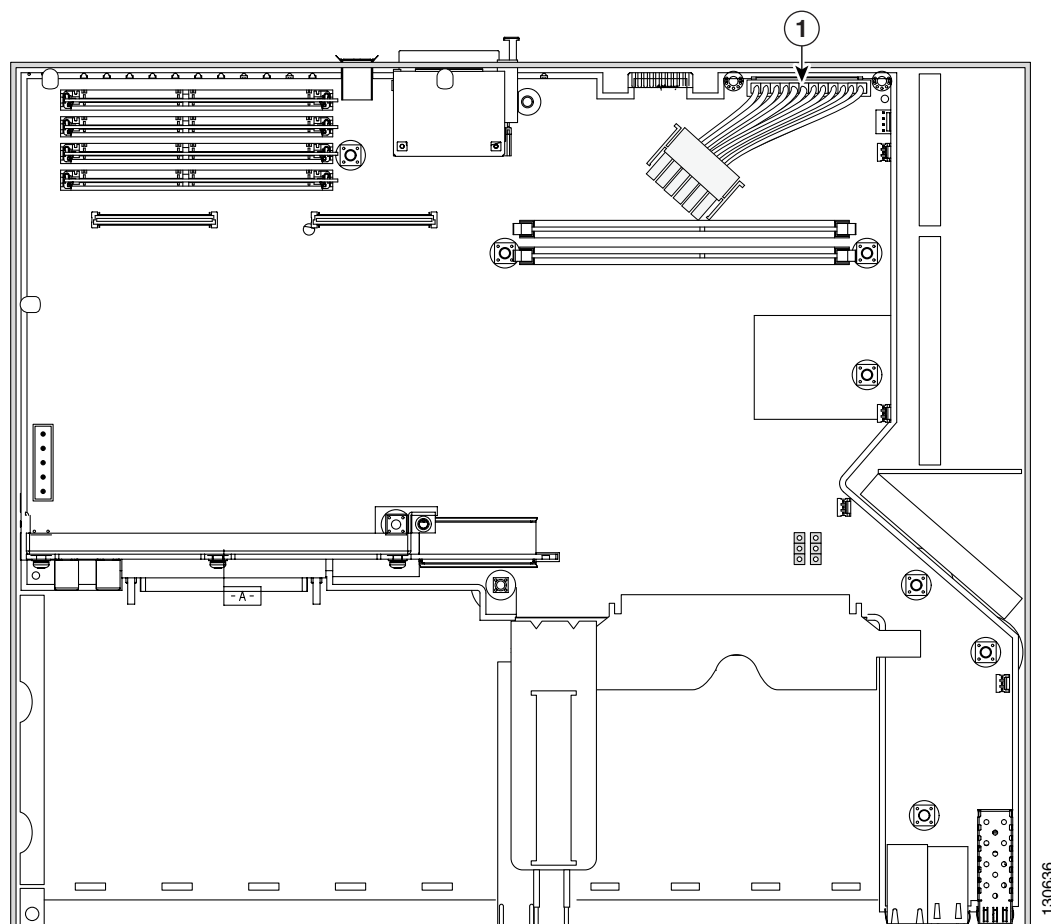
1	Primary power connector
---	-------------------------

Follow these steps to attach the power supply to the power supply tray.

-
- Step 1** Turn the tray right side up. Align the new power supply with the front wall of the tray.
- Step 2** Replace and tighten the screws that hold the power supply to the tray.
-

Verify that the primary power cable is connected to the motherboard as shown in [Figure 69](#).

Figure 69 Primary Power Cable Motherboard Connection



1	Primary power cable
----------	---------------------

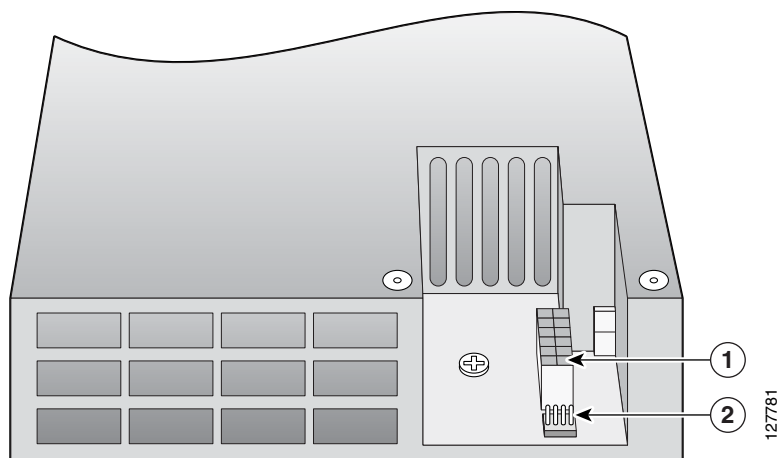
If you are finished installing components inside the router, continue with the [“Reinstalling the Power Supply Assembly in a Cisco 3825 Router”](#) procedure on page 105.

To install an SDRAM DIMM, continue with the [“SDRAM DIMM Removal and Installation”](#) procedure on page 85. To install an AIM, continue with the [“AIM Installation and Removal”](#) procedure on page 88. To install a PVDM, continue with the [“PVDM Installation and Removal”](#) procedure on page 96.

Installing a DC Power Supply

The DC power supply has two power connectors, as shown in [Figure 70](#).

Figure 70 **DC Power Supply**



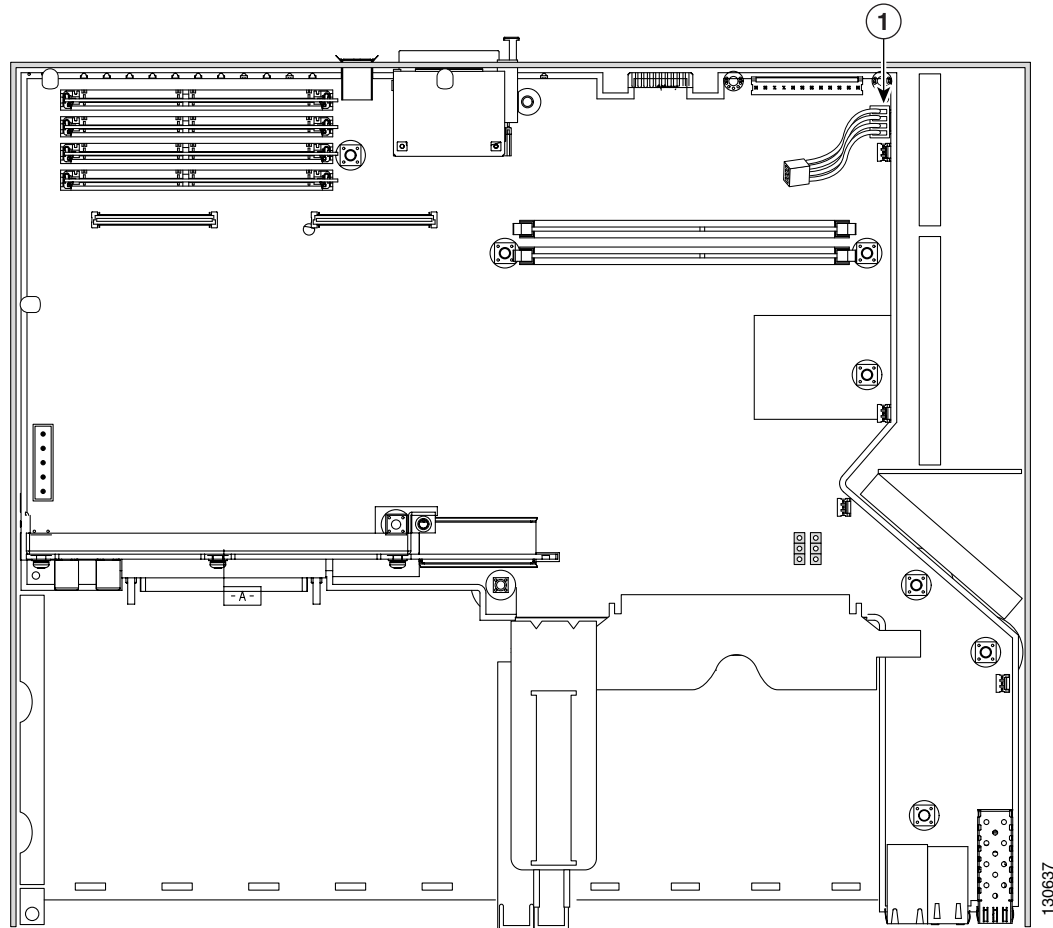
1	Primary power connector	2	Secondary power connector
----------	-------------------------	----------	---------------------------

Follow these steps to attach the power supply to the power supply tray.

- | | |
|---------------|--|
| Step 1 | Turn the tray right side up. Align the new power supply with the front wall of the tray. |
| Step 2 | Replace and tighten the screws that hold the power supply to the tray. |

Verify that the primary power cable is connected to the motherboard as shown in [Figure 69](#).

Make sure that the secondary power cable is connected to the motherboard as shown in [Figure 71](#).

Figure 71 **Secondary Power Cable Motherboard Connection**

1	Secondary power cable
----------	-----------------------

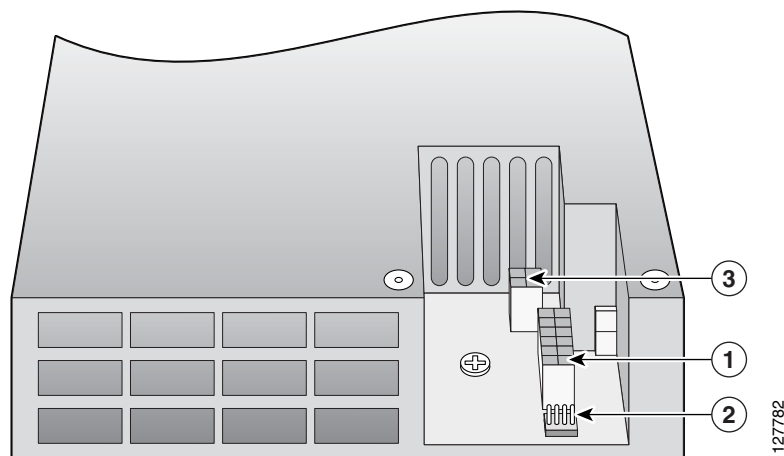
If you are finished installing components inside the router, continue with the [“Reinstalling the Power Supply Assembly in a Cisco 3825 Router”](#) procedure on page 105.

To install an SDRAM DIMM, continue with the [“SDRAM DIMM Removal and Installation”](#) procedure on page 85. To install an AIM, continue with the [“AIM Installation and Removal”](#) procedure on page 88. To install a PVDM, continue with the [“PVDM Installation and Removal”](#) procedure on page 96.

Installing an IP Phone Power Supply

The IP phone power supply has three connectors, as shown in [Figure 72](#).

Figure 72 AC Power Supply With IP Phone Power Support



1	Primary power connector	3	IP phone power connector
2	Secondary power connector		

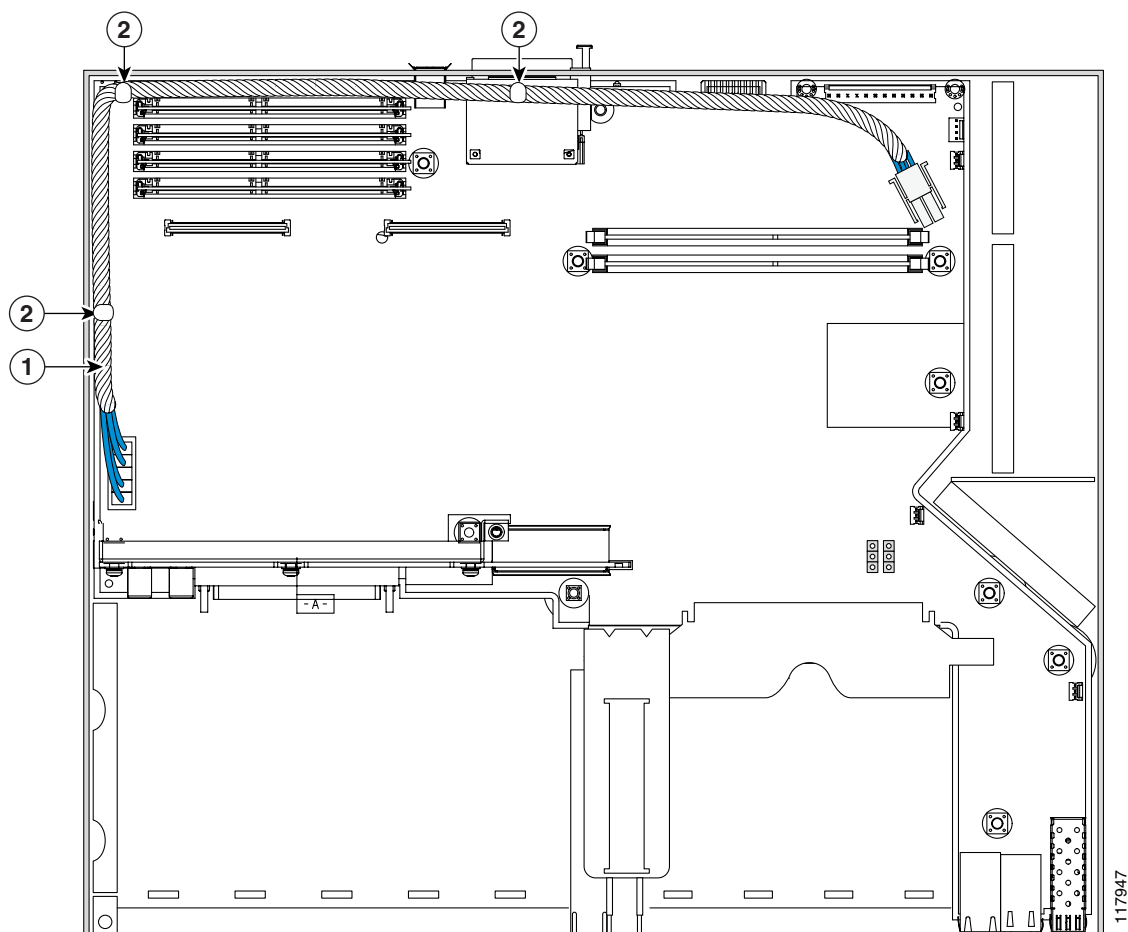
Follow these steps to attach the power supply to the power supply tray.

-
- Step 1** Turn the tray right side up. Align the new power supply with the front wall of the tray.
- Step 2** Replace and tighten the screws that hold the power supply to the tray.
-

Verify that the primary power cable is connected to the motherboard as shown in [Figure 69](#).

Make sure that the secondary power cable is connected to the motherboard as shown in [Figure 71](#).

Install the IP phone power cable as shown in [Figure 73](#). Make sure that the cable is held in place by the three cable brackets, as shown in the illustration.

Figure 73 *IP Phone Power Cable Motherboard Connection*

1	IP phone power cable	2	Cable brackets
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If you are finished installing components inside the router, continue with the [“Reinstalling the Power Supply Assembly in a Cisco 3825 Router”](#) procedure on page 105.

To install an SDRAM DIMM, continue with the [“SDRAM DIMM Removal and Installation”](#) procedure on page 85. To install an AIM, continue with the [“AIM Installation and Removal”](#) procedure on page 88. To install a PVDM, continue with the [“PVDM Installation and Removal”](#) procedure on page 96.

Reinstalling the Power Supply Assembly in a Cisco 3825 Router

To reinstall the power supply assembly after removing it for any of the procedures in this document, follow these steps:

-
- Step 1** Place the power supply assembly into the router, as shown in [Figure 49](#), being careful not to pinch any cables.
 - Step 2** Using a number 2 Phillips screwdriver, fasten the captive screws on the power supply assembly to the router chassis.
 - Step 3** Connect the internal power cables to the connectors on the power supply. AC power supplies without IP phone power support have one connector, as seen in [Figure 68](#). DC power supplies have two connectors, as seen in [Figure 70](#). AC power supplies with IP phone power support have three connectors, as seen in [Figure 72](#).
 - Step 4** Continue with the [“Reinstalling the Cover on a Cisco 3825 Router”](#) procedure on page 105.
-

Reinstalling the Cover on a Cisco 3825 Router

To reinstall the router cover, follow these steps. You need a number 1 Phillips screwdriver.

-
- Step 1** Place the router on a flat surface, with the front panel facing you.
 - Step 2** Place the cover on the base, with about 1 inch (25 mm) of clearance between the cover and the rear panel.
 - Step 3** Slide the cover back onto the base, making sure that the hook at the rear edge of the cover, near the left side, fits underneath the card cage on the rear panel of the router.
 - Step 4** Reinstall the three screws on the top of the cover and the three screws on each side.
 - Step 5** Reinstall the router in the rack.
 - Step 6** Reconnect power and network interface cables. See the [“Connecting Cables to Cisco 3800 Series Routers”](#) section for detailed information.
 - Step 7** Power on the router. See the [“Powering Up Cisco 3800 Series Routers”](#) section for detailed information.
-

Installing or Replacing the Plug-In Motherboard in a Cisco 3845 Router

To reinstall a plug-in motherboard in a Cisco 3845 router, or to install a replacement motherboard after removing the old one, follow these steps. You need a number 2 Phillips screwdriver.

-
- Step 1** Place the router so that the rear panel with the empty motherboard slot faces you.
 - Step 2** Make sure that the ejector levers on the motherboard are fully open. Carefully insert the motherboard into the router slot until the connector is engaged, and then close the ejector levers to fully seat the board.

- Step 3** Use a number 2 Phillips screwdriver to tighten the two captive retention screws, one on each side of the motherboard.

Removing and Installing the Fan Tray and Power Supplies in a Cisco 3845 Router

The Cisco 3845 router accommodates two hot-swappable power supplies in bays at the front of the router. A single power supply meets router requirements. The second power supply provides redundancy, load sharing, and increased router availability. Either power supply can be removed without affecting router operation. Any combination of two power supplies is permitted.



Caution

To comply with Telcordia NEBS GR-1089-Core and EN 300386 requirements, you must use foil twisted-pair cable that is properly grounded at both ends.

To remove or install a power supply, you must first remove the fan tray assembly. Follow the same procedure to replace the fan tray assembly with a new one.

- Step 1** Flip open the four small doors on the edges of the router front panel to gain access to the screws holding the fan tray assembly. See [Figure 74](#). Use a number 2 Phillips screwdriver to loosen these screws and remove the fan tray assembly.

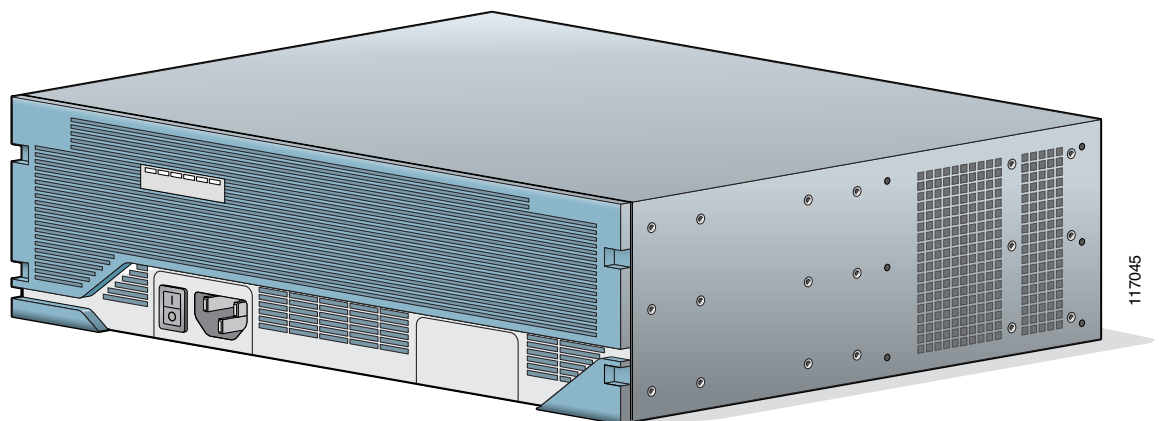
To replace the fan tray assembly without removing or installing power supplies, continue with [Step 6](#).



Caution

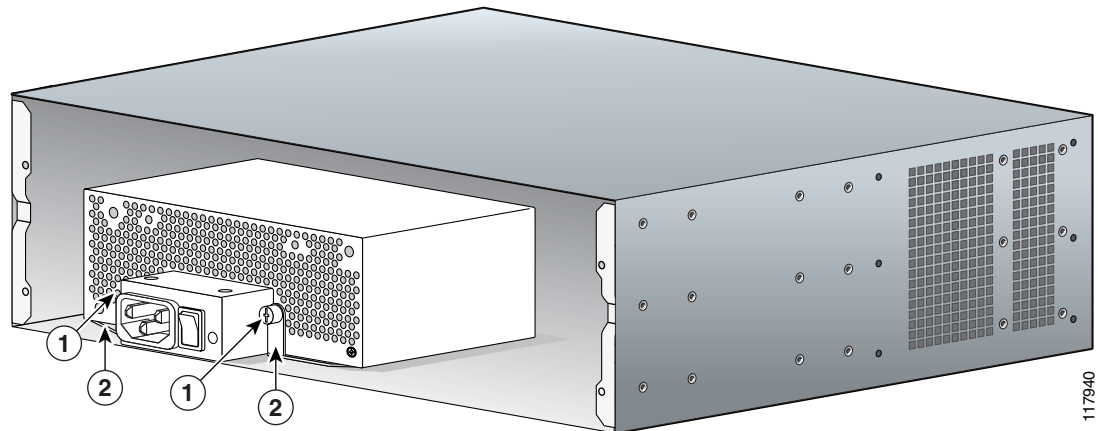
If the router is operating on a second power supply, it can run for up to 5 minutes without fans. During this period you see a fan tray warning message on the console.

Figure 74 Fan Tray Assembly on the Front Panel of a Cisco 3845 Router



- Step 2** To remove a power supply, use a flat-blade or number 2 Phillips screwdriver to loosen the two captive thumbscrews. Holding the thumbscrews, rotate the ejector levers on each side of the power supply outward. Fold the handle up, and pull the power supply out by the handle. See [Figure 75](#). An AC power supply is shown as an example.

Figure 75 Removing the Power Supply from a Cisco 3845 Router (AC Shown)



1	Loosen captive thumbscrews	2	Rotate ejector levers outward
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- Step 3** Make sure that the ejector levers on the new or replacement power supply are extended out away from the power supply. Insert the power supply into the router from the front. The power supply has a built-in connector; you do not need to attach any cables.
- Step 4** Rotate the ejector levers inward until the power supply latches into place. Fold down the handle. Use a flat-blade or number 2 Phillips screwdriver to tighten the captive thumbscrews.
- Step 5** If necessary, use a flat-blade screwdriver to pry off the plastic panel from the front of the fan tray assembly at the power supply location. Use a number 1 Phillips screwdriver to remove the metal cover plate.
- Step 6** Replace the fan tray assembly and tighten the mounting screws.

