



# Cisco 2800 Series Hardware Documents: Introduction and Warnings

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This introduction discusses the objectives, audience, organization, and conventions of these hardware documents, and points to related documents that have information beyond the scope of these documents. This preface contains the following sections:

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## Objectives

These hardware documents provide you with comprehensive hardware-related information about Cisco 2800 series integrated services routers, including platform descriptions, safety information, site preparation, chassis installation and interconnection, power up, initial configuration, troubleshooting, interface card and module installation, and procedures for maintenance and upgrades.

These documents provide enough initial software configuration information to establish network communication. For detailed software configuration information, refer to the Cisco 2800 series software configuration documents and to the Cisco IOS configuration guides and command reference publications. These publications are available online. See the [“Obtaining Documentation” section on page 11](#) for more information.



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These documents describe several router platforms that are similar in functionality, but differ in the number of interfaces supported. Some information provided may not apply to your particular router model.

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

## Audience

This documentation is designed for the person installing, configuring, and maintaining the router, who should be familiar with electronic circuitry and wiring practices and has experience as an electronic or electromechanical technician. It identifies certain procedures that should be performed only by trained and qualified personnel.

## Topics Covered by Hardware Documents

[Table 1](#) lists the topics covered by these hardware documents.

**Table 1** *Hardware Documentation for Cisco 2800 Series Routers*

Topic	Description
	This document. Describes the features and warnings of Cisco 2800 series routers.
<a href="#">Overview of Cisco 2800 Series Routers</a>	Describes the features and specifications of Cisco 2800 series routers.
<a href="#">Preinstallation Requirements and Planning for Cisco 2800 Series Routers</a>	Describes safety recommendations, site requirements, and required tools and equipment, and includes an installation checklist.
<a href="#">Port and Cable Information for Cisco 2800 Series Routers</a>	Provides information about cables needed to install your Cisco 2800 series router.
<a href="#">Chassis Installation Procedures for Cisco 2800 Series Routers</a>	Describes how to install your Cisco 2800 series router on a desktop, in a rack, or on a wall.
<a href="#">Cable Connection Procedures for Cisco 2800 Series Routers</a>	Describes how to connect your Cisco 2800 series router to a power source and to networks and external devices.
<a href="#">Power Up and Initial Configuration Procedures for Cisco 2800 Series Routers</a>	Describes how to power up your Cisco 2800 series router and perform an initial configuration to provide network access.
<a href="#">Troubleshooting Cisco 2800 Series Routers</a>	Describes how to isolate problems, read LEDs, and interpret error and recovery messages.
<a href="#">Installing Network Modules in Cisco 2800 Series Routers</a>	Contains links to the procedures for installing network modules in external chassis slots.
<a href="#">Installing Interface Cards in Cisco 2800 Series Routers</a>	Contains links to the procedures for installing the various types of interface card in external chassis slots.

**Table 1** Hardware Documentation for Cisco 2800 Series Routers (Continued)

Topic	Description
<a href="#">Installing and Upgrading Internal Modules in Cisco 2800 Series Routers</a>	Describes how to install or upgrade modules that are located internally within the router, such as memory modules, AIMs, PVDMs, and power supplies.
<a href="#">Removing and Installing CompactFlash Memory Cards in Cisco 2800 Series Routers</a>	Describes hardware installation procedures that do not require opening the chassis.

## Conventions

These documents use the conventions listed in [Table 2](#) to convey instructions and information:

**Table 2** Document Conventions

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

**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 publications 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 these publications, refer to the *Cisco 2800 Series Routers Regulatory Compliance and Safety Information* document that accompanied your router.

## Warning Definition



Warning

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### IMPORTANT SAFETY INSTRUCTIONS

**This warning symbol means danger. You are in a situation that could cause bodily injury. Before you work on any equipment, be aware of the hazards involved with electrical circuitry and be familiar with standard practices for preventing accidents. To see translations of the warnings that appear in this publication, refer to the translated safety warnings that accompanied this device.** Statement 1071

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### SAVE THESE INSTRUCTIONS

Waarschuwing

### BELANGRIJKE VEILIGHEIDSINSTRUCTIES

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

**Opmerking BEWAAR DEZE INSTRUCTIES.**

Varoitus

### TÄRKEITÄ TURVALLISUUTEEN LIITTYVIÄ OHJEITA

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

**Huomautus SÄILYTÄ NÄMÄ OHJEET**

Attention

### IMPORTANTES INFORMATIONS DE SÉCURITÉ

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

**Remarque CONSERVEZ CES INFORMATIONS**

**Warnung WICHTIGE SICHERHEITSANWEISUNGEN**

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

**Hinweis BEWAHREN SIE DIESE SICHERHEITSANWEISUNGEN AUF**

**Avvertenza IMPORTANTI ISTRUZIONI SULLA SICUREZZA**

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

**Nota CONSERVARE QUESTE ISTRUZIONI**

**Advarsel VIKTIGE SIKKERHETSINSTRUKSJONER**

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

**Merk TA VARE PÅ DISSE INSTRUKSJONENE**

**Aviso INSTRUÇÕES IMPORTANTES DE SEGURANÇA**

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

**Nota GARDE 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. Vea las traducciones de las advertencias que acompañan a este dispositivo.

**Nota GARDE 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. Se översättningarna av de varningsmeddelanden som finns i denna publikation, och se de översatta säkerhetsvarningarna som medföljer denna anordning.

**OBS! 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 mellékelt 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 legemeskadedigelse. 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 للإصابات. 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****ВАЖНИ БЕЗБЕДНОСНИ НАПАТСТВИЈА**

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 ОВИЕ НАПАТСТВИЈА**



**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 running your Cisco 2800 series router includes extensive features and functionality. For information that is beyond the scope of these documents, or for additional information, use the following resources:

**Timesaver**

Make sure that you have access to the documents listed in [Table 3](#). Some of these documents are available in print, and all are on the World Wide Web. If you need to order printed documents, see the [“Obtaining Documentation”](#) section on page 11.

**Table 3** *Related and Referenced Documents*

<b>Cisco Product</b>	<b>Document Title</b>
Cisco 2800 series routers	<a href="#">Cisco 2800 Series Routers Quick Start Guide</a>
	<a href="#">Software configuration documentation for Cisco 2800 series routers</a>
	<a href="#">Cisco 2800 Series and Cisco 3800 Series Routers Regulatory Compliance and Safety Information</a>
	<a href="#">Cisco 2800 Series Cards and Modules</a>
	<a href="#">Cisco Modular Access Router Cable Specifications</a>
	<a href="#">Cisco RPS-675 Redundant Power System Hardware Installation Guide</a>
	<a href="#">Cisco 2800 Series Intergrated Services Routers Quick Start Guide</a>
	<a href="#">Cisco Network Modules Hardware Installation Guide</a>
	<a href="#">Installing Cisco Interface Cards in Access Routers</a>
	<a href="#">Cisco 2800 Serie Hardware Installation</a>
Network management system	<a href="#">Network management software documentation</a>
Cisco IOS software	<a href="#">Cisco IOS software documentation</a> , all releases. Refer to the 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\\_inpck/cetrans.htm](http://www.cisco.com/univercd/cc/td/doc/es_inpck/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](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	

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You can access the Cisco website at this URL:

<http://www.cisco.com>

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[http://www.cisco.com/public/countries\\_languages.shtml](http://www.cisco.com/public/countries_languages.shtml)

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[http://www.cisco.com/en/US/docs/general/Illus\\_process/PDI/pdi.htm](http://www.cisco.com/en/US/docs/general/Illus_process/PDI/pdi.htm)

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<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:

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**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.

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- 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:

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- *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:

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- *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:

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- *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:

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- *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>

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# Installing and Upgrading Fans in Cisco 2811 Series Routers

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This document describes how to install or upgrade fans that are located internally within a Cisco 2811 series integrated services router. You need to remove the cover from the router to install or remove any of these items. The document contains the following sections:

- [Safety Warnings, page 1](#)
- [Removing the Chassis Cover, page 2](#)
- [Locating the Fan, page 5](#)
- [Installing and Removing the Fans, page 5](#)
- [Installing the Chassis Cover, page 13](#)

Before you begin the fan replacement procedure, disconnect the power and remove the cover, as described in the [“Removing the Chassis Cover” section on page 2](#). After you complete the fan replacement procedure, install the chassis cover as described in the [“Installing the Chassis Cover” section on page 13](#).

## Safety Warnings



Warning

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**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

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Warning

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

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Warning

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

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**Warning**

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



**Warning**

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



**Warning**

**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



**Warning**

**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

## Removing the Chassis Cover

Cisco 2811 series routers have a cover that lifts off after you slide it free from front panel.



**Caution**

*Do not*, under any circumstances, tamper with or attempt to remove the safety shields protecting the WIC/HWIC slots and connectors on the Cisco 2811 routers.

## Removing the Cover from Cisco 2811 Routers

To remove the chassis cover for a Cisco 2811 series router, follow these steps. You will need a number 2 Phillips screwdriver and a flat-blade screwdriver with a blade width of  $1/4 \pm 1/32$  inch (5 to 7 mm). Rack-mounted routers must be removed from the rack and positioned on a flat surface before you start removing the cover.



**Caution**

To prevent damage to the chassis, follow this procedure to remove the cover. Do not pry on the plastic bezel or on the ears at either side of the chassis on the back.

The following warning applies only if the router is provided with a DC power input:



**Warning**

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

**Step 1** Make sure that the router is turned off and disconnected from its power source.



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

**Step 2** If rack-mounting brackets are attached to the chassis, remove them, using a Phillips screwdriver.

**Step 3** Remove the four screws at the back of the top cover, using a Phillips screwdriver.

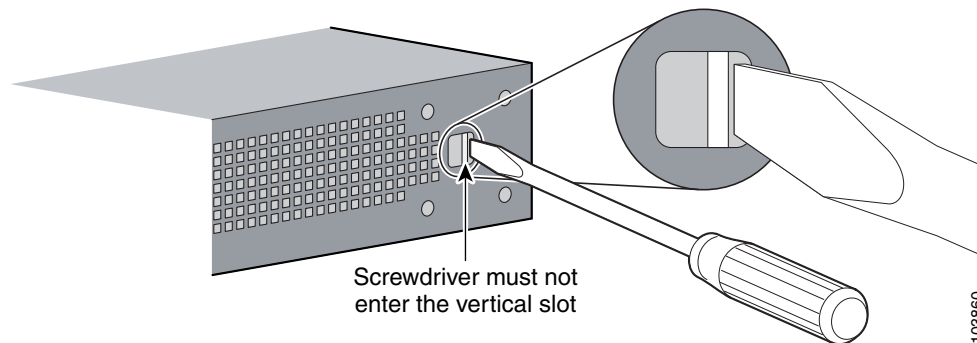
**Step 4** Perform the following steps to loosen the cover from the chassis:

- a. Insert the blade of the 1/4-inch screwdriver straight into the square hole on either side of the chassis near the back, so that it fits against the chassis and does *not* go past the chassis and into the narrow slot. See [Figure 1](#).



**Caution** Make sure that the tip of the screwdriver does *not* slide into the narrow vertical slot that is visible inside the square hole. The tip of the screwdriver should rest on the metal tab just inside the chassis cover and to the right of the vertical slot.

**Figure 1** Inserting the Screwdriver into the Side of the Chassis

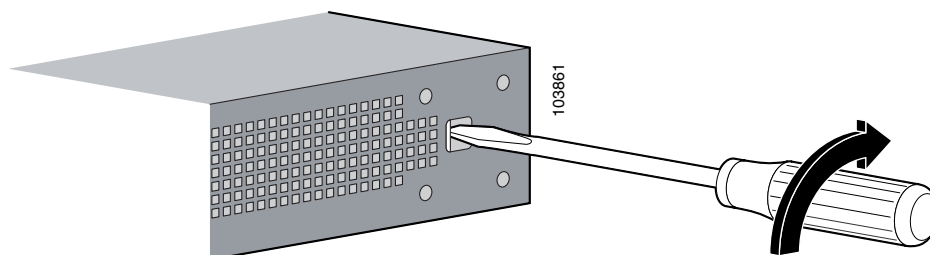


- b. With the screwdriver positioned as required in [Step a.](#) above, rotate the screwdriver a quarter turn toward the back of the chassis to loosen one side of the cover. See [Figure 2](#).



**Caution** The friction fit may be fairly tight; however, if the cover does not move with moderate effort, make sure that the screwdriver is *not* inserted into the narrow vertical slot.

**Figure 2** Rotating the Screwdriver to Loosen the Chassis Cover



- c. Repeat [Step a.](#) and [Step b.](#) for the opposite side of the chassis.

The cover should now be positioned back from the bezel about 1/4 inch (6 to 7 mm). If it is not, repeat [Step a.](#) and [Step b.](#) for one or both sides of the chassis.

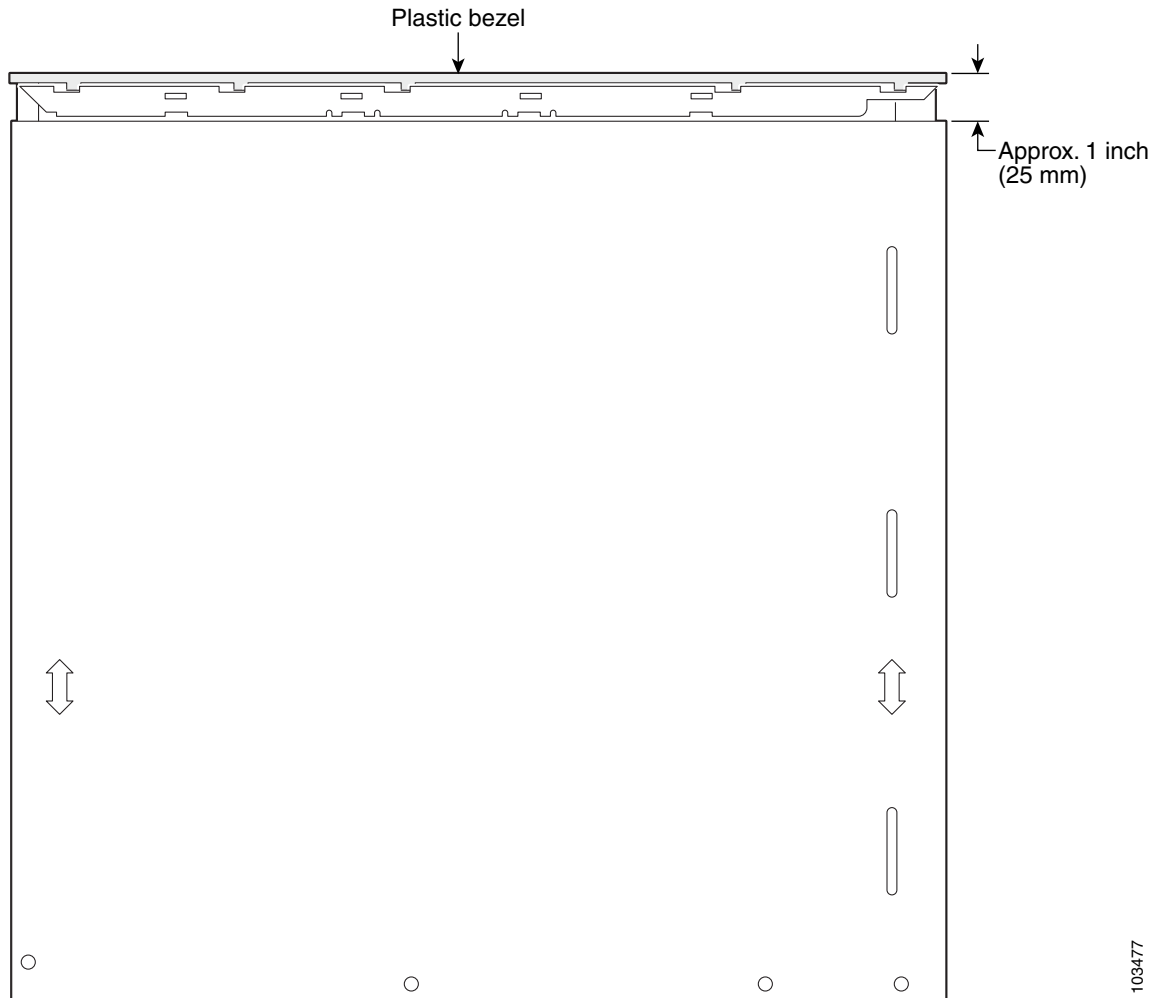
**Step 5** Slide the cover toward the back of the chassis until it contacts a stop (about 1 inch [25 mm]). The front edge of the cover should be free. See [Figure 3](#).



**Note** After the cover is loosened as in [Step 4](#), there may still be some friction to overcome as you complete the removal. However, do not use the screwdriver again as in [Step 4](#).

**Step 6** Lift the cover free of the router chassis.

**Figure 3** Cisco 2811 Router—Cover in Position for Removal

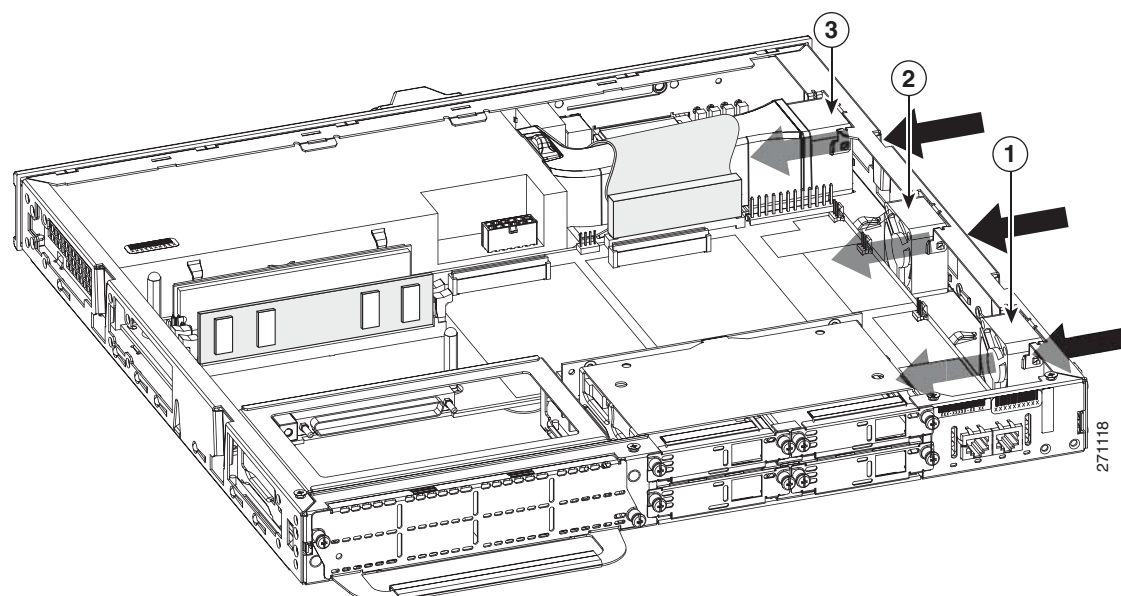


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# Locating the Fan

Figure 4 shows the locations of the fans in a Cisco 2811 series router.

**Figure 4** Fan Locations in Cisco 2811 Routers



1	System fan	2	System fan
3	Power supply fan		



**Note** The fan numbers in Figure 4 correlate to IOS show environment command numbers. The arrows show proper air flow.

## Installing and Removing the Fans

The router fans rest on the chassis base and have a wire that connects to the system board.

Before you remove or install a fan, remove the chassis cover as described in the “[Removing the Chassis Cover](#)” section on page 2.



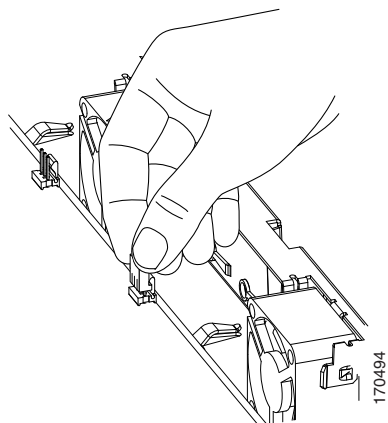
When you remove or install a fan, always wear an ESD-preventive wrist strap, and ensure that it makes good contact with your skin. Connect the equipment end of the wrist strap to the metal part of the chassis.

## Removing the System Fans

To remove a system fan, perform the following procedure. To complete this procedure, you may need a flat-blade screwdriver.

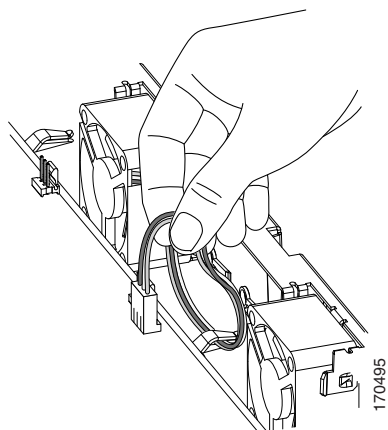
- 
- Step 1** Locate the fans to be removed. See [Figure 4](#) for the location of the fans.
  - Step 2** Disconnect the fan connector from the system board as shown in [Figure 5](#).

**Figure 5** *Disconnecting the System Fan Connector from the System Board*



- Step 3** Remove the fan wire from the wire management clip, which is located on the chassis base as shown in [Figure 6](#).

**Figure 6** *Removing the Fan Wire from the Wire Management Clip*



- Step 4** Remove the fan by sliding it upward, and then tilting it toward the chassis wall as shown in [Figure 8](#).



**Note** If the fan is difficult to grasp when sliding upward, use a flat-blade driver for leverage as shown in [Figure 7](#).

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**Figure 7** Using a Flat-Blade Screwdriver for Added Leverage When Removing the Fan

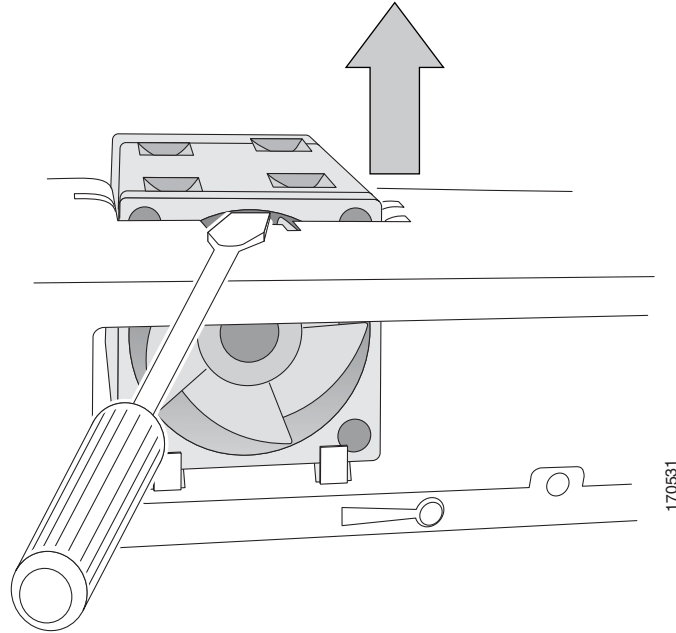
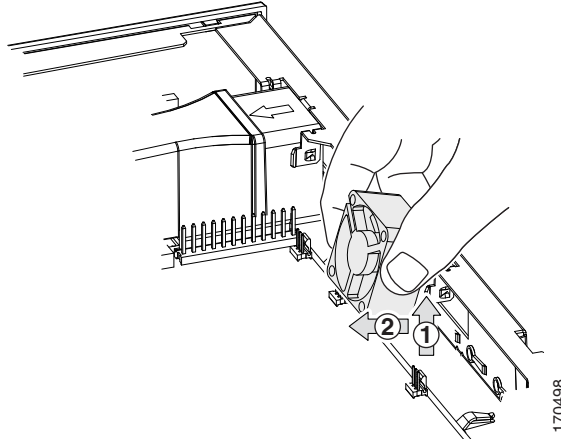


Figure 8 shows the fan being tilted away from the chassis to remove it.

**Figure 8** Lifting and Tilting the Fan to Remove



<b>1</b>	Lift the fan upward	<b>2</b>	Tilt the fan toward chassis
----------	---------------------	----------	-----------------------------

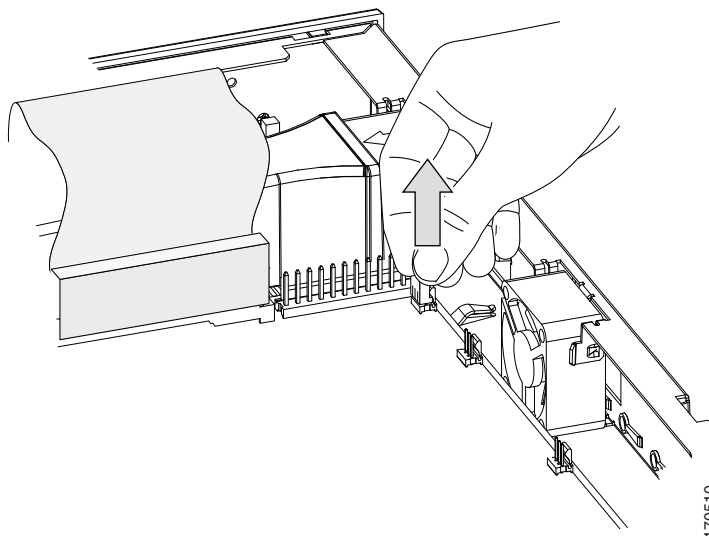
**Step 5** Place the fan in an antistatic bag to protect it from ESD damage.

## Removing the Power Supply Fan

To remove the power supply fan, perform the following procedure. To complete this procedure, you may need a flat-blade screwdriver.

- 
- Step 1** Locate the fan to be removed. See [Figure 4](#) for the location of the fans.
- Step 2** Disconnect the fan connector from the system board as shown in [Figure 9](#).

**Figure 9** *Disconnecting the Power Supply Fan Connector*



- Step 3** Lift the ribbon cable to allow slack to remove the air baffle as shown in [Figure 10](#).



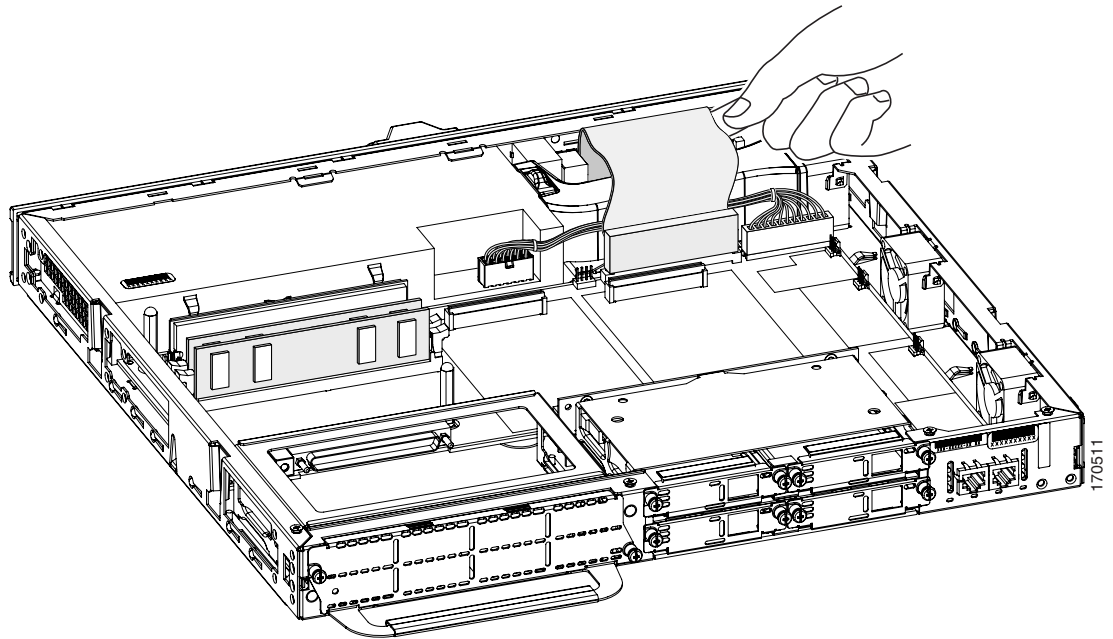
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**Note** It is not necessary to disconnect the ribbon cable from the CompactFlash printed circuit board (PCB) or system board.

---

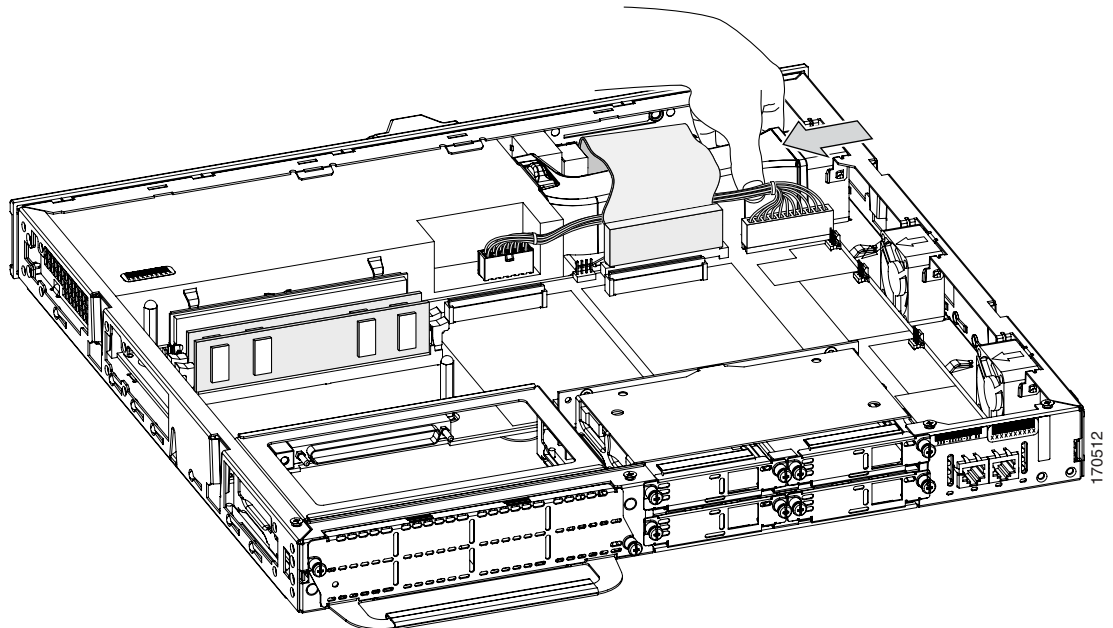


**Figure 10** *Lifting the Ribbon Cable*



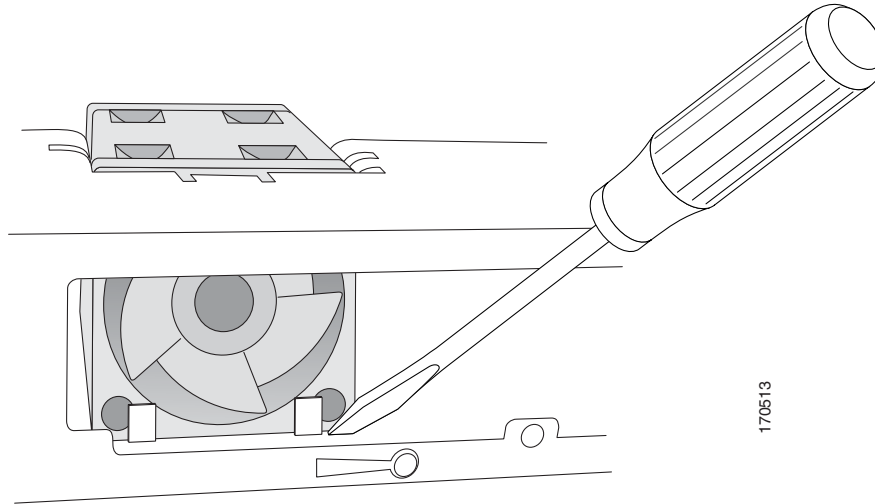
- Step 4** Remove the plastic air baffle by gently squeezing the air baffle sides, disengaging the baffle from the chassis base as shown in [Figure 11](#).

**Figure 11** *Removing the Air Baffle*



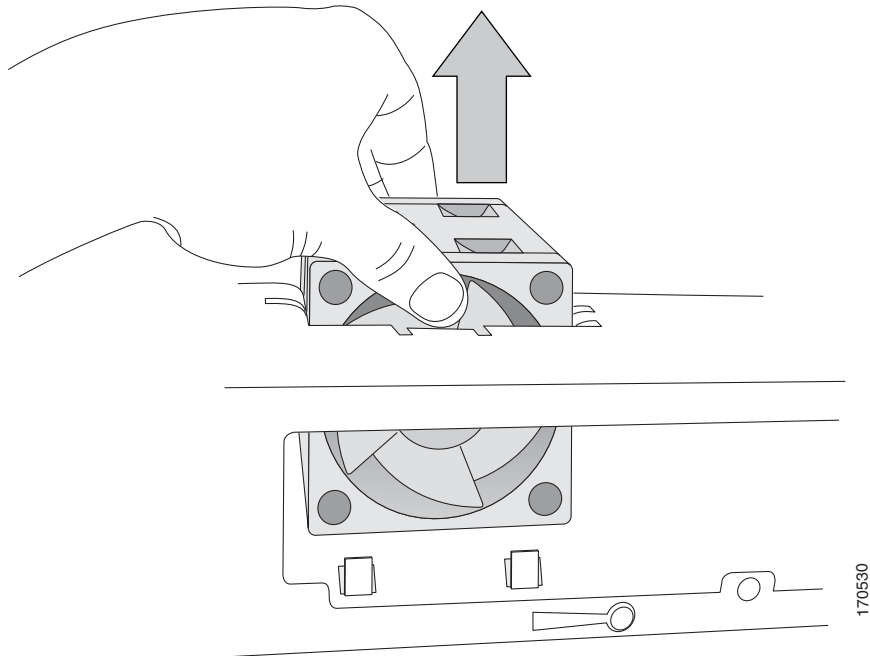
- Step 5** Remove the fan wire from the wire management clip, which is located on the chassis base as shown in [Figure 6](#).
- Step 6** Remove the fan by placing a flat-blade screwdriver at the base of the plastic fan housing and lifting the fan in a vertical position, as shown in [Figure 12](#).

**Figure 12** *Using a Flat-Blade Screwdriver to Lift the Fan*



**Step 7** Disengage the fan from the side attachment slots and push the fan toward the center of the chassis, and remove the fan as shown in [Figure 13](#).

**Figure 13** *Disengaging the Fan from the Side Attachment Slots*



**Step 8** Place the fan in an antistatic bag to protect it from ESD damage.

## Installing the Fans

To install the system and power supply fans, perform the following procedure:

**Step 1** Locate the fan slot. See [Figure 4](#) for the location of the fans.

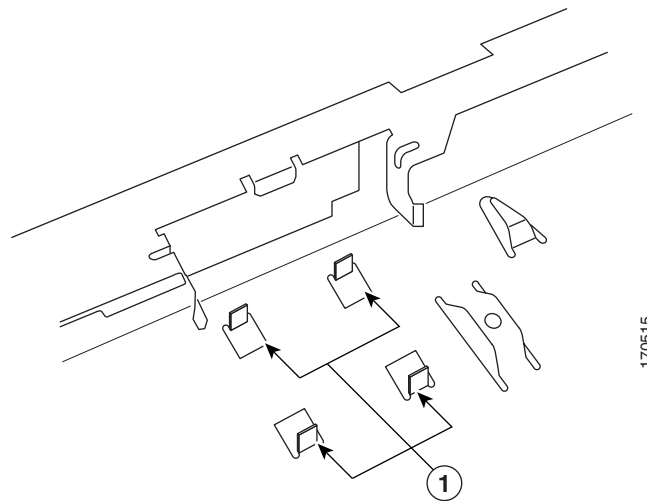


**Note** The fan should seat within the four tabs shown in [Figure 14](#).



**Note** The fans have side attachment slots that are used to guide the fan into place. See [Figure 16](#).

**Figure 14** Positioning the Fan



**1** Tabs

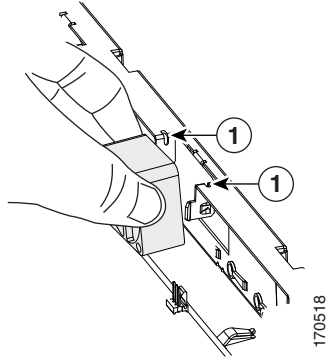


**Caution**

Verify that the side attachment slots are not bent out of position when you install the fan. Misaligned side attachment slots will not properly secure the fan when in position.

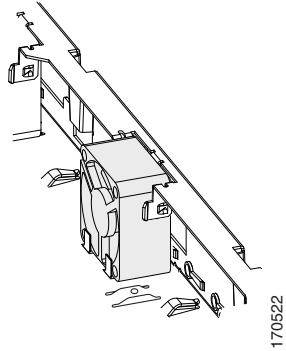
**Step 2** Insert the fan in the side attachment slots (as shown in [Figure 16](#)), and slide the fan down over the locking tabs at the chassis base as shown in [Figure 17](#).

**Figure 15** *Inserting the Fan*



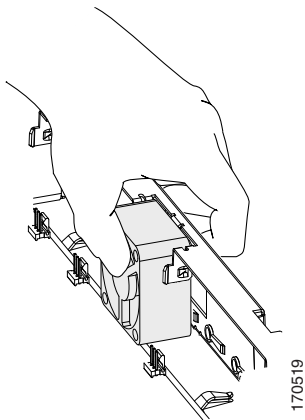
**1** Side attachment slots

**Figure 16** *Fan Inserted*



**Step 3** Angle the fan into the locking tabs, and verify that the fan has snapped into the locking tabs as shown in [Figure 17](#).

**Figure 17** *Angling the Fan Into the Locking Tabs*

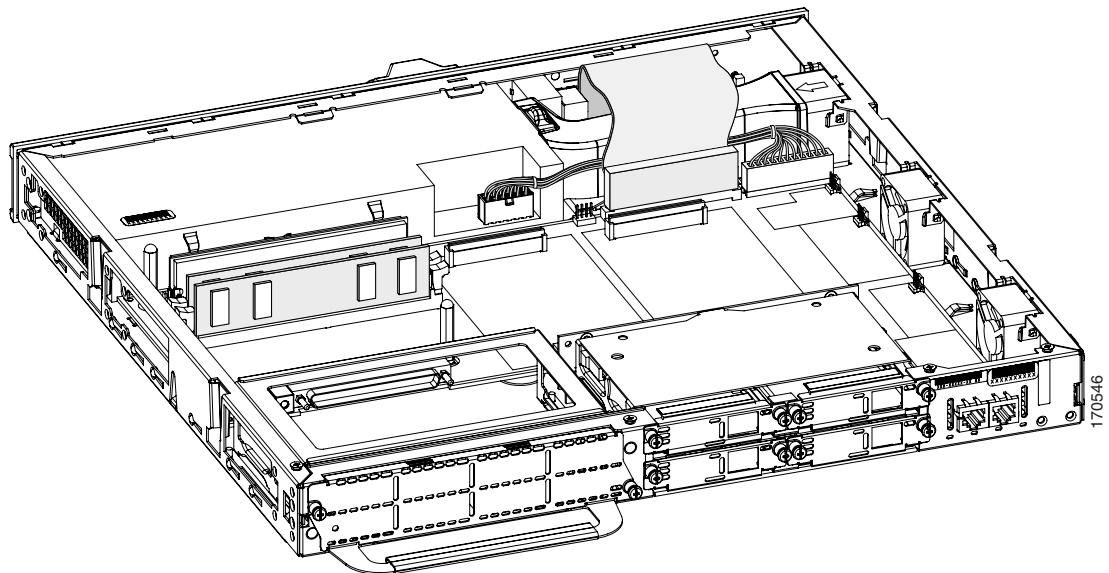




**Note** When the fan is properly seated, the top and bottom of the fan should be flush against the chassis wall.

- Step 4** Thread the fan wire under the wire management feature at the chassis base as shown in [Figure 6](#).
- Step 5** Attach the fan connector to the system board.
- Step 6** (Power supply fan only) Install the plastic air baffle below the ribbon cable, and secure the plastic tabs onto the chassis base. Gently squeeze the baffle so that the four bottom hooks can snap into the sheet metal hold-downs.
- Step 7** (Power supply fan only) Fold the ribbon cable below the sheet metal flange, as shown in [Figure 18](#) to prevent damage when installing the cover.

**Figure 18** *Ribbon Cable Orientation*



**Note** Verify that the power cable and ribbon cable have remained secure to the CompactFlash PCB and system board.

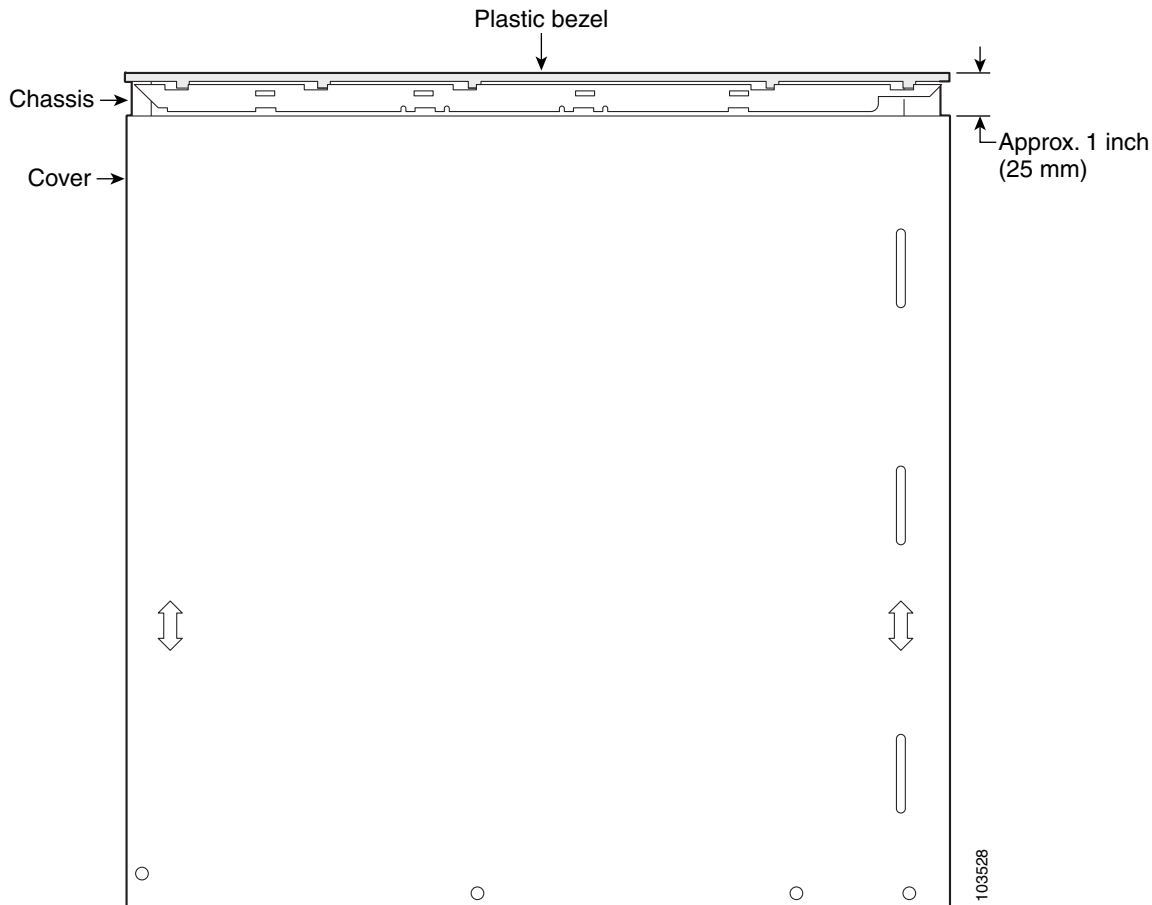
## Installing the Chassis Cover

The Cisco 2811 series router has a cover that slides into place after you position it flat on top of the chassis.

To install the chassis cover on the router, follow these steps. You will need a number 2 flat-blade screwdriver.

- Step 1** Position the cover so that it rests flat on the chassis, with the front (bezel) end of the cover about 1 inch (25 mm) from the front end of the chassis. See [Figure 19](#).

**Figure 19** Cover in Position for Installation



- Step 2** Slide the cover toward the front so that the male flanges enter the slots and the cover is fully closed. Press the cover flat against the chassis while you slide the cover closed.
- Step 3** Use a Phillips screwdriver to install the four screws at the top back of the cover.

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## Overview of Cisco 2800 Series Routers

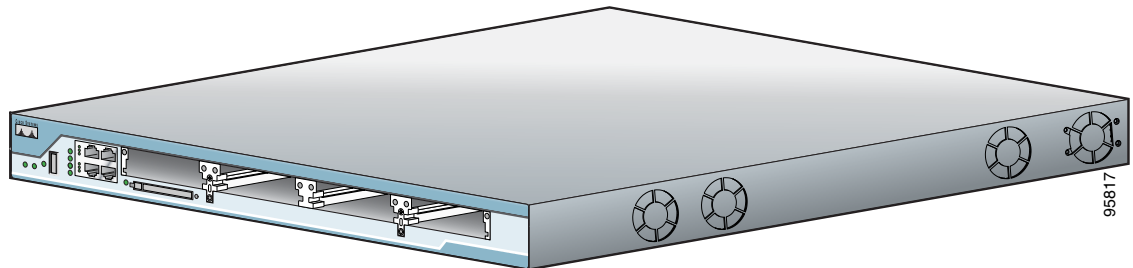
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The Cisco 2800 series of integrated services routers offers secure, wire-speed delivery of concurrent data, voice, and video services. The modular design of the Cisco 2800 series routers provides maximum flexibility, allowing you to configure your router to meet evolving needs. The Cisco 2800 series routers incorporate data, security, and voice services in a single system for fast, scalable delivery of crucial business applications. The routers offer features such as hardware-based VPN encryption acceleration, intrusion-protection and firewall functions, and optional integrated call processing and voice mail. The routers offer a wide variety of network modules and interfaces, voice digital signal processor (DSP) slots, high-density interfaces for a wide range of connectivity requirements, and sufficient performance and slot density for future network expansion requirements and advanced applications.

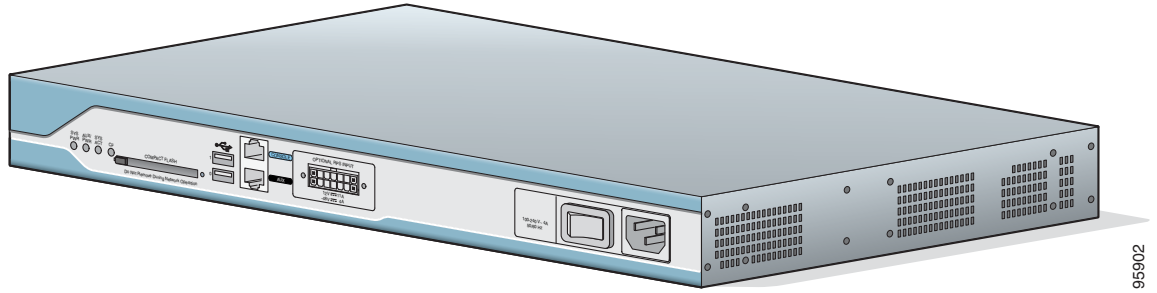
The Cisco 2800 series consists of four versions. The Cisco 2801 routers and Cisco 2811 routers are one rack unit in height and have two 10/100 LAN ports. The more powerful Cisco 2821 routers and Cisco 2851 routers are two rack units in height and have two 10/100/1000 LAN ports. The higher-end router platforms of the Cisco 2800 series offer increased performance, increased slot density including network module slots and extension voice module slots and increased inline power output.

[Figure 1](#), [Figure 2](#), and [Figure 3](#) show front views of the Cisco 2800 series routers.

**Figure 1** Front View of a Cisco 2801 Router

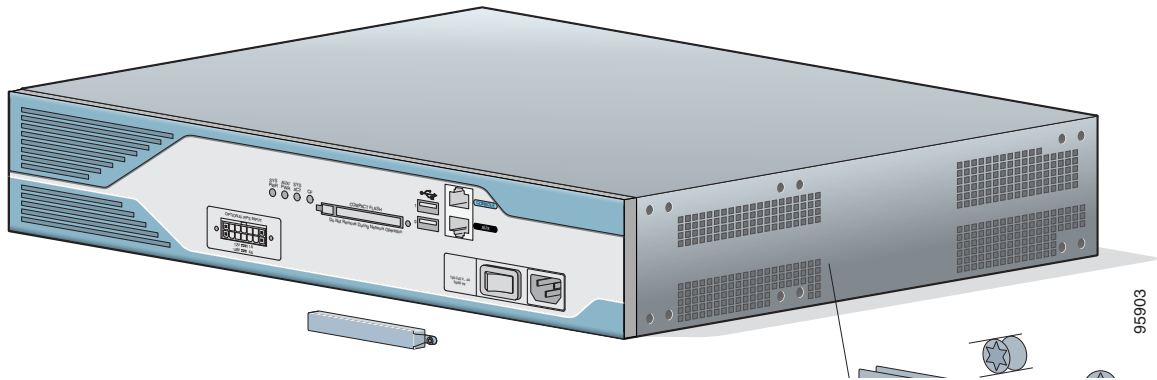


**Figure 2** Front View of a Cisco 2811 Router



95902

**Figure 3** Front View of a Cisco 2821 or Cisco 2851 Router



95903

This chapter describes the features and specifications of the routers and includes the following sections:

- [Hardware Features, page 2](#)
- [Chassis Views, page 11](#)
- [Interface Numbering, page 16](#)
- [Specifications, page 18](#)
- [Regulatory Compliance, page 25](#)

## Hardware Features

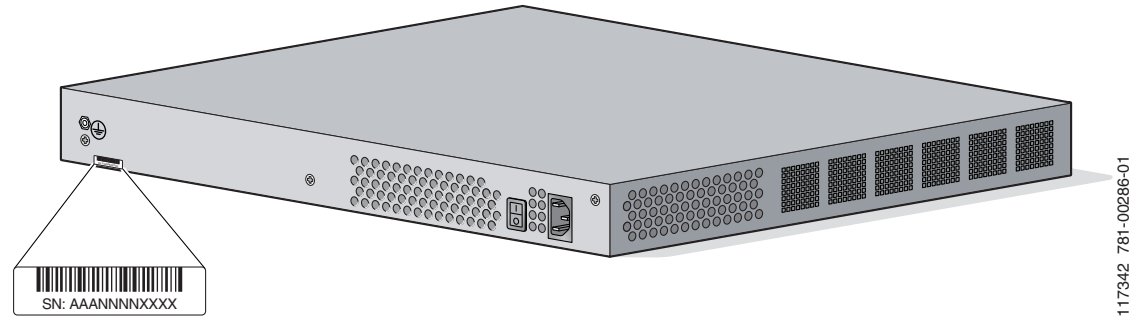
This section describes the basic features of Cisco 2800 series routers, including product identification, built-in interfaces, modules, memory, LED indicators, chassis ventilation, and the internal clock.

## Product Serial Number Location

The serial number label for Cisco 2801 routers is located on the rear of the chassis, along the bottom edge near the lower left corner. (See [Figure 4](#).)



**Figure 4** Serial Number Location on the Cisco 2801 Router

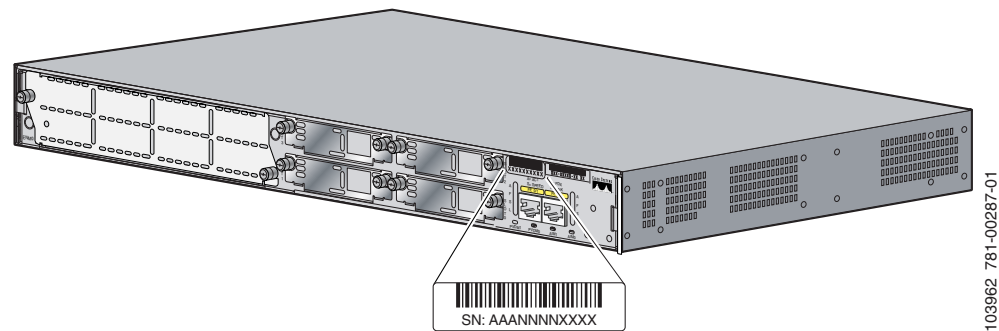


**Note**

The serial number for Cisco 2801 routers is 11 characters long.

The serial number label for Cisco 2811 routers is located on the rear of the chassis, near the top right corner, to the left of the CLEI label. (See [Figure 5](#).)

**Figure 5** Serial Number Location on the Cisco 2811 Router

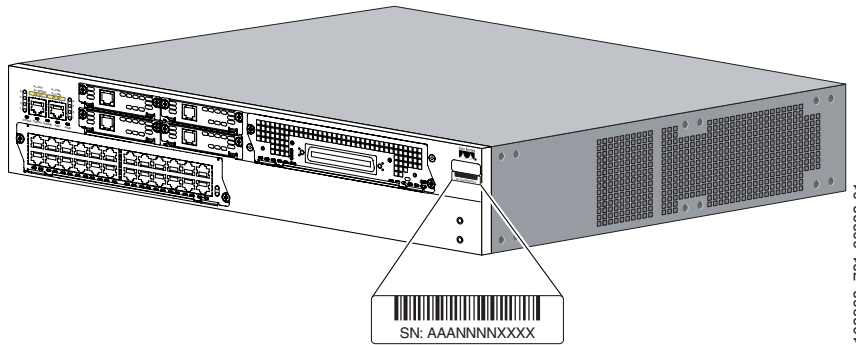


**Note**

The serial number for Cisco 2811 routers is 11 characters long.

The serial number label for Cisco 2821 and Cisco 2851 routers is located on the rear of the chassis, near the top right corner, below the CLEI label. (See [Figure 6](#).)

**Figure 6** Serial Number Location on the Cisco 2821 and Cisco 2851 Routers



**Note**

The serial number for Cisco 2821 and Cisco 2851 routers is 11 characters long.

## Cisco Product Identification Tool

The Cisco Product Identification (CPI) 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 Interfaces

[Table 1](#) summarizes the interface ports built into the chassis.

**Table 1** Summary of Cisco 2800 Series Built-In Interfaces

Model	100BASE-T Fast Ethernet (FE) Ports (RJ-45)	1000BASE-T Gigabit Ethernet (GE) Ports (RJ-45)	Universal Serial Bus (USB) Ports	Console Port (RJ-45)	Auxiliary Port (RJ-45)
Cisco 2801	2	—	1	1	1
Cisco 2811	2	—	2	1	1
Cisco 2821	—	2	2	1	1
Cisco 2851	—	2	2	1	1

## Removable and Interchangeable Modules

Table 2 summarizes the optional modules that can be installed in the router to provide specific capabilities. The network modules, extension voice modules, and interface cards fit into slots, located on the front of the chassis on the Cisco 2801 router, and on the rear of the chassis on the Cisco 2811, Cisco 2821, and Cisco 2851 routers; they can be removed and installed without opening the chassis. Advanced integration modules (AIMs), expansion DRAM memory modules (DIMMs), and packet voice data modules (PVDMs) plug into connectors inside the chassis; they can be removed and installed only by opening the chassis.

**Table 2** Summary of Cisco 2800 Series Removable and Interchangeable Modules

Router Model	External Modules (In chassis slots)			Internal Modules	
	Network Modules	High-Speed WAN Interface Cards (HWICs)	Extension Voice Modules (EVMs)	Advanced Integration Modules (AIMs)	Packet Voice Data Modules (PVDMs) <sup>1</sup>
Cisco 2801	—	2 single-wide (HWIC) or 2 double-wide (HWIC-D)  1 WIC/VWIC/VIC slot  1 VWIC/VIC (voice-only)	—	2	2
Cisco 2811	1 network module (NM) or 1 network module enhanced (NME)	4 single-wide (HWIC) or 2 double-wide (HWIC-D)	—	2	2
Cisco 2821	1 network module (NM) or 1 network module enhanced (NME) or  1 network module enhanced extended (NME-X)	4 single-wide (HWIC) or 2 double-wide (HWIC-D)	1	2	3
Cisco 2851	1 network module (NM) or 1 network module enhanced (NME) or  1 network module enhanced extended (NME-X) or  1 network module double-wide (NMD) or  1 network module enhanced extended double-wide (NME-XD)	4 single-wide (HWIC) or 2 double-wide (HWIC-D)	1	2	3

1. Cisco 2800 series routers use PVDM II modules that are not compatible with Cisco 2600 series routers.

## Memory

Cisco 2800 series routers contain the following types of memory:

- **DRAM**—Stores the running configuration and routing tables and is used for packet buffering by the network interfaces. Cisco IOS software executes from DRAM memory.
- **Boot/NVRAM**—Internal flash memory. Stores the bootstrap program (ROM monitor), the configuration register, and the startup configuration.
- **Flash memory**—External flash memory. Stores the operating system software image.

Table 3 summarizes the memory options for Cisco 2800 series routers. The default memory numbers for RAM represent the minimum usable memory. You can install additional RAM in multiples of the default amount, up to the maximum amount.

**Table 3 Router Memory Specifications**

Router Platform	DRAM	Boot/NVRAM	Flash Memory
Cisco 2801	Type—SDRAM DIMM DIMM sizes—64 MB, 128 MB, 256 MB DIMM expansion slots—1 <sup>1</sup> Default onboard memory—128 MB Maximum memory—384 MB	Internal 4-MB flash memory	External CompactFlash memory cards of the following optional sizes: <ul style="list-style-type: none"> <li>• 64 MB (default)</li> <li>• 128 MB</li> </ul>
Cisco 2811	Type—ECC DDR (error-correcting code, double data rate) SDRAM DIMM DIMM sizes—256 MB, 512 MB DIMM slots—2 Default onboard memory— none Default memory—256 MB Maximum memory—768 MB <sup>2</sup>	Internal 2-MB flash memory	External CompactFlash memory cards of the following optional sizes: <ul style="list-style-type: none"> <li>• 64 MB (default)</li> <li>• 128 MB</li> <li>• 256 MB</li> </ul>
Cisco 2821	Type—ECC DDR (error-correcting code, double data rate) DRAM DIMM		
Cisco 2851	DIMM sizes—256 MB, 512 MB DIMM slots—2 Default onboard memory— none Default memory—256 MB Maximum memory—1024 MB <sup>3</sup>		

1. Cisco 2801 routers have 128 MB of SDRAM soldered onto the system board. You can install a DIMM into the expansion slot to increase memory to the maximum of 384 MB.
2. Cisco 2811 routers can accept one 256 MB and one 512 MB DIMM to provide 768 MB of usable memory.
3. Cisco 2851 routers can accept two 512 MB DIMMs to provide 1024 MB of usable memory.

## Power

Table 4 summarizes the power options for Cisco 2800 series routers. Cisco 2801 routers are equipped for operation using AC power only. Cisco 2811, Cisco 2821, and Cisco 2851 routers can be equipped for operation using either AC or DC input power by installation of the appropriate chassis power supply. IP phone power is supported if the appropriate AC-input chassis power supply is installed.

**Table 4** Summary of Cisco 2800 Series Power Options

Router Model	Power Option	Input	IP Phone Power Output
Cisco 2801	AC input without IP phone power output	100 - 240 VAC, 2 A	None
	AC input with IP phone power output	100 - 240 VAC, 5 A	-48 VDC, 120 W
Cisco 2811	AC input without IP phone power output	100 - 240 VAC, 2 A	None
	AC input with IP phone power output	100 - 240 VAC, 4 A	-48 VDC, 160 W
	DC input without IP phone power output	24 - 60 VDC, 8 A	None
Cisco 2821	AC input without IP phone power output	100 - 240 VAC, 3 A	None
	AC input with IP phone power output	100 - 240 VAC, 8 A	-48 VDC, 240 W
	DC input without IP phone power output	24 - 60 VDC, 12 A	None
Cisco 2851	AC input without IP phone power output	100 - 240 VAC, 3 A	None
	AC input with 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 2811, Cisco 2821, and Cisco 2851	Backup power for AC- or DC-powered routers: Cisco Redundant Power System (RPS-675)	100 VAC, 10 A, or 240 VAC, 6 A	The Cisco RPS provides IP phone power only if the chassis power supply supports IP phone power. With Cisco 2811: -48 VDC, 160 W With Cisco 2821: -48 VDC, 240 W With Cisco 2851: -48 VDC, 360 W

## LED Indicators

Table 5 and Table 6 summarize the LED indicators that are located in the router bezel or chassis, but not in removable modules or interface cards.

To see descriptions of LEDs in removable modules and interface cards, refer to the applicable documentation for those products: the [Cisco Network Modules Hardware Installation Guide](#) or the [Cisco Interface Cards Installation Guide](#).

For LED troubleshooting information, including possible trouble causes and corrective actions, see [Table 1](#) in the “[Troubleshooting Cisco 2800 Series Routers](#)” document.

**Table 5 Summary of Cisco 2801 Series LED Indicators**

LED	Color	Description	Location
SYS PWR	Green	Router has successfully booted up and the software is functional. This LED blinks while booting or in the ROM monitor.	Front
SYS ACT	Green	Blinking when any packets are transmitted or received on any WAN or LAN or system is monitoring internal activities.	Front
CF	Green	On when flash memory is busy. Do not remove the CompactFlash memory card when this light is on.	Front
AUX/PWR	Green/ Amber	Indicates that the inline power supply is present (LED is on). When the inline power supply is not installed, the LED is off. If the power supply is working properly, the LED is green. If the power supply is not working properly, the LED is amber, indicating an inline power failure.	Front
FE 0 Link	Green	On when the router is correctly connected to a local Ethernet LAN through Ethernet port 0.	Front
FE 0 100	Green	On indicates a 100-Mbps link. Off indicates a 10-Mbps link.	Front
FE 0 FDX	Green	On indicates full-duplex operation. Off indicates half-duplex operation.	Front
FE 1 Link	Green	On when the router is correctly connected to a local Ethernet LAN through Ethernet port 1.	Front
FE 1 100	Green	On indicates a 100-Mbps link. Off indicates a 10-Mbps link.	Front
FE 1 FDX	Green	On indicates full-duplex operation. Off indicates half-duplex operation.	Front
AIM 0	Green	On indicates presence of an advanced integration module (AIM) in AIM slot 0.	Front
AIM 1	Green	On indicates presence of an AIM in AIM slot 1.	Front
PVDM 0	Green	On indicates presence of a packet voice data module (PVDM) in PVDM slot 0.	Front
PVDM 1	Green	On indicates presence of a PVDM in PVDM slot 1.	Front

**Table 6 Summary of Cisco 2811, Cisco 2821, and Cisco 2851 Series LED Indicators**

LED Location	LED Label	LED Color or State	Meaning	
Front of chassis	SYS PWR	Solid green	System is operating normally	
		Blinking green	System is booting or is in ROM monitor mode	
		Amber	System error	
		Off	Power is off or system board is faulty	
	AUX/PWR	Green	IP phone power operating normally (if installed), or Cisco Redundant Power System (RPS) operating normally (if installed)	
		Amber	IP phone power fault (if installed), or Cisco Redundant Power System (RPS) fault (if installed)	
		Off	IP phone power and Cisco RPS are not installed	
	SYS ACT	Blinking green or solid green	Packet transfers are occurring	
		Off	No packet transfers are occurring	
	CF	Green	Flash memory is being accessed; do not eject the CompactFlash memory card	
		Off	Flash memory is not being accessed; okay to eject the CompactFlash memory card	
	Rear of chassis	A (=ACT)	Blinking green or solid green	Packet activity in FE or GE port
			Off	No packet activity in FE or GE port
		F (=FDX)	Green	FE or GE port is operating in full-duplex mode
Off			FE or GE port is operating in half-duplex mode	
S (= Speed) <sup>1</sup>		1 blink + pause	FE or GE port operating at 10 Mbps	
		2 blinks + pause	FE or GE port operating at 100 Mbps	
		3 blinks + pause	GE port operating at 1000 Mbps (Cisco 2821 and Cisco 2851 only)	
L (= Link)		Green	FE or GE link is established	
		Off	No FE or GE link is established	
PVDM0		Green	PVDM in slot (0, 1, or 2) is initialized	
PVDM1		Amber	PVDM in slot (0, 1, or 2) is detected but not initialized	
PVDM2 <sup>2</sup>		Off	No PVDM installed in slot (0, 1, or 2)	
AIM0		Green	AIM in slot (0 or 1) is initialized	
AIM1		Amber	AIM in slot (0 or 1) has initialization error	
	Off	No AIM installed in slot (0 or 1)		

1. The Ethernet S (Speed) LED blinks only when the L (Link) LED is on.

2. The PVDM2 LED is applicable only to the Cisco 2821 and Cisco 2851 routers.

## Chassis Ventilation

Internal multispeed fans provide chassis cooling, controlled by an onboard temperature sensor.

The Cisco 2801 router has two fans. The Cisco 2801 router with inline power includes two additional fans integrated with the inline power supply, for a total of four fans. The Cisco 2801 internal fans operate at three different speeds, running at the slower speeds to conserve power and reduce fan noise at ambient temperatures below 40°C. They operate at the highest speed in ambient temperatures above 40°C.

The Cisco 2811 router has three fans that operate at a slower speed to conserve power and reduce fan noise at ambient temperatures below 32°C. They operate at high speed in ambient temperatures above 32°C.

The Cisco 2821 and Cisco 2851 routers have three fans that operate at a slower speed to conserve power and reduce fan noise at ambient temperatures below 40°C. They operate at high speed in ambient temperatures above 40°C.



**Caution**

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Ensure the device is not installed in close proximity to other devices which could lead to excessive pre-heating of air at the air intake of the router.

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**Caution**

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Your chassis installation must allow unrestricted airflow for chassis cooling.

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## Cisco 2800 Series Router Installation and Preventive Maintenance

Periodic inspection and cleaning of the external surface of the router is recommended to minimize the negative impact of environmental dust or debris on the router performance. The frequency of inspection and cleaning is dependent upon the severity of the environmental conditions. Cleaning involves vacuuming of router air intake and exhaust vents.



**Caution**

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Fans are dynamic Electro-Mechanical devices. As such, fans can fail for various electronic reasons, and will eventually fail due to mechanical wear-out. Sites with ambient temperatures consistently above 25 degree C and with potentially high levels of dust or debris may require fan servicing.

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## Real-Time Clock

An internal real-time clock with battery backup provides the system software with time of day on system power up. This allows the system to verify the validity of the certification authority (CA) certificate. In the Cisco 2811, Cisco 2821, and Cisco 2851 routers, the clock and battery are permanently installed; the battery lasts the life of the router under the operating environmental conditions specified for the router. The Cisco 2801 router has a socketed lithium battery. This battery lasts the life of the router under the operating environmental conditions specified for the router, and is not field-replaceable.



**Note**

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If the lithium battery in a Cisco 2801 router should fail, the router must be returned to Cisco for repair.

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Although the battery is not intended to be field-replaceable, the following warning must be heeded:



**Warning**

There is the danger of explosion if the battery is replaced incorrectly. Replace the battery only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer's instructions. Statement 1015

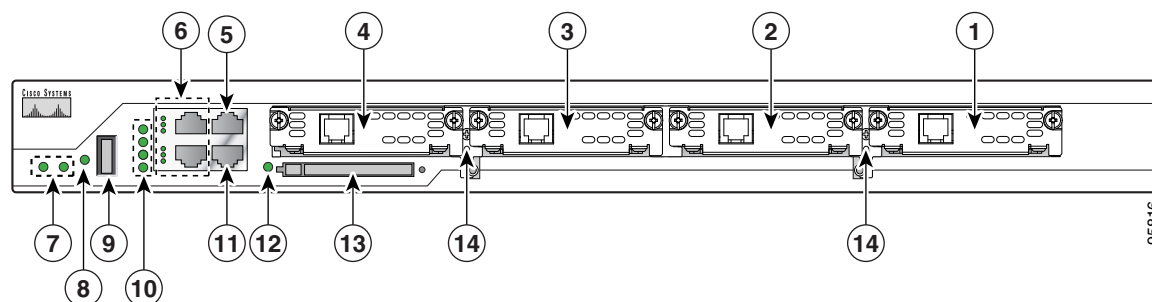
## Chassis Views

This section contains views of the front and rear panels of the Cisco 2800 series routers, showing locations of the power and signal interfaces, module slots, status indicators, and chassis identification labels.

### Cisco 2801 Chassis

Figure 7 shows the front panel of a Cisco 2801 router. Figure 8 shows the back panel.

**Figure 7** Front Panel of the Cisco 2801 Router



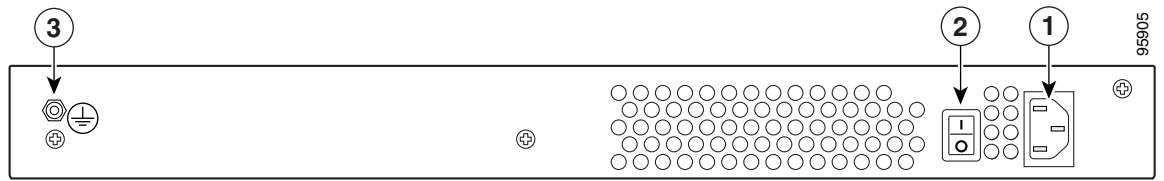
<b>1</b>	Slot 0 (VIC or VWIC, for voice only)	<b>8</b>	Auxiliary Power (AUX/PWR) LED
<b>2</b>	Slot 1 (WIC, VIC, VWIC, or HWIC)	<b>9</b>	Universal serial bus (USB) port
<b>3</b>	Slot 2 (WIC, VIC, or VWIC)	<b>10</b>	AIM/PVDM LEDs
<b>4</b>	Slot 3 (WIC, VIC, VWIC, or HWIC)	<b>11</b>	Auxiliary port
<b>5</b>	Console port	<b>12</b>	Compact flash (CF) LED
<b>6</b>	Fast Ethernet ports and LEDs	<b>13</b>	External CompactFlash memory card slot
<b>7</b>	System LEDs	<b>14</b>	Removable center card guides to allow double-wide HWIC-D installation

Double-wide HWICs can go into slots 0 and 1, and into slots 2 and 3.

**Note**

Slot 0 does not support PRI on T1/E1 VWICs, only channel-associated signaling (CAS) digital voice.

**Figure 8 Back Panel of the Cisco 2801 Router**

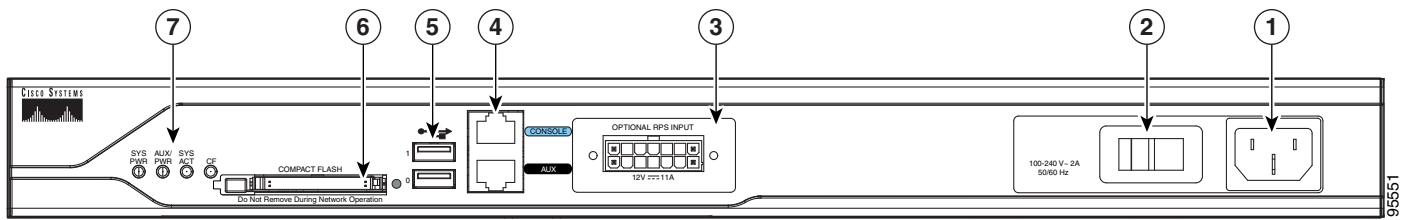


1	Input power connector	3	Chassis ground connection
2	On/Off switch		

## Cisco 2811 Chassis

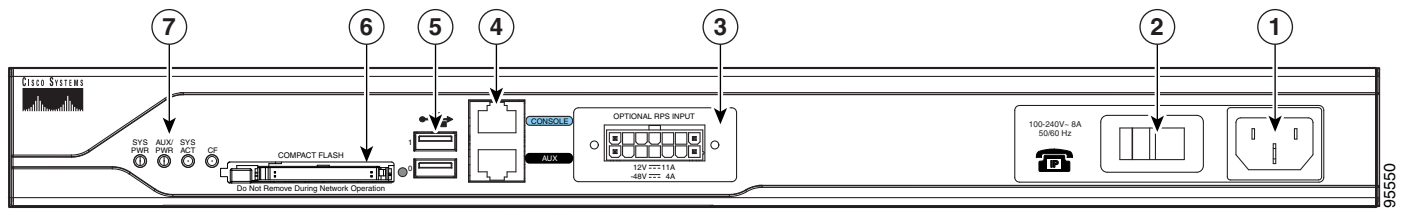
Figure 9, Figure 10, and Figure 11 show the front panel of a Cisco 2811 router. Figure 12 shows the rear panel of a Cisco 2811 router.

**Figure 9 Front Panel of Cisco 2811 Router with AC Input Power and Without IP Phone Power Output**



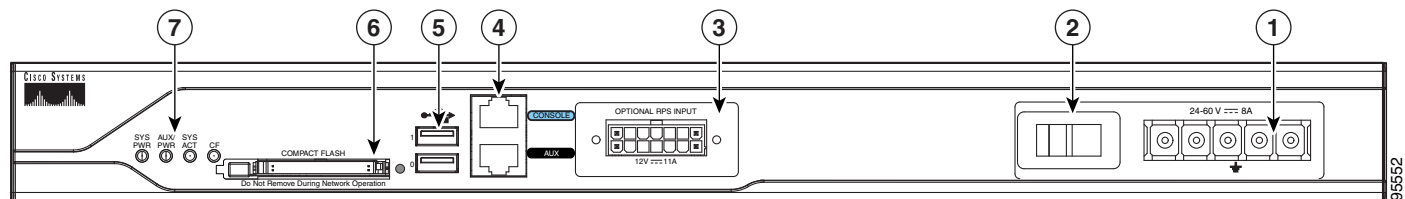
1	Input power connection	5	Universal serial bus (USB) ports
2	On/Off switch	6	External CompactFlash memory card slot
3	Cisco redundant power supply connector (covered if not used)	7	LED indicators
4	Console and auxiliary ports		

**Figure 10 Front Panel of Cisco 2811 Router with AC Input Power and with IP Phone Power Output**



1	Input power connection	5	Universal serial bus (USB) ports
2	On/Off switch	6	External CompactFlash memory card slot
3	Cisco redundant power supply connector (covered if not used)	7	LED indicators
4	Console and auxiliary ports		

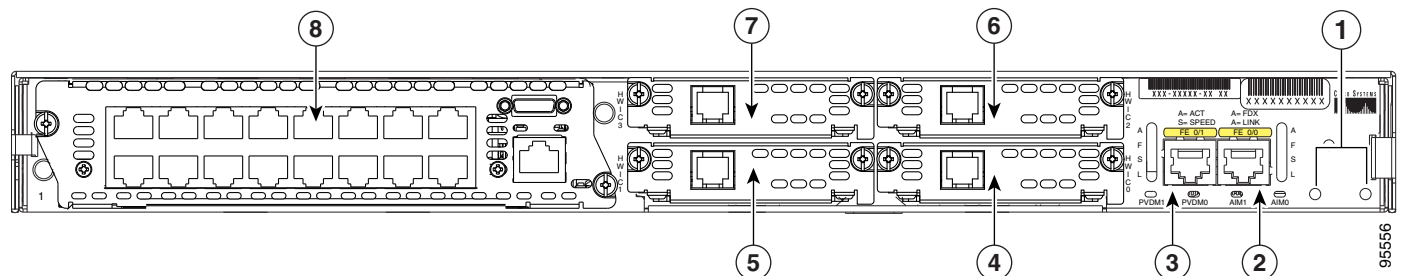
Figure 11 Front Panel of Cisco 2811 Router with DC Input Power



1	Input power connection	5	Universal serial bus (USB) ports
2	On/Stand-by switch <sup>1</sup>	6	External CompactFlash memory card slot
3	Cisco redundant power supply connector (covered if not used)	7	LED indicators
4	Console and auxiliary ports		

1. This switch does not turn off the power supply completely, but rather puts it in stand-by mode.

Figure 12 Rear Panel of Cisco 2811 Router



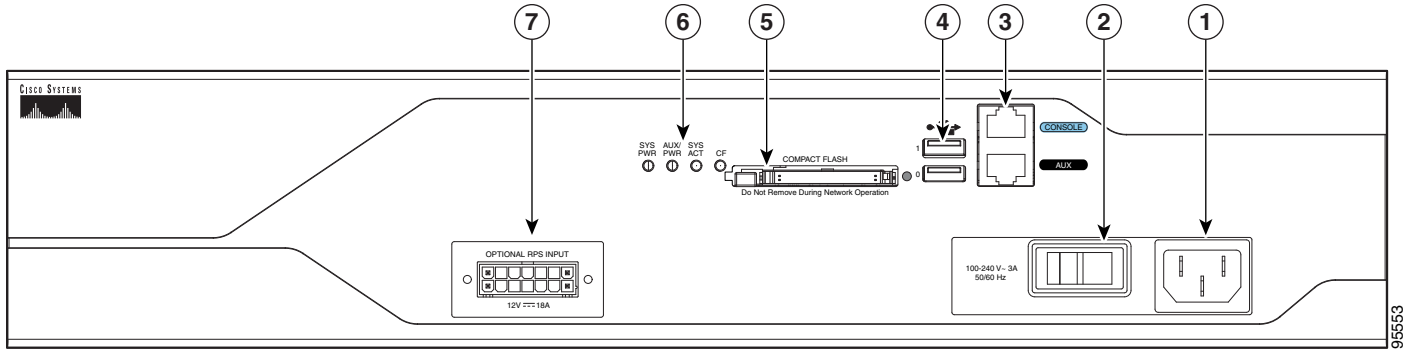
1	Screw holes for ground lug	5	High-speed WAN interface card slot 1
2	Fast Ethernet port 0/0	6	High-speed WAN interface card slot 2
3	Fast Ethernet port 0/1	7	High-speed WAN interface card slot 3
4	High-speed WAN interface card slot 0	8	Network module enhanced (NME) slot <sup>1</sup>

1. The network module slot is compatible with Cisco network modules of type NM (network module) and NME (network module enhanced).

# Cisco 2821 and Cisco 2851 Chassis

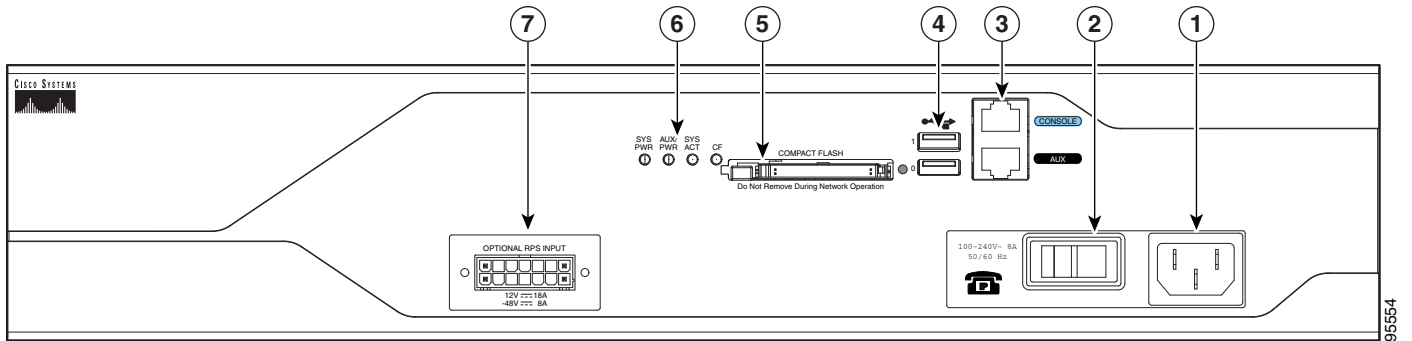
Figure 13, Figure 14, and Figure 15 show the front panel of Cisco 2821 and Cisco 2851 routers. Figure 16 shows the rear panel of a Cisco 2821 router. Figure 17 shows the rear panel of a Cisco 2851 router.

**Figure 13 Front Panel of Cisco 2821 and Cisco 2851 Routers with AC Input Power and Without IP Phone Power Output**



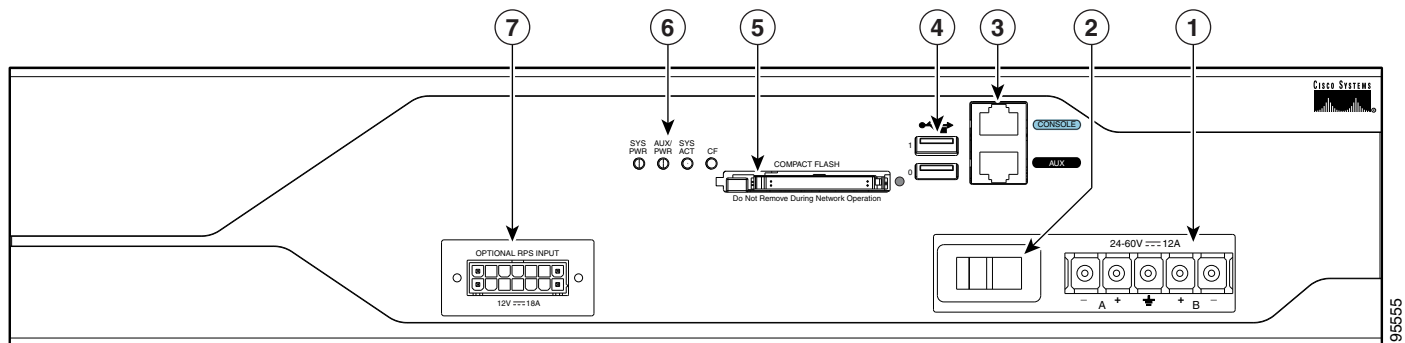
1	Input power connection	5	External CompactFlash memory card slot
2	On/Off switch	6	LED indicators
3	Console and auxiliary ports	7	Cisco redundant power supply connector (covered if not used)
4	Universal serial bus (USB) ports		

**Figure 14 Front Panel of Cisco 2821 and Cisco 2851 Routers with AC Input Power and IP Phone Power Output**



1	Input power connection	5	External CompactFlash memory card slot
2	On/Off switch	6	LED indicators
3	Console and auxiliary ports	7	Cisco redundant power supply connector (covered if not used)
4	Universal serial bus (USB) ports		

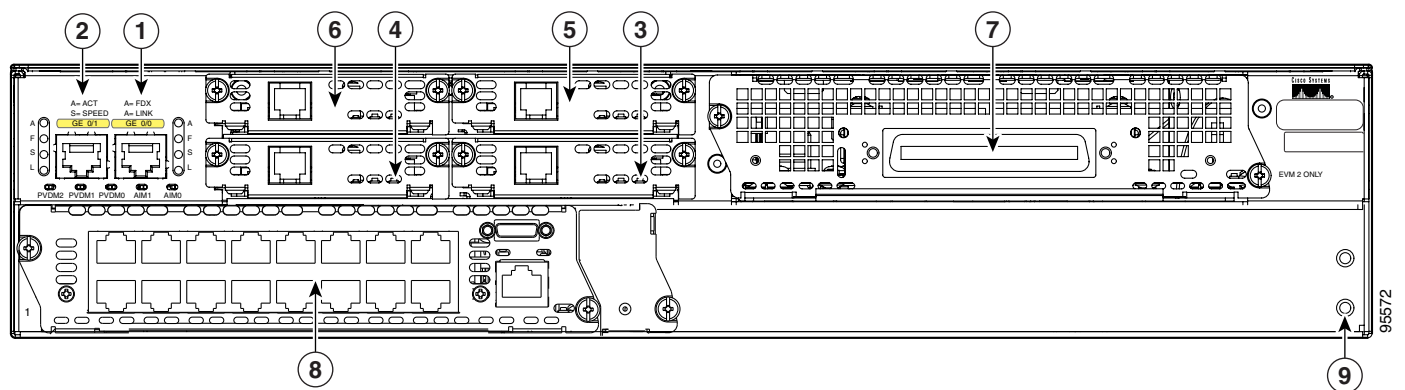
Figure 15 Front Panel of Cisco 2821 and Cisco 2851 Routers with DC Input Power



1	Input power connection	5	External CompactFlash memory card slot
2	On/Standby switch <sup>1</sup>	6	LED indicators
3	Console and auxiliary ports	7	Cisco redundant power supply connector (covered if not used)
4	Universal serial bus (USB) ports		

1. This switch does not turn off the power supply completely, but rather puts it in standby mode.

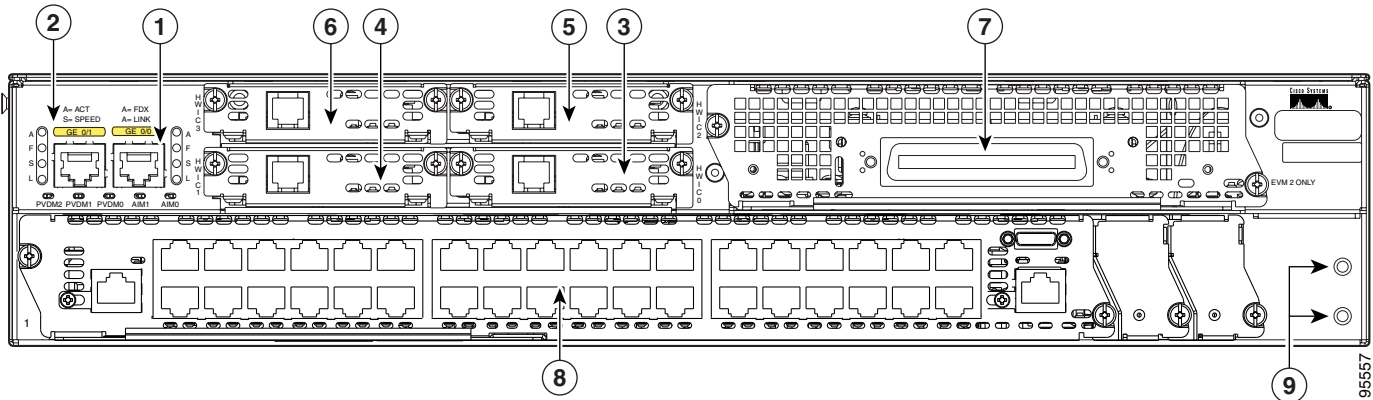
Figure 16 Rear Panel of the Cisco 2821 Router



1	Gigabit Ethernet port 0/0	6	High-speed WAN interface card slot 3
2	Gigabit Ethernet port 0/1	7	Extension voice module (EVM) slot
3	High-speed WAN interface card slot 0	8	Network module enhanced (NME) slot <sup>1</sup>
4	High-speed WAN interface card slot 1	9	Screw holes for ground lug
5	High-speed WAN interface card slot 2		

1. The network module slot is compatible with Cisco network modules of type NM (network module), NME (network module enhanced), and NME-X (enhanced extended).

Figure 17 Rear Panel of the Cisco 2851 Router



1	Gigabit Ethernet port 0/0	6	High-speed WAN interface card slot 3
2	Gigabit Ethernet port 0/1	7	Extension voice module (EVM) slot
3	High-speed WAN interface card slot 0	8	Network module enhanced (NME) slot <sup>1</sup>
4	High-speed WAN interface card slot 1	9	Screw holes for ground lug
5	High-speed WAN interface card slot 2		

1. The network module slot is compatible with Cisco network modules of type NM (network module), NME (network module enhanced), NME-X (enhanced extended), NMD (double-wide), and NME-XD (enhanced extended double-wide).

## Interface Numbering

Table 7 summarizes the interface numbering on a Cisco 2801 series router. Table 8 summarizes the interface numbering on Cisco 2811, Cisco 2821, and Cisco 2851 series routers.



### Note

The interface numbering on Cisco 2800 series routers is different from the numbering on Cisco 2600 series routers.



### Note

On the Cisco 2801 router, the numbering format for slots is *interface type 0/slot/port*. “0” indicates slots that are built into the chassis of a router. On the Cisco 2801 router, all slots begin with “0,” because all slots are built into the chassis. Note that this is different from the Cisco 2811, Cisco 2821, and Cisco 2851 routers. On these routers, some slots are built into the chassis and have slot numbers that begin with “0”. However, it is possible to have other slots that are part of a network module or an extension voice module. Those slots have slot numbers that begin with “1” or “2,” respectively.

**Table 7** Interface Numbering on Cisco 2801 Series Routers

Slot Number	Slot Type	Interface Numbering Range
Onboard ports	Fast Ethernet	0/0 and 0/1
0	VIC / VWIC (voice only)	0/0/0 to 0/0/3
1	HWIC / WIC / VIC / VWIC <sup>1</sup>	0/1/0 to 0/1/3 (single-wide HWIC) 0/1/0 to 0/1/7 (double-wide HWIC)
2	WIC / VIC / VWIC <sup>1</sup>	0/2/0 to 0/2/3
3	HWIC / WIC / VIC / VWIC <sup>1</sup>	0/3/0 to 0/3/3 (single-wide HWIC) 0/3/0 to 0/3/7 (double-wide HWIC)

1. A VWIC in slots 1, 2, and 3 can operate in both data and voice mode; in slot 0, a VWIC can operate only in voice mode.

**Note**

On the Cisco 2801 router, the numbering format for configuring an asynchronous interface is *0/slot/port*. To configure the line associated with an asynchronous interface, simply use the interface number to specify the async line. For example, line 0/1/0 specifies the line associated with interface serial 0/1/0 on a WIC-2A/S in slot 1. Similarly, line 0/2/1 specifies the line associated with interface async 0/2/1 on a WIC-2AM in slot 2.

**Table 8** Interface Numbering on Cisco 2811, Cisco 2821, and Cisco 2851 Integrated Services Routers

Port Location	Interface Numbering Scheme	Examples <sup>1, 2</sup>
Built into the chassis front panel	<i>Interface-type port</i>	usb 0 usb 1
Built into the chassis rear panel	<i>Interface-type 0 / port</i>	interface fa 0/x interface gi 0/x
In an interface card (HWIC, HWIC-D, WIC, VWIC, VIC) plugged directly into an HWIC slot in a chassis	<i>Interface-type 0 / interface-card-slot<sup>3</sup> / port</i> <b>Note</b> Interface card slots built into the chassis are labeled HWIC <i>slot-number</i> on Cisco 2800 series routers.	interface serial 0/x/y interface async 0/x/y line 0/x/y <sup>4</sup> interface fa 0/x/y voice-port 0/x/y
In an interface card (WIC, VWIC, VIC) plugged into a slot in a network module	<i>Interface-type 1<sup>5</sup> / interface-card-slot / port</i>	controller t1 1/x/y voice-port 1/x/y interface serial 1/x/y interface async 1/x/y line 1/x/y <sup>4</sup>
Built into a network module (NME, NME-X, NMD, NME-XD)	<i>Interface-type 1<sup>5</sup> / port</i>	interface gi 1/x interface serial 1/x interface async 1/x line 1/x <sup>4</sup>
FXS or FXO port in an extension voice module (EVM)	<i>Interface-type 2<sup>6</sup> / 0<sup>7</sup> / port</i> FXS/DID port numbers 0 to 7 are built into the EVM. FXS/FXO port numbers 8 to 15 are in expansion module 0. FXS/FXO port numbers 16 to 23 are in expansion module 1.	voice-port 2/0/x

**Table 8** Interface Numbering on Cisco 2811, Cisco 2821, and Cisco 2851 Integrated Services Routers (continued)

Port Location	Interface Numbering Scheme	Examples <sup>1, 2</sup>
Voice port in a BRI expansion module (internal slot) in an extension voice module (EVM)	<i>Interface-type 2<sup>6</sup> / 0<sup>7</sup> / port</i> Port numbers are 8 to 11 in expansion module 0. Port numbers are 16 to 19 in expansion module 1.	voice-port 2/0/x
BRI interface in a BRI expansion module (internal slot) in an extension voice module (EVM)	<i>Interface-type 2<sup>6</sup> / port</i> Port numbers are 0 to 3 if one expansion module is installed. Port numbers are 0 to 7 if two expansion modules are installed.	interface bri 2/x

1. Interface abbreviations: fa = Fast Ethernet; gi = Gigabit Ethernet; usb = universal serial bus; bri = ISDN basic rate interface.
2. The interfaces listed are examples only; other possible interface types are not listed.
3. Interface card slot numbers for double-width (HWIC-D) slots are 1 and 3 only.
4. Specify the line number in the Cisco IOS CLI by using the interface number for the associated asynchronous serial interface.
5. “1” is the network module slot number in all Cisco 2800 series routers.
6. “2” is the EVM slot number in Cisco 2821 and Cisco 2851 routers.
7. “0” is required by the CLI syntax for voice ports in an EVM; it indicates no interface card slots in EVMs.



**Note**

On the Cisco 2811, Cisco 2821, and Cisco 2851 routers, the interface numbering scheme is the same for asynchronous interfaces as other types of interfaces. To configure the line associated with an async interface, simply use the interface number to specify the async line. For example, line 0/3/0 specifies the line associated with interface serial 0/3/0 on a WIC-2A/S in slot 3. Similarly, line 1/22 specifies the line associated with interface async 1/22 on a NM-32A in network module slot 1.

## Specifications

Table 9, Table 10, Table 11, and Table 12 list Cisco 2800 series specifications.

**Table 9** Cisco 2801 Router Specifications

Description	Specification
Dimensions (H x W x D)	1.72 x 17.49 x 16.5 in. (4.4 x 44.4 x 41.9 cm).
Weight	10.9 lb (4.9 kg) with standard power supply if fully populated with modules 13.71 lb (6.2 kg) with inline power supply if fully populated with modules
AC input power <ul style="list-style-type: none"> <li>• Input voltage</li> <li>• Frequency</li> <li>• Input current</li> <li>• Inrush surge current</li> </ul>	100 to 240 VAC, autoranging 47 to 63 Hz 2 A (5 A for IP phone support) 50 A maximum, one cycle (–48V power included)
Power consumption	105 W with standard power supply (maximum) 130 W with inline power supply and 12 IP phones (maximum)
Console and auxiliary ports	RJ-45 connector



**Table 9 Cisco 2801 Router Specifications (continued)**

<b>Description</b>	<b>Specification</b>
Operating humidity	5 to 95%, noncondensing
Operating temperature	32 to 104° F (0 to 40° C)
Nonoperating temperature	–4 to 149° F (–20 to 65° C)
Noise level, standard power supply	39 dBA for local temperatures < 90° F (32° C) 47 dBA for local temperatures between 90° F and 116° F (47° F) 52.6 dBA for temperatures above 116° F (47° F)
Noise level, inline power supply	44 dBA for local temperatures < 90° F (32° C) 50 dBA for local temperatures between 90° F and 116° F (47° F) 53 dBA for temperatures above 116° F (47° F)
Safety compliance	UL 60950; CAN/CSA C22.2 No. 60950-00; IEC 60950; EN 60950-1; AS/NZS 60950  For detailed compliance information, refer to the <i>Cisco 2800 and Cisco 3800 Series Integrated Services Routers Regulatory Compliance and Safety Information</i> document.
Immunity compliance	EN300386; EN55024/CISPR24; EN50082-1; EN61000-6-2  For detailed compliance information, refer to the <i>Cisco 2800 and Cisco 3800 Series Integrated Services Routers Regulatory Compliance and Safety Information</i> document.
EMC compliance	FCC Part 15; ICES-003 Class A; EN55022 Class A; CISPR22 Class A; AS/NZS 3548 Class A; VCCI Class A; EN 300386; EN61000-3-3; EN61000-3-2  For detailed compliance information, refer to the <i>Cisco 2800 and Cisco 3800 Series Integrated Services Routers Regulatory Compliance and Safety Information</i> document.

**Table 10 Cisco 2811 Router Specifications**

Description	Specification
Dimensions (H x W x D)	1.75 x 17.25 x 16.4 in. (44.5 x 438.2 x 416.6 mm), 1 RU height
Weight	14 lb (6.36 kg) if fully populated with modules
AC input power <ul style="list-style-type: none"> <li>• Input voltage</li> <li>• Frequency</li> <li>• Input current</li> <li>• Inrush surge current</li> </ul>	100 to 240 VAC, autoranging 47 to 63 Hz 2 A (4 A for IP phone support) 50 A maximum, one cycle (–48V power included)
DC input power <ul style="list-style-type: none"> <li>• Input voltage</li> <li>• Input current</li> <li>• Inrush surge current</li> </ul>	24 to 60 VDC, positive or negative 8 A at 24 V 50 A, maximum, <10 ms
Power dissipation (maximum) <ul style="list-style-type: none"> <li>• AC without IP phone support</li> <li>• AC with IP phone support:               <ul style="list-style-type: none"> <li>System only</li> <li>IP phones</li> <li>DC</li> </ul> </li> </ul>	170 W (580 BTU/hr)  210 W (717 BTU/hr) 160 W (546 BTU/hr)  180 W (614 BTU/hr)
Console and auxiliary ports	RJ-45 connector
Operating humidity	5 to 95%, noncondensing
Operating temperature	32 to 104° F (0 to 40° C)
Nonoperating temperature	–4 to 149° F (–20 to 65° C)
Noise level	47 dBA in normal ambient temperature; 57 dBA in maximum ambient temperature
Safety compliance	UL 60950; CAN/CSA C22.2 No. 60950-00; IEC 60950; EN 60950-1; AS/NZS 60950  For detailed compliance information, refer to the <i>Cisco 2800 and Cisco 3800 Series Integrated Services Routers Regulatory Compliance and Safety Information</i> document.
Immunity compliance	EN300386; EN55024/CISPR24; EN50082-1; EN61000-6-2  For detailed compliance information, refer to the <i>Cisco 2800 and Cisco 3800 Series Integrated Services Routers Regulatory Compliance and Safety Information</i> document.

**Table 10** *Cisco 2811 Router Specifications (continued)*

<b>Description</b>	<b>Specification</b>
EMC compliance	FCC Part 15; ICES-003 Class A; EN55022 Class A; CISPR22 Class A; AS/NZS 3548 Class A; VCCI Class A; EN 300386; EN61000-3-3; EN61000-3-2  For detailed compliance information, refer to the <i>Cisco 2800 and Cisco 3800 Series Integrated Services Routers Regulatory Compliance and Safety Information</i> document.

**Table 11 Cisco 2821 Router Specifications**

Description	Specification
Dimensions (H x W x D)	3.5 x 17.25 x 16.4 in. (88.9 x 438.2 x 416.6 mm), 2 RU height
Weight	25 lb (11.36 kg) if fully populated with modules
AC input power <ul style="list-style-type: none"> <li>• Input voltage</li> <li>• Frequency</li> <li>• Input current</li> <li>• Inrush surge current</li> </ul>	100 to 240 VAC, autoranging 47 to 63 Hz 3 A (8 A for IP phone support) 50 A maximum, one cycle (–48 V power included)
DC input power <ul style="list-style-type: none"> <li>• Input voltage</li> <li>• Input current</li> <li>• Inrush surge current</li> </ul>	24 to 60 VDC, positive or negative 12 A at 24 V 50 A, maximum, <10 ms
Power dissipation (maximum) <ul style="list-style-type: none"> <li>• AC without IP phone support</li> <li>• AC with IP phone support:               <ul style="list-style-type: none"> <li>– System only</li> <li>– IP phones</li> </ul> </li> <li>• DC</li> </ul>	280 W (955 BTU/hr)  310 W (1058 BTU/hr) 240 W (820 BTU/hr) 300 W (1024 BTU/hr)
Console and auxiliary ports	RJ-45 connector
Operating humidity	5 to 95%, noncondensing
Operating temperature	32 to 104° F (0 to 40° C)
Nonoperating temperature	–4 to 149° F (–20 to 65° C)
Noise level	44 dBA in normal ambient temperature; 52 dBA in maximum ambient temperature
Safety compliance	UL 60950; CAN/CSA C22.2 No. 60950-00; IEC 60950; EN 60950-1; AS/NZS 60950  For detailed compliance information, refer to the <i>Cisco 2800 and Cisco 3800 Series Integrated Services Routers Regulatory Compliance and Safety Information</i> document.
Immunity compliance	EN300386; EN55024/CISPR24; EN50082-1; EN61000-6-2  For detailed compliance information, refer to the <i>Cisco 2800 and Cisco 3800 Series Integrated Services Routers Regulatory Compliance and Safety Information</i> document.

**Table 11 Cisco 2821 Router Specifications (continued)**

<b>Description</b>	<b>Specification</b>
EMC compliance	FCC Part 15; ICES-003 Class A; EN55022 Class A; CISPR22 Class A; AS/NZS 3548 Class A; VCCI Class A; EN 300386; EN61000-3-3; EN61000-3-2  For detailed compliance information, refer to the <i>Cisco 2800 and Cisco 3800 Series Integrated Services Routers Regulatory Compliance and Safety Information</i> document.

**Table 12 Cisco 2851 Router Specifications**

Description	Specification
Dimensions (H x W x D)	3.5 x 17.25 x 16.4 in. (88.9 x 438.2 x 416.6 mm), 2 RU height
Weight	25 lb (11.36 kg) if fully populated with modules
AC input power <ul style="list-style-type: none"> <li>• Input voltage</li> <li>• Frequency</li> <li>• Input current</li> <li>• Inrush surge current</li> </ul>	100 to 240 VAC, autoranging 47 to 63 Hz 3 A (8 A for IP phone support) 50 A maximum, one cycle (–48 V power included)
DC input power <ul style="list-style-type: none"> <li>• Input voltage</li> <li>• Input current</li> <li>• Inrush surge current</li> </ul>	24 to 60 VDC, positive or negative 12 A at 24 V 50 A, maximum, <10 ms
Power dissipation (maximum) <ul style="list-style-type: none"> <li>• AC without IP phone support</li> <li>• AC with IP phone support:               <ul style="list-style-type: none"> <li>– System only</li> <li>– IP phones</li> </ul> </li> <li>• DC</li> </ul>	280 W (955 BTU/hr)  370 W (1262 BTU/hr) 360 W (1128 BTU/hr) 300 W (1024 BTU/hr)
Console and auxiliary ports	RJ-45 connector
Operating humidity	5 to 95%, noncondensing
Operating temperature	32 to 104° F (0 to 40° C)
Nonoperating temperature	–4 to 149° F (–20 to 65° C)
Noise level	44 dBA in normal ambient temperature; 52 dBA in maximum ambient temperature
Safety compliance	UL 60950; CAN/CSA C22.2 No. 60950-00; IEC 60950; EN 60950-1; AS/NZS 60950  For detailed compliance information, refer to the <i>Cisco 2800 and Cisco 3800 Series Integrated Services Routers Regulatory Compliance and Safety Information</i> document.
Immunity compliance	EN300386; EN55024/CISPR24; EN50082-1; EN61000-6-2  For detailed compliance information, refer to the <i>Cisco 2800 and Cisco 3800 Series Integrated Services Routers Regulatory Compliance and Safety Information</i> document.

**Table 12** *Cisco 2851 Router Specifications (continued)*

Description	Specification
EMC compliance	FCC Part 15; ICES-003 Class A; EN55022 Class A; CISPR22 Class A; AS/NZS 3548 Class A; VCCI Class A; EN 300386; EN61000-3-3; EN61000-3-2  For detailed compliance information, refer to the <i>Cisco 2800 and Cisco 3800 Series Integrated Services Routers Regulatory Compliance and Safety Information</i> document.

## Regulatory Compliance

For compliance information, refer to the *Cisco 2800 and Cisco 3800 Series Integrated Services Routers Regulatory Compliance and Safety Information* document that accompanied the router.

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# Preinstallation Requirements and Planning for Cisco 2800 Series Routers

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This document describes site requirements and equipment needed to install your Cisco 2800 series integrated services router. It includes 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](#)



## Note

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To see translations of the warnings that appear in this publication, refer to the *Cisco 2800 and Cisco 3800 Series Integrated Services Routers Regulatory Compliance and Safety Information* document that accompanies your router.

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## Warning

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

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## Safety Recommendations

Follow these guidelines to ensure general safety:

- Keep the chassis area clear and dust-free during and after installation.
- If you remove the chassis cover, put it in a safe place.
- Keep tools and chassis components away from walk areas.
- Do not wear loose clothing that could get caught in the chassis. Fasten your tie or scarf and roll up your sleeves.



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- 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.

## Safety with Electricity



Warning

**This unit might have more than one power supply connection. All connections must be removed to de-energize the unit.** Statement 1028



Warning

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



Warning

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



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

**The covers are an integral part of the safety design of the product. Do not operate the unit without the covers installed.** Statement 1077

Follow these guidelines when working on equipment powered by electricity:

- 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 chassis
  - 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.
- Never open the enclosure of the router's internal power supply.
- 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 chassis 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 chassis 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 chassis.



### 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 includes the following features:

- Autoselects either 110 V or 220 V operation.

- All units 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], current draw, and power dissipation for the unit.)

Table 1 lists power requirements for Cisco 2800 series routers.

**Table 1 Power Requirements for Cisco 2800 Series Routers**

Router	Power Source	Input Power	Input Voltage Tolerance Limits
Cisco 2801 without IP phone power output	AC	100 - 240 VAC, 2.0 A, 50 - 60 Hz	90 - 264 VAC
Cisco 2801 with IP phone power output	AC	100 - 240 VAC, 5.0 A, 50 - 60 Hz	90 - 264 VAC
Cisco 2811 without IP phone power output	AC	100 - 240 VAC, 2.0 A, 50 - 60 Hz	90 - 264 VAC
	DC	24 - 60 VDC, 8 A, positive or negative	18 - 72 VDC
Cisco 2811 with IP phone power output	AC	100 - 240 VAC, 4.0 A, 50 - 60 Hz	90 - 264 VAC
Cisco 2821 without IP phone power output	AC	100 - 240 VAC, 3.0 A, 50 - 60 Hz	90 - 264 VAC
	DC	24 - 60 VDC, 12 A, positive or negative	18 - 72 VDC
Cisco 2821 with IP phone power output	AC	100 - 240 VAC, 8.0 A, 50 - 60 Hz	90 - 264 VAC
Cisco 2851 without IP phone power output	AC	100 - 240 VAC, 3.0 A, 50 - 60 Hz	90 - 264 VAC
	DC	24 - 60 VDC, 12 A, positive or negative	18 - 72 VDC
Cisco 2851 with IP phone power output	AC	100 - 240 VAC, 8.0 A, 50 - 60 Hz	90 - 264 VAC
Cisco 2811, 2821, and 2851	Backup power: Cisco RPS-675 Redundant Power System	100 VAC, 10 A, or 240 VAC, 6 A	

## Site Environment

Cisco 2800 series routers can be placed on a desktop or installed in a rack. This Cisco 2811 router can also be wall mounted. 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.

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 possibility of environmentally caused shutdowns. If you are currently 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 will help you plan an acceptable operating environment for your router and will help you avoid environmentally caused equipment failures:

- Ensure that the room where your router operates has adequate air circulation. Electrical equipment generates heat. Without adequate air 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 chassis cover and module rear panels are secure. All empty network module slots, interface card slots, and power supply bays must have filler panels installed. The chassis is designed to allow cooling air to flow within it, through specially designed cooling slots. A chassis with uncovered openings permits air leaks, which may interrupt and reduce the flow of air across internal components.

## Equipment Racks

Cisco 2800 series routers include brackets for use with a 19-inch rack or, if specified in your order, optional larger brackets for use with a 23-inch rack.

**Note**

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Brackets for a 23-inch rack are not available for Cisco 2801 routers.

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The following information will help you plan your equipment rack configuration:

- Allow clearance around the rack for maintenance.
- Allow at least one rack unit of vertical space between routers.
- 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 chassis in an open rack, ensure that the rack frame does not block the intake or exhaust ports. If the chassis is installed on slides, check the position of the chassis 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 chassis. 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 under test a maximum of cooling air and clean power.

# Installation Checklist

The sample installation checklist lists items and procedures for installing a new router. Make a copy of this checklist 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		
Router quick start guide received		
<i>Cisco 2800 and Cisco 3800 Series Integrated Services Routers Regulatory Compliance and Safety Information</i> document received		
Product registration card received		
Cisco.com contact information label received		
Chassis 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 provides a record of all actions related to the router. Keep it in an accessible place near the chassis where anyone who performs tasks has access to it. Use the Installation Checklist to verify steps in the installation and maintenance of the router. 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 entries as each procedure is completed.
- Upgrade and maintenance procedures—Use the Site Log as a record of ongoing router maintenance and expansion history. A Site Log might include the following events:
  - Installation of network modules
  - Removal or replacement of network modules and 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 chassis in its shipping container to prevent accidental damage. When you are ready to install the router, proceed with unpacking it.

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-foot (1.8-meter) power cord (with AC-powered routers only)
- Rubber feet for desktop mounting (Cisco 2801 router only)
- Rack-mount brackets with screws for 19-inch racks
- Ground lug and two mounting screws (Cisco 2811, Cisco 2821, and Cisco 2851 routers only)
- Cable management bracket
- RJ-45-to-DB-9 console cable
- RJ-45-to-DB-25 modem cable (Cisco 2811, Cisco 2821, and Cisco 2851 routers only)
- DB-9-to-DB-25 connector adapter (Cisco 2801 router only)
- Optional equipment (such as network connection cables or additional rack-mount brackets)
- *Cisco 2800 Series Integrated Services Routers Quick Start Guide*,
- *Cisco 2800 and Cisco 3800 Series Integrated Services Routers Regulatory Compliance and Safety Information* document
- *Cisco Router and Security Device Manager (SDM) Quick Start Guide*
- 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. Warranty, service, and support information is in the quick start guide that shipped with your router.

## Required Tools and Equipment for Installation and Maintenance

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

- ESD-preventive cord and wrist strap
- Number 2 Phillips screwdriver
- Flat-blade screwdrivers: small, 3/16-in. (4 - 5 mm) and medium, 1/4-in. (6 - 7 mm)
  - To install or remove modules
  - To remove the cover, if you are upgrading memory or other components
- Screws that fit your rack
- Wire crimper
- Wire for connecting the chassis to an earth ground:
  - AWG 6 (13 mm<sup>2</sup>) wire for NEBS-compliant chassis grounding
  - AWG 14 (2 mm<sup>2</sup>) or larger wire for NEC-compliant chassis grounding
  - AWG 18 (1 mm<sup>2</sup>) or larger wire for EN/IEC 60950-compliant chassis grounding
- For NEC-compliant grounding, an appropriate user-supplied ring terminal, with an inner diameter of 1/4 in. (5-7 mm)

In addition, depending on the type of modules you plan to use, you might need the following equipment to connect a port to an external network:

- Cables for connection to the WAN and LAN ports (dependent on configuration)




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**Note** For more information on cable specifications, refer to the online document [Cisco Modular Access Router Cable Specifications](#) on Cisco.com.

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- Ethernet hub or PC with a network interface card for connection to an Ethernet (LAN) port.
- Console terminal (an ASCII terminal or a PC running HyperTerminal or similar terminal emulation software) configured for 9600 baud, 8 data bits, 1 stop bit, no flow control, and no parity.
- Modem for connection to the auxiliary port for remote administrative access (optional).
- Data service unit (DSU) or channel service unit/data service unit (CSU/DSU) as appropriate for serial interfaces.
- External CSU for any CT1/PRI modules without a built-in CSU.
- NT1 device for ISDN BRI S/T interfaces (if not supplied by your service provider).





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# Port and Cable Information for Cisco 2800 Series Routers

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This document provides information about cables needed to install your Cisco 2800 series integrated services router. It includes the following sections:

- [Console and Auxiliary Port Considerations, page 1](#)
- [Preparing to Connect to a Network, page 2](#)

## Console and Auxiliary Port Considerations

The router includes an asynchronous serial console port and an auxiliary port. The console and auxiliary ports provide access to the router either locally using a console terminal connected to the console port, or remotely using a modem connected to the auxiliary port. This section discusses important cabling information to consider before connecting the router to a console terminal or modem.

The main difference between the console and auxiliary ports is that the auxiliary port supports hardware flow control and the console port does not. Flow control paces the transmission of data between a sending device and a receiving device. Flow control ensures 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 ideally suited for use with the high-speed transmissions of a modem. Console terminals send data at slower speeds than modems; therefore, the console port is ideally suited for use with console terminals.

## Console Port Connections

The router has an EIA/TIA-232 asynchronous serial console port (RJ-45). Depending on the cable and the adapter used, this port appears as a DTE or DCE device at the end of the cable.

For connection to a PC running terminal emulation software, your router is provided with an RJ-45 to DB-9 adapter cable.

To connect the router to an ASCII terminal, use the RJ-45-to-DB-9 cable and a DB-9-to-DB-25 adapter (provided with the Cisco 2801 router only).



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The default parameters for the console port are 9600 baud, 8 data bits, 1 stop bit, and no parity. The console port does not support hardware flow control. For detailed information about installing a console terminal, see the [“Connecting to a Console Terminal or Modem” section on page 12](#).

For cable and port pinouts, refer to the online document [Cisco Modular Access Router Cable Specifications](#). This document is located on Cisco.com.

## Auxiliary Port Connections

The router has an EIA/TIA-232 asynchronous serial auxiliary port (RJ-45) that supports flow control. Depending on the cable and the adapter used, this port appears as a DTE or DCE device at the end of the cable.

For connection to a modem, your router is provided with an RJ-45-to-DB-25 adapter cable. (A DB-9-to-DB-25 adapter is also included with the Cisco 2801 router.)

For detailed information about connecting devices to the auxiliary port, see the [“Connecting to a Console Terminal or Modem” section on page 12](#) of the [“Cable Connection Procedures for Cisco 2800 Series Routers”](#) online document.

For cable and port pinouts, refer to the [Cisco Modular Access Router Cable Specifications](#) online document on Cisco.com.

## Preparing to Connect to a Network

When setting up your router, consider distance limitations and potential electromagnetic interference (EMI) as defined by the applicable local and international regulations.

Network connection considerations are provided for several types of network interfaces and are described in the following sections:

- [Ethernet Connections, page 3](#)
- [Serial Connections, page 3](#)
- [ISDN BRI Connections, page 5](#)
- [CSU/DSU Connections, page 6](#)

Refer to the following online documents for more information about network connections and interfaces:

- [Cisco Network Modules Hardware Installation Guide](#)
- [Cisco Interface Cards Installation Guide](#)
- [Cisco Modular Access Router Cable Specifications](#)



**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.** Statement 1021

---

## Ethernet Connections

The IEEE has established Ethernet as standard IEEE 802.3. Cisco 2800 series routers support the following Ethernet implementations:

- 1000BASE-T—1000 Mbps full-duplex transmission over a Category 5 or better unshielded twisted-pair (UTP) cable. Supports the Ethernet maximum length of 328 feet (100 meters).




---

**Note** The Cisco 2801 and Cisco 2811 routers do not support the 1000BASE-T Ethernet implementation.

---

- 100BASE-T—100 Mbps full-duplex transmission over a Category 5 or better unshielded twisted-pair (UTP) cable. Supports the Ethernet maximum length of 328 feet (100 meters).
- 10BASE-T—10 Mbps full-duplex transmission over a Category 5 or better unshielded twisted-pair (UTP) cable. Supports the Ethernet maximum length of 328 feet (100 meters).

Refer to the [Cisco Modular Access Router Cable Specifications](#) online document for information about Ethernet cables, connectors, and pinouts.

## Serial Connections

Serial connections are provided by WAN interface cards and network modules. For more information on WAN interface cards, refer to the [Cisco Interface Cards Installation Guide](#). For more information on network modules, refer to the [Cisco Network Modules Hardware Installation Guide](#). These documents are accessible online at Cisco.com.

Before you connect a device to a serial port, you need to know the following:

- Type of device, data terminal equipment (DTE) or data communications equipment (DCE), you are connecting to the synchronous serial interface
- Type of connector, male or female, required to connect to the device
- Signaling standard required by the device

## Configuring Serial Connections

The serial ports on the asynchronous/synchronous serial network modules and the serial WAN interface card use DB-60 connectors. Serial ports can be configured as DTE or DCE, depending on the serial cable used.

## Serial DTE or DCE Devices

A device that communicates over a synchronous serial interface is either a DTE or DCE device. A DCE device provides a clock signal that paces the communications between the device and the router. A DTE device does not provide a clock signal. DTE devices usually connect to DCE devices. The documentation that accompanied the device should indicate whether it is a DTE or DCE device. (Some devices have a jumper to select either DTE or DCE mode.) [Table 1](#) lists typical DTE and DCE devices.

**Table 1** Typical DTE and DCE Devices

Device Type	Gender	Typical Devices
DTE	Male <sup>1</sup>	Terminal PC
DCE	Female <sup>2</sup>	Modem CSU/DSU Multiplexer

1. If pins protrude from the base of the connector, the connector is male.
2. If the connector has holes to accept pins, the connector is female.

## Signaling Standards Supported

The synchronous serial ports available for the router support the following signaling standards: EIA/TIA-232, EIA/TIA-449, V.35, X.21, and EIA-530. You can order a Cisco DB-60 shielded serial transition cable that has the appropriate connector for the standard you specify. The documentation for the device you want to connect should indicate the standard used for that device. The router end of the shielded serial transition cable has a DB-60 connector, which connects to the DB-60 port on a serial WAN interface card. The other end of the serial transition cable is available with a connector appropriate for the standard you specify.

The synchronous serial port can be configured as DTE or DCE, depending on the attached cable (except EIA-530, which is DTE only). To order a shielded cable, contact customer service. See the “Obtaining Technical Assistance” section of the “” online document.



**Note**

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All serial ports configured as DTE require external clocking from a CSU/DSU or other DCE device.

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Although manufacturing your own serial cables is not recommended (because of the small size of the pins on the DB-60 serial connector), cable pinouts are provided in the [Cisco Modular Access Router Cable Specifications](#) document.

## Distance Limitations

Serial signals can travel a limited distance at any given bit rate; generally, the slower the data rate, the greater the distance. All serial signals are subject to distance limits, beyond which a signal significantly degrades or is completely lost.



**Note**

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Only the serial WAN interface card supports bit rates above 128 Kbps.

---

**Table 2** lists the recommended maximum speeds and distances for each serial interface type; however, you might get good results at speeds and distances greater than those listed, if you understand the electrical problems that might arise and can compensate for them. For instance, the recommended maximum rate for V.35 is 2 Mbps, but 4 Mbps is commonly used.

**Table 2** Serial Signal Transmission Speeds and Distances

Rate (bps)	EIA/TIA-232 Distance		EIA/TIA-449, X.21, V.35, EIA-530 Distance	
	Feet	Meters	Feet	Meters
2400	200	60	4100	1250
4800	100	30	2050	625
9600	50	15	1025	312
19200	25	7.6	513	156
38400	12	3.7	256	78
56000	8.6	2.6	102	31
1544000 (T1)	—	—	50	15

Balanced drivers allow EIA/TIA-449 signals to travel greater distances than EIA/TIA-232 signals. The recommended distance limits for EIA/TIA-449 shown in [Table 2](#) are also valid for V.35, X.21, and EIA-530. Typically, EIA/TIA-449 and EIA-530 can support 2-Mbps rates, and V.35 can support 4-Mbps rates.

## Asynchronous/Synchronous Serial Module Baud Rates

The following baud-rate limitations apply to the slow-speed serial interfaces found in the asynchronous/synchronous serial modules:

- Asynchronous interface—Maximum baud rate is 115.2 kbps.
- Synchronous interface—Maximum baud rate is 128-kbps full duplex.

## ISDN BRI Connections

The BRI WAN interface cards provide Integrated Services Digital Network (ISDN) Basic Rate Interface (BRI) connections. The BRI modules and BRI WAN interface cards are available with either an S/T interface that requires an external Network Terminator 1 (NT1), or a U interface that has a built-in NT1.

You can install the BRI modules in any available slot in the chassis.



**Warning**

**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

Use a BRI cable (not included) to connect the BRI WAN interface card directly to an ISDN. [Table 3](#) lists the specifications for ISDN BRI cables. Also, refer to the [Cisco Modular Access Router Cable Specifications](#) online document for pinouts. This document is located on Cisco.com.

**Table 3 ISDN BRI Cable Specifications**

Specification	High-Capacitance Cable	Low-Capacitance Cable
Resistance (at 96 kHz)	160 ohms/km	160 ohms/km
Capacitance (at 1 kHz)	120 nF <sup>1</sup> /km	30 nF/km
Impedance (at 96 kHz)	75 ohms	150 ohms
Wire diameter	0.024 in. (0.6 mm)	0.024 in. (0.6 mm)
Distance limitation	32.8 ft (10 m)	32.8 ft (10 m)

1. nF = nanoFarad

For more information on BRI WAN interface cards, refer to the [Cisco Interface Cards Installation Guide](#) online document on Cisco.com.

## CSU/DSU Connections

CSU/DSU WAN interface cards (WICs) are available to provide switched-56-kbps connections or full or fractionalized T1 connections.

For more information on CSU/DSU WICs, refer to the [Cisco Interface Cards Installation Guide](#) online document on Cisco.com.

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# Chassis Installation Procedures for Cisco 2800 Series Routers

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This document describes how to install your Cisco 2800 series integrated services router on a desktop or in a rack. It includes the following sections:

- [Installing Modules and Interface Cards, page 2](#)
- [Installing Internal Field-Replaceable Units \(FRUs\), page 4](#)
- [Setting Up the Chassis, page 5](#)
- [Installing the Chassis Ground Connection, page 13](#)



## Note

To see translations of the warnings that appear in this publication, see the *Cisco 2800 Series and Cisco 3800 Series Integrated Services Routers Regulatory Compliance and Safety Information* document that accompanied this device.

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## Warning

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

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## 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

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## 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

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**Warning**

**The covers are an integral part of the safety design of the product. Do not operate the unit without the covers installed.** Statement 1077

## Installing Modules and Interface Cards

Cisco routers are normally shipped with network modules, high-speed WAN interface cards (HWICs), and voice interface cards (VICs) already installed. If you need to remove or install any of these items, see the following product installation documents, either online or shipped with the product:

### For Network Modules

- [Installing Network Modules in Cisco 2800 Series Routers](#)
- [Quick Start Guide: Cisco 2800 Series Intergrated Services Routers Quick Start Guide](#)
- [Installing Network Modules in Cisco 2800 Series Routers](#)

### For HWICs and VICs:

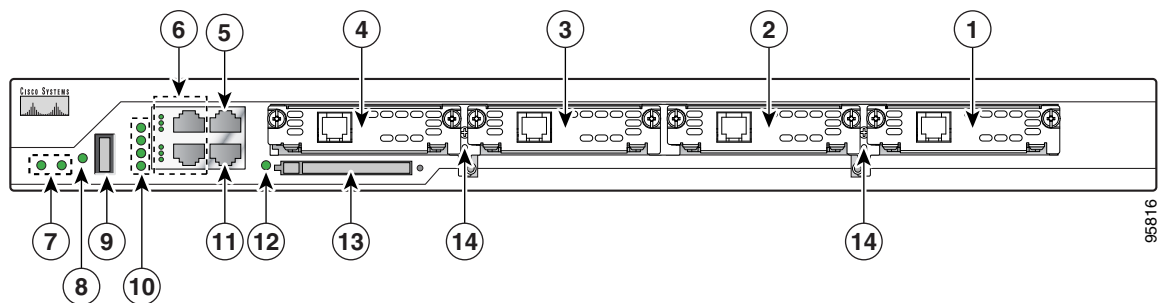
- [Installing Interface Cards in Cisco 2800 Series Routers](#)
- [Quick Start Guide: Interface Cards for Cisco 1600, 1700, 2600, 3600, and 3700 Series ---and Cisco 2800 Series](#)
- [Installing Interface Cards in Cisco 2800 Series Routers](#)

The chassis slots for network modules and interface cards are identified in [Figure 1](#), [Figure 2](#), [Figure 3](#), and [Figure 4](#).

If the required network modules, interface cards, and internal field-replaceable units (FRUs) are already installed, proceed to the “[Setting Up the Chassis](#)” section on page 5.

If you need to remove or install any internal FRUs, see the “[Installing Internal Field-Replaceable Units \(FRUs\)](#)” section on page 4.

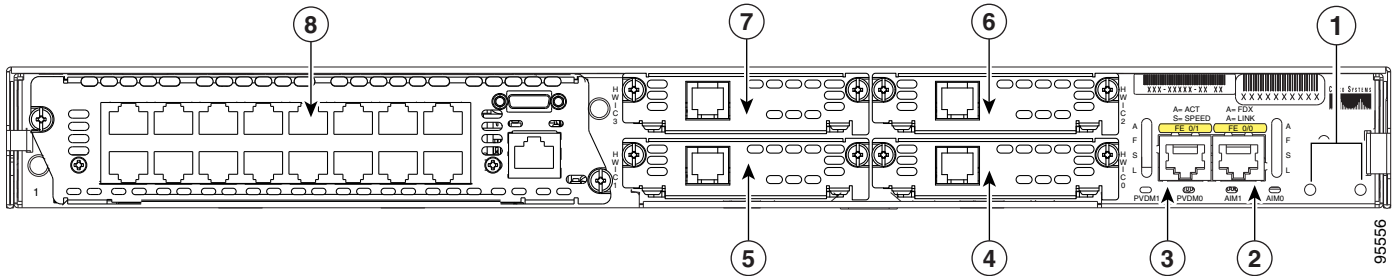
**Figure 1** Chassis Slot Locations in Cisco 2801 Routers



<b>1</b>	Slot 0 (VIC or VWIC, voice only—no PRI)	<b>8</b>	Auxiliary power (AUX/PWR) LED
<b>2</b>	Slot 1 (WIC, VIC, VWIC, or HWIC)	<b>9</b>	Universal serial bus (USB) port
<b>3</b>	Slot 2 (WIC, VIC, or VWIC)	<b>10</b>	AIM/PVDM LEDs
<b>4</b>	Slot 3 (WIC, VIC, VWIC, or HWIC)	<b>11</b>	Auxiliary port

5	Console port	12	CompactFlash (CF) LED
6	Fast Ethernet ports and LEDs	13	External CompactFlash memory card slot
7	System LEDs	14	Removable center card guides to allow double-wide HWIC-D installation

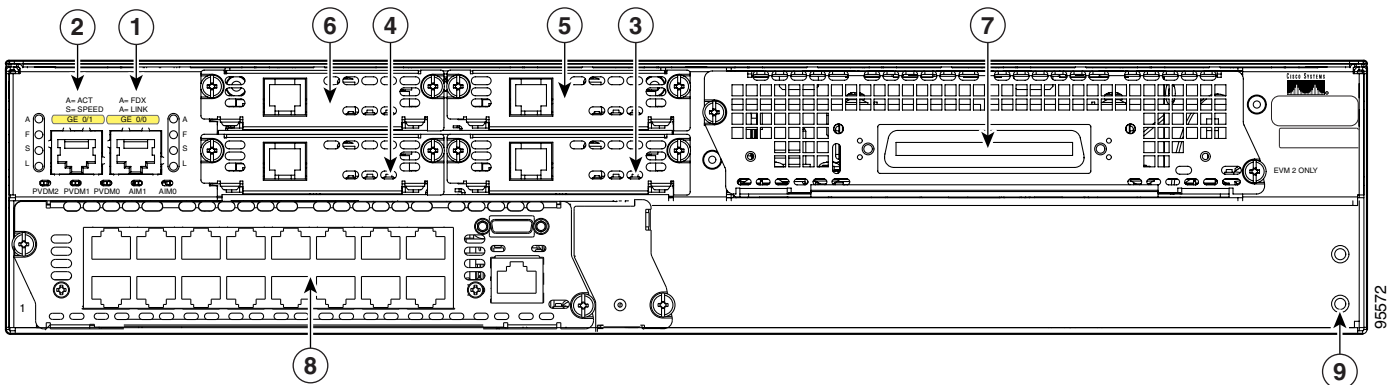
Figure 2 Chassis Slot Locations in Cisco 2811 Routers



1	Screw holes for ground lug	5	High-speed WAN interface card slot 1
2	Fast Ethernet port 0/0	6	High-speed WAN interface card slot 2
3	Fast Ethernet port 0/1	7	High-speed WAN interface card slot 3
4	High-speed WAN interface card slot 0	8	Network module enhanced (NME) slot <sup>1</sup>

1. The network module slot is compatible with Cisco network modules of type NM (network module) and NME (network module enhanced).

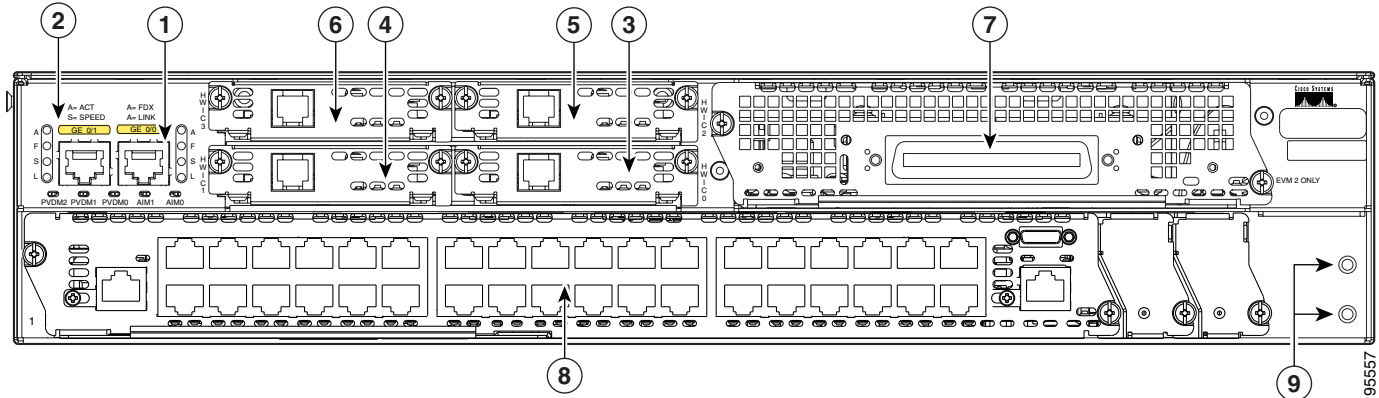
Figure 3 Chassis Slot Locations in Cisco 2821 Routers



1	Gigabit Ethernet port 0/0	6	High-speed WAN interface card slot 3
2	Gigabit Ethernet port 0/1	7	Extension voice module slot
3	High-speed WAN interface card slot 0	8	Network module enhanced (NME) slot <sup>1</sup>
4	High-speed WAN interface card slot 1	9	Screw holes for ground lug
5	High-speed WAN interface card slot 2		

1. The network module slot is compatible with Cisco network modules of type NM (network module), NME (network module enhanced), and NME-X (enhanced extended).

Figure 4 Chassis Slot Locations in Cisco 2851 Routers



1	Gigabit Ethernet port 0/0	6	High-speed WAN interface card slot 3
2	Gigabit Ethernet port 0/1	7	Extension voice module slot
3	High-speed WAN interface card slot 0	8	Network module enhanced (NME) slot <sup>1</sup>
4	High-speed WAN interface card slot 1	9	Screw holes for ground lug
5	High-speed WAN interface card slot 2		

1. The network module slot is compatible with Cisco network modules of type NM (network module), NME (network module enhanced), NME-X (enhanced extended), NMD (double-wide), and NME-XD (enhanced extended double-wide).

## Installing Internal Field-Replaceable Units (FRUs)

Cisco routers are shipped with default memory and power supplies already installed, and usually configured and shipped with interface cards, network module cards, packet voice data modules (PVDMs) and advanced integration modules (AIMs). If you need to remove or install any of the internal items, see the following product installation documents:

### For AIMs

The “Installing and Removing AIMs” section of the *Installing and Upgrading Internal Modules in Cisco 2800 Series Routers* online document

### For PVDMs

- The “Installing and Removing PVDMs” section of the *Installing and Upgrading Internal Modules in Cisco 2800 Series Routers* online document

### For Internal Power Supplies

- The “Replacing the Power Supply” section of the *Installing and Upgrading Internal Modules in Cisco 2800 Series Routers* online document

### For Installing DRAM, SDRAM, or NVRAM

- The “Installing and Removing DRAM DIMMs” section of the *Installing and Upgrading Internal Modules in Cisco 2800 Series Routers* online document

**For Installing CompactFlash Memory Cards**

- The “Installing a CompactFlash Memory Card” section of the *Removing and Installing CompactFlash Memory Cards in Cisco 2800 Series Routers* online document

**Note**

If there are internal FRUs to be removed or installed, perform the installation or removal before you install the chassis in a rack on a wall. To remove internal FRUs, you have to remove the chassis cover; this requires removal of the chassis from the rack.

If the required internal FRUs are already installed, proceed to the next section, “Setting Up the Chassis”.

## Setting Up the Chassis

**Note**

Cisco 2800 series routers are normally ordered with modules and interface cards preinstalled. Before you remove or install any modules or interface cards, see the documents that accompany those items or to the online Cisco 2800 series hardware installation documentation at the following URL:

<http://www.cisco.com/en/US/docs/routers/access/2800/hardware/installation/guide/hw.html>

For module and interface card compatibility information, see the data sheet for each module and interface card.

**Warning**

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

You can set any Cisco 2800 series router on a desktop or install it in a rack. A Cisco 2811 router can also be mounted on a wall or other flat surface. See the applicable instructions in the following sections.

- [Rack-Mounting the Chassis](#)
- [Setting the Chassis on a Desktop](#)
- [Mounting a Cisco 2811 Router on a Wall](#)

**Caution**

To prevent damage to the chassis, never attempt to lift or tilt the chassis by the plastic panel on the front. Always hold the chassis by the metal body.

## Rack-Mounting the Chassis

If you are planning to rack-mount the router, do so before making network and power connections. If you need to install network modules or interface cards, you can do so either before or after rack-mounting the router. Ideally, you would install modules and interface cards when you have the best access to the rear panel of the router. Internal modules, such as advanced integration modules (AIMs) or packet voice data modules (PVDMs), should be installed prior to rack-mounting.

Cisco 2811, Cisco 2821, and Cisco 2851 routers can be installed in 19 (48.26-cm)- and 23-inch (58.42-cm) racks. Cisco 2801 routers can be installed only in 19-inch racks, and cannot be center mounted. Use the standard brackets shipped with the router for mounting the chassis in a 19-inch rack; you can order optional larger brackets for mounting the chassis in a 23-inch rack.



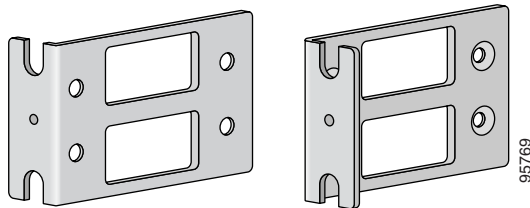
**Note** Brackets for 23-inch (58.42-cm) equipment racks are not available for Cisco 2801 routers.

You can mount the router in the following ways:

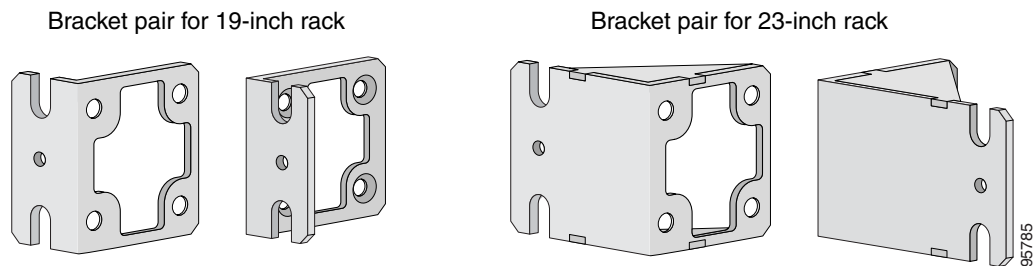
- Center mounting—Brackets attached in the center of the chassis with only the front panel facing forward. (This option is not available on Cisco 2801 routers.)
- Front mounting—Brackets attached at the front of the chassis with the front panel facing forward.
- Rear mounting—Brackets attached at the rear of the chassis with the rear panel facing forward.

The brackets are shown in [Figure 5](#), [Figure 6](#), and [Figure 7](#).

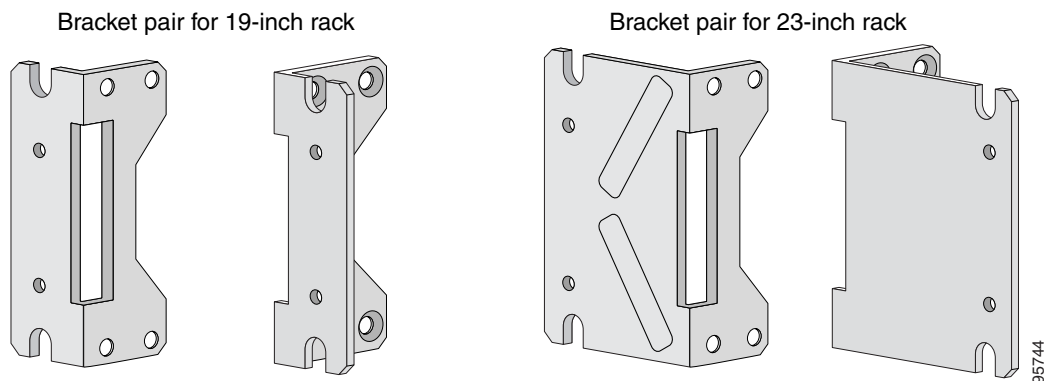
**Figure 5** Rack-Mounting Brackets for Cisco 2801 Routers for 19-Inch Rack



**Figure 6** Rack-Mounting Brackets for Cisco 2811 Routers



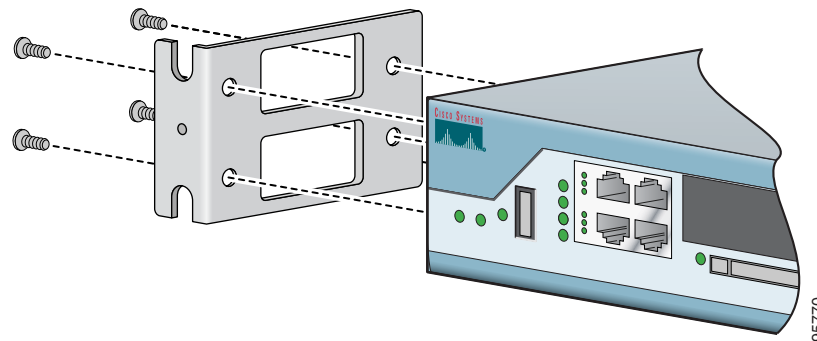
**Figure 7** Rack-Mounting Brackets for Cisco 2821 and Cisco 2851 Routers



## Attaching Rack-Mount Brackets to Cisco 2801 Routers

Use four of the supplied number-8 Phillips flat-head screws to attach the long side of each bracket to the router. [Figure 8](#) shows how to attach the brackets to the sides of the router with the front panel forward.

**Figure 8** Attaching Rack-Mounting Brackets to a Cisco 2801 Router



## Attaching Rack-Mount Brackets to Cisco 2811, Cisco 2821, and Cisco 2851 Routers

Attach the mounting brackets to the router chassis as shown in [Figure 9](#) through [Figure 11](#), using the screws provided.



**Caution**

Do not overtorque the screws. The recommended torque is 15–18 inch-lb (1.7–2.0 N-m).

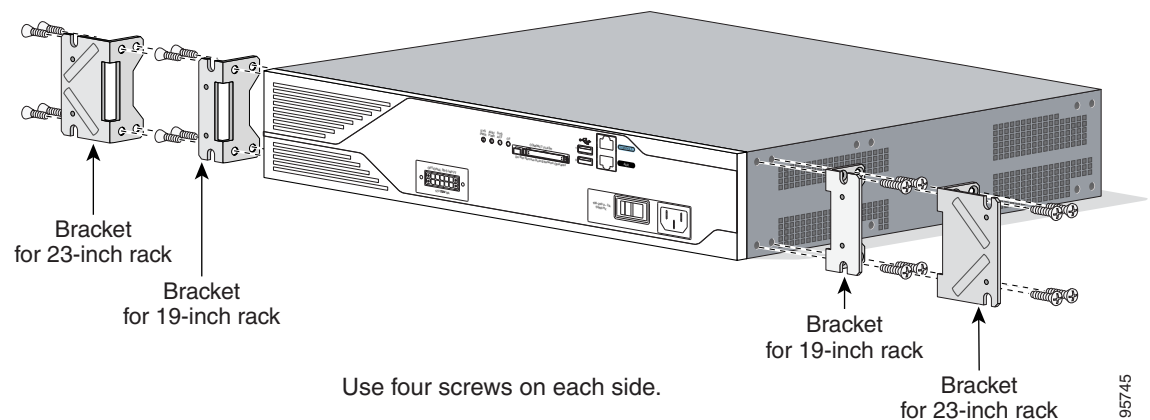
Attach the second bracket to the opposite side of the chassis. Use a number 2 Phillips screwdriver to install the bracket screws.



**Caution**

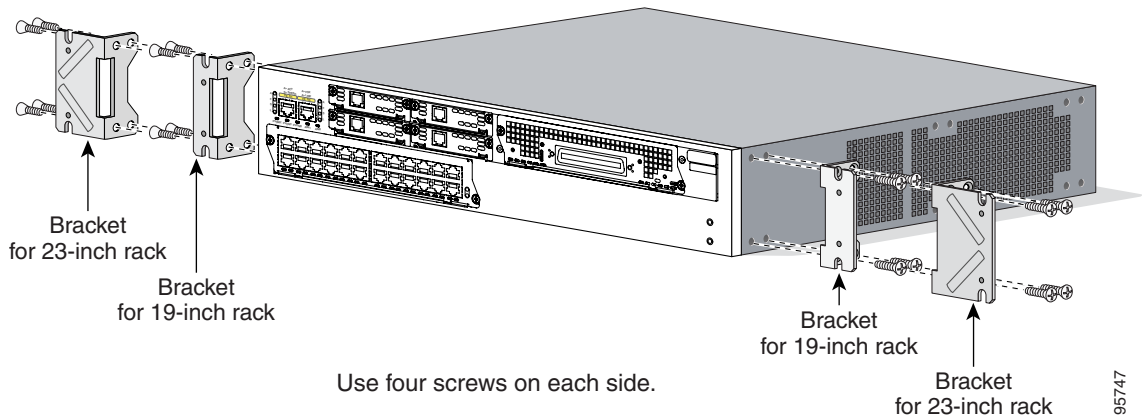
Your chassis installation must allow unrestricted airflow for chassis cooling.

**Figure 9** Bracket Installation for Front Mounting

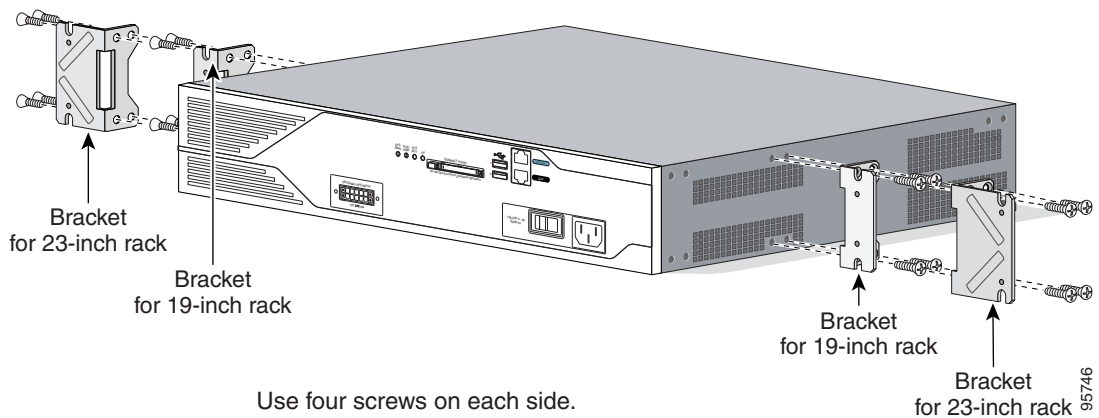


95745

**Figure 10** *Bracket Installation for Rear Mounting*



**Figure 11** *Bracket Installation for Center Mounting with Front Panel Forward*



## Installing the Router in a Rack

After you have attached the brackets to the router chassis, use the screws provided with the rack to install the chassis in the rack. (See [Figure 12](#).)



**Tip**

Start the lower pair of screws first, and rest the brackets on the lower screws while you insert the upper pair of screws.



**Tip**

The screw slots in the brackets are spaced to line up with every *second* pair of screw holes in the rack. When the correct screw holes are used, the small threaded holes in the brackets line up with unused screw holes in the rack. If the small holes do not line up with the rack holes, you must raise or lower the brackets to the next rack hole.



**Warning**

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

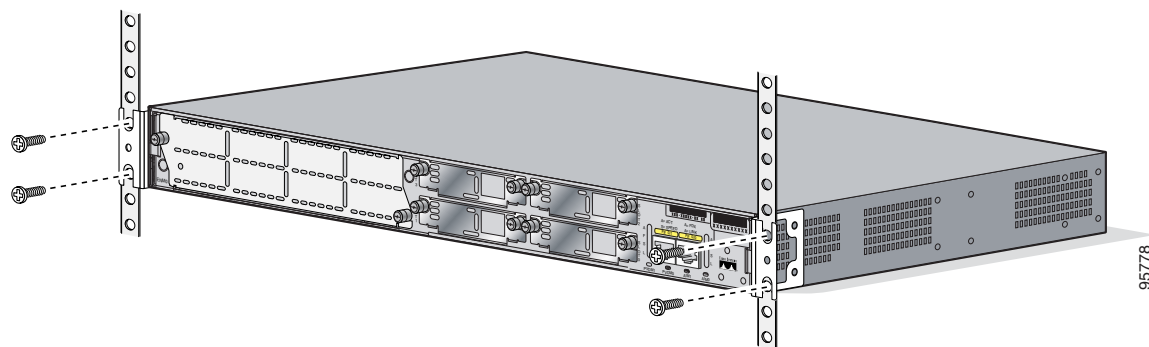
**Warning**

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**

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

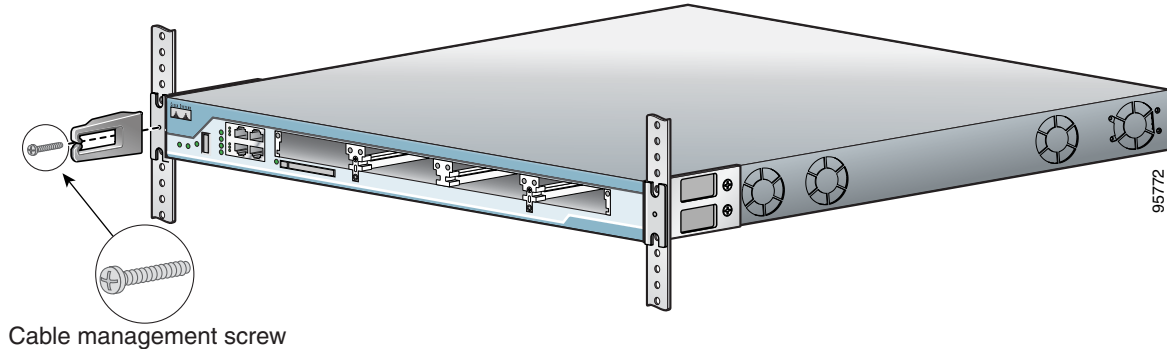
**Figure 12** *Mounting the Chassis in a Rack (Typical)*



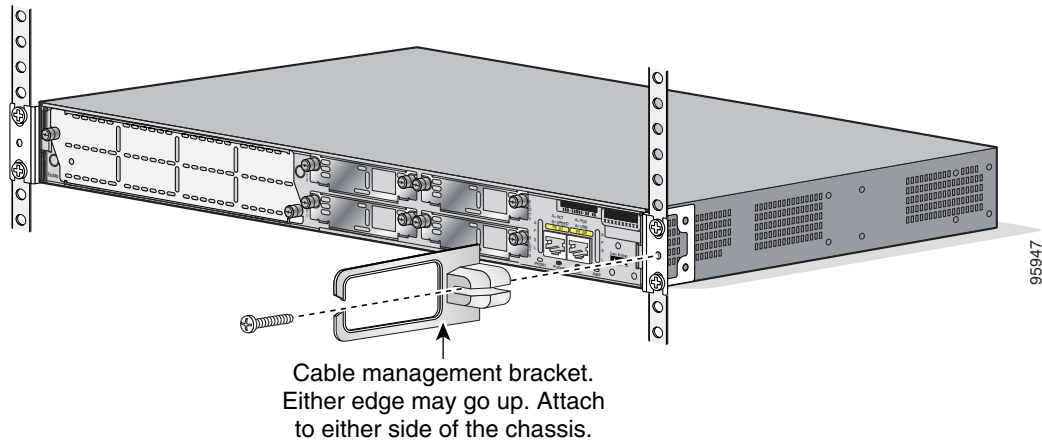
## Attaching Optional Cable Management Bracket

The optional cable management bracket provides attachment points for organizing and routing cables. On brackets for the Cisco 2801 and Cisco 2811 routers, attach the cable management bracket to the left or right rack-mount bracket using the screw provided, as shown in [Figure 13](#) and [Figure 14](#). On brackets for 2-rack-unit-high Cisco 2821 and Cisco 2851 routers, you can attach the cable management bracket to either the upper or lower threaded hole on either the left or right rack-mount brackets using the screw provided.

**Figure 13** Attaching the Optional Cable Management Bracket to the Cisco 2801 Router



**Figure 14** Attaching the Optional Cable Management Bracket to a Cisco 2811, 2821, or 2851 Router



## Chassis Grounding

After the router is installed, you must connect the chassis to a reliable earth ground. For the chassis ground connection procedures, see the [“Installing the Chassis Ground Connection”](#) section on page 13.

## Setting the Chassis on a Desktop

You can place Cisco 2800 series routers on a desktop or shelf. If you are placing a Cisco 2801 router on a desktop, you must first install the four rubber feet that are supplied in the accessory kit. They provide space for air circulation and antiskid protection. Peel the rubber feet from the adhesive strip, and stick them onto the features marked “+” on the bottom of the chassis.



**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**

Do not place anything on top of the router that weighs more than 10 pounds (4.5 kg), and do not stack routers on a desktop. Excessive distributed weight of more than 10 pounds, or pound point load of 10 pounds on top could damage the chassis.

**Caution**

Your chassis installation must allow unrestricted airflow for chassis cooling. For placing the router on a desktop, keep at least 1 inch (2.54 cm) of clear space beside the cooling inlet and exhaust vents.

After the router is installed, you must connect the chassis to a reliable earth ground. For the chassis ground connection procedures, see the “[Installing the Chassis Ground Connection](#)” section on page 13.

## Mounting a Cisco 2811 Router on a Wall

This section explains how to mount Cisco 2811 routers on a wall or other vertical surface. Mounting Cisco 2801, Cisco 2821, and Cisco 2851 routers on a wall is not recommended.

The following warning applies to Cisco 2811 routers:

**Warning**

**This unit is intended to be mounted on a wall. Please read the wall mounting instructions carefully before beginning installation. Failure to use the correct hardware or to follow the correct procedures could result in a hazardous situation to people and damage to the system.** Statement 248

**Tip**

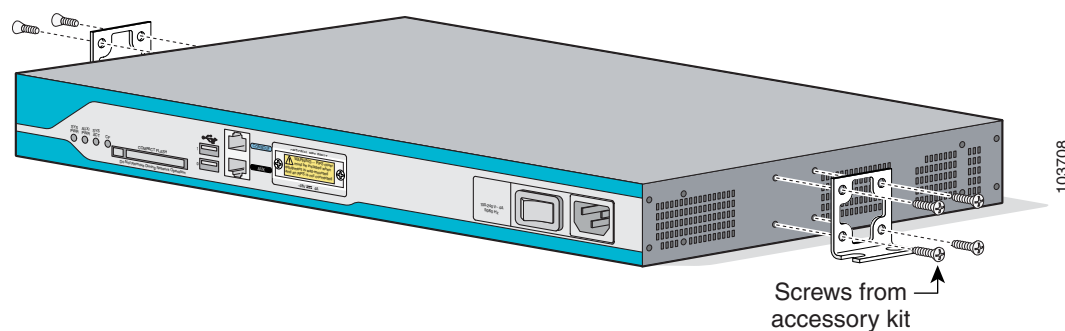
When choosing a wall mounting location, consider cable limitations and wall structure.

Use brackets designed for 23-inch rack-mounting (shown in [Figure 6](#)) to wall-mount the chassis.

## Attaching Brackets to the Router for Wall Mounting

Attach the standard brackets to the chassis as shown in [Figure 15](#), using the four screws provided for each bracket.

**Figure 15** Attaching the Brackets for Wall-Mounting a Cisco 2811 Router



## Attaching the Router to a Wall

Attach the router to the wall using the brackets previously attached and attachment hardware that you provide as follows:

- For attaching to a wall stud, each bracket requires two #10 wood screws (round- or pan-head) with #10 washers, or two #10 washer-head screws. The screws must be long enough to penetrate at least 3/4 inch (20 mm) into supporting wood or metal wall stud.
- For hollow-wall mounting, each bracket requires two wall anchors with washers. Wall anchors and washers must be size #10.

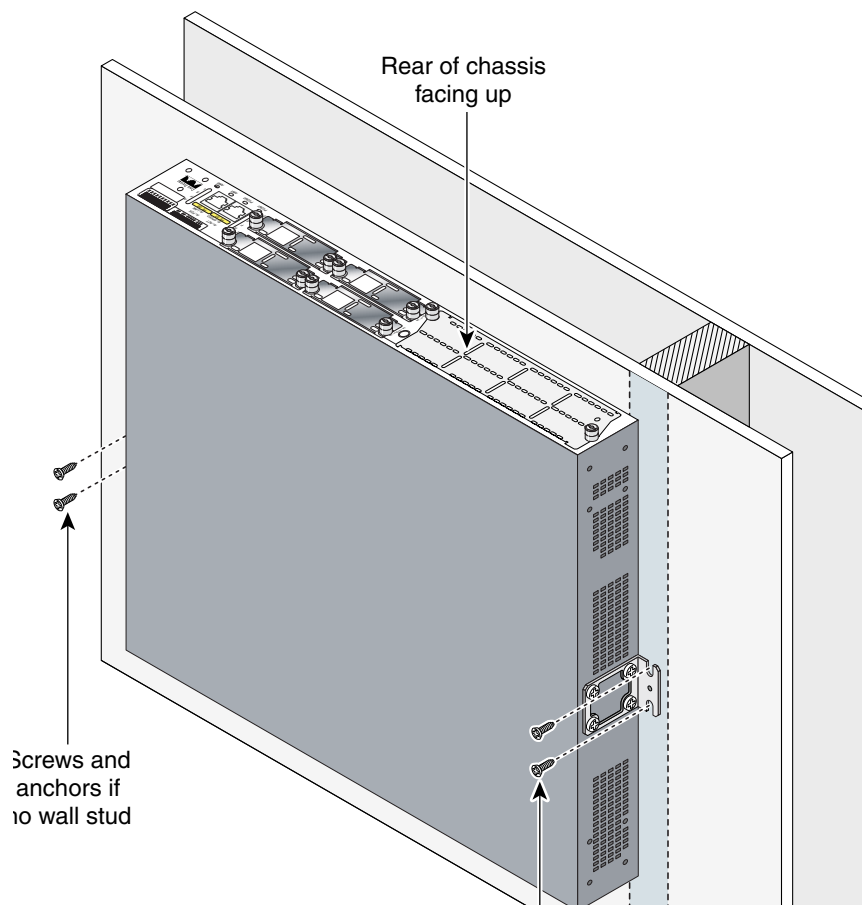


### Caution

The router must be mounted with the power connections oriented downward. Failure to do so could present a fire hazard.

- [Figure 16](#) shows a typical wall-mounted installation.

**Figure 16** *Mounting the Chassis on the Wall*



After the router is installed, you must connect the chassis to a reliable earth ground. For the chassis ground connection procedures, see the [“Installing the Chassis Ground Connection”](#) section on page 13.

# Installing the Chassis Ground Connection



**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 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 6 AWG (13 mm<sup>2</sup>) copper wire and the ground lug provided in the accessory kit.



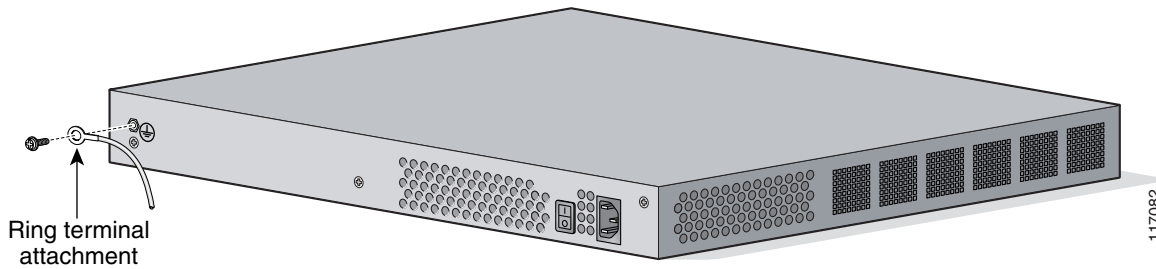
**Note** NEBS-compliant grounding is not supported on the Cisco 2801 router.

- For NEC-compliant grounding, use size 14 AWG (2 mm<sup>2</sup>) or larger copper wire and an appropriate user-supplied ring terminal with an inner diameter of 1/4 in. (5–7 mm).
- For EN/IEC 60950-compliant grounding, use size 18 AWG (1 mm<sup>2</sup>) or larger copper wire and an appropriate user-supplied ring terminal.

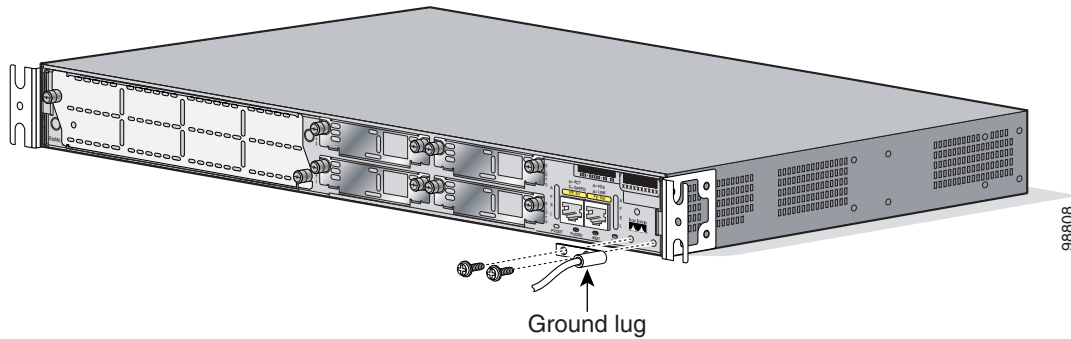
To install the ground connection for a Cisco 2800 series router, perform the following steps:

- Step 1** Strip one end of the ground wire to the length required for the ground lug or terminal.
  - For the NEBS ground lug—approximately 0.75 in. (20 mm)
  - For user-provided ring terminal—as required
- Step 2** Crimp the ground wire to the ground lug or ring terminal, using a crimp tool of the appropriate size.
- Step 3** Attach the ground lug or ring terminal to the chassis as shown in [Figure 17](#), [Figure 18](#), [Figure 19](#), [Figure 20](#), or [Figure 21](#). For a ground 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 known reliable earth ground point at your site.

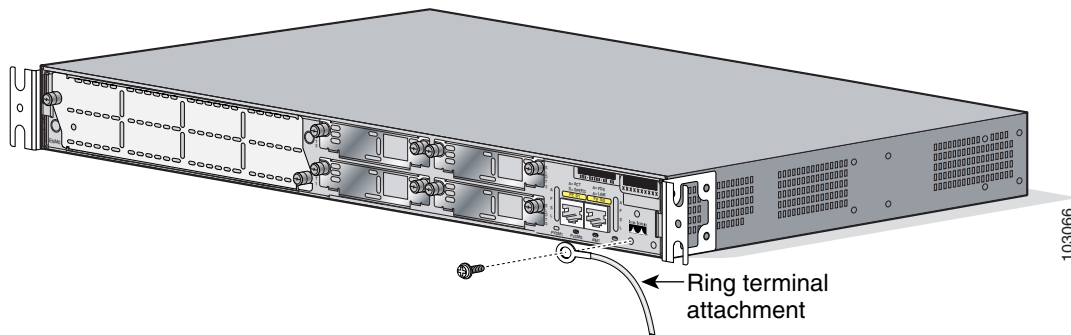
**Figure 17** Chassis Ground Connection Using Ring Terminal on Cisco 2801 Chassis

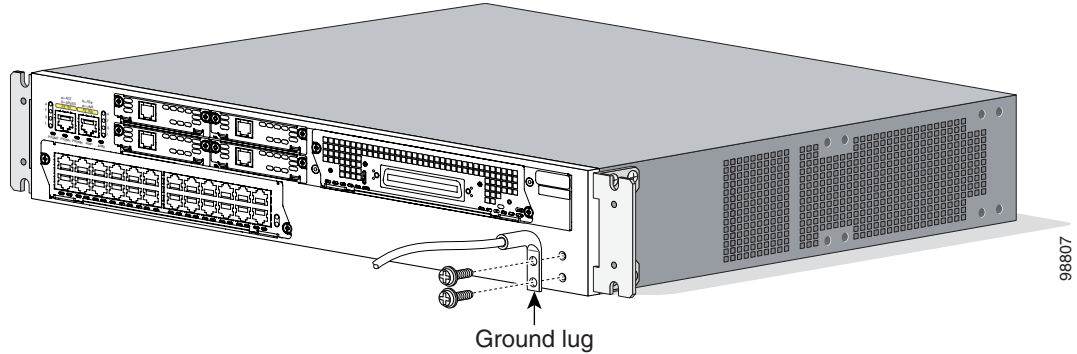
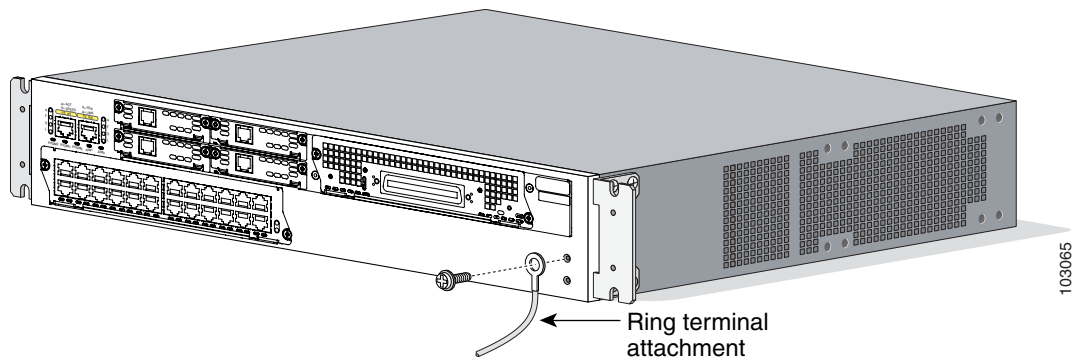


**Figure 18** NEBS-Compliant Chassis Ground Connection on Cisco 2811 Chassis



**Figure 19** Chassis Ground Connection Using Ring Terminal on Cisco 2811 Chassis



**Figure 20** NEBS-Compliant Chassis Ground Connection on Cisco 2821 or Cisco 2851 Chassis**Figure 21** Chassis Ground Connection Using Ring Terminal on Cisco 2821 or Cisco 2851 Chassis

After the router has been installed and properly grounded, you can connect the power wiring; the WAN, LAN, and voice cables; and the cables for administrative access as required for your installation. For information about connecting the cables, see the [Cable Connection Procedures for Cisco 2800 Series Routers](#) online document.

This document is to be used in conjunction with the *Cisco 2800 Series Integrated Services Routers Quick Start Guide*.

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# Cable Connection Procedures for Cisco 2800 Series Routers

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This document describes how to connect your Cisco 2800 series integrated services router to a power source and to networks and external devices. It includes the following sections:

- [Power Connections, page 2](#)
- [Connecting WAN, LAN, and Voice Cables, page 9](#)
- [Connecting to a Console Terminal or Modem, page 11](#)



**Note**

To see translations of the warnings that appear in this publication, refer to the [Cisco 2800 Series and Cisco 3800 Series Integrated Services Routers Regulatory Compliance and Safety Information](#) document that accompanied this device.

---



**Warning**

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

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**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 to Cisco 2800 series routers. It covers the following topics:

- [Connecting Routers to AC Power, page 2](#)
- [Connecting Routers to DC Power, page 2](#)
- [Connecting Routers to Backup Power, page 9](#)



**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 (10 A, 240 VAC) circuit with overcurrent protection. If backup power is required, see the [“Connecting Routers to Backup Power”](#) section on page 9.



**Note**

The input voltage tolerance limits for AC power are 90 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



**Warning**

**This product relies on the building’s installation for short-circuit (overcurrent) protection. Ensure that the protective device is rated not greater than: 15A, 120VAC (10A, 240VAC).** Statement 1005

## Connecting Routers to DC Power



**Note**

The Cisco 2801 router does not support DC power.



**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

**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

**Warning**

**Use copper conductors only.** Statement 1025

If your router has a DC-input power supply, follow the directions in this section for proper wiring. A router with a DC-input power supply has a terminal block for the DC power connections. If backup power is required, see the [“Connecting Routers to Backup Power”](#) section on page 9.

## DC Wiring Requirements

A Cisco 2811, Cisco 2821, or Cisco 2851 router with a DC-input power supply requires copper wire and crimp-type terminals for the power connections. [Table 1](#) and [Table 2](#) summarize the wiring requirements.

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 be the same polarity and voltage.

**Table 1** DC Wiring Requirements for Cisco 2811 Routers

DC Power Input	DC Input Wire Size	Safety Ground Wire Size	Wire Terminal (Lug)	Overcurrent Protection
24–36 VDC, 8 A, positive or negative, single source or dual sources	AWG 14 (2.0 mm <sup>2</sup> )	AWG 14 (2.0 mm <sup>2</sup> ), minimum	Amp/Tyco No. 32957 or equivalent	20 A maximum
36–60 VDC, 5 A, positive or negative, single source or dual sources				

**Table 2** DC Wiring Requirements for Cisco 2821 and Cisco 2851 Routers

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

## Wiring Procedure for DC Input

To connect a router to a DC power source, perform the following 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 strip length is 3/16 to 1/4 inch (5 to 6 mm) for Amp/Tyco No. 32957 terminals.

- Step 3** Crimp the terminals to the 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 1](#). Tighten the terminal screws to  $8.0 \pm 0.5$  in-lb ( $0.9 \pm 0.05$  N-m).



**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**

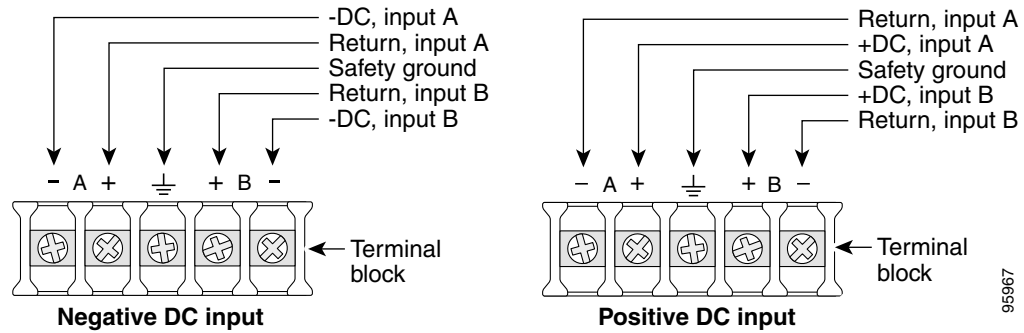
**An exposed wire lead from a DC-input power source can conduct harmful levels of electricity. Be sure that no exposed portion of the DC-input power source wire extends from the terminal block plug.** Statement 122



**Caution**

Do not overtorque the terminal block contact screws. Recommended torque is  $8.0 \pm 0.5$  in-lb ( $0.90 \pm 0.05$  N-m).

**Figure 1 DC Power Connections for Cisco 2800 Series Routers**



95967

**Step 6** Install the plastic covers over the terminals. (See [Figure 2](#) or [Figure 3](#).)



**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 secure the wires using cable ties as shown in [Figure 2](#) or [Figure 3](#). Make sure that the wires do not project above or below the front panel of the router.

**Step 8** Turn on power to the DC circuit. Be sure to remove tape used to secure the circuit-breaker switch in the OFF position.

**Figure 2 Wire Routing and Attachment for Cisco 2811 Routers**

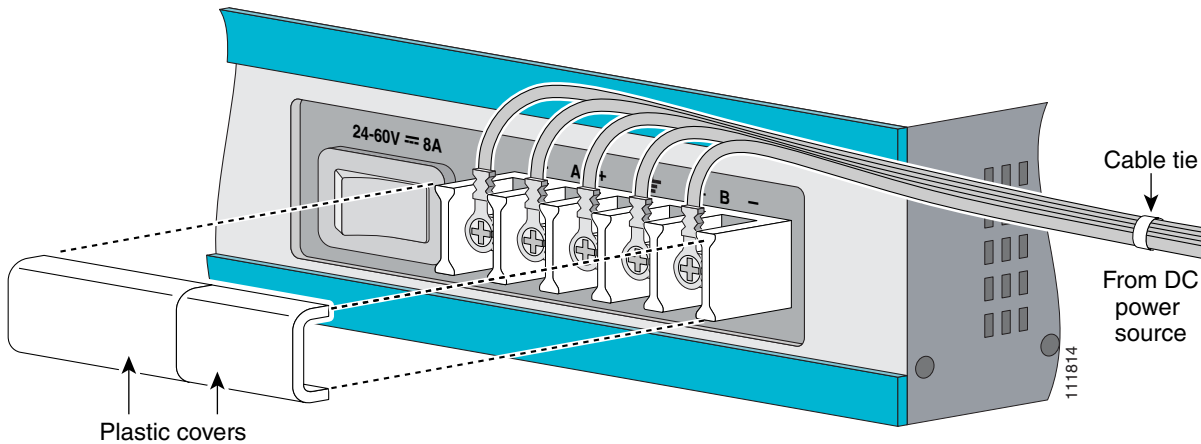
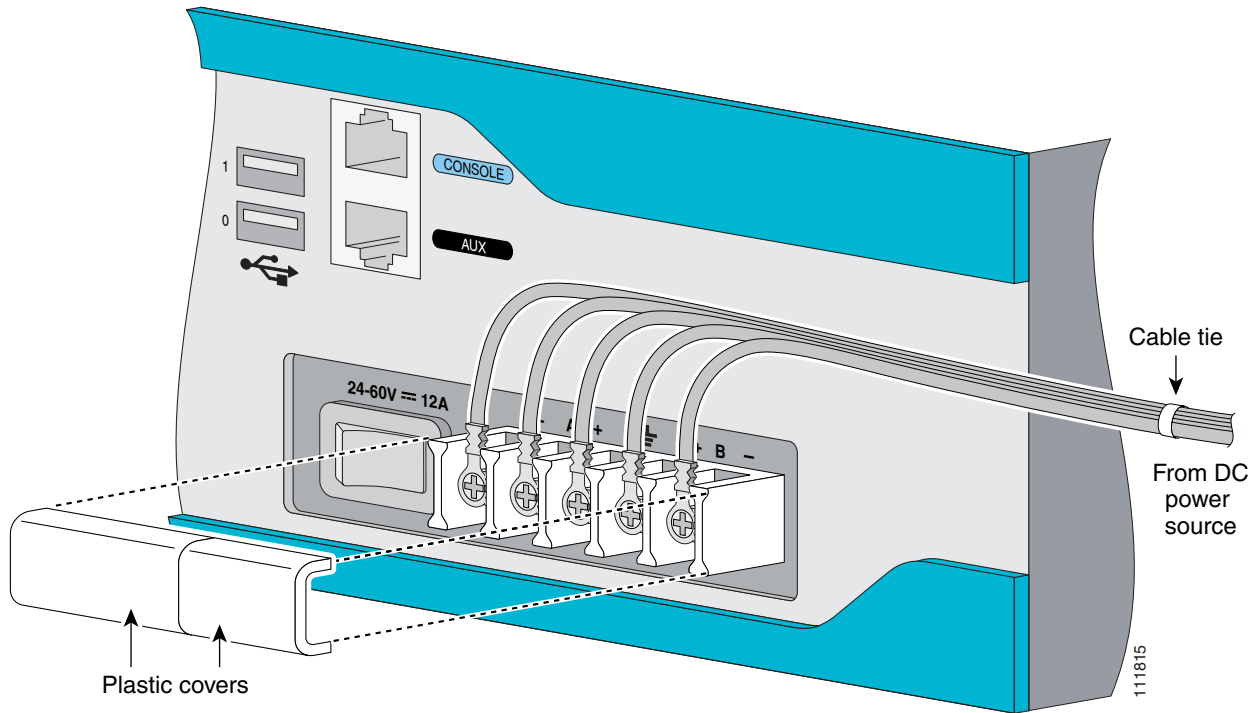


Figure 3 Wire Routing and Attachment for Cisco 2821 and Cisco 2851 Routers



## Approved Scenarios and Scenarios Not Approved for Dual DC Power Supply Configuration in Cisco 2800 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 be the same polarity (with respect to ground) and voltage (within 0.25 volts). Do not connect –DC grounded and +DC grounded dual sources to Cisco 2811, Cisco 2821, and Cisco 2851 routers.

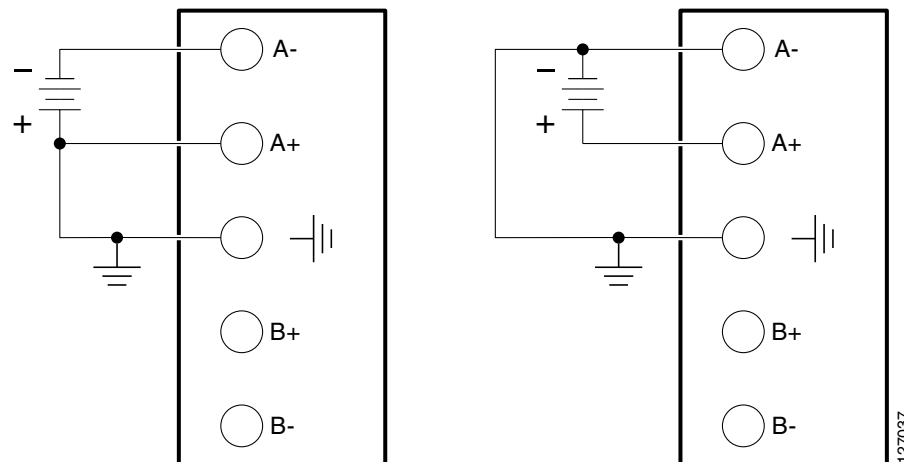


**Caution**

Dual sources with opposite-polarity grounding damage equipment.

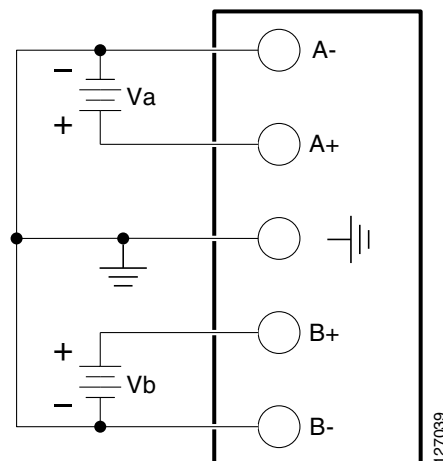
In [Figure 4](#), either the positive source terminal or the negative source terminal is tied to ground.

**Figure 4** Connecting to One Source Only—Source A or Source B



In [Figure 5](#), source A and source B share common negative terminal connections.

**Figure 5** Connecting Source A and Source B with Common Negative Terminals



In [Figure 6](#), source A and source B share common positive terminal connections. This is allowed only if  $V_a$  equals  $V_b$  (within 0.25 V).

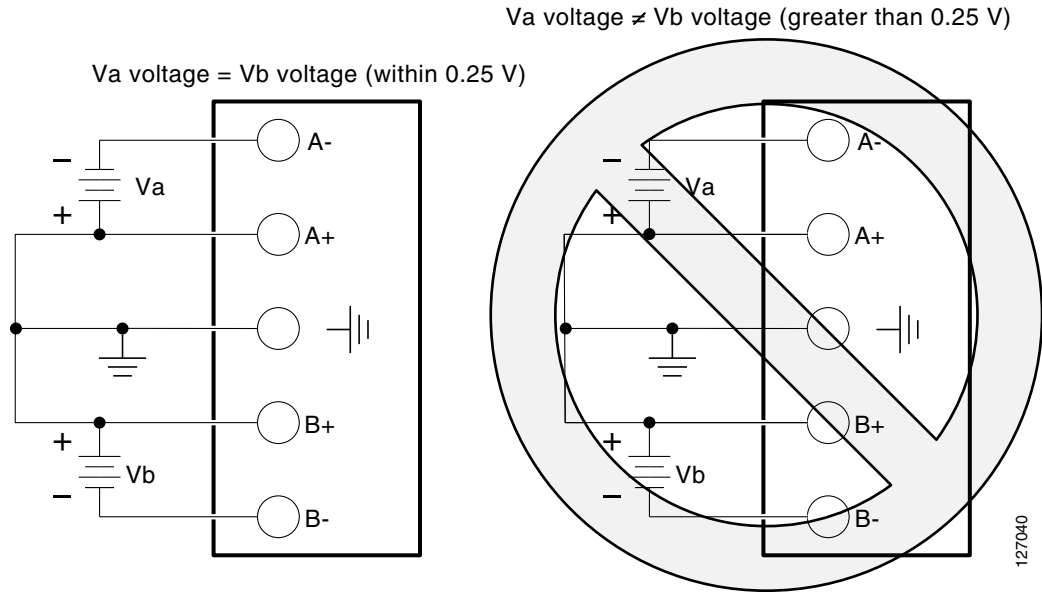
**Caution**

When connecting source A and source B with common positive terminals, if source A and source B voltages are unequal by more than 0.25 V, the higher-voltage source can discharge into the lower-voltage source through the A- and B- input terminals. Excessive discharging currents through these terminals can cause one or both of the dual input DC power supply's internal A- or B- fuses to open, 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 5](#), discharging does not occur and there is no restriction requiring that source A and source B voltages be equal.

**Figure 6** Connecting Source A and Source B with Common Positive Terminals

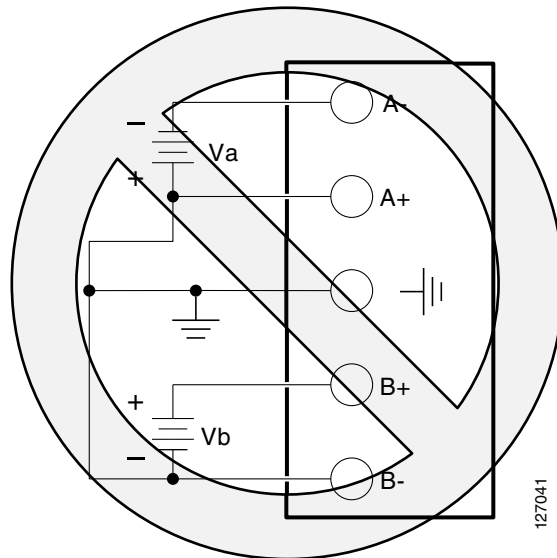


In [Figure 7](#), source A and source B are wired with opposite polarity grounds. *Do not* use this configuration.

  
**Caution**

*Do not* use the DC input configuration shown in [Figure 7](#).

**Figure 7** Source A and Source B Wired with Opposite-Polarity Grounds





## Connecting Routers to Backup Power

If your router uses the Cisco Redundant Power System (RPS), refer to the *Cisco Redundant Power System Hardware Installation Guide* for instructions about the power connections. You can access this document at:

<http://www.cisco.com/en/US/docs/routers/access/rps/hardware/installation/guide/rpshim.html>.



### 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.



### Note

The Cisco 2801 router does not support an RPS.

## Connecting WAN, LAN, and Voice Cables

This section describes how to connect the WAN, LAN, and voice interface cables. It covers the following topics:

- [Ports and Cabling, page 9](#)
- [Connection Procedures and Precautions, page 11](#)

One or two Ethernet cables are typically provided with the router. Additional cables and transceivers can be ordered from Cisco. For ordering information, contact customer service. For cable pinouts, refer to 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

**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 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

## Ports and Cabling

Table 3 summarizes some typical WAN, LAN, and voice connections for Cisco 2800 series routers. The connections summarized here are also described in detail in the following documents:

- *Cisco Modular Access Router Cable Specifications*
- *Cisco Network Modules Hardware Installation Guide*

- *Installing Cisco Interface Cards in Cisco Access Router*

**Table 3 WAN, LAN, and Voice Connections**

Port or Connection	Port Type, Color <sup>1</sup>	Connection:	Cable
Ethernet	RJ-45, yellow	Ethernet hub or Ethernet switch	Category 5 or higher Ethernet
T1/E1 WAN xCE1T1-PRI	RJ-48C/CA81A RJ-48S, tan	T1 or E1 network External T1 CSU or other T1 equipment	RJ-48 T1/E1 RJ-48S to RJ-48S TE RJ-48S to RJ-48S NT RJ-48S to RJ-48S T1 RJ-48S to bare RJ-48S to BNC RJ-48S to twinaxial cable RJ-48S to DB-15 RJ-48S to DB-15 null
T3/DS3/E3 WAN	BNC connector	T3 network, CSU/DSU, or other T3/DS3 equipment	75-ohm coaxial cable
Cisco serial	60-pin D-sub, blue	CSU/DSU and serial network or equipment	Cisco serial transition cable that matches the signaling protocol (EIA/TIA-232, EIA/TIA-449, V.35, X.21, or EIA-530) and the serial port operating mode (DTE or DCE). <sup>2</sup>
Cisco Smart serial	Cisco Smart compact connector, blue	CSU/DSU and serial network or equipment	
ADSL	RJ-11C/CA11A, lavender	Network demarcation device for service provider DSL interface	RJ-11 straight-through
SHDSL	RJ-11C/CA11A, lavender, RJ-14	Network demarcation device for service provider DSL interface	RJ-11 straight-through for 2-wire RJ-14 straight-through for 4-wire
T1/E1 digital voice	RJ-48C/CA81A, tan	Digital PBX, ISDN network, CSU/DSU	RJ-48 T1/E1
Analog voice FXS	RJ-11, gray	Telephone, fax	RJ-11; RJ21 if using NM-HDA, straight-through
Analog voice FXO	RJ-11, pink	Central office, analog PBX	
Analog voice E&M	RJ-45, brown	Analog PBX	RJ-45
BRI S/T WAN (external NT1)	RJ-45/CB-1D, orange	NT1 device or private integrated network exchange (PINX)	RJ-45 straight-through
BRI U WAN (built-in NT1)	RJ-49C/CA-A11, red	ISDN network	RJ-48 straight-through
56/64-kbps DSU/CSU	8-pin modular, blue	RJ-48S interface in subrate device or network	RJ-48 straight-through
T1/FT1 DSU/CSU	8-pin modular, blue	RJ-48C interface	RJ-48 straight-through
Gigabit Ethernet SFP, optical	LC, color according to optical wavelength	1000BASE-SX, -LX, -LH, -ZX, -CWDM	Optical fiber as specified on applicable data sheet
Gigabit Ethernet SFP, copper	RJ-45	1000BASE-T	Category 5, 5e, 6 UTP

1. Cable color codes are specific to Cisco cables.

2. See the *Cisco Modular Access Router Cable Specifications* document for information about choosing these cables.

## Connection Procedures and Precautions

Connect each WAN, LAN, and voice cable to the appropriate connector on the chassis or on a network module or interface card.

- Position the cables carefully, so that they do not put strain on the connectors.
- Organize cables in bundles so that cables do not intertwine.
- 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.

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

## Connecting to a Console Terminal or Modem

Your router has asynchronous serial console and auxiliary ports for system management. These ports provide administrative access to your router either locally (with a console terminal or PC) or remotely (with a modem).

Cisco provides the following cables for connecting your router to a console terminal, PC, or modem:

- One console cable (RJ-45-to-DB-9, blue)
- One modem cable (RJ-45-to-DB-25, black) (Cisco 2811, Cisco 2821, and Cisco 2851 only)
- One DB-9-to-DB-25 adapter (Cisco 2801 only)

This section describes how to connect a console terminal or PC to the console port and how to connect a modem to the auxiliary port. [Table 4](#) summarizes the system management connections.

**Table 4** System Management Connections

Port	Color	Connected To:	Cable
Console	Light blue	PC or ASCII terminal communication port (usually labeled COM)	RJ-45-to-DB-9 console cable
Auxiliary	Black	Modem for remote access	RJ-45-to-DB-25 modem cable or RJ-45-to-DB-9 console cable with a DB-9-to-DB25 adapter

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

## Connecting to the Console Port

If a console terminal or PC is connected to the console port, you can configure the router locally. To connect a console terminal or a PC running HyperTerminal or similar terminal emulation software to the console port on the router, perform the following steps:

---

**Step 1** Use the blue RJ-45-to-DB-9 console cable to connect the router to a terminal.



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

---

**Step 2** Configure your terminal or terminal emulation software for 9600 baud (default), 8 data bits, 1 stop bit, no parity, and flow control set to “none.”



**Note** Because hardware flow control is not possible on the console port, do not connect modems to the console port. Connect modems only to the auxiliary port.

---

## Connecting to the Auxiliary Port

If a modem is connected to the auxiliary port, a remote user can dial in to the router and configure it. To connect a modem to the auxiliary port on the router, perform the following steps:

---

**Step 1** Use the black RJ-45-to-DB-25 modem cable or the RJ-45-to-DB-9 console cable with a DB-9 to DB-25 adapter to connect the router to a modem.

**Step 2** Make sure that your modem and the router auxiliary port are configured for the same transmission speed (up to 115200 bps is supported) and hardware flow control with data carrier detect (DCD) and data terminal ready (DTR) operations.

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# Power Up and Initial Configuration Procedures for Cisco 2800 Series Routers

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This document describes how to power up your Cisco 2800 series integrated services router and perform an initial configuration to provide network access. It includes the following sections:

- [Powering Up Cisco 2800 Series Routers, page 1](#)
- [Configuring the Router, page 4](#)

## Powering Up Cisco 2800 Series Routers



---

**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

---

This section covers the following topics:

- [Checklist for Power Up, page 1](#)
- [Power Up Procedure, page 2](#)
- [Verifying the Front Panel LED Indications, page 3](#)
- [Verifying the Hardware Configuration, page 4](#)

## Checklist for Power Up

You are ready to power up the Cisco router if the following steps are completed:

- Chassis is securely mounted and grounded.
- Power and interface cables are connected.



---

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- The external CompactFlash memory card is properly seated into its slot. For installation instructions, see the online document [Removing and Installing CompactFlash Memory Cards in Cisco 2800 Series Routers](#).
- PC with terminal emulation program (hyperTerminal or equivalent) is connected to the console port and powered up.
- Your PC terminal emulation program is configured for 9600 baud, 8 data bits, 1 stop bit, no parity, and flow control is set to “none.”
- Suitable PC COM port is selected in the terminal emulation program.
- You have selected passwords for access control.
- You have determined the IP addresses for the Ethernet and serial interfaces.

## Power Up Procedure

To power up your Cisco router and verify that it goes through its initialization and self-test, follow the procedure below. When the procedure is finished, the Cisco router is ready to configure.

If you encounter problems when you power on the router, refer to the [Troubleshooting Cisco 2800 Series Routers](#) online document.

For information about the ROM monitor and the bootstrap program, refer to the [Using the ROM Monitor](#) document. For information about the configuration register, refer to the [Cisco 2800 Series Software Configuration Guide](#) document.



### Note

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

**Step 1** Make sure that your PC is powered up and connected as described in the [“Checklist for Power Up” section on page 1](#).

**Step 2** Move the power switch to the ON position.

The following indications appear:

- The SYS PWR LED on the front of the chassis blinks green.
- The fans operate.

Depending on your installation, some LEDs on the rear of the chassis and on installed modules might also come on.

If you encounter problems when you power up the router, refer to the [Troubleshooting Cisco 2800 Series Routers](#) online document.

Startup messages appear in your terminal emulation program window. When the startup messages end, the SYS PWR LED comes on solid green.



### Caution

*Do not press any keys on the keyboard until the messages stop and the SYS PWR LED is solid green. Any keys pressed during this time are interpreted as the first command typed when the messages stop, which might cause the router to power off and start over. It takes a few minutes for the messages to stop.*



You may see different startup messages:

- If you see the following messages, the router has booted with a configuration file and is ready for initial configuration using Cisco Router and Security Device Manager (SDM).

```
yourname con0 is now available

Press RETURN to get started.
```

If the messages above do not appear, SDM and the *Cisco Router and Security Device Manager (SDM) Quick Start Guide* were not shipped with your router. If SDM is installed on your router, we recommend using SDM to perform the initial configuration. To learn how to configure your router using SDM, or how to obtain SDM and install it on your router, see the [“Initial Configuration Using Cisco Router and Security Device Manager”](#) section on page 5.

- If you see the following messages, the router has booted and is ready for initial configuration using the setup command facility or the command-line interface (CLI).

```
--- System Configuration Dialog ---

At any point you may enter a question mark '?' for help.
Use ctrl-c to abort configuration dialog at any prompt.
Default settings are in square brackets '['].

Would you like to enter the initial configuration dialog? [yes/no]:
```

To learn how to use the setup command facility to configure the router, see the [“Initial Configuration Using the Setup Command Facility”](#) section on page 5.

To learn how to use the CLI to configure the router, see the [“Initial Configuration Using the Cisco CLI—Manual Configuration”](#) section on page 8.



**Note**

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

## Verifying the Front Panel LED Indications

The front-panel indicator LEDs described in [Table 1](#) provide power, activity, and status information useful during powerup. The built-in LED indicators in the front and rear panels are described in [Table 6 on page 9](#). For more detailed information about the LEDs, refer to the [“LED Indicators”](#) section of the [Overview of Cisco 2800 Series Routers](#) online document.

**Table 1** Cisco 2800 Series LED Indicators

LED Label	LED Color or State	Meaning
SYS PWR	Solid green	System is operating normally
	Blinking green	System is booting or is in ROM monitor mode
	Amber	System error
	Off	Power is off or power fault

**Table 1** Cisco 2800 Series LED Indicators

LED Label	LED Color or State	Meaning
AUX/ PWR	Green	IP phone power operating normally (if installed), or Cisco Redundant Power System (RPS) operating normally (if installed)
	Amber	IP phone power fault (if installed), or Cisco Redundant Power System (RPS) fault (if installed)
	Off	IP phone power and Cisco RPS are not installed
SYS ACT	Blinking green or solid green	Packet transfers are occurring or internal monitoring activities are occurring
	Off	No packet transfers are occurring
CF	Blinking green or solid green	Flash memory is being accessed; do not eject the CompactFlash memory card
	Off	Flash memory is not being accessed; okay to eject the CompactFlash memory card

## Verifying the Hardware Configuration

To display and verify the 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).

## Configuring the Router

This section covers the following topics:

- [Initial Configuration Using Cisco Router and Security Device Manager, page 5](#)
- [Initial Configuration Using the Setup Command Facility, page 5](#)
- [Initial Configuration Using the Cisco CLI—Manual Configuration, page 8](#)
- [Verifying the Initial Configuration, page 9](#)
- [Completing the Configuration, page 9](#)

You can configure your router by using one of the following tools:

- Cisco Router and Security Device Manager—See the “[Initial Configuration Using Cisco Router and Security Device Manager](#)” section on page 5.
- Setup command facility—See the “[Initial Configuration Using the Setup Command Facility](#)” section on page 5.
- Command-line interface (CLI)—See the “[Initial Configuration Using the Cisco CLI—Manual Configuration](#)” section on page 8.

**Note**

If you need help with the interface and port numbering, refer to the [“Interface Numbering”](#) section of the [Overview of Cisco 2800 Series Routers](#) online document.

## Initial Configuration Using Cisco Router and Security Device Manager

The following messages appear at the end of the startup sequence:

```
yourname con0 is now available
```

```
Press RETURN to get started.
```

For instructions on configuring your router by using SDM, refer to the [Cisco Router and Security Device Manager \(SDM\) Quick Start Guide](#) that shipped with your router. If the messages above do not appear, SDM and the [Cisco Router and Security Device Manager \(SDM\) Quick Start Guide](#) were not shipped with your router. If you want to use SDM, you can download the latest version of SDM and instructions for installing it on your router from the following location:

```
http://www.cisco.com/cgi-bin/tablebuild.pl/sdm
```

To obtain the SDM quick start guide, SDM release notes, and other SDM documentation, go to [www.cisco.com/go/sdm](http://www.cisco.com/go/sdm) and click the Technical Documentation link.

For help with interface and port numbering, refer to the [“Interface Numbering”](#) section of the [“Overview of Cisco 2800 Series Routers”](#) online document.

## Initial Configuration Using the Setup Command Facility

This section shows how to use the setup command facility to configure a hostname for the router, set passwords, and configure an interface for communication with the management network. If you see the following messages at the end of the startup sequence, the setup command facility has been invoked automatically:

```
--- System Configuration Dialog ---
```

```
At any point you may enter a question mark '?' for help.
Use ctrl-c to abort configuration dialog at any prompt.
Default settings are in square brackets '['].
```

```
Would you like to enter the initial configuration dialog? [yes/no]:
```

The setup command facility prompts you for basic information about your router and network, and it creates an initial configuration file. After the configuration file has been created, you can use the CLI or Cisco Router and Security Device Manager to perform additional configuration.

The prompts in the setup command facility vary, depending on your router model, the installed interface modules, and the software image. The following example and the user entries (in **bold**) are shown as examples only.

For a description of the interface numbering, refer to the [“Interface Numbering”](#) section of the [Overview of Cisco 2800 Series Routers](#) online document.

**Note**

If you make a mistake while using the setup command facility, you can exit and run the setup facility again. Press **Ctrl-c**, and type **setup** at the privileged EXEC mode prompt (Router#).

**Step 1** To proceed using the setup command facility, enter **yes** when the power-up messages have ended:

Would you like to enter the initial configuration dialog? [yes/no]: **yes**

**Step 2** When the following messages appear, press **Return** to enter basic management setup:

At any point you may enter a question mark '?' for help.  
Use ctrl-c to abort configuration dialog at any prompt.  
Default settings are in square brackets '['].

Basic management setup configures only enough connectivity for management of the system, extended setup will ask you to configure each interface on the system

Would you like to enter basic management setup? [yes/no]: **yes**

**Step 3** Enter a hostname for the router (this example uses **Router**):

Configuring global parameters:

Enter host name [Router]: **Router**

**Step 4** Enter an enable secret password. This password is encrypted (more secure) and cannot be seen when viewing the configuration:

The enable secret is a password used to protect access to privileged EXEC and configuration modes. This password, after entered, becomes encrypted in the configuration.

Enter enable secret: **xxxxxxx**

**Step 5** Enter an enable password that is different from the enable secret password. This password is *not* encrypted (less secure) and can be seen when viewing the configuration:

The enable password is used when you do not specify an enable secret password, with some older software versions, and some boot images.

Enter enable password: **xxxxxxx**

**Step 6** Enter the virtual terminal password, which prevents unauthenticated access to the router through ports other than the console port:

The virtual terminal password is used to protect access to the router over a network interface.

Enter virtual terminal password: **xxxxxxx**

**Step 7** Respond to the following prompts as appropriate for your network:

Configure SNMP Network Management? [yes]:

Community string [public]:

A summary of the available interfaces appears:



**Note** The interface numbering that appears is dependent on the type of Cisco modular router platform and on the installed interface modules and cards.

Current interface summary

Controller	Timeslots	D-Channel	Configurable modes	Status
T1	0/0/0	24	23	pri/channelized Administratively up

Interface	IP-Address	OK?	Method	Status	Prol
FastEthernet0/0	unassigned	NO	unset	up	up

```
FastEthernet0/1          unassigned      NO  unset  up          dow
```

**Step 8** Select one of the available interfaces for connecting the router to the management network:

Enter interface name used to connect to the management network from the above interface summary: **fastethernet0/0**

**Step 9** Respond to the following prompts as appropriate for your network:

```
Configuring interface FastEthernet0/0:
Use the 100 Base-TX (RJ-45) connector? [yes]: yes
Operate in full-duplex mode? [no]: no
Configure IP on this interface? [yes]: yes
  IP address for this interface: 172.1.2.3
  Subnet mask for this interface [255.255.0.0] : 255.255.0.0
  Class B network is 172.1.0.0, 16 subnet bits; mask is /16
```

The configuration is displayed:

The following configuration command script was created:

```
hostname Router
enable secret 5 $1$D5P6$PYx41/lQIASK.HcSbf05q1
enable password xxxxxx
line vty 0 4
password xxxxxx
snmp-server community public
!
no ip routing

!
interface FastEthernet0/0
no shutdown
media-type 100BaseX
half-duplex
ip address 172.1.2.3 255.255.0.0
!
interface FastEthernet0/1
shutdown
no ip address
!
end
```

**Step 10** Respond to the following prompts. Select [2] to save the initial configuration:

```
[0] Go to the IOS command prompt without saving this config.
[1] Return back to the setup without saving this config.
[2] Save this configuration to nvram and exit.
```

```
Enter your selection [2]: 2
Building configuration...
Use the enabled mode 'configure' command to modify this configuration.
```

Press RETURN to get started!

The user prompt appears.

```
Router>
```

**Step 11** Verify the initial configuration. See the [“Verifying the Initial Configuration”](#) section on page 9 for verification procedures.

## Initial Configuration Using the Cisco CLI—Manual Configuration

This section shows how to display a command-line interface (CLI) prompt for configuration using the CLI, and it directs you to documentation for the CLI configuration. You can use the CLI if you see the following messages at the end of the startup sequence:

```
--- System Configuration Dialog ---
```

```
At any point you may enter a question mark '?' for help.
Use ctrl-c to abort configuration dialog at any prompt.
Default settings are in square brackets '['].
```

```
Would you like to enter the initial configuration dialog? [yes/no]:
```

If these messages do not appear, SDM and a default configuration file were installed on the router at the factory. To use SDM to configure your router, see the [“Initial Configuration Using Cisco Router and Security Device Manager”](#) section on page 5.

For help with interface and port numbering, refer to the [“Interface Numbering”](#) section of the [Overview of Cisco 2800 Series Routers](#) online document.

---

**Step 1** To proceed with manual configuration using the CLI, enter **no** when the power-up messages end:

```
Would you like to enter the initial configuration dialog? [yes/no]: no
```

**Step 2** Press **Return** to terminate autoinstall and continue with manual configuration:

```
Would you like to terminate autoinstall? [yes] Return
```

Several messages are displayed, ending with a line similar to the following:

```
...
Copyright (c) 1986-2004 by cisco Systems, Inc.
Compiled <date> <time> by <person>
```

**Step 3** Press **Return** to bring up the Router> prompt.

```
...
flashfs[4]: Initialization complete.
Router>
```

**Step 4** Type **enable** to enter privileged EXEC mode:

```
Router> enable
Router#
```

**Step 5** For configuration procedures, refer to the online [Cisco 2800 Series Software Configuration Guide](#) documents.




---

**Note** To avoid losing work you have completed, be sure to save your configuration occasionally as you proceed. Use the **copy running-config startup-config** command to save the configuration to NVRAM.

---

**Step 6** When you have finished the initial configuration, verify the initial configuration. See the [“Verifying the Initial Configuration”](#) section on page 9 for verification procedures.

---

## Verifying the Initial Configuration

Verify that the new interfaces are operating correctly by performing the following tests:

- To verify that the interfaces are operating correctly and that the interfaces and line protocol are in the correct state—up or down—enter the **show interfaces** command.
- To display a summary status of the interfaces configured for IP, enter the **show ip interface brief** command.
- To verify that you configured the correct hostname and password, enter the **show configuration** command.

When you have completed and verified the initial configuration, your Cisco router is ready to configure for specific functions. See the “[Completing the Configuration](#)” section on page 9 for information about locating documentation for advanced configuration procedures.

## Completing the Configuration

When you have completed and verified the initial configuration, your Cisco router is ready to configure for specific functions. For advanced configuration procedures, use either SDM or the CLI.

For configuration procedures using SDM, refer to the *Cisco Router and Security Device Manager (SDM) Quick Start Guide* that shipped with your router.

For configuration procedures using the CLI, refer to the online [Cisco 2800 Series Software Configuration Guide](#) documents. The software configuration documents include information about the following topics:

- Basic software configuration
- Feature documentation
- Configuration examples
- Troubleshooting and maintenance
- Cisco 2800 series cards and modules

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# Troubleshooting Cisco 2800 Series Routers

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If you encounter problems with your Cisco 2800 series integrated services router, use this information to isolate problems in the router or to eliminate the router as the source of the problem.

This document includes the following sections:

- [Solving Problems, page 2](#)
- [Reading System LEDs, page 4](#)
- [Reading Port and Module LEDs, page 6](#)
- [System Messages, page 7](#)
- [Recovering a Lost Password, page 11](#)
- [More Troubleshooting Help—Cisco Technical Assistance Center, page 11](#)



**Note**

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To troubleshoot a network module, refer to the online [Cisco Network Modules Hardware Installation Guide](#) ; to troubleshoot interface cards, refer to the online [Cisco Interface Cards Installation Guide](#).

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If you cannot locate the source of the problem, contact a customer service representative for information on how to proceed. For technical support information, refer to the [Obtaining Technical Assistance](#) section of the [Cisco 2800 Series Hardware Documents: Introduction and Warnings](#) online document. Before you call, have the following information ready:

- Chassis type and serial number
- Maintenance agreement or warranty information
- Type of software and version number
- Date you received the new chassis
- Brief description of the problem
- Brief explanation of the steps you have 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 following sections:

- [Reading System LEDs, page 4](#)
- [Reading Port and Module LEDs, page 6](#)

When solving problems, consider the following router 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.
- Modules—LEDs on the modules help identify a failure.
- Cables—External cables that connect the router to the network.

## Troubleshooting the Power and Cooling Systems

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

### Normal Indications

With the power switch on, the normal indications are:

- SYS PWR LED on green and continuous
- Fans operating
- AUX/PWR LED on green and continuous, if the IP phone power module or Cisco Redundant Power Supply (RPS) is installed

### Fault Indications

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

- With the power switch on, is the SYS PWR LED on?
  - If the LED is green and continuous, 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 and the SYS PWR LED on and green, do the fans operate?
  - If no, check the fans.
  - If yes, the power system is functioning.
- With the power switch on and the PWR SYS LED 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](#).
  - Ensure that all interface cards and internal modules are correctly installed.
  - Check for a power supply failure by inspecting the SYS PWR LED on the front panel. If it 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 front panel of the router. If the SYS PWR LED is blinking or continuous green or continuous amber, the power supply is functional.
  - If the SYS PWR LED is not on, refer to the “[Cisco 90-Day Limited Hardware Warranty Terms](#)” section of the [Cisco 2800 Series Hardware Documents: Introduction and Warnings](#) document for warranty information, or contact customer service.
  - Check for a power supply failure by inspecting the power supply LEDs on the front panel. See the “[Reading System LEDs](#)” section on [page 4](#) for power supply LED descriptions.

## Environmental Reporting Features

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

```
%SYS-1-OVERTEMP: System detected OVERTEMPERATURE condition. Please resolve cooling problem immediately!
```

Some causes of abnormally high router temperature are as follows:

- Fan failure
- Air conditioner 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](#).

## 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:

- Module is not recognized by the router.
  - Make sure that the module is firmly seated in its slot.
  - Check the LEDs on the module. Each module has its own set of LEDs. For information on these LEDs, refer to the online [Cisco Network Modules Hardware Installation Guide](#).

- Make sure that you have a version of Cisco IOS software that supports the module. Check the [Cisco 2800 Series Cards and Modules](#) online document for software requirements for the network module.
- Module is recognized, but interface ports do not initialize.
  - Make sure that the module is firmly seated in its slot.
  - Check external cable connections.
  - Make sure that you have a version of Cisco IOS software that supports the module. Check the software requirements for the affected module, which can be found in the configuration note that shipped with the network module.
- Router does not boot properly, or constantly or intermittently reboots.
  - Make sure that the module is firmly seated in its slot.
  - Check the router chassis or software. Refer to the [Cisco 90-Day Limited Hardware Warranty Terms](#) and the [Obtaining Technical Assistance](#) sections of the [Cisco 2800 Series Hardware Documents: Introduction and Warnings](#) online document for warranty and customer service contact information.
- Router boots, but the console screen is frozen, displays no output, or displays garbled output.
  - Check the external console connection.
  - Verify that the parameters for your terminal are set as follows:
    - (a) The same data rate as configured for the router (9600 baud is the default)
    - (b) 8 data bits
    - (c) 1 stop bit
    - (d) No parity generated or checked
- Router powers on and boots only when a particular module is removed.
  - Check the module. Refer to the [Cisco 90-Day Limited Hardware Warranty Terms](#) and the [Obtaining Technical Assistance](#) sections of the [Cisco 2800 Series Hardware Documents: Introduction and Warnings](#) online document for warranty and customer service contact information.
  - Confirm that the Cisco IOS release installed in the router supports the card. The [Cisco Interface Cards Installation Guide](#) lists the software requirements for each card.
- Router powers on and boots only when a particular cable is disconnected.
  - There may be a problem with the module or cable. [Cisco 90-Day Limited Hardware Warranty Terms](#) and the [Obtaining Technical Assistance](#) sections of the [Cisco 2800 Series Hardware Documents: Introduction and Warnings](#) online document. document for warranty and customer service contact information.

## Reading System LEDs

The system LEDs on the front panel of the router provide information about the power, data packet activity, and flash memory activity. For an explanation of these LEDs see [Table 1](#).

**Table 1** System LEDs on Cisco 2800 Series Routers

LED Indicator	State	Meaning	Possible Causes and Corrective Actions
SYS PWR	Off	If the fan is not running— <ul style="list-style-type: none"> <li>No output from the internal power supply.</li> </ul>	Power not switched on at the router. Power not available from source. Faulty input power wires or connections. Failed power supply in the router. To replace the internal power supply, refer to the <a href="#">Replacing the Power Supply</a> section of the <a href="#">Installing and Upgrading Internal Modules in Cisco 2800 Series Routers</a> online document.
		If the fan is running— <ul style="list-style-type: none"> <li>Router fault</li> </ul>	Failure in one or more system board components. Contact Cisco technical support. Refer to the <a href="#">Obtaining Technical Assistance</a> section of the <a href="#">Cisco 2800 Series Hardware Documents: Introduction and Warnings</a> online document.
	Solid green	Router is receiving power, and the internal power supply is functional.	Normal indication. No action required.
	Blinking green	During bootup, router is booting up normally.	Normal indication. No action required.
After bootup, router is operating in ROM monitor mode.		Refer to the router rebooting and ROM monitor information in the <a href="#">Cisco IOS Configuration Fundamentals Configuration Guide</a> for your Cisco IOS software release.	
AUX/PWR	Off	IP power is not installed, and RPS is not connected or not powered up.	If RPS is connected, power it up to provide backup power. Otherwise, no action is required.
	Solid green	IP power is functional, if installed. RPS is functional, if connected.	Normal indication. No action required for IP power or RPS.
		Solid amber	If RPS backup is not connected, IP power output has failed.
	If IP power is not installed, RPS has failed.		Repair or replace the RPS. Refer to the <a href="#">Cisco RPS-675 Document</a> .
	If RPS backup is connected and IP power is installed, either one or both has failed.	Check RPS, and repair or replace if faulty. Refer to the <a href="#">Cisco RPS-675 Document</a> . Check AC power supply, and replace if faulty. Refer to the <a href="#">Replacing the Power Supply</a> section of the <a href="#">Installing and Upgrading Internal Modules in Cisco 2800 Series Routers</a> online document.	

**Table 1** System LEDs on Cisco 2800 Series Routers (continued)

LED Indicator	State	Meaning	Possible Causes and Corrective Actions
SYS ACT	Off	No packet transfers are occurring.	Ethernet not active or not connected. Check Ethernet connections and make corrections as necessary.  Router not configured properly. Check configuration and make corrections as necessary.
	Blinking	System is actively transferring packets or is monitoring internal activities.	Normal indication. No action required.
CF	Off	The flash memory is not being accessed.	Normal indication. No action required. It is okay to remove the CompactFlash memory card if the CF LED remains off.
	Solid green or blinking	The flash memory is being accessed.	Normal indication. No action required.  Caution: Do not remove the CompactFlash memory card while it is being accessed.

## Reading Port and Module LEDs

The port and module LEDs, located on the front panel of the router on the Cisco 2801 router and on the rear panel of the router on the Cisco 2811, Cisco 2821, and Cisco 2851 routers, enable you to determine router performance and operation. For an explanation of these LEDs see [Table 2](#).

**Table 2** LED Indicators on Cisco 2800 Series Routers

LED Indicator	State	Meaning	Corrective Action
A = ACT	Off	Ethernet interface next to the LED is not receiving packets.	Ethernet not active or not connected. Check Ethernet connections and make corrections as necessary.  Router not configured properly. Check configuration and make corrections as necessary.
	Solid or blinking green	Ethernet interface next to the LED is receiving packets.	Normal indication. No action required.
F = FDX	Off	Ethernet port next to the LED is operating in half-duplex mode.	Indication is for information only.
	Solid green	Ethernet port next to the LED is operating in full-duplex mode.	Indication is for information only.

**Table 2 LED Indicators on Cisco 2800 Series Routers (continued)**

LED Indicator	State	Meaning	Corrective Action
S = Speed	1 blink + pause (Off (Cisco 2801 router))	Ethernet port next to the LED is operating at 10 Mbps.	Indication is for information only.
	2 blinks + pause (On (Cisco 2801 router))	Ethernet port next to the LED is operating at 100 Mbps.	Indication is for information only.
	3 blinks + pause <sup>1</sup>	Ethernet port next to the LED is operating at 1000 Mbps.	Indication is for information only.
L = Link	Off	Ethernet link is not established.	Ethernet not active or not connected. Check Ethernet connections  Router not configured properly. Check configuration and make corrections as necessary.
	Green	Ethernet link is established.	Normal indication. No action required.
PVDM0 PVDM1 PVDM2 <sup>2</sup>  (Packet voice data modules)	Off	No PVDM installed in slot (0, 1, 2).	Indication is for information only.
	Green	PVDM in slot (0, 1, 2) is initialized.	Normal indication. No action required.
	Amber	During bootup—PVDM in slot (0, 1, 2) is detected.  After bootup—PVDM in slot (0, 1, 2) failed to initialize.	If PVDM fails to initialize, replace the PVDM. To replace the PVDM, refer to the <a href="#">Installing and Removing PVDMs</a> section of the <a href="#">Installing and Upgrading Internal Modules in Cisco 2800 Series Routers</a> online document.
AIM0 AIM1  (Advanced integration modules)	Off	No AIM installed in slot (0, 1).	Indication is for information only.
	Green	AIM in slot (0, 1) is initialized.	Normal indication. No action required.
	Amber	AIM in slot (0, 1) failed to initialize.	Replace the AIM. To replace the AIM, refer to the <a href="#">Installing and Removing AIMS</a> section of the <a href="#">Installing and Upgrading Internal Modules in Cisco 2800 Series Routers</a> online document.

1. The 3 blinks+pause state is applicable to the Cisco 2821 and Cisco 2851 routers only. The Cisco 2801 and Cisco 2811 do not have 1000 Mbps ethernet ports.
2. The PVDM2 LED is applicable only to the Cisco 2821 and Cisco 2851 routers.

## System Messages

This section describes system error and recovery messages that may appear when a Cisco 2800 series router is operated. Cisco IOS software displays system error and recovery messages on an external device console terminal screen. (For more information, see the [“Connecting to a Console Terminal or Modem”](#) section on page 12.)

The terminal should display one of the following prompts:

Router> (indicates the user EXEC command mode)

or

Router# (indicates the privileged EXEC command mode)

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

Table 3 describes system error and recovery messages and LED conditions that might accompany them.



**Note**

Table 3 does not provide a complete list of system LED conditions. (For all LED conditions that can occur in your router, see the “Reading System LEDs” section on page 4 and the “Reading Port and Module LEDs” section on page 6.)

**Table 3 System Error and Recovery Messages**

LED Type	LED Color	Message, Meaning, and Recommended Action
SYS PWR	Amber	<p>Error:</p> <pre>%SYS-1-OVERTEMP: System detected OVERTEMPERATURE condition. Please resolve cooling problem immediately!</pre> <p>Explanation:</p> <p>The router is operating at an abnormally high temperature, possibly caused by one or more of the following conditions:</p> <ul style="list-style-type: none"> <li>• Fan failure</li> <li>• Air conditioner failure in the room</li> <li>• Air blockage to cooling vents</li> </ul> <p>Recovery:</p> <p>Make sure that the room temperature is not too high and that airflow to the router is not blocked. See also the “Site Environment” section on page 4 and the “Equipment Racks” section on page 5.</p> <p>If this condition persists, the environmental monitor might shut down the system. Call your Cisco technical support representative for assistance, if necessary.</p> <p>When the error condition is resolved, the SYS PWR LED changes to green, and the following informational message appears:</p> <pre>%ENVMON-3-OVERTEMP_OK: System temperature normal</pre> <p><b>Note</b> These messages are not supported on the Cisco 2801.</p>



**Table 3** System Error and Recovery Messages (continued)

LED Type	LED Color	Message, Meaning, and Recommended Action
—	—	<p>Error:</p> <p><code>%ENVMON-3-FAN_FAILED: Fan fan-number not rotating.</code></p> <p>Explanation:</p> <p>The specified fan (1, 2, or 3) is not rotating at the desired speed.</p> <p>Recovery:</p> <p>Make sure that the fan power cable is properly attached to the mainboard fan power connector. If the problem persists, contact your technical support representative.</p>
AUX/ PWR	Amber	<p>Message:</p> <p><code>%ENVMON-5-48V_STATUS: -48V supply failed</code></p> <p>Explanation:</p> <p>The -48 V power supply has failed.</p> <p>Recommended action:</p> <p>Replace the power supply. Refer to the <a href="#">Replacing the Power Supply</a> section of the <a href="#">Installing and Upgrading Internal Modules in Cisco 2800 Series Routers</a> online document.</p>
AUX/ PWR	Green	<p>Message:</p> <p><code>%ENVMON-5-48V_STATUS: -48V supply OK</code></p> <p>Explanation:</p> <p>The -48 V power supply is operating normally.</p> <p>Recommended action:</p> <p>Message is informational only.</p>
—	—	<p>Message:</p> <p><code>%ENVMON-5-RPS: Redundant power supply attached</code></p> <p>Explanation:</p> <p>Redundant power supply was connected to the router.</p> <p>Recommended action:</p> <p>Message is informational only.</p> <p><b>Note</b> The Cisco 2801 does not support RPS. This message is not applicable to the Cisco 2801.</p>
—	—	<p>Message:</p> <p><code>%ENVMON-5-RPS: Redundant power supply removed</code></p> <p>Explanation:</p> <p>Redundant power supply was disconnected from the router.</p> <p>Recommended action:</p> <p>Message is informational only.</p> <p><b>Note</b> The Cisco 2801 does not support RPS. This message is not applicable to the Cisco 2801.</p>

Table 3 System Error and Recovery Messages (continued)

LED Type	LED Color	Message, Meaning, and Recommended Action
AUX/ PWR	Amber	<p>Message: %ENVMON-5-RPS_STATUS: RPS standby/faulty</p> <p>Explanation: Redundant power supply has failed or has gone into standby mode.</p> <p>Recommended action: Check the redundant power supply. If faulty, disconnect it from the router and contact your Cisco technical support representative.</p> <p><b>Note</b> The Cisco 2801 does not support RPS. This message is not applicable to the Cisco 2801.</p>
AUX/ PWR	Green	<p>Message: %ENVMON-5-RPS_STATUS: RPS not available</p> <p>Explanation: Redundant power supply is connected to the router, but is not available to back up the internal power supply.</p> <p>Recommended action: Message is informational only.</p> <p><b>Note</b> The Cisco 2801 does not support RPS. This message is not applicable to the Cisco 2801.</p>
AUX/ PWR	Green	<p>Message: %ENVMON-5-RPS_STATUS: RPS in use</p> <p>Explanation: The router is receiving power from the redundant power supply.</p> <p>Recommended action: Message is informational only.</p> <p><b>Note</b> The Cisco 2801 does not support RPS. This message is not applicable to the Cisco 2801.</p>
AUX/ PWR	Green	<p>Message: %ENVMON-5-RPS_STATUS: RPS ready/available</p> <p>Explanation: Redundant power supply is connected to the router and is powered up, but the router is not receiving power from the redundant power supply.</p> <p>Recommended action: Message is informational only.</p> <p><b>Note</b> The Cisco 2801 does not support RPS. This message is not applicable to the Cisco 2801.</p>

**Table 3** System Error and Recovery Messages (continued)

LED Type	LED Color	Message, Meaning, and Recommended Action
—	—	<p>Message:</p> <pre>%ENVMON-1-NO_PROCESS: Failed to create environmental monitor process</pre> <p>Explanation:</p> <p>The router failed to establish the environmental monitor process. The amount of memory available in the router may not be sufficient.</p> <p>Recommended action:</p> <p>Increase the amount of memory (RAM) in the router.</p>

## 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 that is configured on your router, you can replace it with a new enable secret password.

For password recovery and replacement procedures for the Cisco 2800 series routers, refer to the [Password Recovery Procedures](#) document on Cisco.com.

## More Troubleshooting Help—Cisco Technical Assistance Center

For online troubleshooting help, go to the [TAC Case Collection Tool and Troubleshooting Assistant](#).

You must have an account on Cisco.com. If you do not have an account or have forgotten your username or password, click **Cancel** at the login dialog box and follow the instructions that appear.

For additional troubleshooting tools and information, go to the [Troubleshooting Links](#) index.

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# Installing Network Modules in Cisco 2800 Series Routers

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This chapter contains information on installing network modules, network module slot dividers, network module filler panels, and blank panels in Cisco 2800 series integrated services routers.



**Note**

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Cisco 2801 routers do not have network module slots. Network modules cannot be installed in Cisco 2801 routers.

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This chapter contains the following sections:

- [Viewing the Cisco Network Module Installation Guide, page 1](#)
- [Installing Slot Dividers in Network Module Slots, page 2](#)
- [Installing and Removing Filler Panels in Network Module Slots, page 4](#)
- [Installing Blank Panels over Empty Chassis Slots, page 7](#)
- [Related Product Documentation, page 7](#)

## Viewing the Cisco Network Module Installation Guide

The Cisco Network Module Installation Guide contains the procedures for installing network modules in external chassis slots.

You can view the [Cisco Network Module Installation Guide](#) online on Cisco.com.



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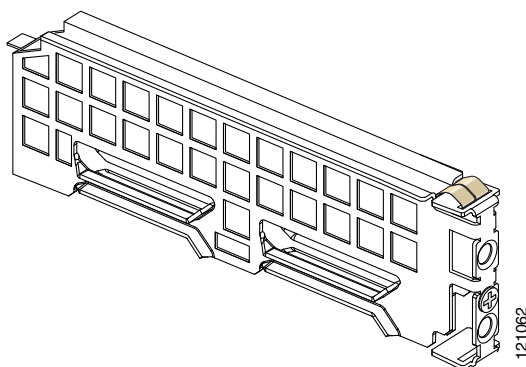
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# Installing Slot Dividers in Network Module Slots

In a Cisco 2851 router, you can install a slot divider in the network module slot to reduce the slot width from extended double-wide to extended single-wide. Use of a slot divider alone (without a filler panel) creates a slot width suitable for an enhanced extended single-wide (NME-X) network module. Use of a slot divider with a filler panel creates a slot width suitable for an enhanced single-wide (NME) or older version (NM) single-wide network module.

[Figure 1](#) shows a slot divider with captive screw for the network module slot in Cisco 2851 routers.

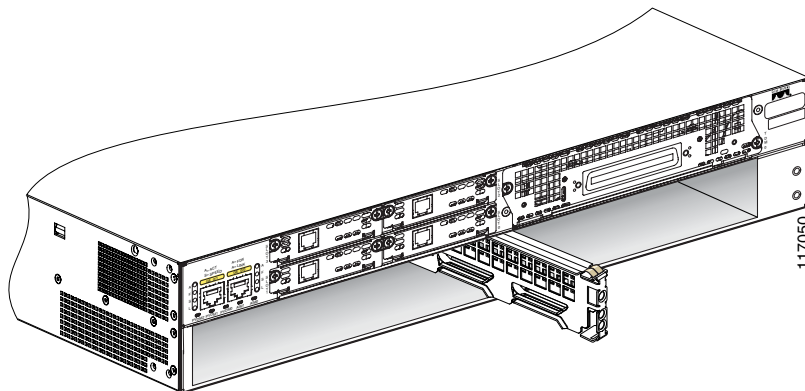
**Figure 1** Slot Divider for Network Module Slots



Install slot dividers into network module slots as follows:

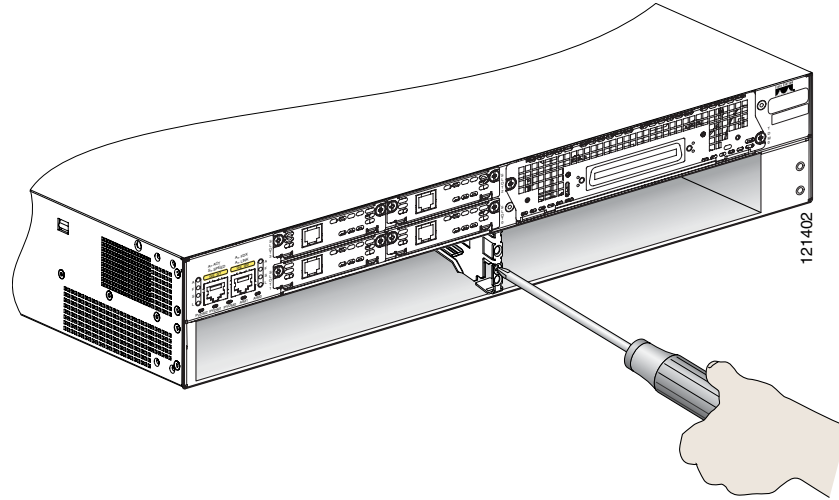
- 
- Step 1** Insert the top rails of the slot divider between the two guide rails in the top of the network module slot. See [Figure 2](#).

**Figure 2** Inserting a Slot Divider into a Network Module Slot

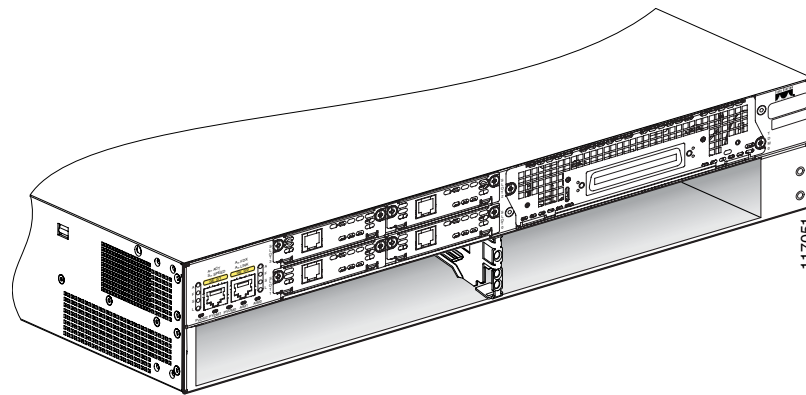


- Step 2** Push the slot divider in until it is fully seated.
- Step 3** Tighten the retention screw on the front of the slot divider with a number 1 Phillips screwdriver. See [Figure 3](#). When the slot divider is fully inserted, its front surface is flush with the panel of the router. See [Figure 4](#).

**Figure 3** Tightening the Slot Divider in a Network Module Slot



**Figure 4** Slot Divider Installed in a Network Module Slot



## Removing Slot Dividers from Network Module Slots



**Note** The network module slots on both sides of a slot divider must be empty before you remove the slot divider.

Remove slot dividers from network module slots as follows:

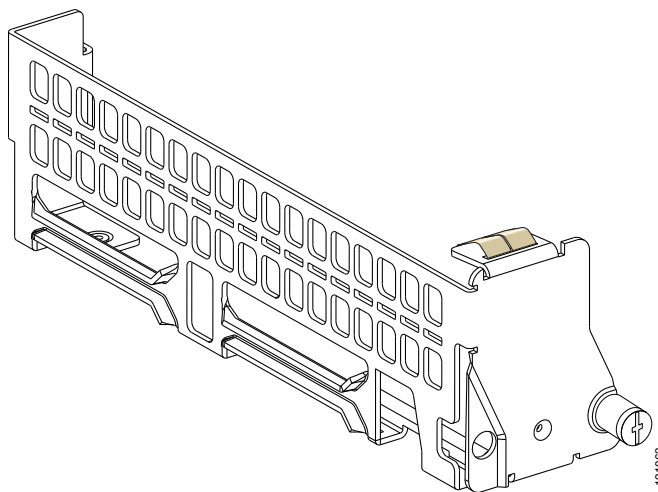
- Step 1** Loosen the retention screw on the front of the slot divider.
- Step 2** Pull the slot divider straight out of the network module slot.

# Installing and Removing Filler Panels in Network Module Slots

You can install filler panels in extended-wide network module slots to reduce the slot width. Use one filler panel to reduce an extended single-wide slot (NME-X) to standard single-wide (NME). Use two filler panels to reduce an extended double-wide slot (NME-XD) to standard double-wide (NMD).

[Figure 5](#) shows a filler panel for network module slots.

**Figure 5** Filler Panel for Network Module Slots

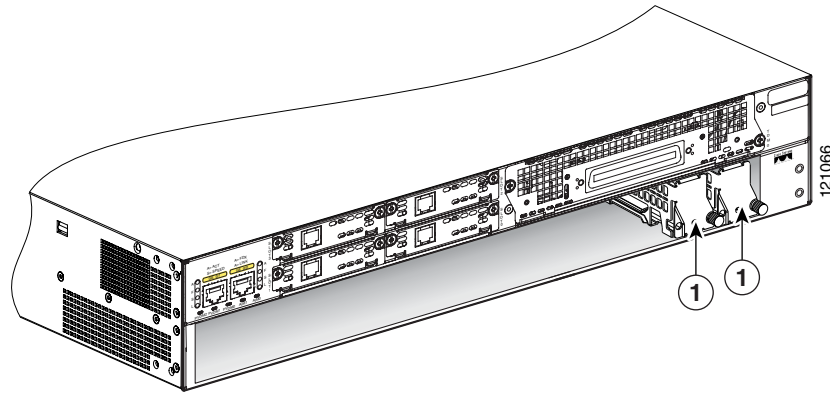


You can use filler panels in the following configurations:

- In a Cisco 2821 router, use one filler panel to reduce the extended single-wide slot (NME-X) to standard single-wide slot (NME).
- In a Cisco 2851 router, use filler panels as follows:
  - To create a slot for a standard double-wide network module (NMD), use two filler panels at the far right. See [Figure 6](#).
  - To create a slot for an extended single-wide network module (NME-X), use one filler panel at the far right, a slot divider in the middle, and a blank panel at the right. See [Figure 7](#).
  - To create a slot for a standard single-wide network module (NME or NM), use one filler panel at the far right, a slot divider in the middle, a blank panel at the right, and a filler panel next to the slot divider. See [Figure 8](#).

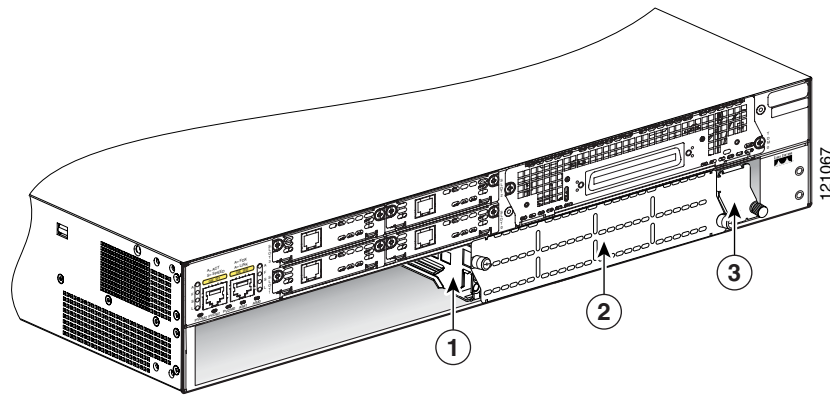


**Figure 6** Filler Panels for NMD



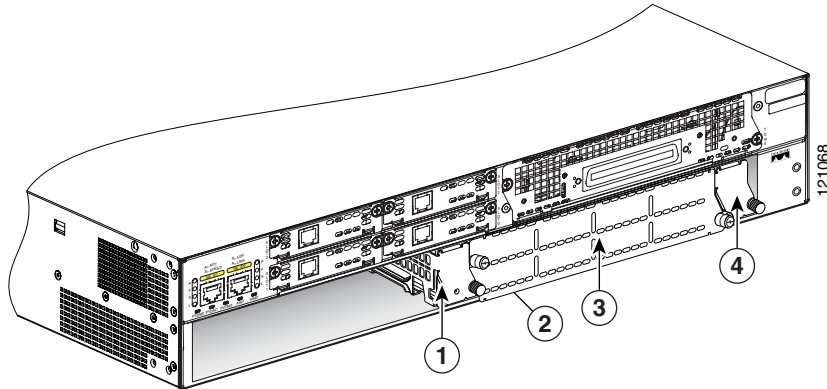
<b>1</b>	Filler panel
----------	--------------

**Figure 7** Filler Panels for NME-X



<b>1</b>	Slot divider	<b>3</b>	Filler panel
<b>2</b>	Blank panel		

Figure 8 Filler Panels for NME and NM



1	Filler panel	3	Blank panel
2	Slot divider	4	Filler panel

## Installing Filler Panels in Network Module Slots



**Note**

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

Install filler panels as follows:

- Step 1** Orient the filler panel for insertion, with the captive retention screw at the right side.
- Step 2** Insert the filler panel into the far right edge of the slot.
- Step 3** Guide the inner end of the filler panel into the square hole at the rear of the network module slot, and align the retention screw with the threaded screw hole in the chassis, slot divider, or adjacent filler panel.



**Note**

You may be securing the filler panel to the router chassis, to another filler panel, or to a slot divider, depending on its installation location.

- Step 4** Tighten the retention screw.

## Removing Filler Panels from Network Module Slots



**Note**

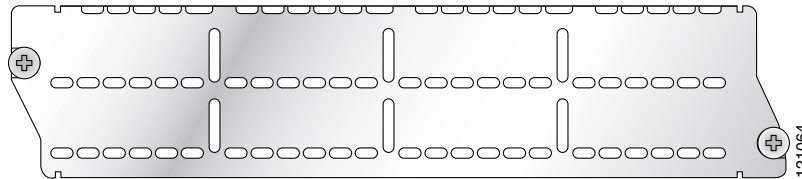
A network module slot must be empty before you remove a filler panel.

To remove a filler panel, loosen the captive retention screw and pull the filler panel straight out of the slot.

# Installing Blank Panels over Empty Chassis Slots

All empty chassis slots for network modules must be covered with blank panels. Blank panels are required to ensure proper cooling airflow and to prevent electromagnetic interference. [Figure 9](#) shows a typical blank panel.

**Figure 9** Typical Blank Panel



## Blank Panels for Network Module Slots

The network module hardware kit for Cisco 2800 series routers contains two blank panels. Each blank panel covers one single-wide network module slot.

Install blank panels over empty network module slots as follows:

- Single-wide slot—Attach a blank panel.
- Extended single-wide slot—Install an adapter/filler panel as described in the [“Installing and Removing Filler Panels in Network Module Slots”](#) section; then attach a blank panel.

## Related Product Documentation

The following documentation is related to your product. This documentation was not shipped with your product, but you can access it online at [Cisco.com](http://Cisco.com).

- [Cisco Network Modules and Interface Cards Regulatory Compliance and Safety Information](#)

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# Installing Interface Cards in Cisco 2800 Series Routers

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This chapter contains information on installing interface cards, interface card slot dividers, and blank panels in Cisco 2800 series integrated services routers.

This chapter contains the following sections:

- [Viewing the Cisco Interface Card Installation Guide, page 1](#)
- [Installing and Removing Slot Dividers, page 1](#)
- [Installing Blank Panels over Empty Chassis Slots, page 6](#)
- [Related Product Documentation, page 7](#)

## Viewing the Cisco Interface Card Installation Guide

The *Cisco Interface Card Installation Guide* contains the procedures for installing the various types of interface cards in external chassis slots. Interface cards include the following types:

- Voice interface cards (VIC)
- Voice-WAN interface cards (VWIC)
- WAN interface cards (WIC)
- High-speed WAN interface cards, single-wide (HWIC)
- High-speed WAN interface cards, double-wide (HWIC-D)

You can view the [Cisco Interface Cards Installation Guide](#) online on Cisco.com.

## Installing and Removing Slot Dividers

In HWIC slots, you can install a slot divider to convert a double-wide HWIC slot into two single-width slots.



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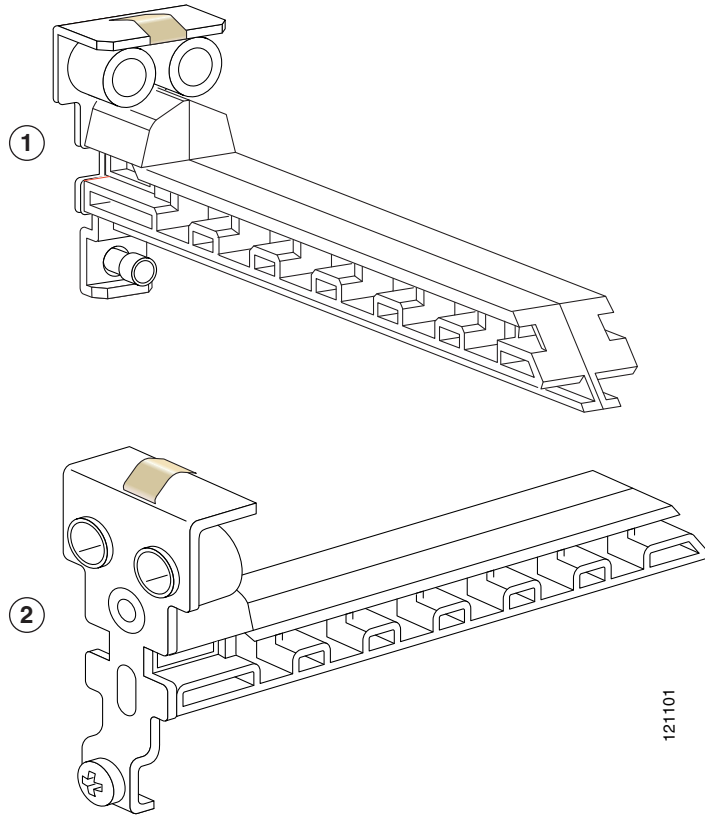
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## Installing Slot Dividers in HWIC Slots on Cisco 2801 Routers

Figure 1 shows a slot divider for HWIC slots on Cisco 2801 routers.

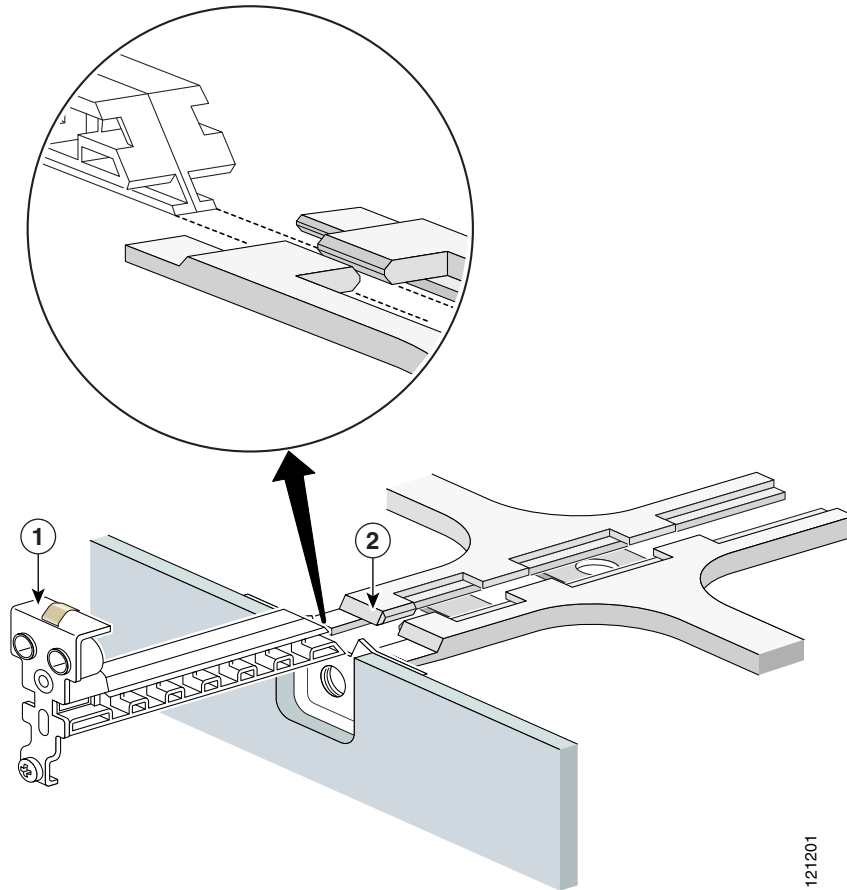
**Figure 1** Slot Divider for HWIC Slots on Cisco 2801 Routers



Install slot dividers into HWIC slots on Cisco 2801 routers as follows:

- 
- Step 1** Guide the slot divider between the two rails in the bottom of the HWIC slot. Push the slot divider in until it is fully seated. When the slot divider is fully seated, its outer end is flush with the front panel of the router. See [Figure 2](#).

**Figure 2** Inserting a Slot Divider into an HWIC Slot on a Cisco 2801 Router

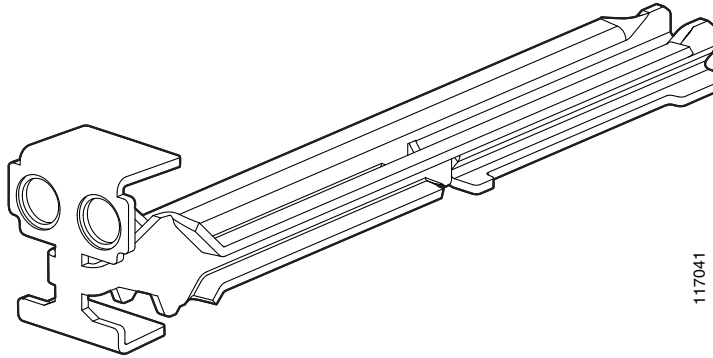


**Step 2** Tighten the retention screw on the slot divider.

## Installing Slot Dividers in HWIC Slots on Cisco 2811, Cisco 2821, and Cisco 2851 Routers

Figure 3 shows a slot divider for HWIC slots on Cisco 2811, Cisco 2821, and Cisco 2851 routers.

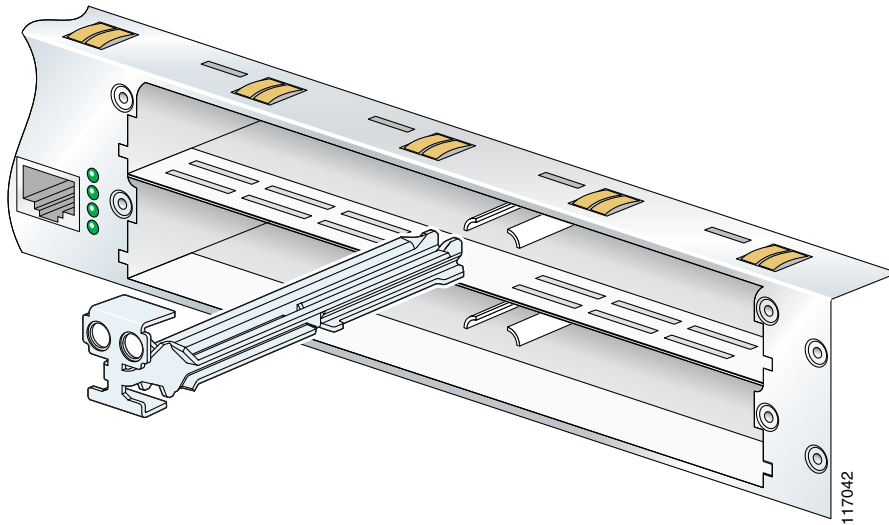
**Figure 3** Slot Divider for HWIC Slots on Cisco 2811, Cisco 2821, and Cisco 2851 Routers



Install slot dividers into HWIC slots on Cisco 2811, Cisco 2821, and Cisco 2851 routers as follows:

- Step 1** Guide the two halves of the slot divider between the two rails in the bottom of the HWIC slot. See [Figure 4](#).

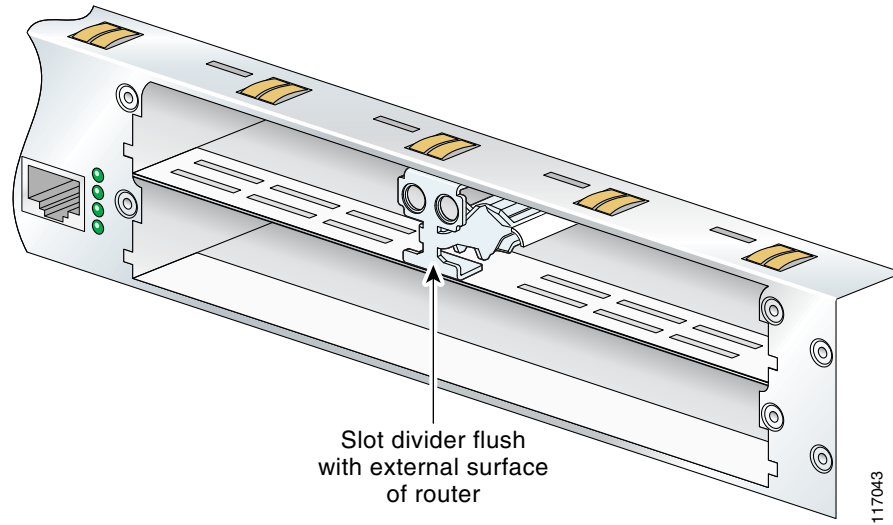
**Figure 4** Inserting Slot Divider into an HWIC Slot on Cisco 2811, Cisco 2821, and Cisco 2851 Routers



- Step 2** Push the slot divider in until it seats and locks into place. When the slot divider is fully seated, its outer end is flush with the front panel of the router. See [Figure 5](#).
- Step 3** Gently pull the slot divider to check for complete seating. If properly seated, it does not come out.



**Figure 5** Slot Divider Installed in an HWIC Slot on Cisco 2811, Cisco 2821, and Cisco 2851 Routers



## Removing Slot Dividers from HWIC Slots on Cisco 2801 Routers



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

Remove slot dividers from HWIC slots on Cisco 2801 routers as follows:

- Step 1** Loosen the retention screw on the slot divider.
- Step 2** Pull the slot divider straight out of the HWIC slot.

## Removing Slot Dividers from HWIC Slots on Cisco 2811, Cisco 2821, and Cisco 2851 Routers

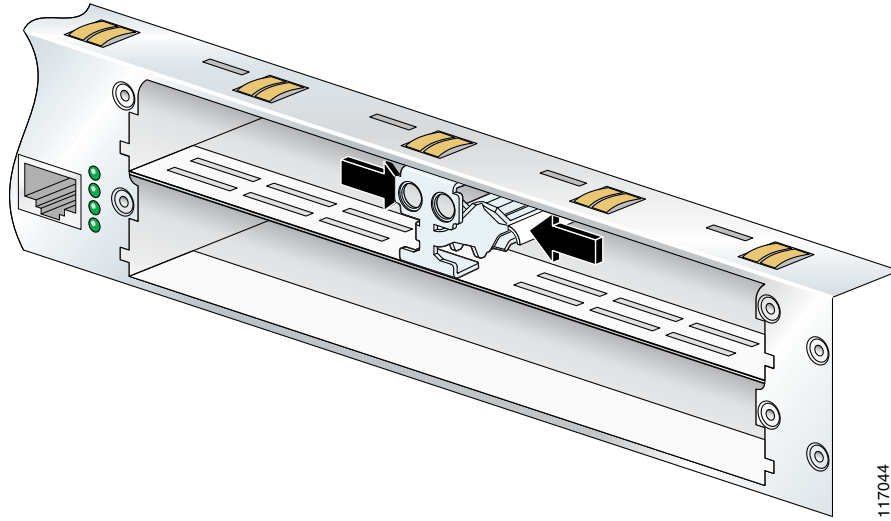


**Note** The HWIC slots on both sides of a slot divider must be empty before you remove the slot divider.

Remove slot dividers from HWIC slots on Cisco 2811, Cisco 2821, and Cisco 2851 routers as follows:

- Step 1** Reach into the HWIC slots on both sides of the slot divider, and squeeze the two halves of the slot divider together. See [Figure 6](#).
- Step 2** Pull the slot divider straight out of the HWIC slot.

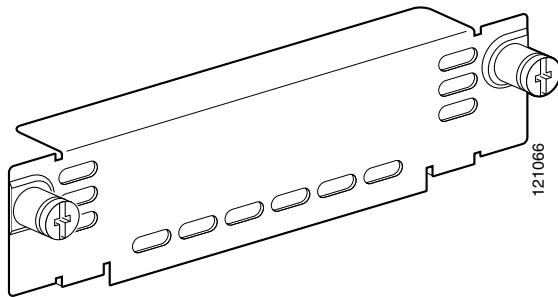
**Figure 6** Squeeze the Slot Divider to Release



## Installing Blank Panels over Empty Chassis Slots

All empty chassis slots for WAN interface cards and voice interface cards must be covered with blank panels. Blank panels are required to ensure proper cooling airflow and to prevent electromagnetic interference. [Figure 7](#) shows a typical blank panel.

**Figure 7** Typical Blank Panel



## Blank Panels for HWIC Slots

The high-speed WAN interface card (HWIC) hardware kit for Cisco 2800 series routers contains two blank panels. Each panel covers one single-wide HWIC slot.

Install blank panels over empty HWIC slots as follows:

- Single-wide slot—Attach a blank panel and tighten the two screws.
- Double-wide slot—Install a slot divider as described in the [“Installing Slot Dividers in HWIC Slots on Cisco 2811, Cisco 2821, and Cisco 2851 Routers”](#) section; then install two blank panels and tighten the two screws in each blank panel.

## Related Product Documentation

The following documentation is related to your product. This documentation was not shipped with your product, but you can access it online at Cisco.com.

- [Cisco Network Modules and Interface Cards Regulatory Compliance and Safety Information](#)

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# Installing and Upgrading Internal Modules in Cisco 2800 Series Routers

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This document describes how to install or upgrade modules that are located internally within your Cisco 2800 series integrated services router, such as memory modules, advanced integration modules (AIMs), packet voice data modules (PVDMs), and power supplies. You need to remove the cover from the router to install or remove any of these items. The document contains the following sections:

- [Safety Warnings, page 1](#)
- [Removing the Chassis Cover, page 2](#)
- [Locating Modules, page 9](#)
- [Installing and Removing DRAM DIMMs, page 12](#)
- [Installing and Removing AIMs, page 16](#)
- [Installing and Removing PVDMs, page 33](#)
- [Replacing the Power Supply, page 36](#)
- [Installing the Chassis Cover, page 56](#)

Before you perform any of these module replacement procedures, disconnect the power and remove the cover, as described in the [“Removing the Chassis Cover” section on page 2](#). After you complete the module replacement procedures, install the chassis cover as described in the [“Installing the Chassis Cover” section on page 56](#).

## Safety Warnings



Warning

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**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

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Warning

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

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**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



**Warning**

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



**Warning**

**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



**Warning**

**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

## Removing the Chassis Cover

Cisco 2801 routers have a cover that slides off the rear of the chassis. Cisco 2811 routers have a cover that lifts off after you slide it free it from front panel. Cisco 2821 and Cisco 2851 routers have a hinged cover that comes off after you rotate it upward and separate it from its hinge.



**Caution**

*Do not*, under any circumstances, tamper with or attempt to remove the safety shields protecting the WIC/HWIC slots and connectors on the Cisco 2811, Cisco 2821, or Cisco 2851 routers.

## Removing the Cover from Cisco 2801 Routers

To remove the cover from a Cisco 2801 router, follow these steps:

**Step 1**

Make sure that the router is turned off and is disconnected from the power supply.



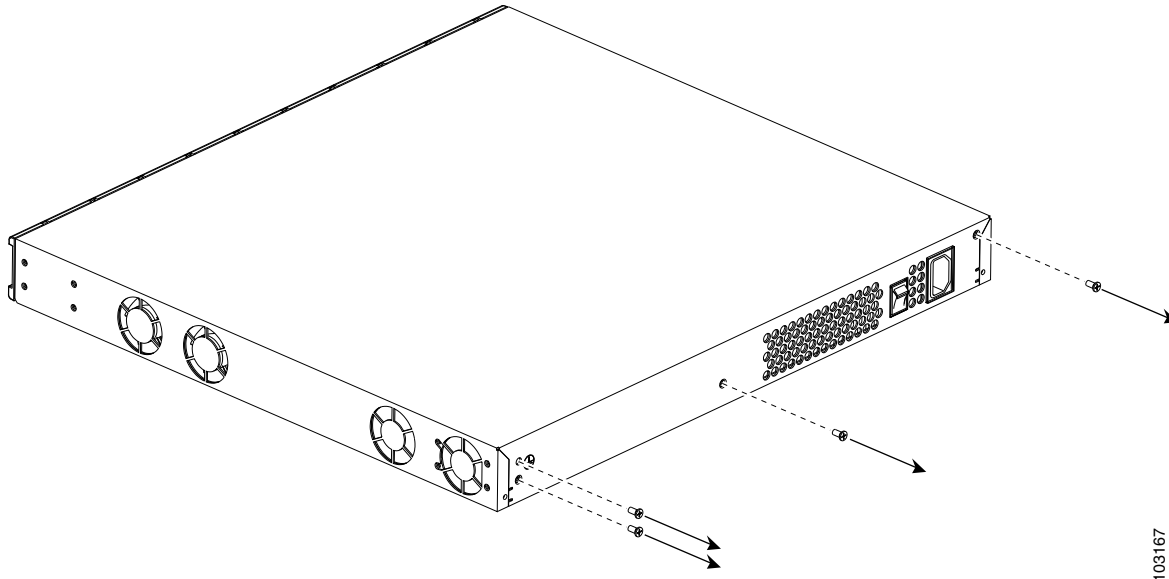
**Warning**

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

**Step 2**

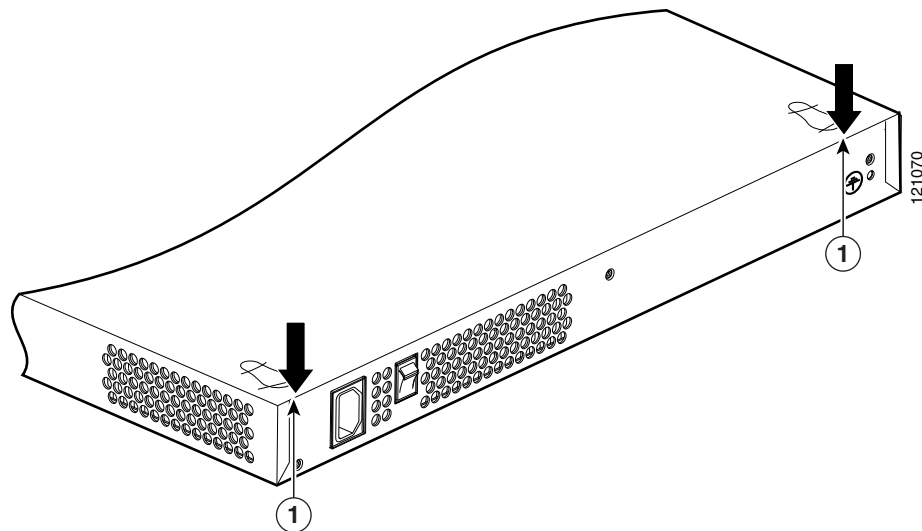
Use a Phillips screwdriver to remove the ground connection screw. Use a flat-blade screwdriver or a hex driver to remove the three screws that hold the chassis and the chassis cover together, as shown in [Figure 1](#).

**Figure 1** Removing the Cisco 2801 Chassis Screws



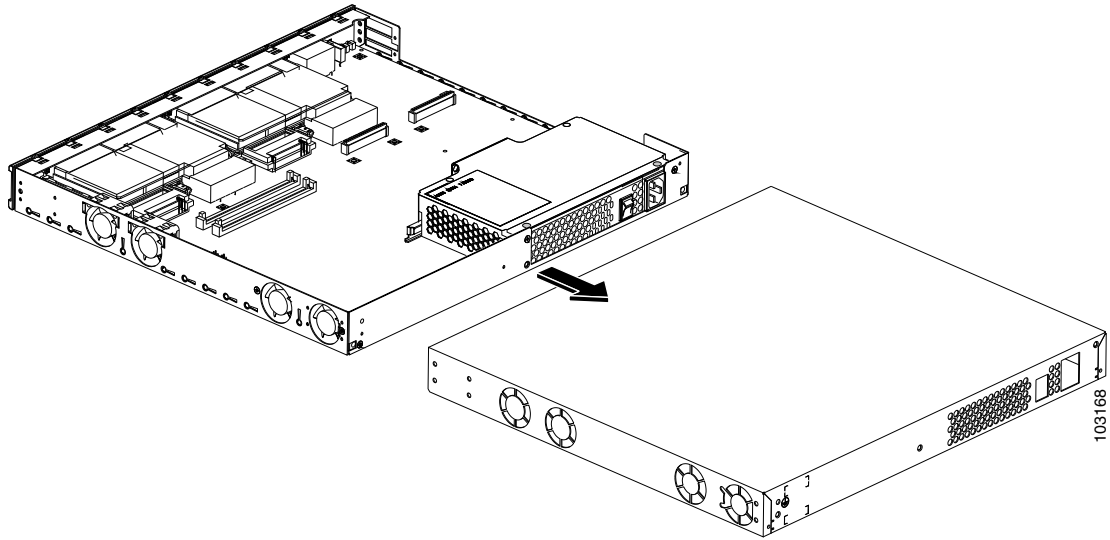
- Step 3** Insert a flat-blade screwdriver between the chassis and chassis cover at the screwdriver pry points on the bottom of the chassis, indicated in [Figure 2](#). Rotate the screwdriver 90 degrees to disengage the chassis cover from the chassis. It may be necessary to turn the unit upside down on a flat surface to access the pry points.

**Figure 2** Screwdriver Pry Points



- Step 4** Gently slide the chassis cover of the router away from the bottom of the chassis, as shown in [Figure 3](#).

**Figure 3** Removing the Cisco 2801 Chassis Cover



**Step 5** Place the router bottom on an antistatic mat, and begin installing modules.

## Removing the Cover from Cisco 2811 Routers

To remove the chassis cover for a Cisco 2811 router, follow these steps. A number 2 Phillips screwdriver and a flat-blade screwdriver with a blade width of  $1/4 \pm 1/32$  inch (5 to 7 mm) are required. Rack-mounted routers must be removed from the rack and positioned on a flat surface before you start removing the cover.



**Caution**

To prevent damage to the chassis, follow this procedure to remove the cover. Do not pry on the plastic bezel or on the ears at either side of the chassis on the rear.

The following warning applies only if the router is provided with a DC-power input:



**Warning**

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

**Step 1**

Make sure that the router is turned off and disconnected from its power source.



**Warning**

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

**Step 2**

If rack-mounting brackets are attached to the chassis, remove them using a Phillips screwdriver.

**Step 3**

Remove the four screws at the rear of the top cover, using a Phillips screwdriver.



**Step 4** Perform the following steps to loosen the cover from the chassis:

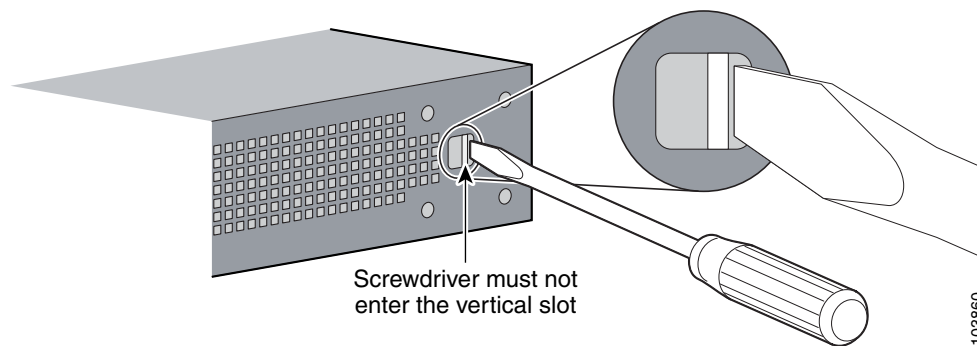
- a. Insert the blade of a 1/4-inch screwdriver straight into the square hole on either side of the chassis near the rear, so that it bottoms against the chassis and does *not* go past the chassis and into the narrow slot. See [Figure 4](#).



**Caution**

Make sure that the tip of the screwdriver does not slide into the narrow vertical slot that is visible inside the square hole. The tip of the screwdriver should rest on the metal tab just inside the chassis cover and to the right of the vertical slot.

**Figure 4** Inserting the Screwdriver into the Side of the Chassis



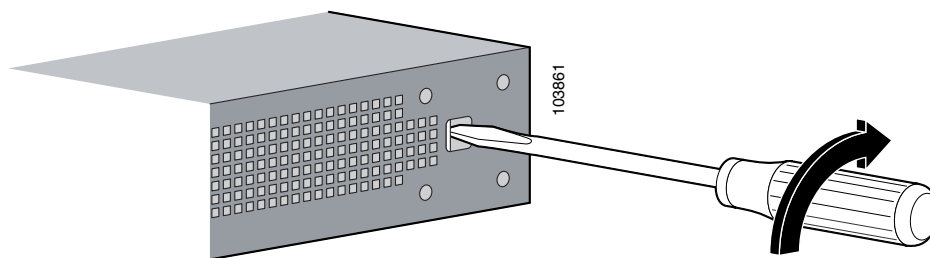
- b. With the screwdriver positioned as required in Step [a.](#) above, rotate the screwdriver a quarter turn toward the rear of the chassis to loosen one side of the cover. See [Figure 5](#).



**Caution**

The friction fit may be fairly tight; however, if the cover does not move with moderate effort, make sure that the screwdriver is *not* inserted into the narrow vertical slot.

**Figure 5** Rotating the Screwdriver to Loosen the Chassis Cover



- c. Repeat Step [a.](#) and Step [b.](#) for the opposite side of the chassis.

The cover should now be positioned back from the bezel about 1/4 inch (6 to 7 mm). If it is not, repeat Step [a.](#) and Step [b.](#) for one or both sides of the chassis.

**Step 5** Slide the cover toward the rear of the chassis until it contacts a stop (about 1 inch [25 mm]) and the front edge of the cover is free. See [Figure 6](#).

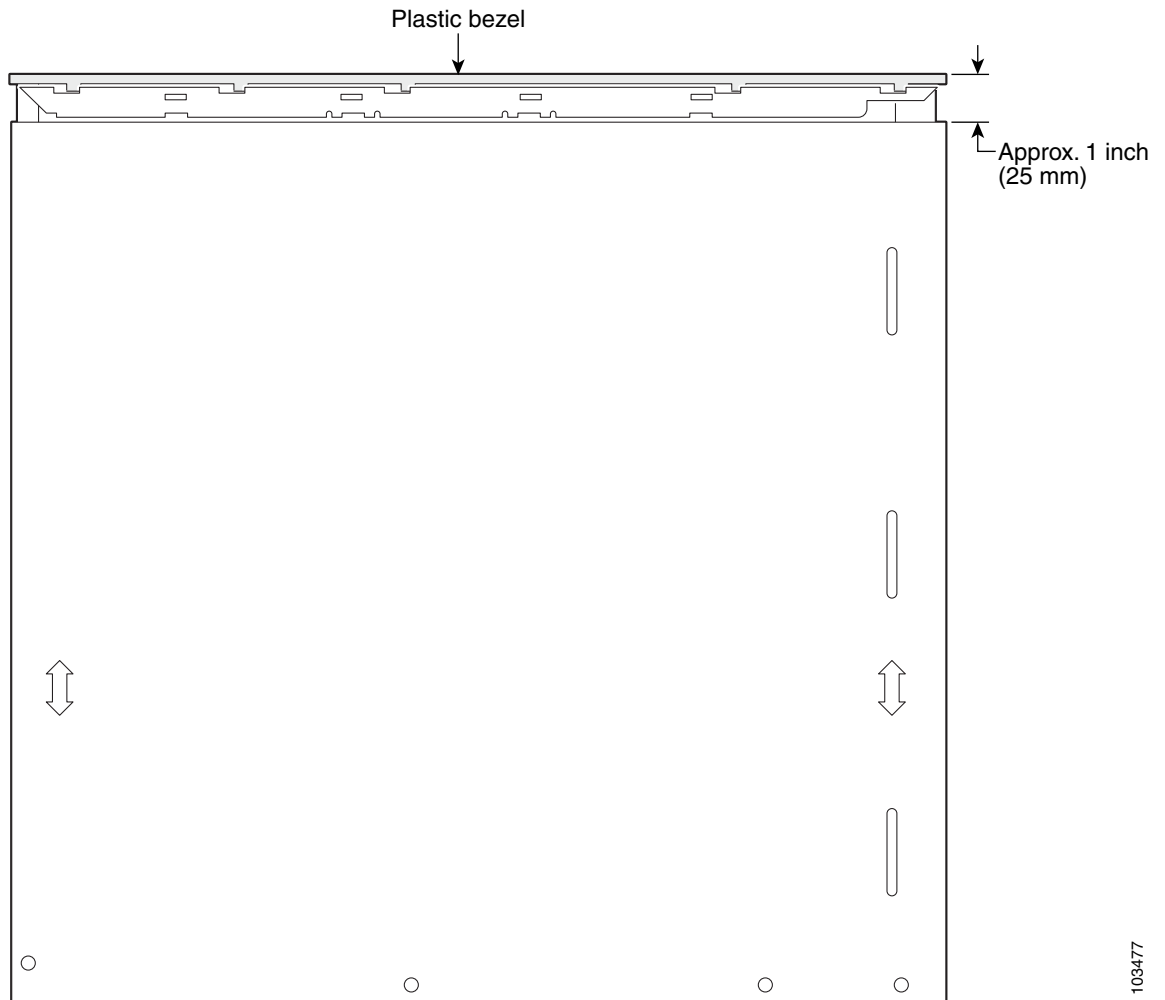


**Note**

After the cover is loosened as in [Step 4](#), there may still be some friction to overcome as you complete the removal. However, do not use the screwdriver again as in [Step 4](#).

**Step 6** Lift the cover free of the router chassis.

**Figure 6** Cisco 2811 Router—Cover in Position for Removal



## Removing the Cover from Cisco 2821 and Cisco 2851 Routers

Follow these steps to remove the chassis cover. A number 2 Phillips screwdriver is required. Rack-mounted routers must be removed from the rack and positioned on a flat surface before you start removing the cover.

The following warning applies only if the router is provided with a DC-power input:



---

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

---

**Step 1** Make sure that the router is turned off and disconnected from its power source.



---

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

---

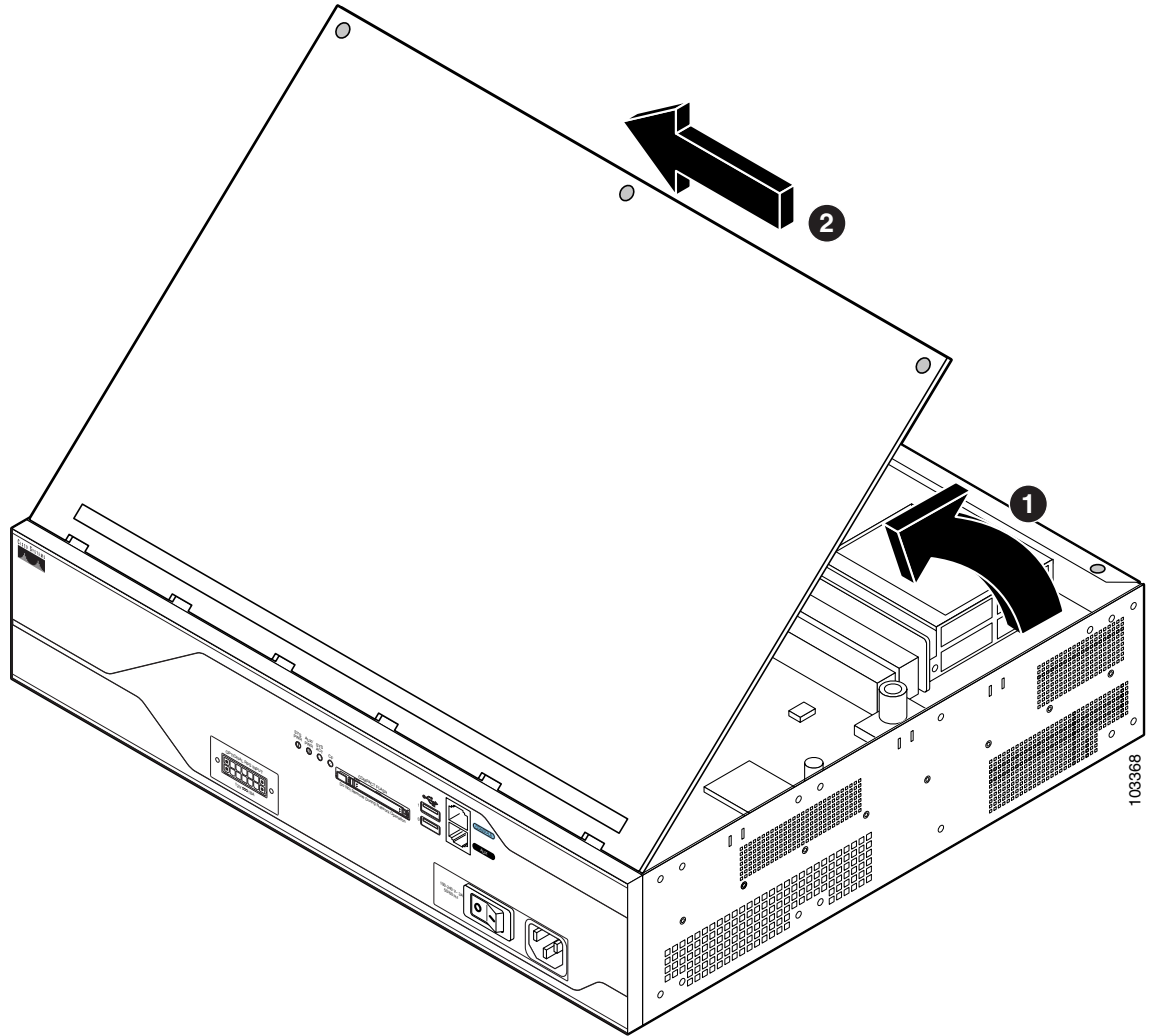
**Step 2** Disconnect all network interface cables from the rear panel of the router.

**Step 3** Place the router on a flat surface. Use a Phillips screwdriver to remove the three screws at the rear of the top cover. Set the screws aside in a safe place.

**Step 4** Lift the cover up to a 45-degree angle. (See [Figure 7](#).)

**Step 5** Slide the cover to the side (toward the side with the fans) until the tabs are free from the slots. (See [Figure 7](#).)

Figure 7 Cisco 2821 or Cisco 2851 Router—Removing the Top Cover of the Router



<b>1</b>	Lift cover	<b>2</b>	Slide cover to free the tabs
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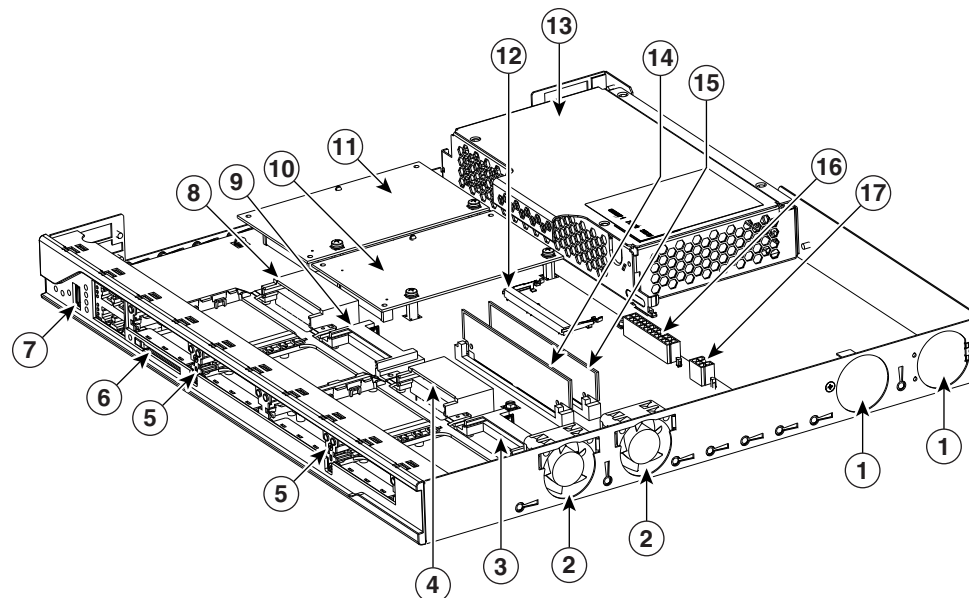
# Locating Modules

Figure 8 shows the locations of the DIMMs, AIMS, PVDMs, and power supply in Cisco 2801 routers.

Figure 9 shows the locations of the DIMMs, AIMS, PVDMs, and power supply in Cisco 2811 routers.

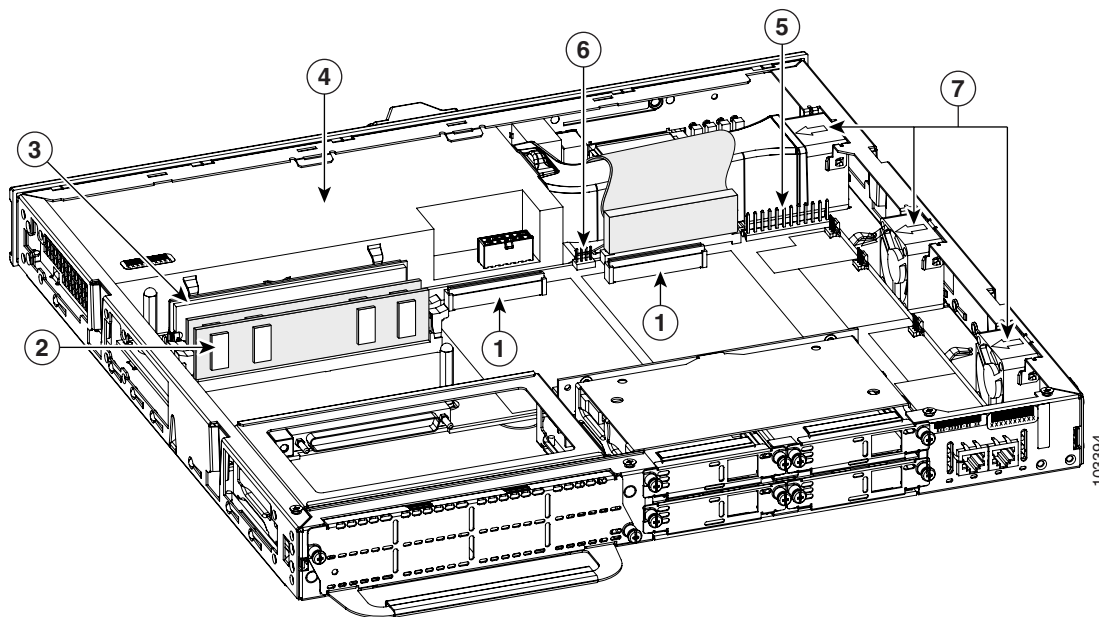
Figure 10 and Figure 11 show the locations of the DIMMs, AIMS, PVDMs, and power supply in Cisco 2821 and Cisco 2851 routers.

**Figure 8** Module Locations in Cisco 2801 Routers



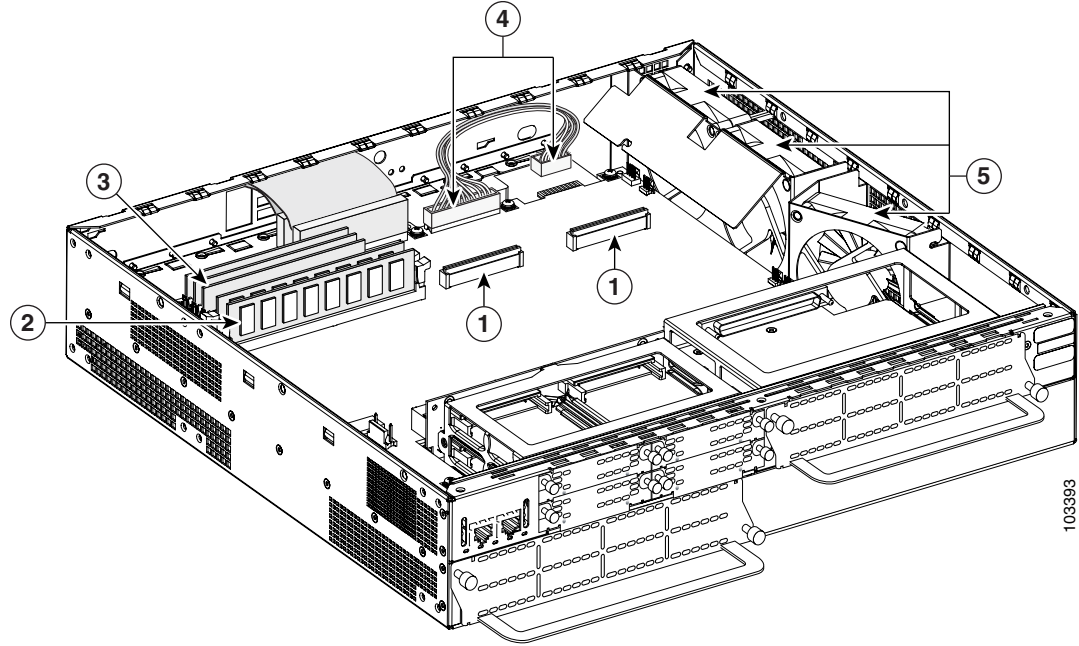
1	ILP fan vents/vent blocking plate	10	AIM 0
2	System fans	11	AIM 1
3	VIC or VWIC connector	12	DIMM socket
4	VIC, VWIC, WIC, or HWIC connector	13	Mainline power supply
5	Card guide center rail	14	PVDM 1
6	External CompactFlash memory card slot	15	PVDM 0
7	Universal serial bus (USB) port	16	Main power supply connector
8	VIC, VWIC, WIC, or HWIC connector	17	ILP supply connector
9	VIC, VWIC, or WIC connector		

Figure 9 Module Locations in Cisco 2811 Routers



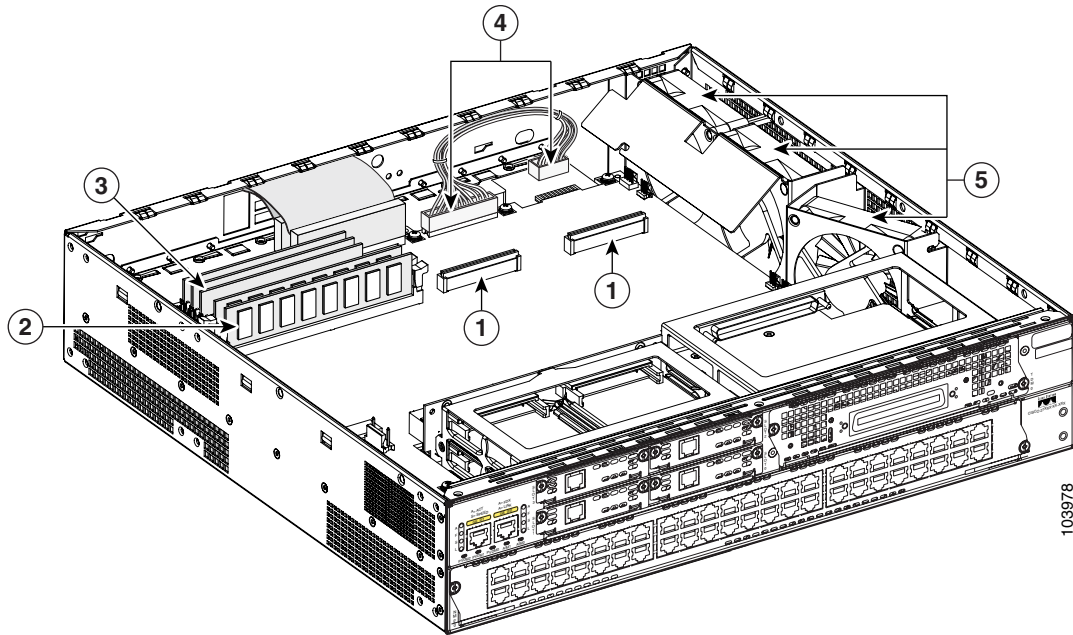
1	AIM connectors	5	Primary power connector
2	DRAM DIMMs	6	Secondary power connector
3	PVDMs	7	Fans
4	Power supply		

**Figure 10** Module Locations in Cisco 2821 Router



<b>1</b>	AIM connectors	<b>4</b>	Power supply connectors
<b>2</b>	DRAM DIMMs	<b>5</b>	Fans
<b>3</b>	PVDMs		

Figure 11 Module Locations in Cisco 2851 Router



1	AIM connectors	4	Power supply connectors
2	DRAM DIMMs	5	Fans
3	PVDMs		

## Installing and Removing DRAM DIMMs

Cisco 2801 routers have 128 MB of SDRAM installed on the system board. You can install an additional DIMM in the DIMM connector to expand system memory to a maximum of 384 MB.



**Note**

The Cisco 2801 uses a different type of DRAM DIMM than the Cisco 2811, Cisco 2821, and Cisco 2851 routers. Refer to the Router Memory Specifications table in the Overview of 2800 Routers chapter for DRAM information.

Cisco 2811, Cisco 2821, and Cisco 2851 routers have two DIMM connectors and are designed to operate with either one or two DRAM DIMMs installed, depending on the amount of memory needed. If only one DRAM DIMM is used, it can be installed in either DIMM connector.

Before you remove or install a DRAM DIMM, remove the chassis cover as described in the [“Removing the Chassis Cover”](#) section on page 2.



**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 chassis.



**Caution**

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

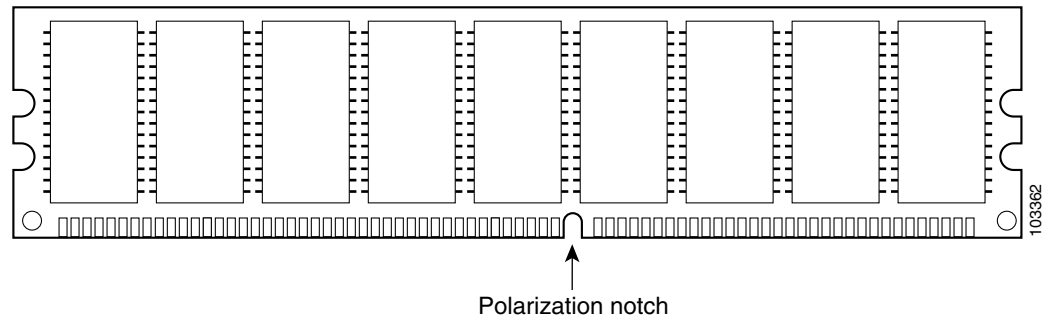
## DRAM DIMM Location and Orientation

On Cisco 2801 routers, the single DRAM DIMM connector is located on the system board. Refer to [Figure 8](#) for the location of the DIMM connector.

On Cisco 2811, Cisco 2821, and Cisco 2851 routers, the two DRAM DIMM connectors are located on the system board, and are identified as DIMM 0 and DIMM 1. Refer to [Figure 9](#), [Figure 10](#), and [Figure 11](#) for the location of the DIMM connectors.

DRAM DIMMs have a polarization notch on the mating edge to prevent incorrect insertion. [Figure 12](#) shows the polarization notch on a DRAM DIMM.

**Figure 12** DRAM DIMM Showing Polarization Notch

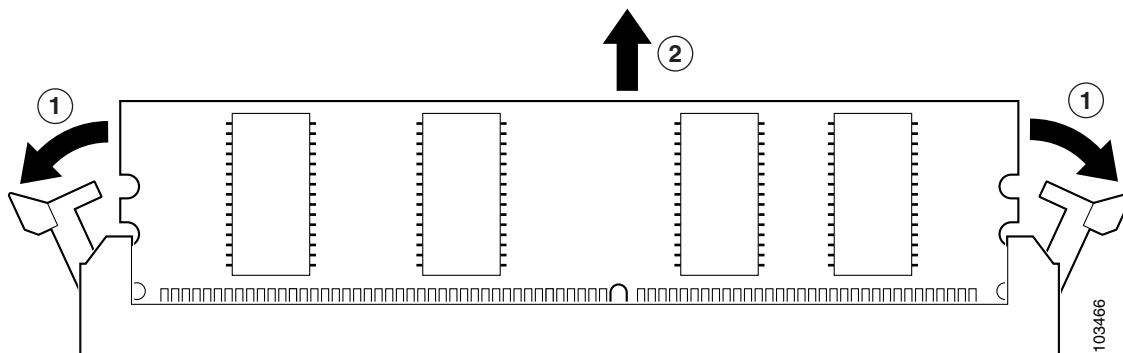


## Removing a DRAM DIMM

To remove a DRAM DIMM from the system board, follow these steps:

- Step 1** Locate the DRAM DIMM on the system board. See [Figure 8](#), [Figure 9](#), [Figure 10](#), or [Figure 11](#), depending on your router model, for the location of the DIMM connectors.
- Step 2** Pull the latches away from the DRAM DIMM at both ends; this lifts the DIMM slightly. Then lift the DIMM out of the connector. See [Figure 13](#).

**Figure 13** Removing a DRAM DIMM



<b>1</b>	Release the latches	<b>2</b>	Remove the DRAM DIMM
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**Step 3** Place the DIMM in an antistatic bag to protect it from ESD damage.

## Installing a DRAM DIMM in a Cisco 2801 Router

To install a DRAM DIMM in a Cisco 2801 router, follow these steps:

- Step 1** Locate the DIMM socket on the motherboard.
- Step 2** Remove any existing DIMM by gently pulling the spring-loaded clips on the end of the socket far enough to clear the DIMM, and gently pulling the DIMM up and away from the socket. See [Figure 14](#).

**Figure 14** Removing a DIMM

**Step 3** Insert the DIMM into the DIMM socket, as shown in [Figure 15](#).

**Figure 15** *Installing a DIMM*

<b>1</b>	DIMM	<b>2</b>	Insert and rotate into socket.
----------	------	----------	--------------------------------

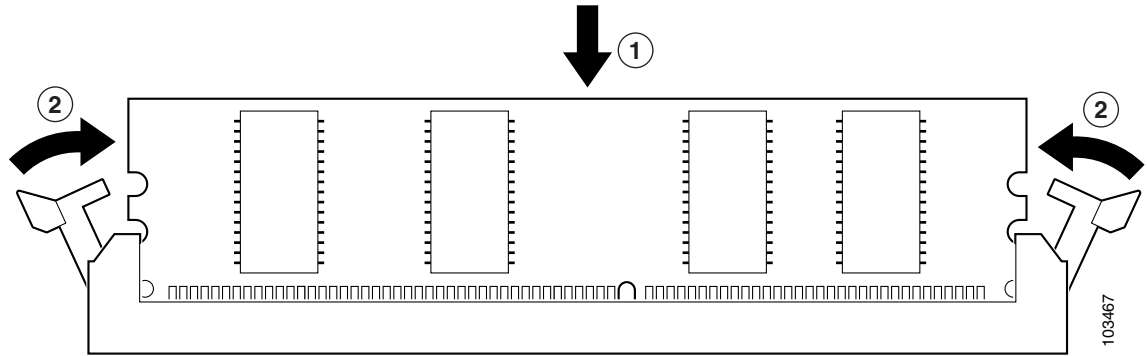
- Step 4** Firmly press the DIMM into the socket until the spring-loaded clips on the socket snap over the end of the DIMM.

## Installing a DRAM DIMM in a Cisco 2811, Cisco 2821, or Cisco 2851 Router

To install a DRAM DIMM in a Cisco 2811, Cisco 2821, or Cisco 2851 router, follow these steps:

- Step 1** Locate the DRAM DIMM connector on the system board. See [Figure 8](#), [Figure 9](#), [Figure 10](#), or [Figure 11](#), depending on your router model, for the location of the DIMM connectors.
- Step 2** Make sure that both latches on the DIMM connector are in the open position.
- Step 3** Orient the DIMM so that the polarization notch lines up with the polarization key on the connector. See [Figure 12](#).
- Step 4** Insert the DIMM carefully into the connector.
- Step 5** Carefully and firmly press the DRAM DIMM into the connector until the latches close onto the DIMM. Make sure that both latches rotate to the closed position against the DIMM. See [Figure 16](#).

Figure 16 Installing a DRAM DIMM



<b>1</b>	Insert the DRAM DIMM	<b>2</b>	Close the latches
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**Step 6** If you are finished installing modules, install the cover on the router. See the [“Installing the Chassis Cover”](#) section on page 56.

## Installing and Removing AIMs

AIMs plug into an AIM connector on the system board as described in the [“Installing an AIM”](#) section on page 18. Each AIM sold as a spare is supplied with a label that identifies the AIM type. Be sure to apply the label to the chassis as described in the [“Applying the AIM Label”](#) section on page 31.

Before you remove or install an AIM, remove the chassis cover as described in the [“Removing the Chassis Cover”](#) section on page 2.

Table 1 AIMs Supported on Cisco 2800 Routers

Cisco Part Number	Type
AIM-ATM=	ATM
ATM-COMPR2-V2=	Compression
AIM-CUE=	Unity Express
AIM2-CUE-K9	Unity Express
AIM2-APPRE-104-K9	AXP - Application eXtension Platform
AIM-IPS	Intrusion Prevention Systems
AIM-VPN-EPII-PLUS	VPN Encryption

  
**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 chassis.

**Caution**

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

## Software Requirement for AIMs

Cisco IOS software of a specified release or later release is required to use an AIM.

To determine the version of Cisco IOS software that is running on your router, log in to the router and enter the **show version** command:

```
Router> show version
```

```
Cisco Internetwork Operating System Software  
2800 Software (C2800-ADVENTERPRISEK9-M), Version 12.3(8.2)T, INTERIM SOFTWARE
```

## AIM Restrictions

The following restrictions apply to the AIM2-CUE-K9 in the Cisco 2811 router:

- Only one AIM2-CUE-K9 or AIM2-APPRE-104-K9 can be installed in a Cisco 2811 router and it must be installed in AIM-0.
- The AIM2-CUE-K9 and AIM2-APPRE-104-K9 cannot be used with AIM-IPS modules in the Cisco 2811 router.

## AIM Location

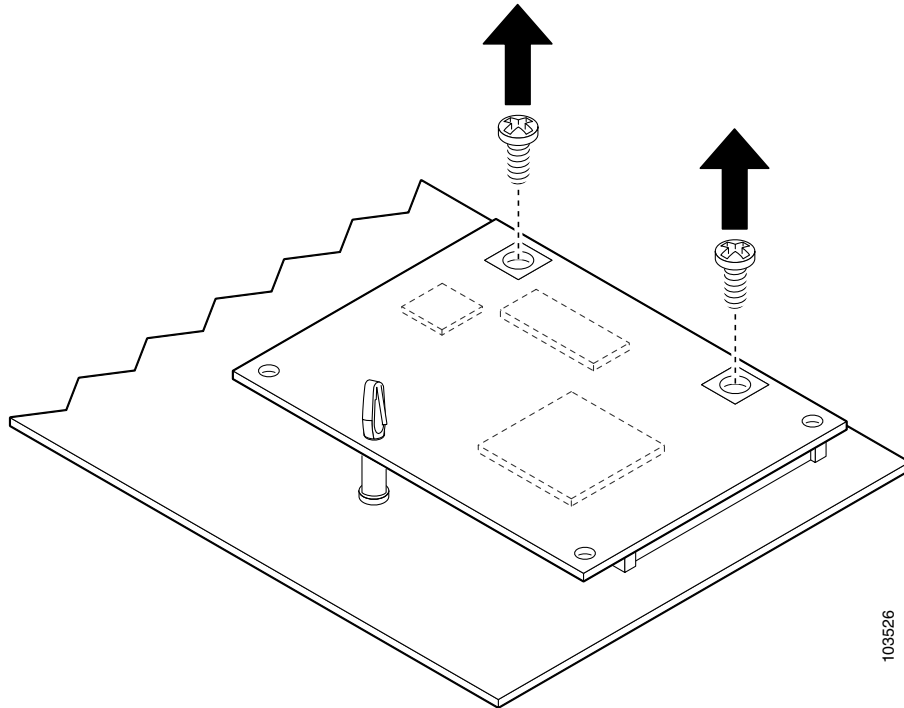
The two AIM connectors are located on the system board and are identified as AIM 0 and AIM 1. Refer to [Figure 8](#), [Figure 9](#), [Figure 10](#), and [Figure 11](#) for the location of the AIM connectors.

## Removing an AIM

To remove an AIM, perform the following procedure. To complete this procedure, you need a number 2 Phillips screwdriver or flat-blade screwdriver.

- 
- Step 1** Locate the AIM to be removed. See [Figure 8](#), [Figure 9](#), [Figure 10](#), or [Figure 11](#), depending on your router model, for the location of the AIMs.
- Step 2** Remove the two screws from the AIM as shown in [Figure 17](#).

**Figure 17** Removing Screws from the AIM



<b>1</b>	AIM retention screws	<b>2</b>	Plastic standoff
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- Step 3** Carefully lift the AIM free from the connector and the plastic standoff. Keep the AIM parallel with the system board to prevent damage to the connector and plastic standoff.
- Step 4** Place the AIM in an antistatic bag to protect it from ESD damage.

## Installing an AIM

To install an AIM, perform the following procedure. To complete this procedure, you need a number 2 Phillips screwdriver or flat-blade screwdriver, and a 1/4-inch nut driver or wrench.

### Installing an AIM in a Cisco 2801 Router

The Cisco 2801 router has two AIM connectors—AIM slot 0 and AIM slot 1. To install these AIMs, follow the procedures given here.

#### Accessory Kit to Use

Some AIMs are provided with multiple accessory kits that contain different configurations of mounting hardware. The mounting hardware required to install an AIM in the Cisco 2801 router consists of two machine-thread metal standoffs, two machine-thread metal screws, and one plastic standoff with a snap fit on both ends. All these components are included in mounting kit 69-1316-01. Some AIMs, however,

are shipped with multiple, different mounting kits. If this is the case, use the plastic standoff with a snap fit on both ends from mounting kit 69-0900-01 and the two machine-threaded metal standoffs and two metal screws found in mounting kit 69-0899-01.

To install the AIM2-CUE-K9 and the AIM2-APPRE-104-K9 modules in a Cisco 2801 router, use the blue plastic standoff, 2 larger screws, and hex standoffs in the 69-1870-01 mounting kit.

## Installation Procedure

To install the AIM, perform the following steps. You need a number 2 Phillips screwdriver or flat-blade screwdriver to complete this procedure.



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**Note**

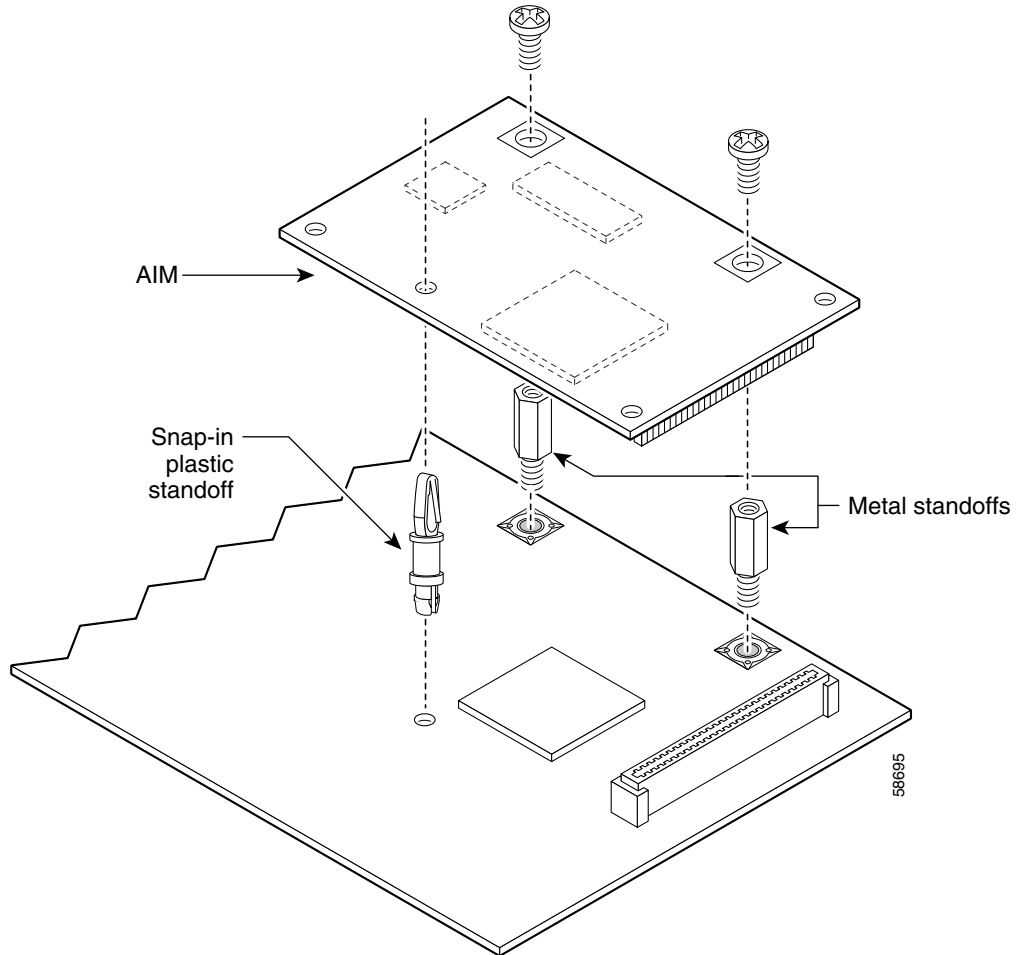
For most AIMs, the plastic snap-in standoff is white. For the AIM2-CUE-K9 and the AIM2-APPRE-104-K9, the plastic standoff is blue and has a slightly larger snap-in feature to accommodate the PCB which is thicker.

---

**Step 1**

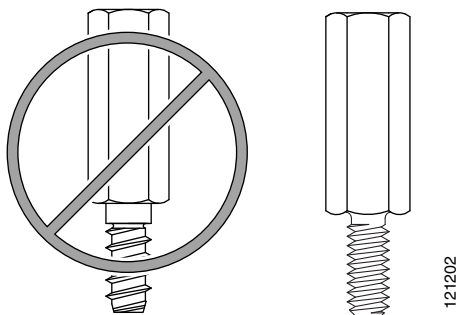
Find the standoff attachment locations on the system board near the AIM connector, indicated by a star pattern. [Figure 18](#) shows the four standoff locations on the system board.

**Figure 18** Connecting the AIM to the Cisco 2801 System Board



**Step 2** Locate the two machine-thread metal standoffs from the accessory kit. Do not use sheet metal-thread standoffs. See [Figure 19](#) for an illustration of the different metal standoffs.

**Figure 19** Metal Standoffs





- Step 3** Install the two machine-thread metal standoffs into the system board in the metal standoff attachment locations, as shown in [Figure 18](#). Use a 1/4-inch nut driver to tighten the standoffs. Locations for AIM standoffs are denoted by a star pattern around the standoff mounting holes.

**Caution**

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

- Step 4** If you have a Cisco 2801 router, insert the plastic standoff with a snap fit on the ends (see [Figure 20](#)) from the accessory kit into the hole in the system board. See [Figure 18](#). Press the standoff firmly into the system board to be sure that it is locked to the board.

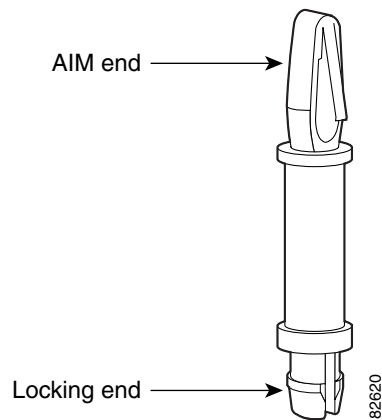
**Note**

The Cisco 2801 router does not have a screw in the spot labeled B in [Figure 22](#). Instead, there is a hole in the system board in approximately the same location. Insert the plastic standoff in the hole in the system board on Cisco 2801 routers.

**Note**

The plastic standoff snaps into the system board. Be sure to insert the locking end of the standoff into the system board. The locking end is the shortest end of the standoff. [Figure 20](#) identifies the locking end of the plastic standoff used with compression AIMs.

**Figure 20 Plastic Standoff Orientation**



- Step 5** Insert the connector on the AIM into the AIM connector on the system board. See [Figure 18](#).

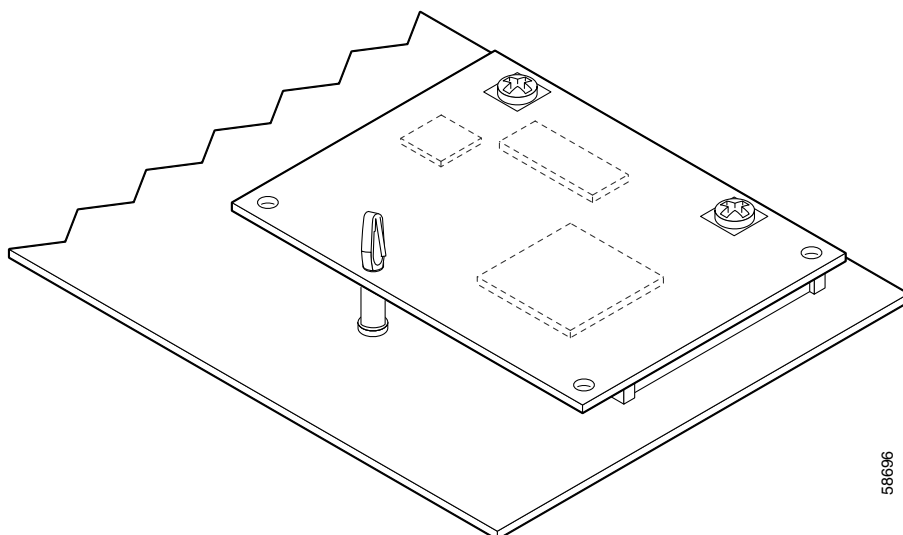
**Note**

Be sure to press firmly on the AIM until the board seats onto the connector. The plastic standoff must snap into the hole in the AIM board. See [Figure 18](#).

- Step 6** Insert the screws from the accessory kit through the AIM into the metal standoffs. See [Figure 18](#). Carefully tighten the screws with a Phillips screwdriver.

- Step 7** Check that the AIM is installed correctly on the system board. See [Figure 21](#).

**Figure 21** Correctly Installed AIM in the Cisco 2801 Router



- Step 8** If you are finished installing modules, install the cover on the router. See the “[Installing the Chassis Cover](#)” section on page 56.
- Step 9** Apply the AIM label to the outside of the chassis as described in the “[Applying the AIM Label](#)” section on page 31.

## Installing Most AIMs in a Cisco 2811, Cisco 2821, or Cisco 2851 Router

Cisco 2811, Cisco 2821, and Cisco 2851 routers have two AIM connectors—AIM slot 0 and AIM slot 1. You can install a virtual private network (VPN) encryption AIM or a voice-mail AIM in either slot, but not in both slots. You can install voice and data compression AIMs and ATM AIMs in both slots.



**Note**

If you are installing an AIM2-CUE-K9 or AIM2-APPRE-104-K9, see the “[Installing AIM2-CUE-K9 or AIM2-APPRE-104-K9 in a Cisco 2811, Cisco 2821, or Cisco 2851 Router](#)” section on page 26.

### Accessory Kit to Use

To install most AIM modules in Cisco 2811, Cisco 2821, or Cisco 2851 routers, use accessory kit number 69-0926-01.

### Installation Procedure

To install an AIM in a Cisco 2811, Cisco 2821, or Cisco 2851 router, follow these steps.

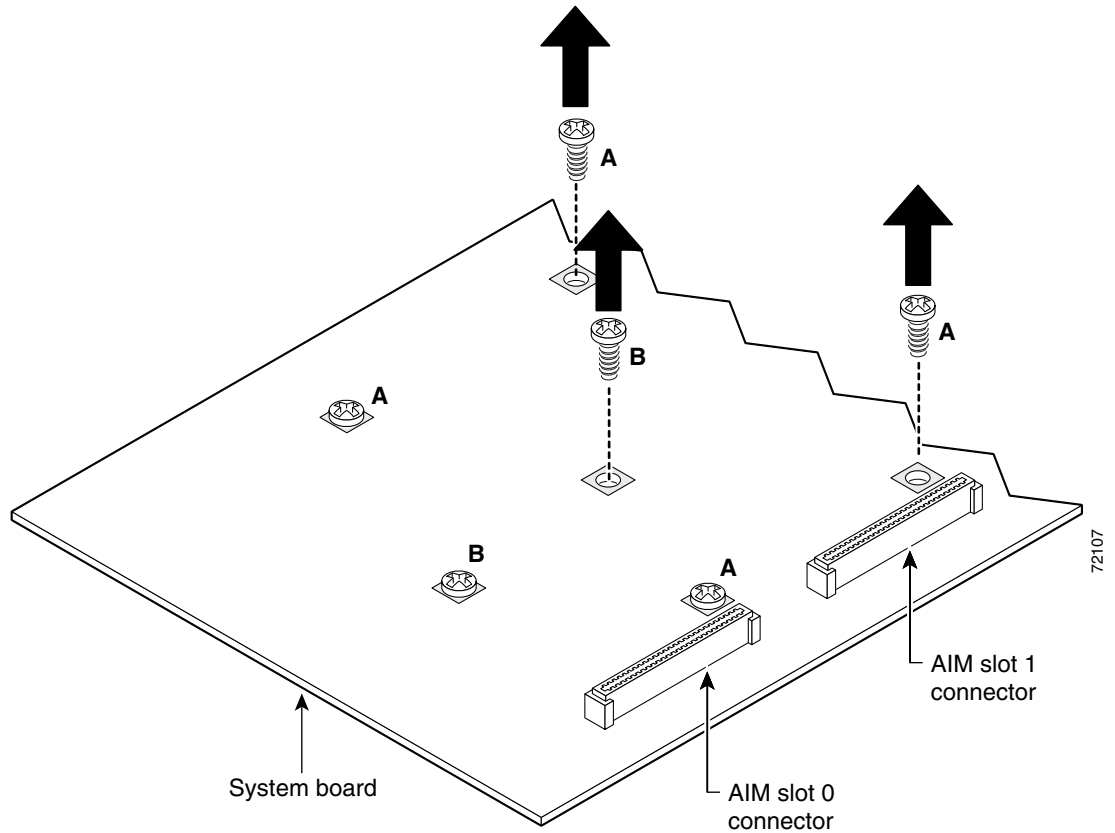


**Note**

If the mounting hardware is already in place on the system board, or if you are replacing an existing AIM, skip [Step 2](#) through [Step 3](#).

- Step 1** Locate the AIM connector.
- Step 2** Remove the three screws from the system board near the AIM connector that you are going to use. (Figure 22 shows the screws to remove for AIM installation in AIM slot 1.)

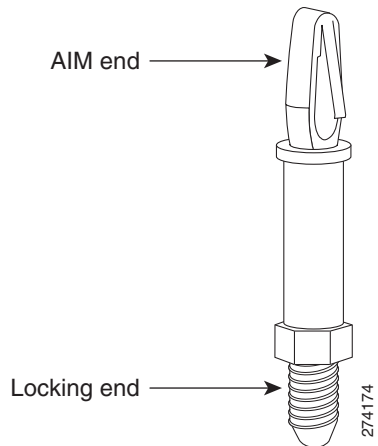
**Figure 22** Removing Screws from System Board—AIM Slot 1 Installation Shown



<b>A</b>	Metal standoff locations	<b>B</b>	Plastic standoff location
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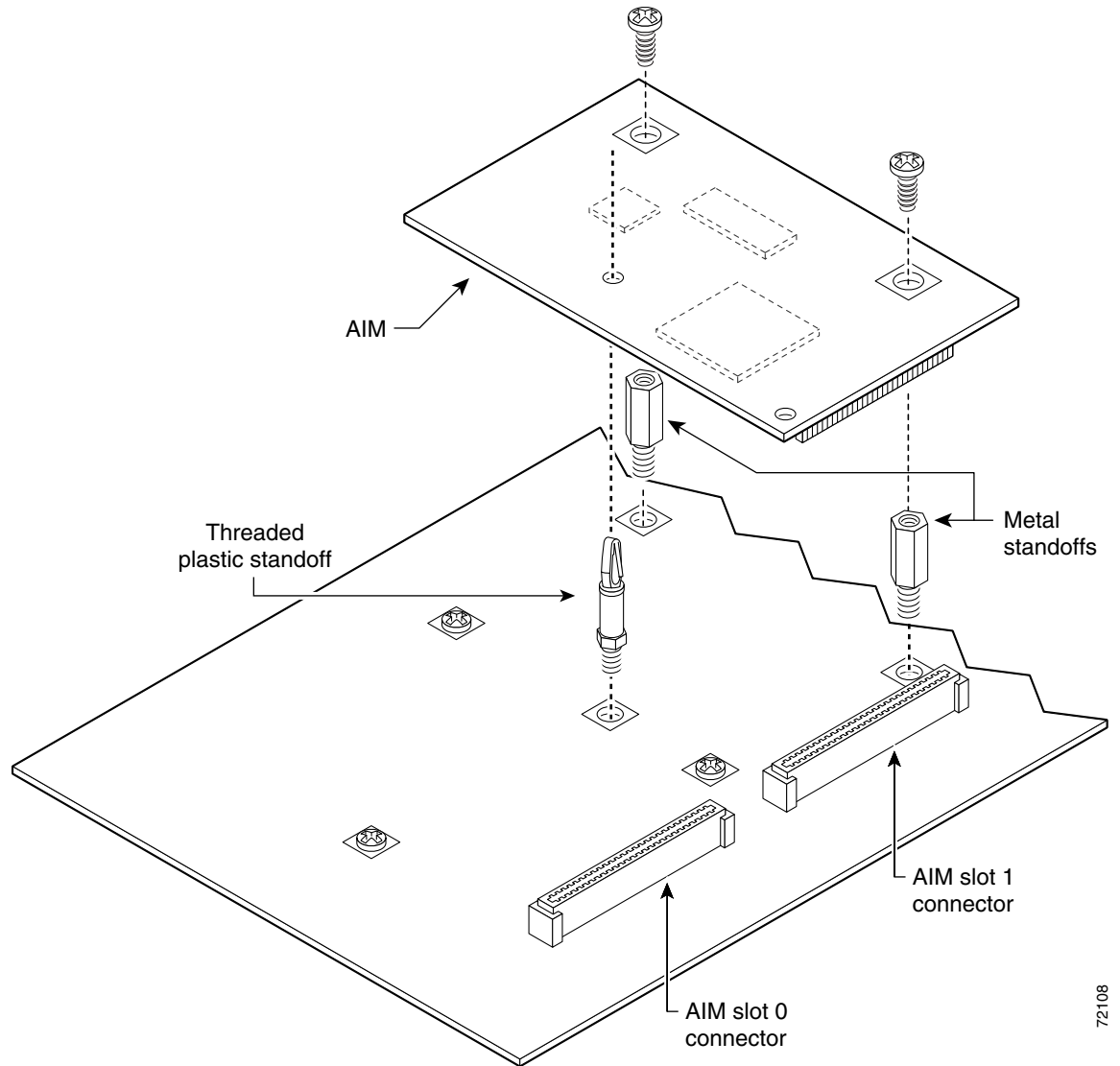
- Step 3** Install the two metal standoffs (included in the accessory kit) in place of the two screws that are labeled A in Figure 22. Use a 1/4-inch nut driver to tighten the standoffs. (See Figure 24.)
- Step 4** For most AIMs, install the plastic standoff (Figure 23) in place of the screw that is labeled B in Figure 22. Tighten it firmly with your fingers, or very carefully using a 3/16-inch open-end wrench. The shoulder must be seated tight against the system board. (See Figure 24.)

**Figure 23**      **Threaded Plastic Standoff**



- Step 5** Plug the AIM into the AIM connector on the system board. (See [Figure 24](#).) Make sure that the plastic standoff fits into the hole in the AIM board and that the connector is fully seated.
- Step 6** Insert the screws (included in the accessory kit) through the AIM into the metal standoffs. (See [Figure 24](#).) Tighten the screws carefully with a Phillips screwdriver.

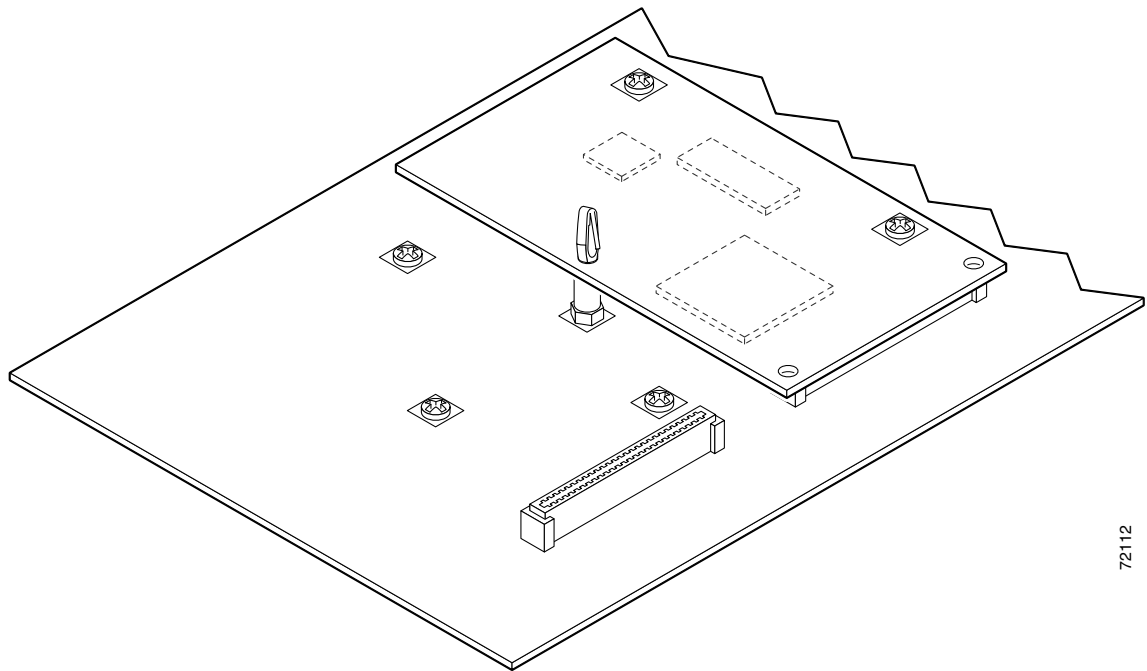
Figure 24 Connecting an AIM to the System Board—AIM Slot 1 Shown



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- Step 7** Check that the AIM is installed correctly on the system board. (See [Figure 25](#).)

**Figure 25** AIM Installed in AIM Slot 1



- Step 8** If you are finished installing modules, install the cover on the router. See the “[Installing the Chassis Cover](#)” section on page 56.
- Step 9** Apply the AIM label to the outside of the chassis as described in the “[Applying the AIM Label](#)” section on page 31.

## Installing AIM2-CUE-K9 or AIM2-APPRE-104-K9 in a Cisco 2811, Cisco 2821, or Cisco 2851 Router

Cisco 2811, Cisco 2821, and Cisco 2851 routers have two AIM connectors—AIM slot 0 and AIM slot 1. You can install a virtual private network (VPN) encryption AIM or a voice-mail AIM in either slot, but not in both slots. You can install voice and data compression AIMs and ATM AIMs in both slots.



**Note** Only one AIM2-CUE-K9 or AIM2-APPRE-104-K9 can be installed in a Cisco 2811 router and it must be installed in AIM slot 0.



**Note** The AIM2-CUE-K9 and AIM2-APPRE-104-K9 cannot be used with AIM-IPS modules in the Cisco 2811 router.

## Accessory Kit to Use

To install the AIM2-CUE-K9 and the AIM2-APPRE-104-K9 modules in a Cisco 2811, Cisco 2821, or Cisco 2851 router, use the 2 M3.0 screws, the hex standoffs, the hex standoff with the band, and the M2.5 screw in the 69-1870-01 mounting kit. You can discard any other parts in the kit.

## Installation Procedure

To install an AIM2-CUE-K9 or AIM2-APPRE-104-K9 in a Cisco 2811, Cisco 2821, or Cisco 2851 router, follow these steps.



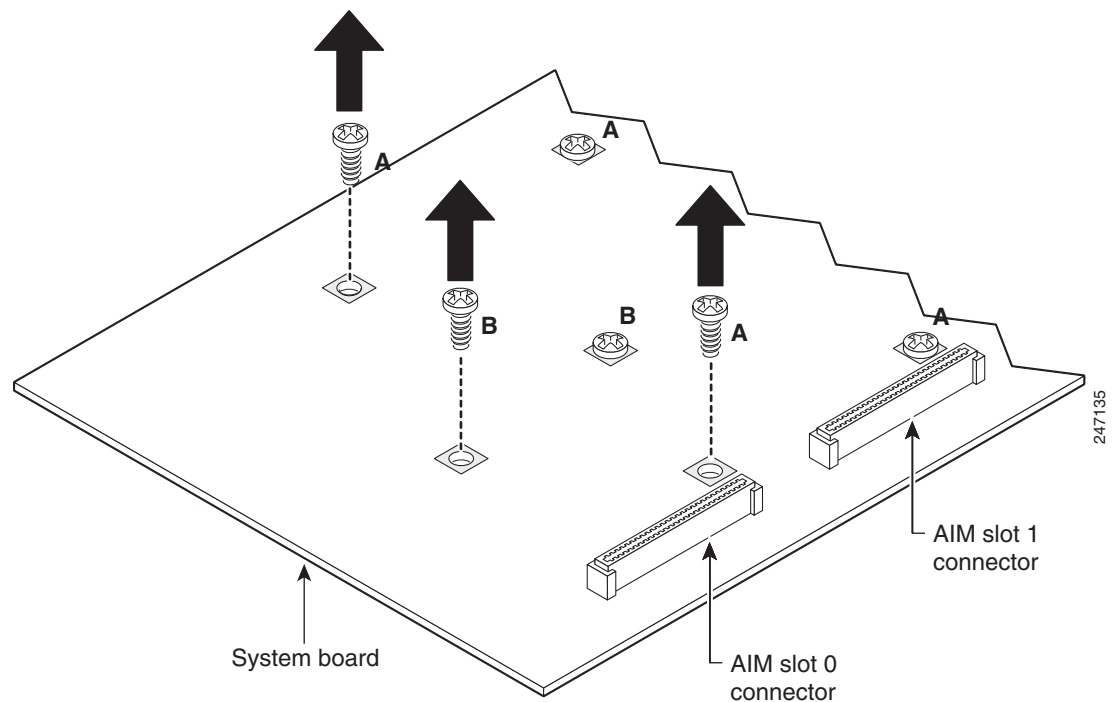
### Note

If the mounting hardware is already in place on the system board, or if you are replacing an existing AIM, skip [Step 2](#) and [Step 3](#).

**Step 1** Locate the AIM connector.

**Step 2** Remove the three screws from the system board near the AIM connector that you are going to use. ([Figure 26](#) shows the screws to remove for AIM installation in AIM slot 0.)

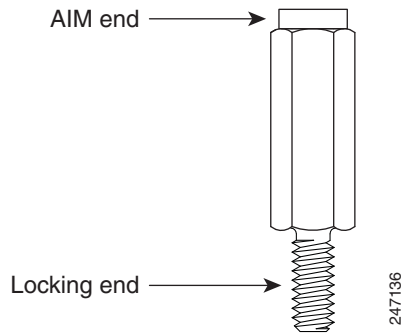
**Figure 26** Removing Screws from System Board—AIM Slot 0 Installation Shown



<b>A</b>	Metal standoff locations	<b>B</b>	Metal standoff with top band location
----------	--------------------------	----------	---------------------------------------

- Step 3** Install the two metal standoffs (included in the accessory kit) in place of the two screws that are labeled A in [Figure 26](#). Use a 1/4-inch nut driver to tighten the standoffs.
- Step 4** Install the hex standoff with the top band ([Figure 27](#)) in place of the screw that is labeled B in [Figure 26](#). Tighten it firmly with your fingers, or very carefully using a 3/16-inch open-end wrench. The shoulder must be seated tight against the system board. (See [Figure 28](#).)

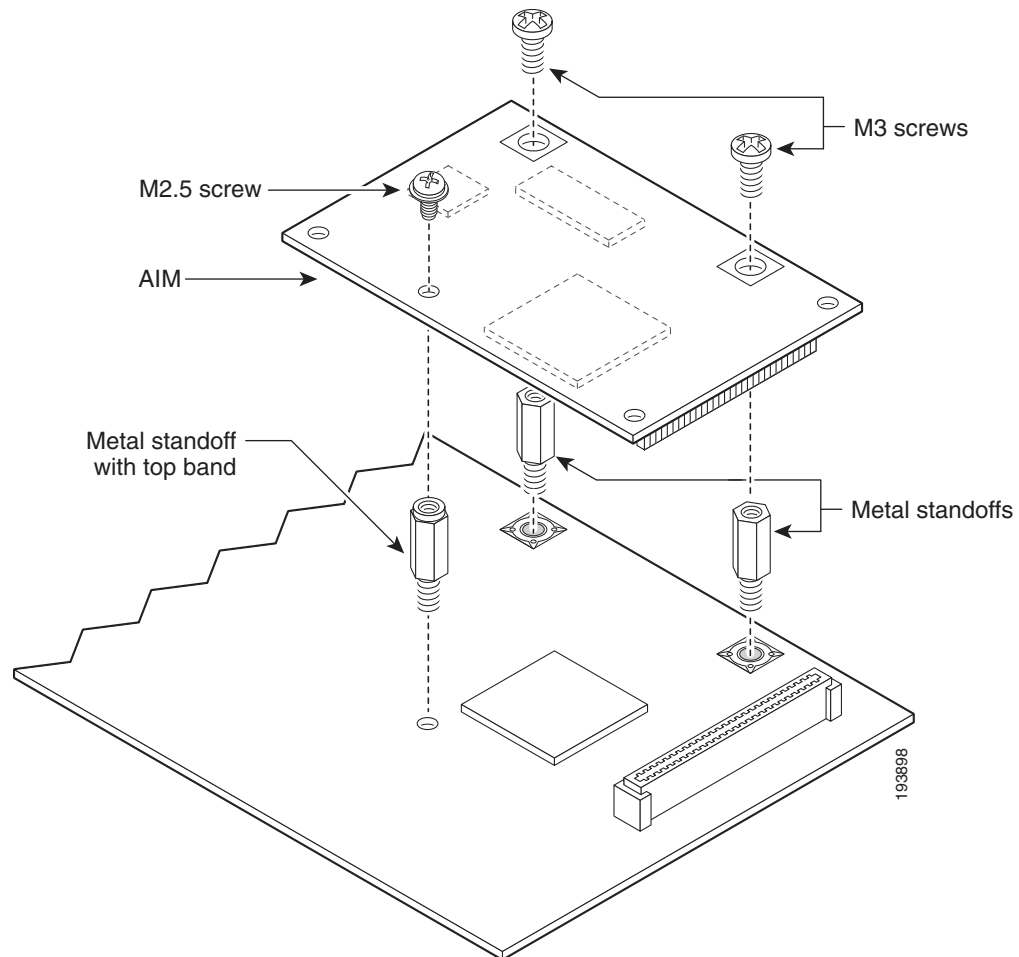
**Figure 27** Hex Standoff with Band



- Step 5** Plug the AIM into the AIM connector on the system board. (See [Figure 28](#).)
- Step 6** Insert the M3 screws (included in the accessory kit) through the AIM into the metal standoffs. Tighten the screws carefully with a Phillips screwdriver.
- Step 7** Insert the M2.5 screw through the AIM2-CUE-K9 or AIM2-APPRE-104-K9 into the hex standoff with the top band into the chassis until it is securely attached to the board. (See [Figure 28](#).)



**Figure 28** Connecting an AIM2-CUE-K9 to the System Board



- Step 8** Check that the AIM is installed correctly on the system board.
- Step 9** If you are finished installing modules, install the cover on the router. See the [“Installing the Chassis Cover”](#) section on page 56.
- Step 10** Apply the AIM label to the outside of the chassis as described in the [“Applying the AIM Label”](#) section on page 31.

## Installing a CompactFlash Memory Card on the AIM

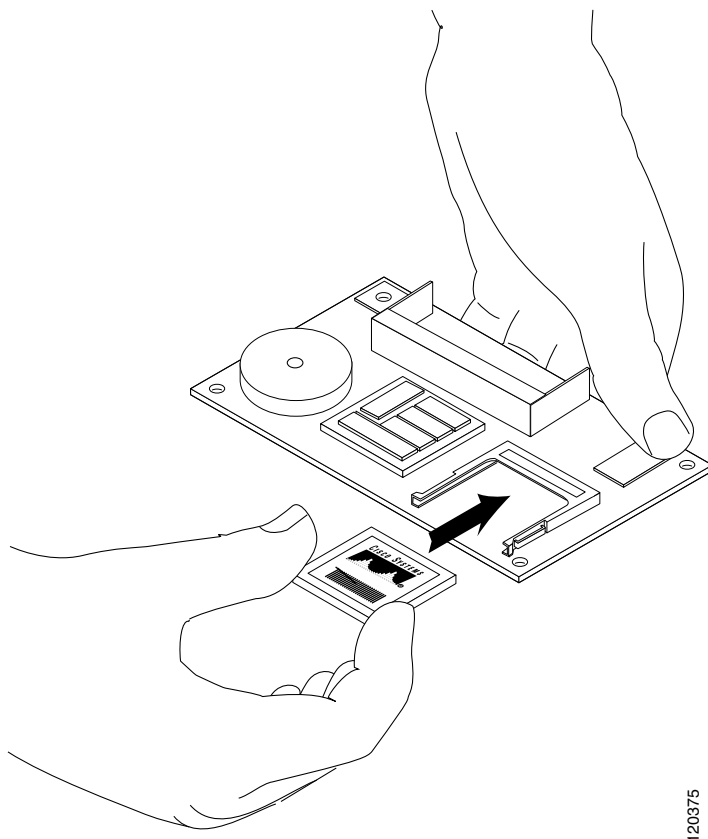


**Note** Not all AIMs require installation of a CompactFlash memory card.

To install a CompactFlash memory card mounted on the AIM, follow these steps:

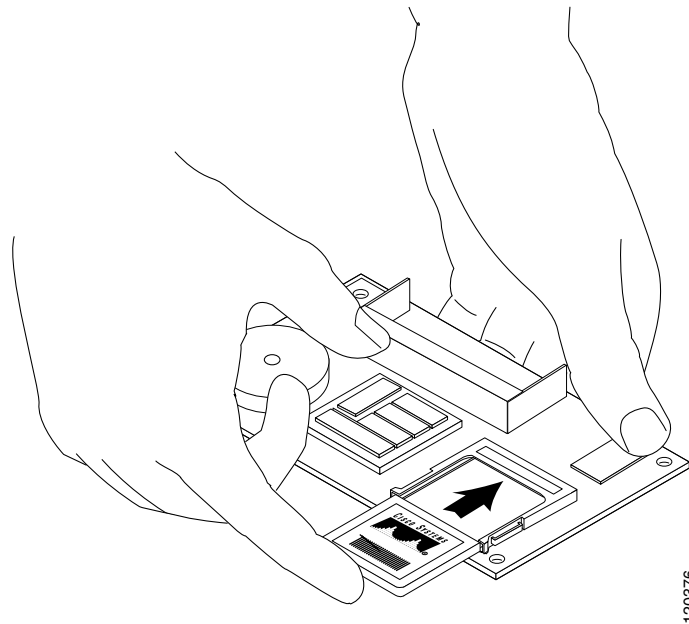
- 
- Step 1** Find the location of the CompactFlash memory card on the AIM. (See [Figure 29](#).)
  - Step 2** Insert the connector end of the CompactFlash memory card into the connector until the card is seated in the connector. (See [Figure 29](#) and [Figure 30](#).)
  - Step 3** Reinstall the AIM as described in “[Installing and Removing AIMs](#)” section on page 16.
  - Step 4** Reinstall the chassis cover as described in the “[Installing the Chassis Cover](#)” section on page 56.
  - Step 5** Refer to the “[Verifying AIM Installation](#)” section on page 32 for instructions on formatting the CompactFlash memory card.
- 

**Figure 29** CompactFlash Memory Card Location on the AIM



120375

**Figure 30** CompactFlash Memory Card Installation on the AIM



## Applying the AIM Label

The AIM label for the chassis might be in the AIM mounting kit, or it might be attached to the label on the AIM card. Apply the chassis label as follows:

- 
- Step 1** If the chassis label is attached to the label on the AIM card, carefully tear off the chassis label at the perforation. If the chassis label is in the AIM mounting kit, remove the label from the kit bag.
  - Step 2** Peel the chassis label from its backing.
  - Step 3** If there is a suitable space, apply the chassis label to the back of the chassis. If no suitable space is available on the back of the chassis, apply the label to the top cover at the back edge. The label must be visible with the chassis installed. See [Figure 31](#) for a typical label location on the back of a chassis.

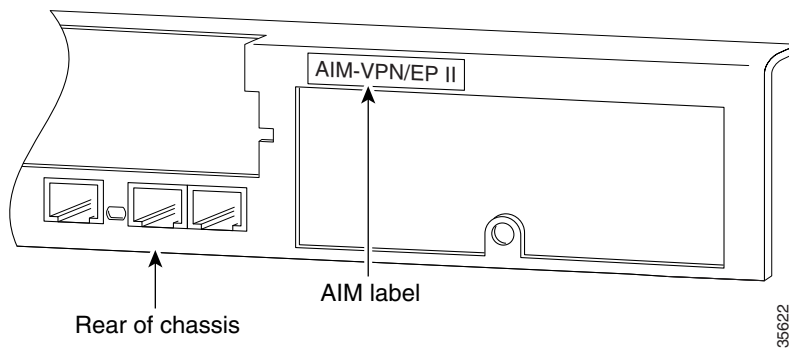



---

**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.

---

**Figure 31** Example of an AIM Label Location on a Chassis



## Verifying AIM Installation

Use the **show version** command to verify that the AIM has been installed correctly. In the following example, one VPN AIM is recognized by the system. (See the bold entry toward the bottom of the example. Note that you will see additional output not shown in this example.)

```
Router# show version
```

```
Cisco IOS Software, 2800 Software (C2800-ADVENTERPRISEK9-M), Experimental Versio
n 12.3(20040521:041814) [pgynther-v123_8_t_throttle 107]
Copyright (c) 1986-2004 by Cisco Systems, Inc.
Compiled Fri 21-May-04 00:35 by pgynther
```

```
ROM: System Bootstrap, Version 12.3(8r)T1, RELEASE SOFTWARE (fc1)
```

```
sjc22-00a-fs-gw2 uptime is 2 days, 16 hours, 17 minutes
System returned to ROM by reload at 17:57:37 PDT Sat Jun 26 2004
System restarted at 17:58:51 PDT Sat Jun 26 2004
System image file is "flash:c2800-adventerprisek9-mz.123-8T-2"
```

```
.
.
.
```

```
Cisco 2851 (revision 53.51) with 196608K/65536K bytes of memory.
Processor board ID FHK0817F02Q
45 FastEthernet interfaces
5 Gigabit Ethernet interfaces
1 Virtual Private Network (VPN) Module
12 Voice FXS interfaces
DRAM configuration is 64 bits wide with parity disabled.
239K bytes of non-volatile configuration memory.
62720K bytes of ATA CompactFlash (Read/Write)
```

```
Configuration register is 0x2102
```

Use the **show diag 0** command to obtain hardware information about an installed AIM. You will see additional output that is not shown in these examples.

The following example shows one Compression AIM in a Cisco 2811 router:

```
Router# show diag 0

Slot 0:
C2851 Motherboard with 2GE and integrated VPN Port adapter, 2 ports
  Port adapter is analyzed
  Port adapter insertion time unknown
  EEPROM contents at hardware discovery:
.
.
.
Compression AIM 1:
  2E1 Compression AIM module Version 2AIM Module in slot: 1
  Hardware Revision      : 1.0
  Part Number           : 73-3888-01
  Board Revision        : A0
  Deviation Number      : 0-0
  Fab Version           : 01
  PCB Serial Number     : JAB05440F12
  RMA Test History      : 00
  RMA Number            : 0-0-0-0
  RMA History           : 00
  EEPROM format version 4
  EEPROM contents (hex):
    0x00: 04 FF 40 04 6D 41 01 00 82 49 0F 30 01 42 41 30
    0x10: 80 00 00 00 00 02 01 C1 8B 4A 41 42 30 35 34 34
    0x20: 30 46 31 32 03 00 81 00 00 00 00 04 00 FF FF FF
    0x30: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
    0x40: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
    0x50: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
    0x60: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
    0x70: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
.
.
.
```

## Installing and Removing PVDMs

Cisco 2801 and Cisco 2811 routers hold up to two Cisco packet voice data modules, version 2 (PVDM2) to support enhanced versions of digital signal processors (DSPs). Cisco 2821 and Cisco 2851 routers hold up to three PVDM-IIs. If only one is PVDM installed, it must be located in the PVDM 0 connector.

Before you remove or install a PVDM, remove the chassis cover as described in the [“Removing the Chassis Cover”](#) section on page 2.



### Note

PVDM-II connectors in the Cisco 2800 series routers are not compatible with older PVDM versions.



### 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 chassis.



### Caution

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

## PVDM Location and Orientation

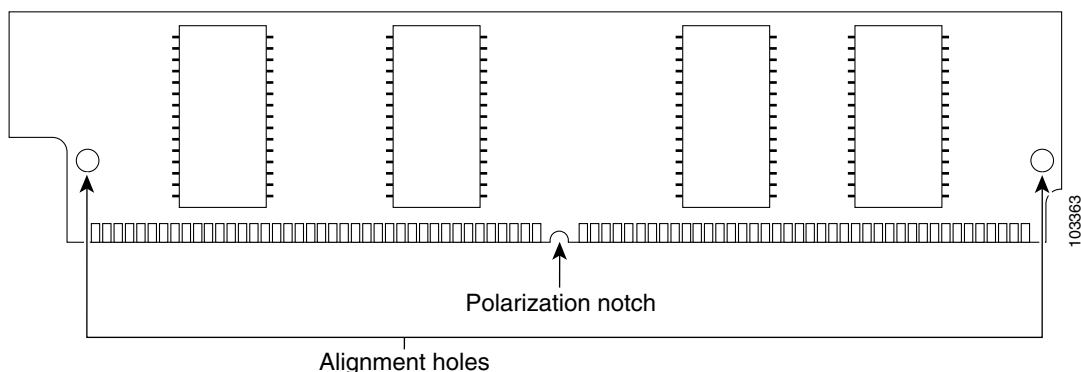
The PVDM connectors are located on the system board, and are identified as follows:

- In Cisco 2801 and Cisco 2811 routers—PVDM 0 and PVDM 1
- In Cisco 2821 and Cisco 2851 routers—PVDM 0, PVDM 1, and PVDM 2

Refer to [Figure 8](#), [Figure 9](#), [Figure 10](#), and [Figure 11](#) for PVDM locations.

PVDMs have a polarization notch on the mating edge to prevent incorrect insertion. [Figure 32](#) shows the polarization notch on a PVDM.

**Figure 32** PVDM Showing Polarization Notch



## Removing a PVDM

To remove a PVDM from the system board, follow these steps:

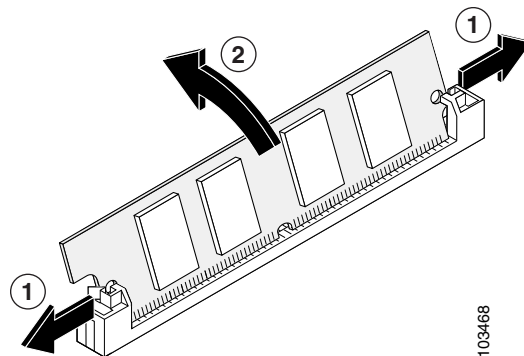
- 
- Step 1** Locate the PVDM on the system board. See [Figure 8](#), [Figure 9](#), [Figure 10](#), or [Figure 11](#), depending on your router model, for the location of the PVDMs.
- Step 2** Pull the PVDM retaining clips away from the PVDM at both ends, and then tilt the PVDM until it can be freely removed from the connector. See [Figure 33](#).




---

**Note** PVDMs must be removed in order—PVDM 1 then PVDM 0 in Cisco 2801 and 2811 routers, and PVDM 2, then PVDM 1, then PVDM 0 in Cisco 2821 and 2851 routers.

---

**Figure 33** Removing a PVDM

<b>1</b>	Release clips	<b>2</b>	Tilt the PVDM
----------	---------------	----------	---------------

**Step 3** Place the PVDM in an antistatic bag to protect it from ESD damage.

## Installing a PVDM

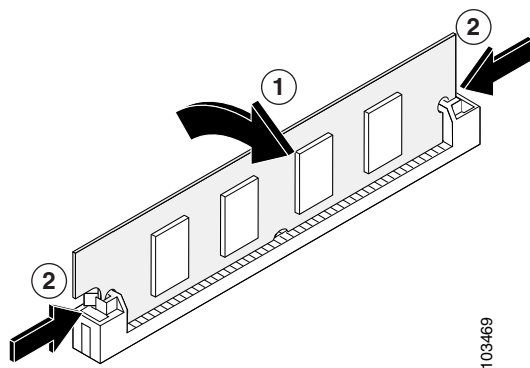
To install a PVDM, follow these steps.



**Note** If installing only one PVDM, install it in PVDM connector 0. If installing two PVDMs, install the second one in PVDM connector 1.

- Step 1** Locate the PVDM connector on the system board. See [Figure 8](#), [Figure 9](#), [Figure 10](#), or [Figure 11](#), depending on your router model, for the location of the PVDM connectors.
- Step 2** Orient the PVDM so that the polarization notch lines up with the polarization key on the connector. See [Figure 32](#).
- 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 34](#).

Figure 34 Installing a PVDM



<b>1</b>	Tilt PVDM up to vertical	<b>2</b>	Clips snap into place
----------	--------------------------	----------	-----------------------

**Step 4** If you are finished installing modules, install the cover on the router. See the “Installing the Chassis Cover” section on page 56.

## Replacing the Power Supply

To install an inline power (ILP) supply in a Cisco 2801 router, remove the chassis cover as described in the “Removing the Chassis Cover” section on page 2, and perform the procedure in the “Installing an Inline Power Supply in a Cisco 2801 Router” section on page 36.

To replace a power supply in a Cisco 2811 router, remove the chassis cover as described in the “Removing the Chassis Cover” section on page 2, and perform the procedure in the “Installing a Power Supply in a Cisco 2811 Router” section on page 38.

To replace a power supply in a Cisco 2821 or Cisco 2851 router, remove the chassis cover as described in the “Removing the Chassis Cover” section on page 2, and perform the procedure in the “Installing a Power Supply in a Cisco 2821 or Cisco 2851 Router” section on page 46.



**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.

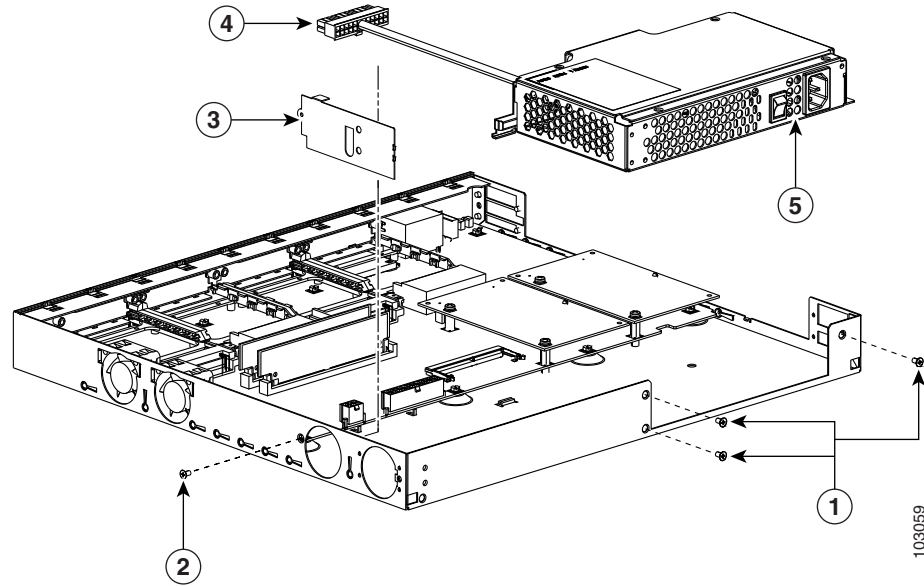
## Installing an Inline Power Supply in a Cisco 2801 Router

To replace the main power supply in a Cisco 2801 router with an inline power supply, perform the following steps. See Figure 8 for the locations of connectors and other components within the Cisco 2801 router.

- Step 1** Disconnect the power supply cable from the main power supply connector.
- Step 2** Remove the screws that fasten the main power supply to the chassis. See Figure 35.



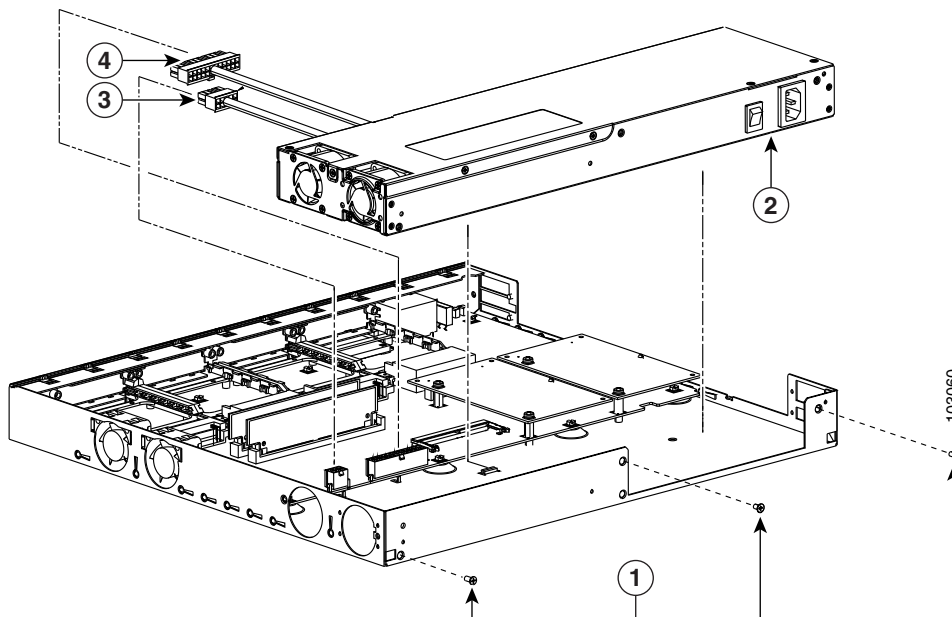
**Figure 35 Cisco 2801 Main Power Supply Removal**



<b>1</b>	Main power supply fastening screws	<b>4</b>	Main power connector
<b>2</b>	Vent blocking plate fastening screws	<b>5</b>	Main power supply
<b>3</b>	Vent blocking plate		

- Step 3** Lift the main power supply out of the chassis.
- Step 4** Remove the screws that fasten the vent blocking plate to the chassis, and remove the vent blocking plate from the inline power (ILP) supply fan vents.
- Step 5** Insert the ILP supply into the chassis. See [Figure 36](#).

**Figure 36** Inserting the ILP Supply into the Cisco 2801 Router



<b>1</b>	ILP supply fastening screws	<b>3</b>	ILP connector
<b>2</b>	ILP supply	<b>4</b>	Main power connector

- Step 6** Insert the screws that fasten the ILP supply to the chassis.
- Step 7** Connect the main power supply cable to the main power supply connector, and connect the ILP supply cable to the ILP supply connector.
- Step 8** Verify that the vent blocking plate has been removed in Step 4. The ILP fans should be visible through the vents that were blocked by the vent blocking plate.

## Installing a Power Supply in a Cisco 2811 Router

Three types of power supplies are available for the Cisco 2811 router:

- An AC-input power supply, driven by external AC power
- A DC-input power supply, driven by external DC power
- An inline power (ILP) supply, driven by external AC power. This supply provides power for the router and inline power for 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, page 39](#)
- [Installing an AC-Input Power Supply, page 41](#)
- [Installing a DC-Input Power Supply, page 43](#)
- [Installing an ILP Supply, page 45](#)

## Removing the Existing Power Supply

To remove a power supply from a Cisco 2811 router, perform the following steps.



### Caution

Do not disconnect the flat ribbon cable (shown in [Figure 37](#)). The cable is of adequate length to perform the power supply replacement procedure. Removing the flat ribbon cable without the proper tools may cause damage to components in the router.

### Step 1

Disconnect the power output cable connector (or connectors—see note below) from the power supply. Power supply connectors have a locking feature on the power supply end that you must release. Do not disconnect any power cables from the system board.



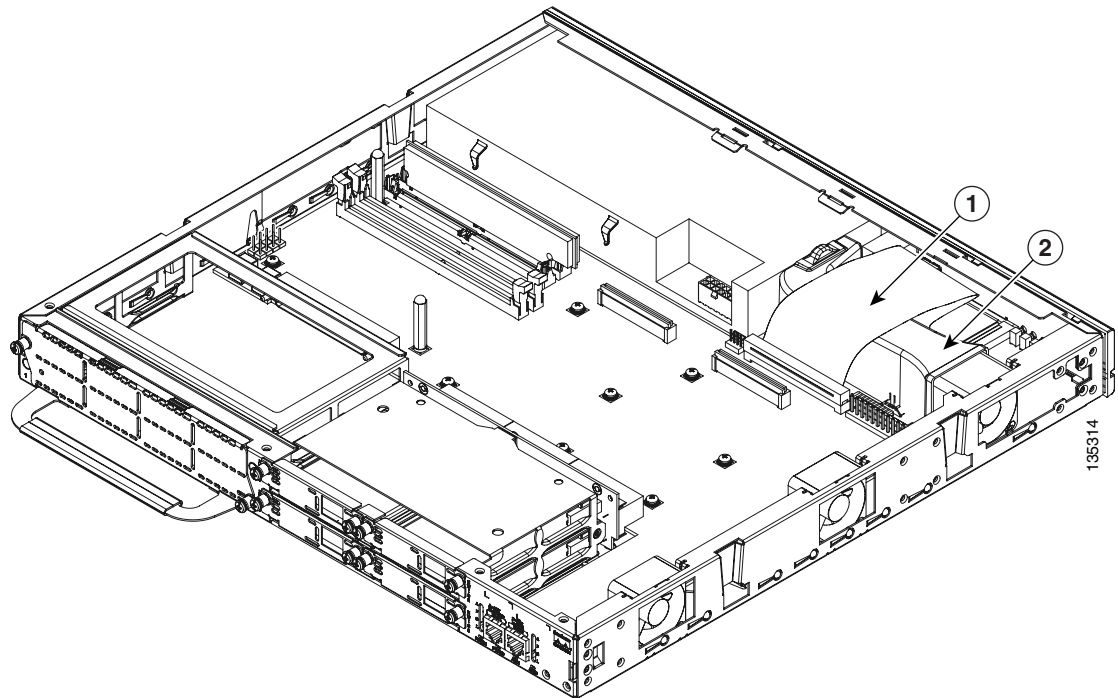
### Note

The AC-input power supply in a Cisco 2811 router uses only one power output cable. The DC-input power supply and the ILP supply each use two power output cables that must be disconnected. On the ILP supply, the ILP cable is also hooked to cable guides on the power supply and the chassis, so it must be both disconnected and unhooked from the power supply. See [Figure 44](#).

### Step 2

Remove the air duct by squeezing it gently at the bottom and lifting it straight up. See [Figure 37](#). Note that there are four snaps on the air duct, two on each side. By squeezing the air duct, the snaps are released from the sheet metal retainers in the chassis that capture them.

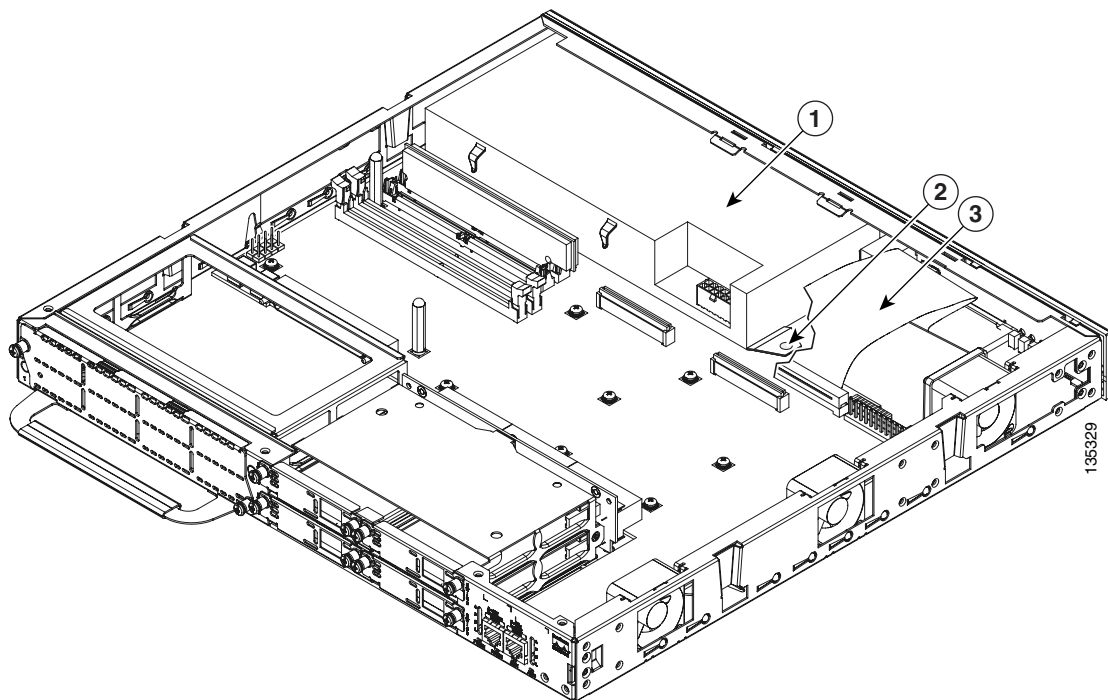
**Figure 37** Flat Ribbon Cable and Air Duct



1	Ribbon Cable	2	Air Duct
---	--------------	---	----------

**Step 3** Remove the power supply retention screw. See [Figure 38](#).

**Figure 38** Power Supply Retention Screw



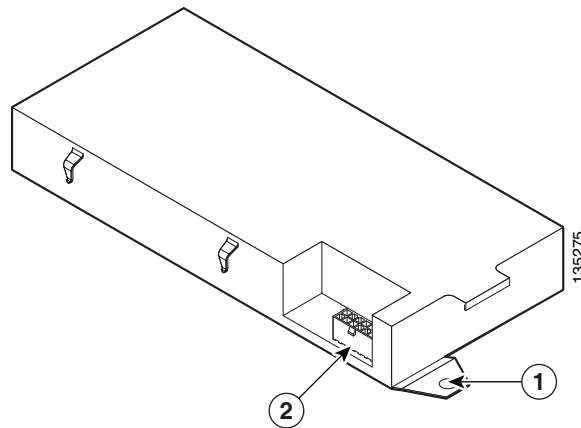
1	Power supply	3	Ribbon Cable
2	Retention screw location		

**Step 4** Slide the power supply toward the fan and toward the system board, and then lift it out.

## Installing an AC-Input Power Supply

The AC-input power supply has a single power connector, as shown in [Figure 39](#).

**Figure 39** AC-Input Power Supply for the Cisco 2811 Router

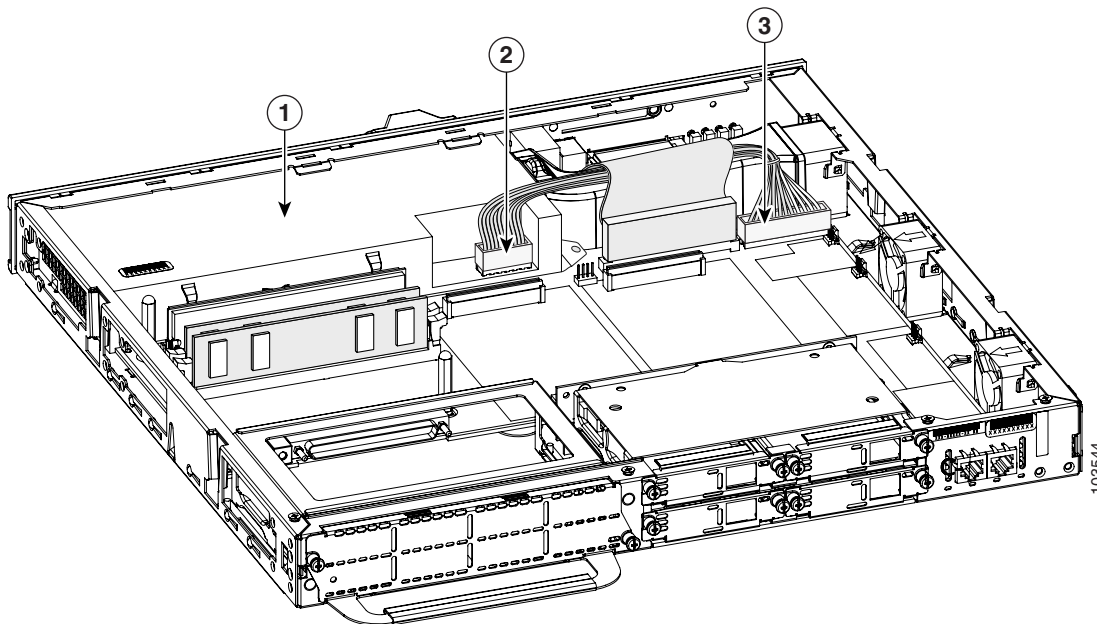


<b>1</b>	Retention tab	<b>2</b>	Primary power connector
----------	---------------	----------	-------------------------

Follow these steps to install the AC-input power supply.

- Step 1** Insert the AC-input power supply, and then slide it to the front and side of the chassis. Please note that there are two hooks inside the front of the chassis that fit into openings on the side of the power supply. When you slide the power supply to the front and then the side of the chassis, make sure that these hooks engage corresponding openings on the side of the power supply.
- Step 2** Install the power supply retention screw. See [Figure 38](#).
- Step 3** Insert the air duct. Squeeze it gently at the bottom so that the four snaps on the duct are captured by the sheet metal retainers in the chassis. See [Figure 37](#).
- Step 4** Connect the primary power cable to the power supply. Make sure that the locking feature snaps into position. See [Figure 40](#).

Figure 40 Connecting a Primary Power Cable in a Cisco 2811 Router



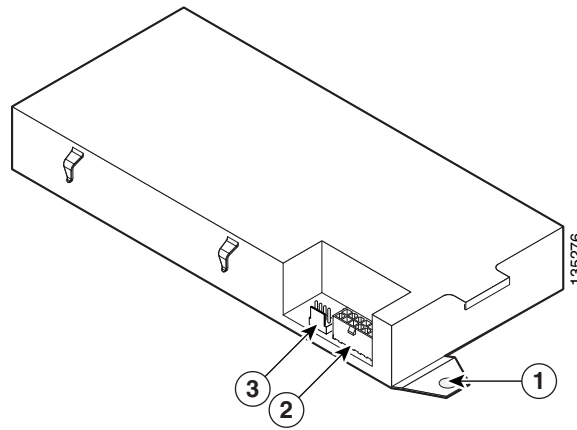
1	Power supply	3	Primary power cable connector, motherboard
2	Primary power cable connector, power supply		

**Step 5** If you are finished installing modules, install the cover on the router. See the [“Installing the Chassis Cover”](#) section on page 56.

## Installing a DC-Input Power Supply

The DC-input power supply has two power connectors, as shown in [Figure 41](#).

**Figure 41** DC-Input Power Supply for the Cisco 2811 Router

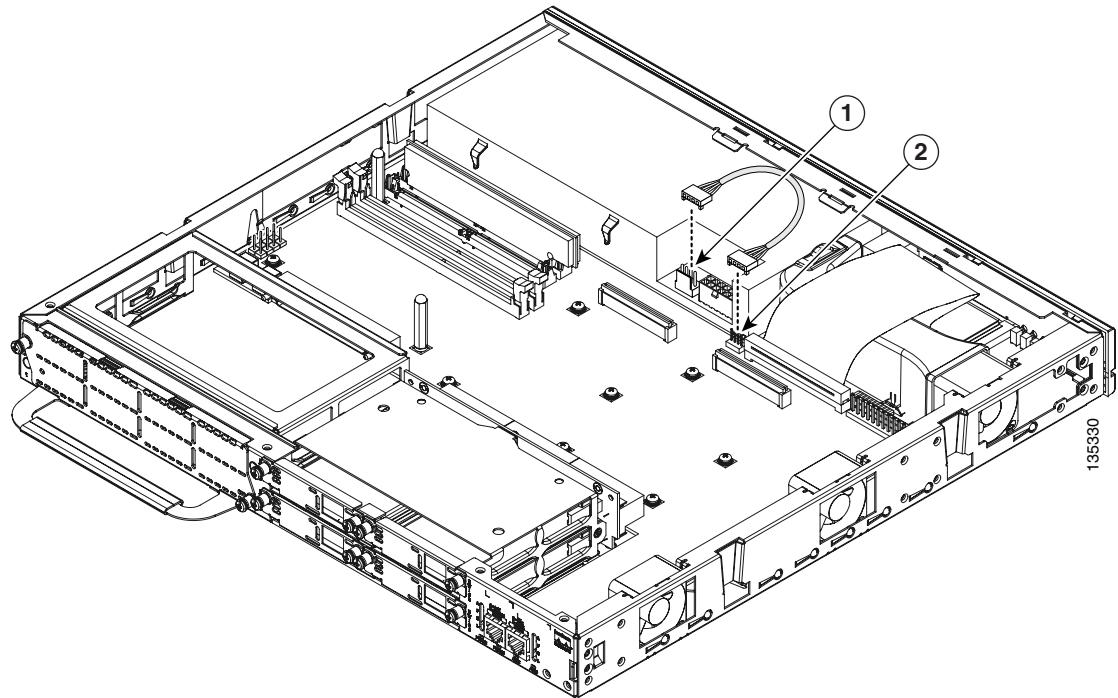


<b>1</b>	Retention tab	<b>3</b>	Secondary power connector
<b>2</b>	Primary power connector		

Follow these steps to install the DC-input power supply.

- Step 1** Insert the DC-input power supply, and then slide it to the front and side of the chassis. Please note that there are two hooks inside the front of the chassis that fit into openings on the side of the power supply. When you slide the power supply to the front and then the side of the chassis, make sure that these hooks engage corresponding openings on the side of the power supply.
- Step 2** Install the power supply retention screw. See [Figure 38](#).
- Step 3** Insert the air duct. Squeeze it gently at the bottom so that the four snaps on the duct are captured by the sheet metal retainers in the chassis. See [Figure 37](#).
- Step 4** Connect the primary power cable to the power supply. Make sure that the locking feature on the power supply end snaps into position. See [Figure 40](#).
- Step 5** Connect the secondary power cable to the power supply and to the secondary power connector on the motherboard. Make sure that the locking feature on the power supply end snaps into position. See [Figure 42](#).

**Figure 42** Connecting a Secondary Power Cable in a Cisco 2811 Router



<b>1</b>	Secondary power connector, power supply	<b>2</b>	Secondary power connector, motherboard
----------	-----------------------------------------	----------	----------------------------------------

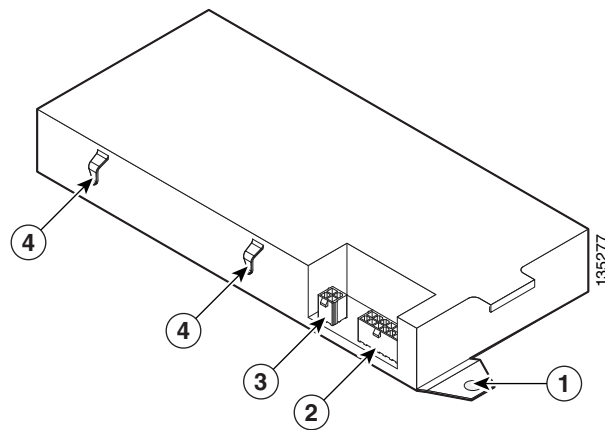
**Step 6** If you are finished installing modules, install the cover on the router. See the [“Installing the Chassis Cover”](#) section on page 56.



## Installing an ILP Supply

The ILP supply has two power connectors, as shown in [Figure 43](#).

**Figure 43** ILP Supply for the Cisco 2811 Router

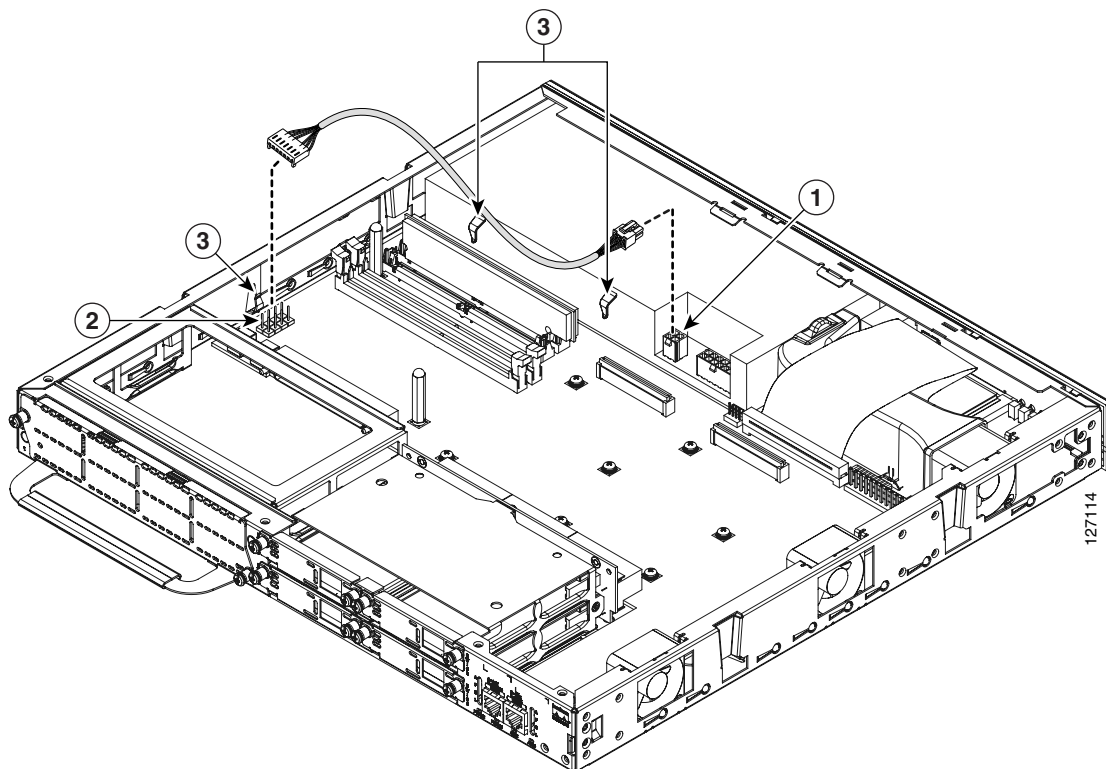


1	Retention tab	3	ILP connector
2	Primary power connector	4	ILP cable guides

Follow these steps to install the ILP supply.

- Step 1** Insert the ILP supply, and then slide it to the front and side of the chassis. Please note that there are two hooks inside the front of the chassis that fit into openings on the side of the power supply. When you slide the power supply to the front and then the side of the chassis, make sure that these hooks engage corresponding openings on the side of the power supply.
- Step 2** Install the power supply retention screw. See [Figure 38](#).
- Step 3** Insert the air duct. Squeeze it gently at the bottom so that the four snaps on the duct are captured by the sheet metal retainers in the chassis. See [Figure 37](#).
- Step 4** Connect the primary power cable to the power supply. Make sure that the locking feature on the power supply end snaps into position. See [Figure 40](#).
- Step 5** Connect the ILP cable to the power supply and to the ILP cable connector on the motherboard. Make sure that the locking feature on the power supply end snaps into position. Route the ILP cable through the cable guides on the power supply, around and under the motherboard and not on top of it. This routing will minimize the chance of airflow interference and of cable snags when opening the chassis. See [Figure 44](#).

Figure 44 Connecting an ILP Cable in a Cisco 2811 Router



1	ILP cable connector on the power supply	3	ILP cable guides
2	ILP cable connector on the motherboard		

**Step 6** If you are finished installing modules, install the cover on the router. See the [“Installing the Chassis Cover”](#) section on page 56.

## Installing a Power Supply in a Cisco 2821 or Cisco 2851 Router

Three types of power supplies are available for the Cisco 2821 and Cisco 2851 routers:

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

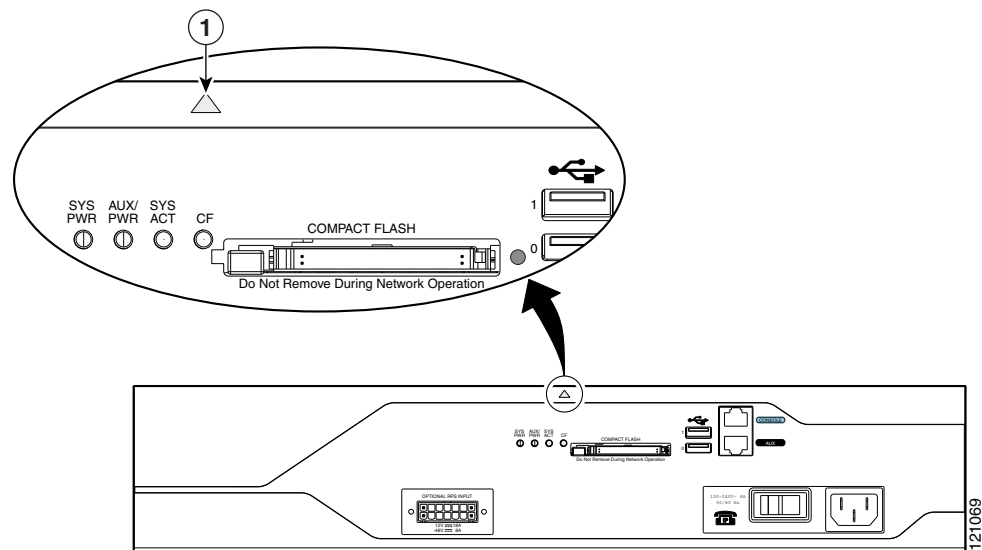
The following sections describe how to install each type of power supply.

## Removing the Existing Power Supply

To remove the power supply from a Cisco 2821 or a Cisco 2851 router, perform the following steps:

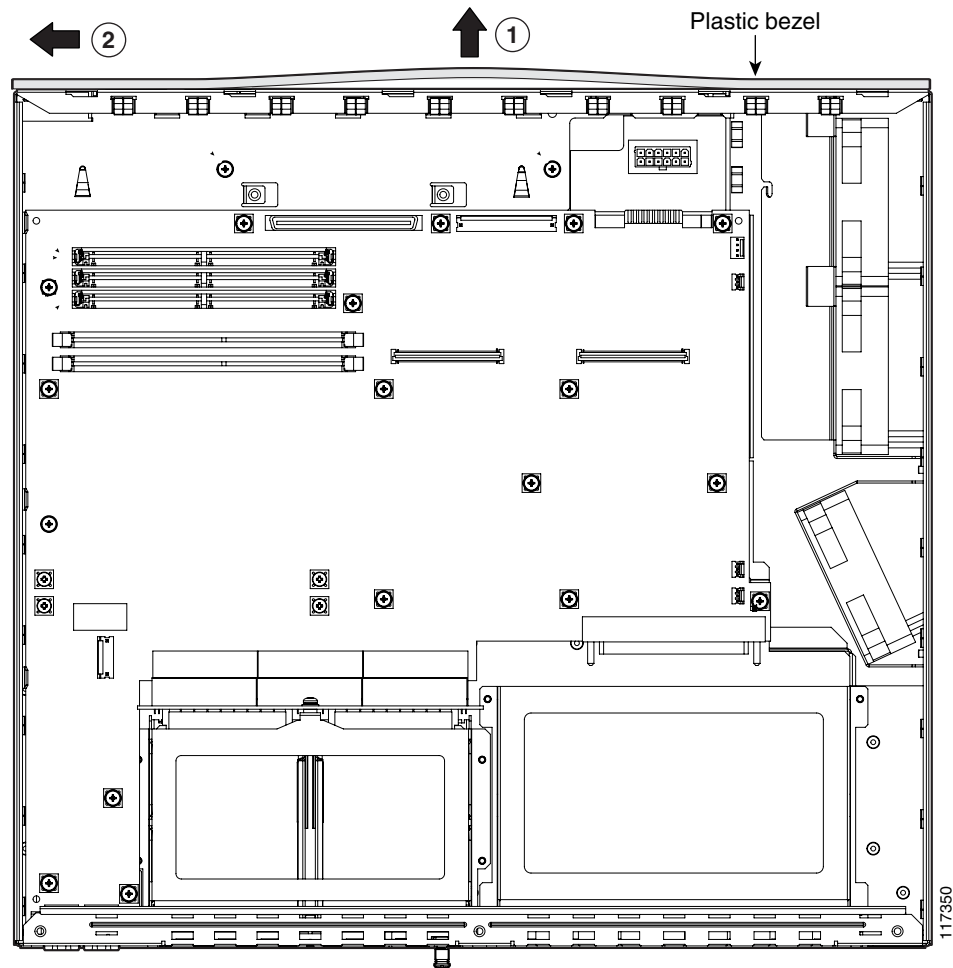
- Step 1** Remove the bezel from the front of the router, as follows:
- Make sure that the Compact Flash Ejector pin is in a position flush to the bezel. There is an upward-facing arrow located at the top and center of the front bezel. Grasp the bezel at the location of the arrow. See [Figure 45](#).

**Figure 45** Where to Hold Front Bezel to Remove It on Cisco 2821 and Cisco 2851 Routers



- Pull the top of the bezel 1/8 to 1/4 inch (3 to 8 mm) away from the chassis at the center. See [Figure 46](#).
- While you hold the bezel away from the chassis, slide the bezel toward the input-power side until it comes free (about 1/2 inch [12 mm]).

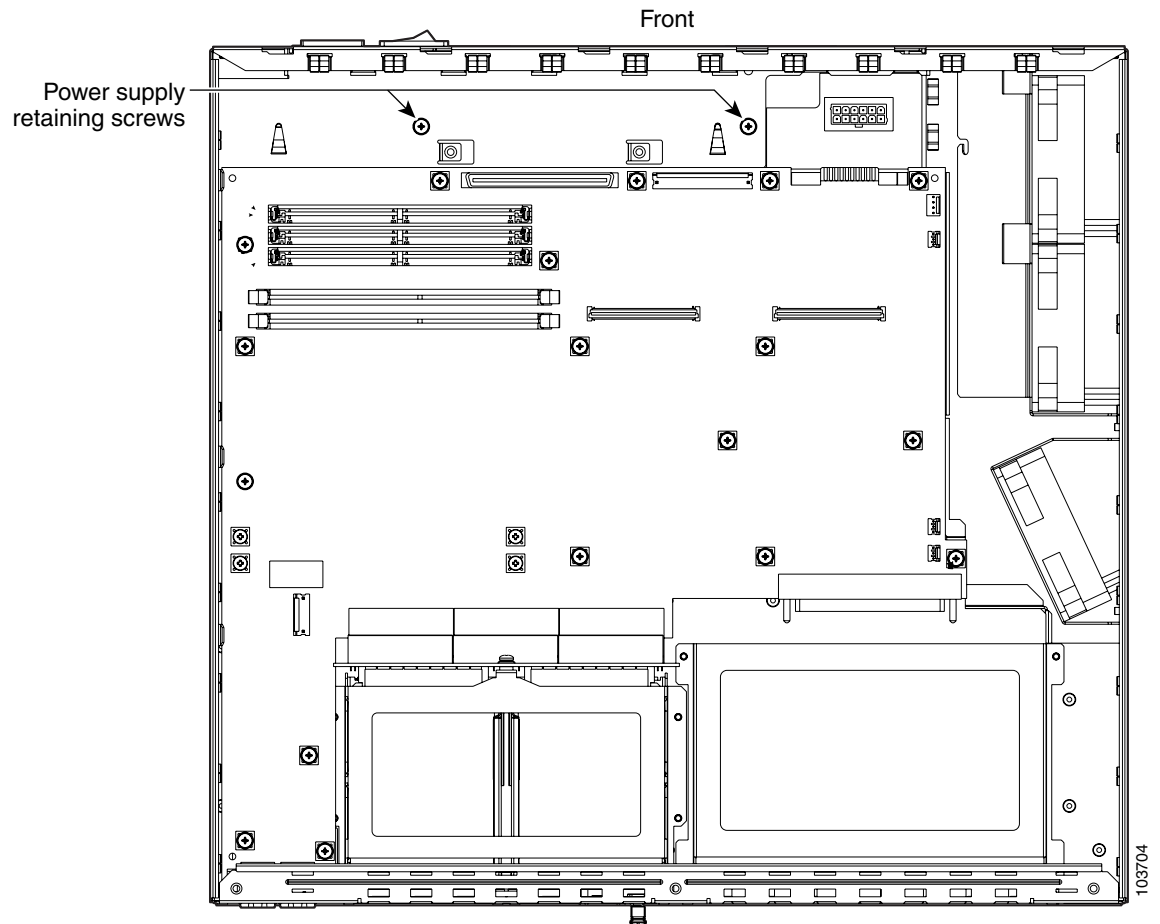
Figure 46 Removing the Bezel from a Cisco 2821 or Cisco 2851 Router



1 Pull top of bezel away from chassis	2 Slide bezel to release it from chassis
---------------------------------------	------------------------------------------

**Step 2** Remove the two power supply retaining screws. See [Figure 47](#).

**Figure 47** Power Supply Retaining Screws in a Cisco 2821 or Cisco 2851 Router



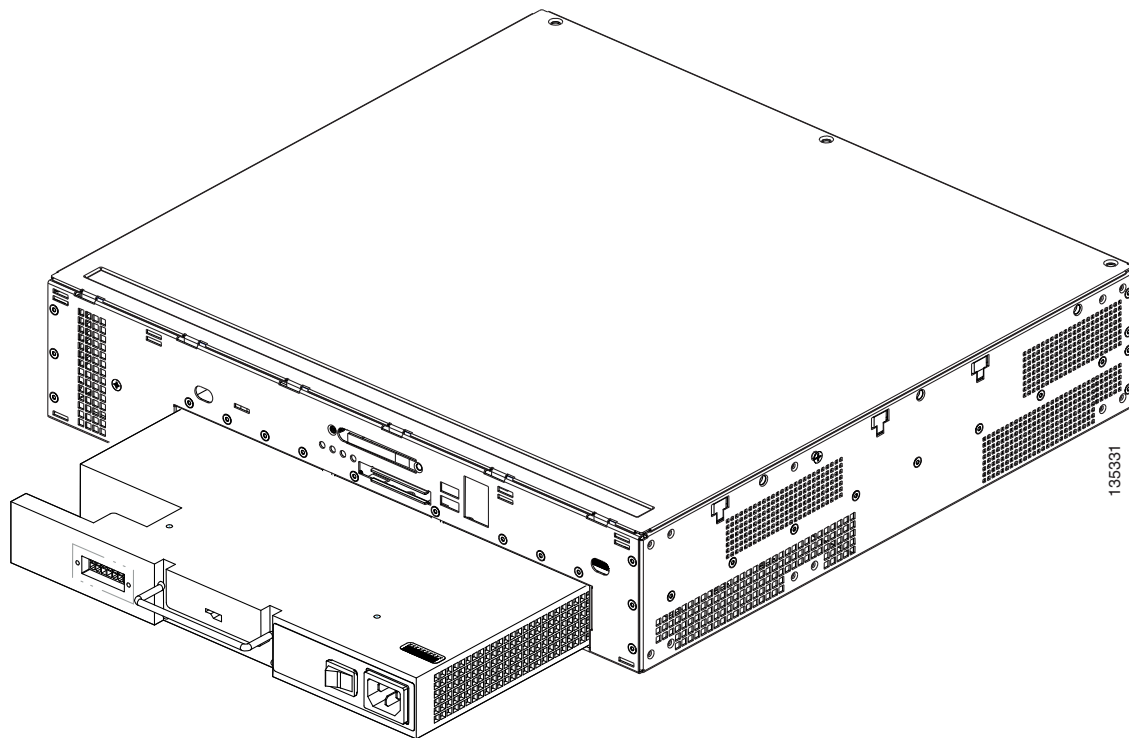
**Step 3** Disconnect the power output cable connector (or connectors—see note below) from the power supply. Power supply connectors have a locking feature on the power supply end that you must release. Do not disconnect any power cables from the system board.



**Note** The AC-input power supply in a Cisco 2821 or Cisco 2851 router has only one power output cable. The DC-input power supply has two power output cables, and the ILP supply has three power output cables that must be disconnected.

**Step 4** Use the integrated power supply handle to pull the power supply out through the front of the chassis. See [Figure 48](#).

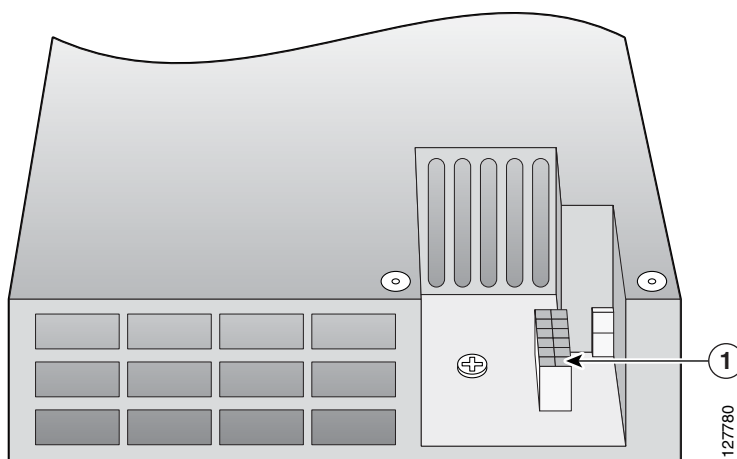
Figure 48 Removing the Power Supply from a Cisco 2821 or Cisco 2851 Router



## Installing an AC-Input Power Supply

The AC-input power supply has a single power connector, as shown in Figure 49.

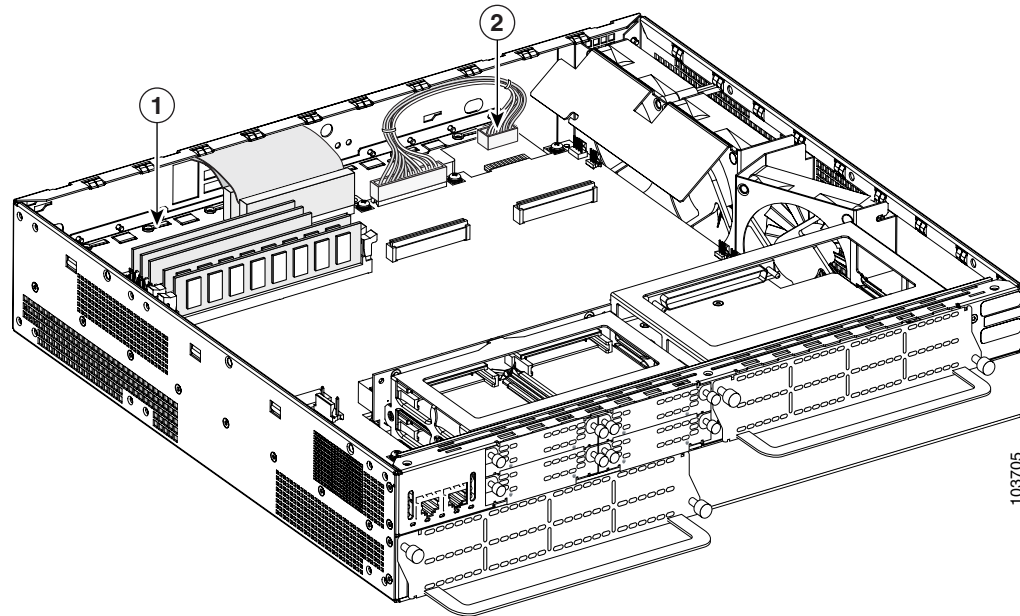
Figure 49 AC\_Input Power Supply



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

- Step 1** Insert the AC-input power supply into the chassis from the front.
- Step 2** Install the two power supply retaining screws. Torque to 8 to10 in-lbf (0.9 to 1.1 N-m). See [Figure 47](#).
- Step 3** Connect the primary power supply cable to the power supply. Make sure that the locking feature on the power supply end snaps into position. See [Figure 50](#).

**Figure 50** Primary Power Cable Connection in a Cisco 2821 or Cisco 2851 Router



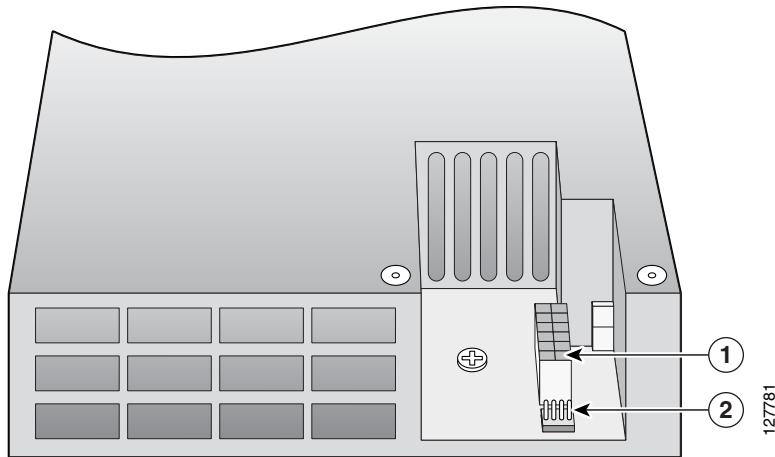
1	Power supply	2	Primary power cable connector
---	--------------	---	-------------------------------

- Step 4** Install the bezel onto the front of the chassis as follows:
- Engage the plastic tabs of the bezel into the slots in the chassis.
  - Slide the bezel until it is centered and tight against the chassis.
- Step 5** If you are finished installing modules, install the cover on the router. See the [“Installing the Chassis Cover”](#) section on page 56.

## Installing a DC-Input Power Supply

The DC-input power supply has two power connectors, as shown in [Figure 51](#).

**Figure 51** DC-Input Power Supply

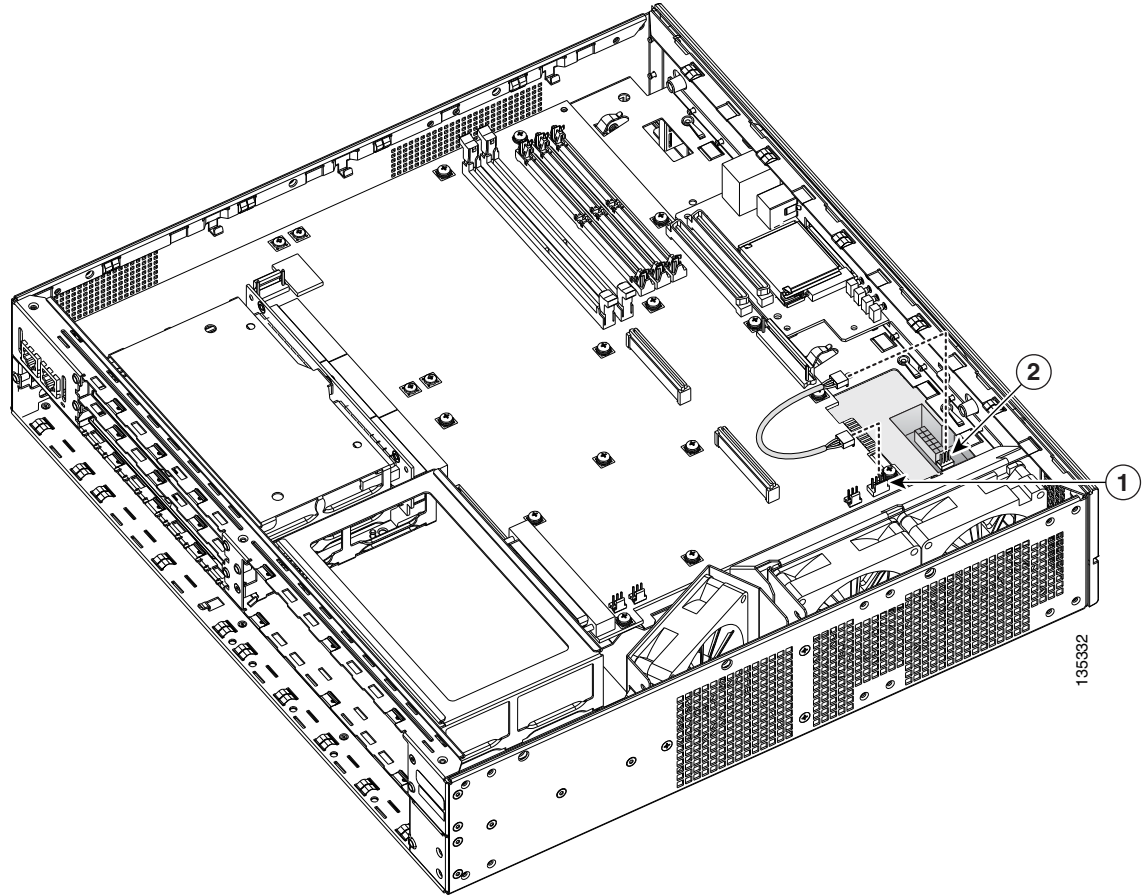


<b>1</b>	Primary power connector	<b>2</b>	Secondary power connector
----------	-------------------------	----------	---------------------------

- Step 1** Insert the AC-input power supply into the chassis from the front.
- Step 2** Install the two power supply retaining screws. Torque to 8 to 10 in-lbf (0.9 to 1.1 N-m). See [Figure 47](#).
- Step 3** Connect the primary power supply cable to the power supply. Make sure that the locking feature on the power supply end snaps into position. See [Figure 50](#).
- Step 4** Connect the secondary power supply cable to the power supply. Make sure that the locking feature on the power supply end snaps into position. See [Figure 52](#).



**Figure 52** Connecting a Secondary Power Cable in Cisco 2821 and Cisco 2851 Routers



<b>1</b>	Secondary power conector, motherboard	<b>2</b>	Secondary power connector, power supply
----------	---------------------------------------	----------	-----------------------------------------

**Step 5** Install the bezel onto the front of the chassis as follows:

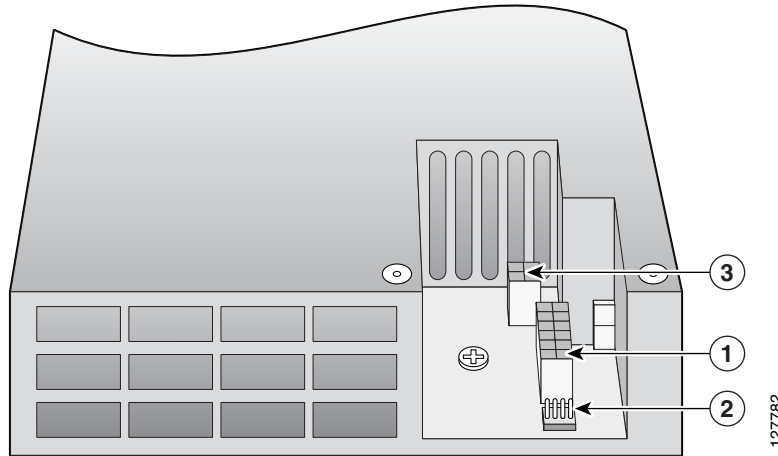
- a. Engage the plastic tabs of the bezel into the slots in the chassis.
- b. Slide the bezel until it is centered and tight against the chassis.

**Step 6** If you are finished installing modules, install the cover on the router. See the [“Installing the Chassis Cover”](#) section on page 56.

## Installing an ILP Supply

The ILP supply has three power connectors, as shown in [Figure 53](#).

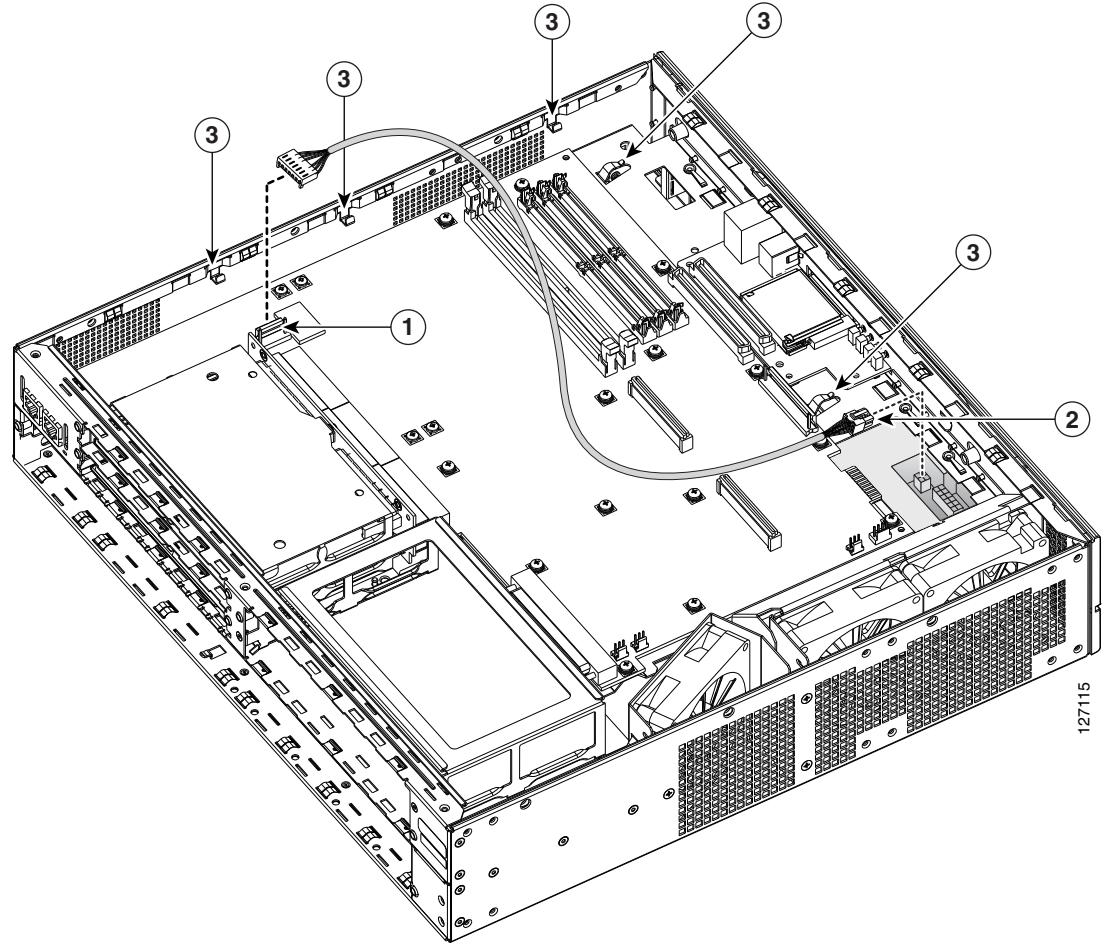
**Figure 53** ILP Supply



<b>1</b>	Primary power connector	<b>3</b>	ILP connector
<b>2</b>	Secondary power connector		

- Step 1** Insert the AC-input power supply into the chassis from the front.
- Step 2** Install the two power supply retaining screws. Torque to 8 to10 in-lbf (0.9 to 1.1 N-m). See [Figure 47](#).
- Step 3** Connect the primary power supply cable to the power supply. Make sure that the locking feature on the power supply end snaps into position. See [Figure 50](#).
- Step 4** Connect the secondary power supply cable to the power supply. Make sure that the locking feature on the power supply end snaps into position. See [Figure 52](#).
- Step 5** Connect the ILP cable to the supply. Make sure that the locking feature on the power supply end snaps into position. You must also route the ILP cable through the hooks on the power supply and chassis.. See [Figure 54](#).

Figure 54 Connecting an ILP Cable in Cisco 2821 and Cisco 2851 Routers



1	ILP cable connector, motherboard	3	ILP cable guides
2	ILP cable connector, power supply		

- Step 6** Install the bezel onto the front of the chassis as follows:
- a. Engage the plastic tabs of the bezel into the slots in the chassis.
  - b. Slide the bezel until it is centered and tight against the chassis.
- Step 7** If you are finished installing modules, install the cover on the router. See the [“Installing the Chassis Cover”](#) section on page 56.

## Installing the Chassis Cover

Cisco 2801 routers have a cover that slides onto the chassis from the rear of the chassis. For cover installation procedures, see the [“Installing the Cover on Cisco 2801 Routers” section on page 56](#).

Cisco 2811 routers have a cover that slides into place after you position it flat on top of the chassis. For cover installation procedures, see the [“Installing the Cover on Cisco 2811 Routers” section on page 57](#).

Cisco 2821 and Cisco 2851 routers have a hinged cover. For cover installation procedures, see the [“Installing the Cover on Cisco 2821 and Cisco 2851 Routers” section on page 58](#).

## Installing the Cover on Cisco 2801 Routers

To install the chassis cover on a Cisco 2801 router, follow these steps:

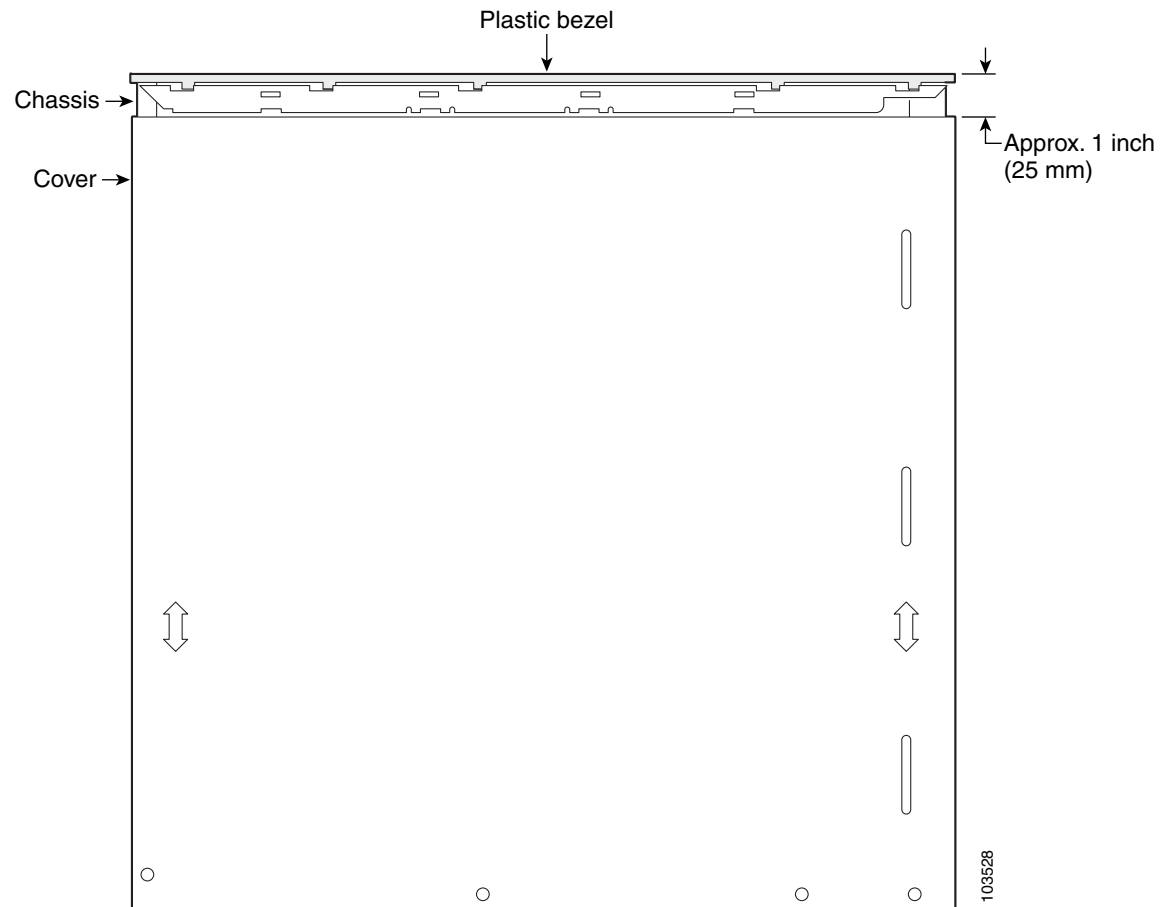
- 
- Step 1** Slide the top cover of the router back on the bottom of the chassis by pushing it in the direction opposite than shown in [Figure 3 on page 4, “Removing the Cisco 2801 Chassis Cover.”](#)
  - Step 2** Replace the three screws and the ground connection that you removed when you opened the chassis. See [Figure 1 on page 3, “Removing the Cisco 2801 Chassis Cover.”](#)
-

## Installing the Cover on Cisco 2811 Routers

To install the chassis cover on a Cisco 2811 router, follow these steps. A number 2 Phillips screwdriver is required.

- Step 1** Position the cover so that it rests flat on the chassis, with the front (bezel) end of the cover about 1 inch (25 mm) from the front end of the chassis. See [Figure 55](#).

**Figure 55** Cover in Position for Installation



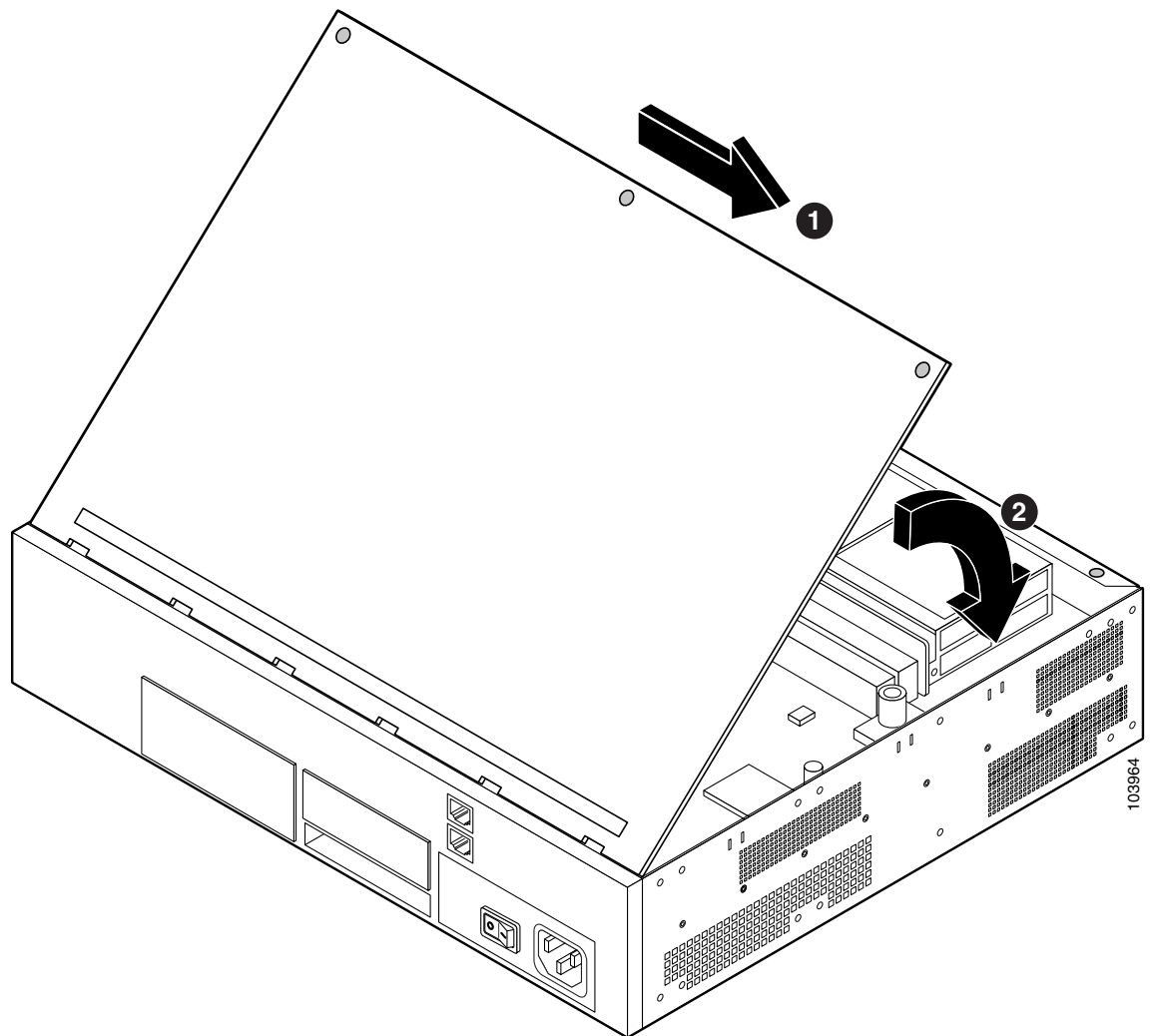
- Step 2** Slide the cover toward the front so that the fingers enter the slots and the cover is fully closed. Press the cover flat against the chassis while you slide the cover closed.
- Step 3** Use a Phillips' screwdriver to install the four screws at the top rear of the cover.

## Installing the Cover on Cisco 2821 and Cisco 2851 Routers

To install the chassis cover on a Cisco 2821 or a Cisco 2851 router, follow these steps. A number 2 Phillips screw driver is required.

- Step 1** Place the chassis on a flat surface.
- Step 2** Hold the cover at a 45-degree angle, and insert the tabs into the slots along the front (bezel) edge of the chassis. See [Figure 56](#).
- Step 3** Center the cover over the chassis and lower it onto the chassis.
- Step 4** Install the three cover screws.

**Figure 56** *Installing Cover on Cisco 2821 and Cisco 2851 Routers*



<b>1</b>	Insert tabs and center the cover	<b>2</b>	Close the cover
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# Removing and Installing CompactFlash Memory Cards in Cisco 2800 Series Routers

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This document describes installing and replacing CompactFlash memory cards in Cisco 2800 series integrated services routers. It contains the following sections:

- [Preventing Electrostatic Discharge Damage, page 1](#)
- [Removing a CompactFlash Memory Card, page 1](#)
- [Installing a CompactFlash Memory Card, page 2](#)

## Preventing Electrostatic Discharge Damage

CompactFlash memory cards are sensitive to electrostatic discharge (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**

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

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## Removing a CompactFlash Memory Card

To remove a CompactFlash memory card from the chassis, perform the following steps (see [Figure 1](#)):



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**Caution**

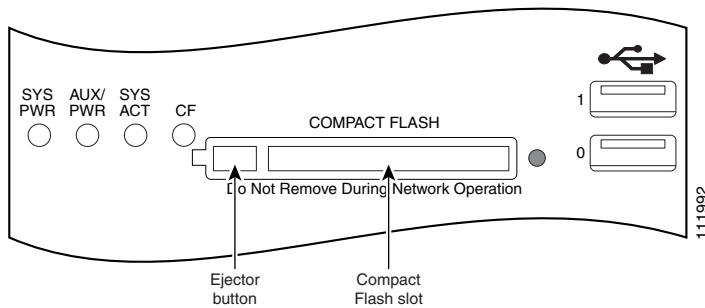
Do not remove a CompactFlash memory card from the chassis while it is being accessed. The CF LED blinks to indicate when flash memory is being accessed. Removing the CompactFlash memory card from the router while flash memory is being accessed can cause damage to your router.

- Step 1** Press the ejector button next to the CompactFlash memory card. The ejector button moves outward so that it projects from the panel.
- Step 2** Press the ejector button again. This ejects the CompactFlash memory card part-way out of its slot.
- Step 3** Pull the CompactFlash memory card out of its slot.
- Step 4** Push the ejector button in until the button is flush with the bezel.

  
**Caution**

To prevent damage to the ejector mechanism, the ejector button must remain pressed all the way in (flush against the bezel) when not being used to eject a CompactFlash memory card.

**Figure 1 CompactFlash Memory Card Slot in Cisco 2800 Series Routers**



## Installing a CompactFlash Memory Card

To install a CompactFlash memory card, perform the following steps (see [Figure 1](#)):

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



**Note** If the ejector button is projecting out from the panel, push it in until it is flush with the bezel.

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



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

**Caution**

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

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