CISCO™

Cisco 1800 Series Integrated Services Routers (Fixed) Hardware Installation Guide

The following information is for FCC compliance of Class A devices: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio-frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case users will be required to correct the interference at their own expense.

The following information is for FCC compliance of Class B devices: The equipment described in this manual generates and may radiate radio-frequency energy. If it is not installed in accordance with Cisco's installation instructions, it may cause interference with radio and television reception. This equipment has been tested and found to comply with the limits for a Class B digital device in accordance with the specifications in part 15 of the FCC rules. These specifications are designed to provide reasonable protection against such interference in a residential installation. However, there is no guarantee that interference will not occur in a particular installation.

Modifying the equipment without Cisco's written authorization may result in the equipment no longer complying with FCC requirements for Class A or Class B digital devices. In that event, your right to use the equipment may be limited by FCC regulations, and you may be required to correct any interference to radio or television communications at your own expense.

You can determine whether your equipment is causing interference by turning it off. If the interference stops, it was probably caused by the Cisco equipment or one of its peripheral devices. If the equipment causes interference to radio or television reception, try to correct the interference by using one or more of the following measures:

• Turn the television or radio antenna until the interference stops.

• Move the equipment to one side or the other of the television or radio.

• Move the equipment farther away from the television or radio.

• Plug the equipment into an outlet that is on a different circuit from the television or radio. (That is, make certain the equipment and the television or radio are on circuits controlled by different circuit breakers or fuses.)

Modifications to this product not authorized by Cisco Systems, Inc. could void the FCC approval and negate your authority to operate the product.

The Cisco implementation of TCP header compression is an adaptation of a program developed by the University of California, Berkeley (UCB) as part of UCB's public domain version of the UNIX operating system. All rights reserved. Copyright © 1981, Regents of the University of California.

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CONTENTS

Preface

This introduction describes the objectives, audience, organization, and conventions of this hardware document, and points to related documents that provide information beyond the scope of this document. This preface contains the following sections:

Objectives

This document provides comprehensive hardware-related information about Cisco 1800 series fixed-configuration integrated services routers, including platform description; information about safety, site preparation, chassis installation and interconnection, power up, initial configuration, and troubleshooting; and procedures for maintenance and upgrades.

This document provides enough initial software configuration information to establish network communication. For detailed software configuration information, see the *Cisco 1800 Series Integrated Services Routers (Fixed) Software Configuration Guide* and to the Cisco IOS configuration guides and command reference publications. These publications are available on line. See the "Obtaining Documentation and Submitting a Service Request" section for more information.

To access warranty, service, and support information, see the "Cisco One-Year Limited Hardware Warranty Terms" section.

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.

Conventions

This document uses the conventions listed in Table 1 to convey instructions and information.

Table 1 Document Conventions

Convention	Description
boldface font	Commands and keywords.
italic font	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.
boldface screen font	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 Tip 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, see the *Regulatory Compliance and Safety Information for Cisco 1800 Integrated Services Routers (Fixed)* document that accompanied your router.

Warning Definition

Warning   **IMPORTANT SAFETY INSTRUCTIONS**

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

SAVE THESE INSTRUCTIONS

Waarschuwing   **BELANGRIJKE VEILIGHEIDSINSTRUCTIES**

Dit waarschuwingssymbool betekent gevaar. U verkeert in een situatie die lichamelijk letsel kan veroorzaken. Voordat u aan enige apparatuur gaat werken, dient u zich bewust te zijn van de bij elektrische schakelingen betrokken risico's en dient u op de hoogte te zijn van de standaard praktijken om ongelukken te voorkomen. 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 GUARDE ESTAS INSTRUÇÕES

¡Advertencia! **INSTRUCCIONES IMPORTANTES DE SEGURIDAD**

Este símbolo de aviso indica peligro. Existe riesgo para su integridad física. Antes de manipular cualquier equipo, considere los riesgos de la corriente eléctrica y familiarícese con los procedimientos estándar de prevención de accidentes. Vea las traducciones de las advertencias que acompañan a este dispositivo.

Nota GUARDE ESTAS INSTRUCCIONES

Varning! **VIKTIGA SÄKERHETSANVISNINGAR**

Denna varningssignal signalerar fara. Du befinner dig i en situation som kan leda till personskada. Innan du utför arbete på någon utrustning måste du vara medveten om farorna med elkretsar och känna till vanliga förfaranden för att förebygga olyckor. 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 figyelmezeto jel veszélyre utal. Sérülésveszélyt rejto helyzetben van. Mielott bármely berendezésen munkát végezte, legyen figyelemmel az elektromos áramkörök okozta kockázatokra, és ismerkedjen meg a szokásos balesetvédelmi eljárásokkal. A kiadványban szereplo figyelmeztetések fordítása a készülékhez mellékelt biztonsági figyelmeztetések között található; a fordítás az egyes figyelmeztetések végén látható szám alapján keresheto meg.

ORIZZE MEG EZEKET AZ UTASÍTÁSOKAT!

Предупреждение   **ВАЖНЫЕ ИНСТРУКЦИИ ПО СОБЛЮДЕНИЮ ТЕХНИКИ БЕЗОПАСНОСТИ**

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

СОХРАНИТЕ ЭТИ ИНСТРУКЦИИ

警告   重要的安全性说明

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

请保存这些安全性说明

警告   安全上の重要な注意事項

「危険」の意味です。人身事故を予防するための注意事項が記述されています。装置の取り扱い作業を行うときは、電気回路の危険性に注意し、一般的な事故防止策に留意してください。警告の各国語版は、各注意事項の番号を基に、装置に付属の「Translated Safety Warnings」を参照してください。

これらの注意事項を保管しておいてください。

주의   중요 안전 지침

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

이 지시 사항을 보관하십시오.

Aviso   **INSTRUÇÕES IMPORTANTES DE SEGURANÇA**

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

GUARDE ESTAS INSTRUÇÕES

Advarsel   **VIGTIGE SIKKERHEDSANVISNINGER**

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

GEM DISSE ANVISNINGER

تحذير   إرشادات الأمان الهامة

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

Upozorenje   **VAŽNE SIGURNOSNE NAPOMENE**

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

SAČUVAJTE OVE UPUTE

Upozornění   **DŮLEŽITÉ BEZPEČNOSTNÍ POKYNY**

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

USCHOVEJTE TYTO POKYNY

Προειδοποίηση   ΣΗΜΑΝΤΙΚΕΣ ΟΔΗΓΙΕΣ ΑΣΦΑΛΕΙΑΣ

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

ΦΥΛΑΞΤΕ ΑΥΤΕΣ ΤΙΣ ΟΔΗΓΙΕΣ

אזהרה   **הוראות בטיחות חשובות**

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

שמור הוראות אלה

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 that runs your Cisco 1800 series fixed-configuration router provides extensive features and functionality. For information that is beyond the scope of this document, or for additional information, use the resources listed in Table 2.

Timesaver Make sure that you have access to the documents listed in Table 2. Some of these documents are available in print, and all are available on the World Wide Web. If you need to order printed documents, see the "Obtaining Documentation and Submitting a Service Request" section on page xvi.

Table 2   Related and Referenced Documents

Cisco Product	Document Title
Cisco 1800 series fixed-configuration routers	*Cisco 1811 and Cisco 1812 Integrated Services Router Cabling and Installation*
	Cisco 1801, Cisco 1802, and Cisco 1803 Integrated Services Router Cabling and Installation
	Cisco 1800 Series Integrated Services Router (Fixed) Software Configuration Guide
	Regulatory Compliance and Safety Information for Cisco 1800 Integrated Services Routers (Fixed)
	Cisco Modular Access Router Cable Specifications
Cisco access router wireless LAN documentation	*Cisco Access Router Wireless Configuration Guide*
	Cisco access router antenna documentation
	Declarations of Conformity and Regulatory Information for Cisco Access Products with 802.11a/b/g and 802.11b/g Radios
Network management system	Network management software documentation
Cisco IOS software	Cisco IOS software documentation, all releases. See the documentation for the Cisco IOS software release installed on your router.

Cisco One-Year Limited Hardware Warranty Terms

The following are special terms applicable to your hardware warranty. Your formal Warranty Statement, including the warranty applicable to Cisco software, appears in the *Cisco Information Packet* that accompanies your Cisco product.

Duration of Hardware Warranty

One (1) Year

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.

Product purchased from	
Their telephone number	
Product Model and Serial number	
Maintenance contract number	

Product warranty terms and other information applicable to Cisco products are available at the following URL:

http://www.cisco.com/go/warranty

78-10747-01D0

Obtaining Documentation and Submitting a Service Request

For information on obtaining documentation, submitting a service request, and gathering additional information, see the monthly *What's New in Cisco Product Documentation*, which also lists all new and revised Cisco technical documentation, at:

http://www.cisco.com/en/US/docs/general/whatsnew/whatsnew.html

Subscribe to the *What's New in Cisco Product Documentation* as a Really Simple Syndication (RSS) feed and set content to be delivered directly to your desktop using a reader application. The RSS feeds are a free service and Cisco currently supports RSS version 2.0.
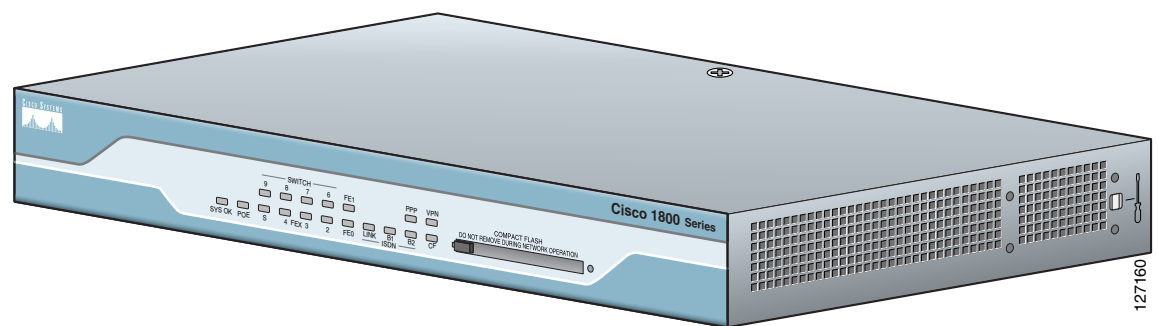
C H A P T E R 1

Overview

The Cisco 1800 series fixed-configuration routers are part of the new line of integrated services routers that are optimized for secure, fast, high-quality delivery of multiple, concurrent services for small-to-medium-sized businesses and small enterprise branch offices. The Cisco 1811 and Cisco 1812 routers offer an 8-port 10/100Base-T switch, dual 10/100Base-T WAN ports, two USB 2.0 ports, and either an ISDN S/T or an analog modem port. The Cisco 1801, Cisco 1802, and Cisco 1803 routers offer an 8-port 10/100Base-T switch; a single 10/100Base-T WAN port; an ISDN S/T port; and either an ADSL over POTS, ADSL over ISDN, or G.SHDSL WAN port. All models also offer embedded hardware-based encryption that provides superior performance for advanced applications, optional 802.11a/b/g wireless LAN functionality, an integrated real-time clock for validating digital certificates and stamping syslog entries, and optional Power over Ethernet (PoE).

Figure 1-1 shows a front view of a Cisco 1800 series fixed-configuration router.

Figure 1-1   **Front View of a Cisco 1800 Series Fixed-Configuration Router**

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

- Hardware Features, page 1-2
- Chassis Views, page 1-7
- Interface Numbering, page 1-11
- Specifications, page 1-12
- Regulatory Compliance, page 1-13

Hardware Features

This section describes the basic features of the Cisco 1800 series fixed-configuration routers, including product identification, built-in interfaces, memory, LED indicators, chassis ventilation, and the internal clock.

Product Serial Number Location

On the Cisco 1800 series fixed-configuration routers, the serial number label is located on the back of the chassis, along the bottom edge near the lower right corner. (See Figure 1-2.)

Figure 1-2   Serial Number Location
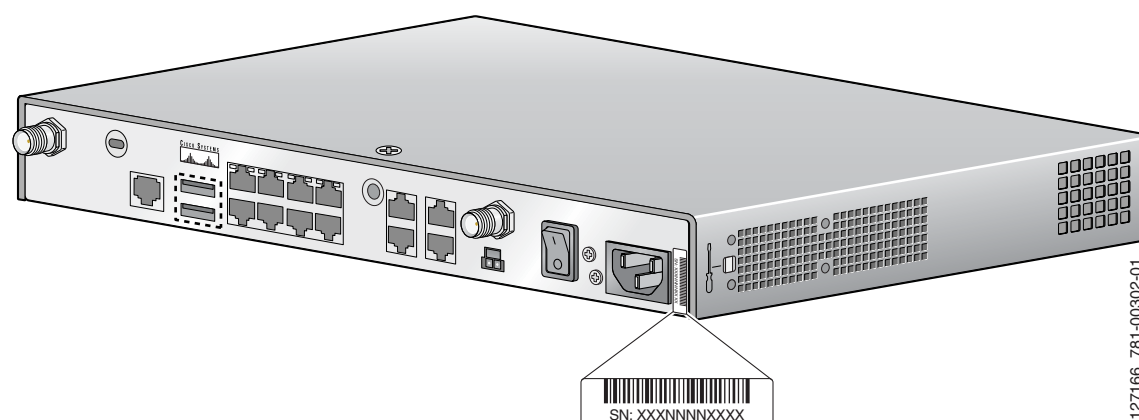
Note   The serial number for the Cisco 1800 series fixed-configuration routers is 11 characters long.

Cisco Product Identification Tool

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

- A search option allows browsing for models by using a tree-structured product hierarchy.
- A search field on the final results page makes 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

Feature Summary

Table 1-1 summarizes the built-in ports and other hardware features of the Cisco 1800 series fixed-configuration routers.

Table 1-1   Summary of Cisco 1800 Series Fixed-Configuration Built-In Interfaces

Feature	Description
Managed 8-port 10/100 Fast Ethernet switch	Provides connection to 10/100BASE-T (10/100-Mbps) Ethernet networks. Compatible with 10/100-Mbps devices.
10/100 Fast Ethernet (FE) WAN port	Provides connection to 10/100BASE-T Ethernet networks. Can be connected to other network devices, such as cable modem, ADSL, and router. Cisco 1801, Cisco 1802, and Cisco 1803 routers have one 10/100 FE WAN port. Cisco 1811 and Cisco 1812 routers have two 10/100 FE WAN ports.
ADSL-over-POTS port	Cisco 1801 router only. Provides connection to an ADSL network. Does not support the autoswitch function.
ADSL-over-ISDN port	Cisco 1802 router only. Provides connection to an ADSL-over-ISDN network. Does not support the autoswitch function.
G.SHDSL port	Cisco 1803 router only. Provides 2-wire or 4-wire connection to a G.SHDSL network.
ISDN S/T port	Cisco 1801, Cisco 1802, Cisco 1803, and Cisco 1812 routers only. Should the main WAN link go down, provides dial backup and remote management functions by connecting to an ISDN service provider.
V.92 analog modem port.	Cisco 1811 routers only. Should the main WAN link go down, provides dial backup and remote management functions.
Console port	Provides a connection to the terminal or PC for software configuration or troubleshooting using the command-line interface (CLI).
Auxiliary port	Provides a connection to a modem for software configuration or troubleshooting using the command-line interface (CLI).
Two USB ports	Cisco 1811 and Cisco 1812 routers only. Support Cisco USB flash memory modules and USB eToken modules.
Integrated 802.11a/b/g radio module	Wireless models only. Provides connectivity to a wireless LAN using IEEE 802.11a/b/g standards. Enables the router to act as an access point (AP) in infrastructure mode.
Internal Power-over-Ethernet (PoE) module	(Optional) Provides inline power for powered devices, such as IP phones, that are connected to the router.
Dying gasp	Detects whether the router is about to lose power, and sends a signal to warn the digital subscriber line access multiplexer (DSLAM) about the impending line drop.
Wall-mount feature	Brackets for mounting the router on a wall or vertical surface.
Kensington security slot	Allows the router to be secured to a desktop or other surface by using Kensington lockdown equipment.
Autosensing function	Eliminates the need for a crossover cable and allows the router to detect medium-dependent interface in normal mode (MDI) or medium-dependent interface in crossover mode (MDIX) in any other PC or hub with a straight-through cable or a crossover cable. The router is capable of bridging and multiprotocol routing between the LAN and WAN ports.

Memory

Cisco 1800 series fixed-configuration 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.Cisco 1800 series fixed-configuration routers contain 128 MB of internal DRAM memory by default. Cisco 1800 series fixed-configuration router models also contain a single 200-pin DDR Small Outline DIMM (SODIMM) slot that can accommodate up to a 256-MB SODIMM, for a maximum of 384 MB of internal DRAM memory.

- NVRAM—Internal flash memory. Stores the bootstrap program (ROM monitor), the configuration register, and the startup configuration. All Cisco 1800 series fixed-configuration models contain 2 MB of boot/NVRAM memory by default.

- Flash memory—External CompactFlash memory. Stores the operating system software image. All Cisco 1800 series fixed-configuration models contain 32 MB of internal flash memory by default, and can use external CompactFlash cards up to 128 MB in capacity.

Power

Table 1-2 summarizes the AC power options for the Cisco 1800 series fixed-configuration routers.

Table 1-2   Summary of Power Options for Cisco 1800 Series Fixed-Configuration Routers

Power Option	Input	IP Phone Power Output
AC input without inline power output	100–120V/200–240V, 1.2A/0.6A	None
AC input with inline power output	100–120V/200–240V, 1.2A/0.6A	–48 VDC, 80W

LED Indicators

Table 1-3 summarizes the LED indicators that are located in the router front panel.

Table 1-3   Summary of LED Indicators on the Cisco 1800 Series Fixed-Configuration Routers

LED	Color	Description
SYS OK	Green	The router has successfully booted up, and the software is functional. This LED blinks while booting or while in the ROM monitor mode.
WLAN	Green	This LED shows wireless access point link status. It is active only on wireless models. On indicates that at least one client is associated. Blinking green indicates that no client is associated.
POE[1]	Green/ Amber	Green indicates that the inline power supply is present. Amber indicates a fault with the inline power supply. Off indicates that the inline power supply is not installed.
FE *<port number>*	Green	These LEDs indicate Fast Ethernet port link and status for both FE WAN ports (ports 0 and 1 on the Cisco 1811 and Cisco 1812 routers; port 0 on the Cisco 1801, Cisco 1802, and Cisco 1803 routers) and the FE switch ports (ports 2 through 9 on the Cisco 1811 and Cisco 1812 routers; ports 1 through 8 on the Cisco 1801, Cisco 1802, and Cisco 1803routers). Green indicates a successful FE link. Off indicates no link.

Table 1-3 ***Summary of LED Indicators on the Cisco 1800 Series Fixed-Configuration Routers (continued)***

LED	Color	Description
CD[2]	Green	This LED indicates whether a connection is established (carrier detect). On the Cisco 1801, Cisco 1802, and Cisco 1803 routers, this LED indicates whether a DSL connection is established. On the Cisco 1811 router, this LED indicates whether a modem connection is established. On indicates a connection is established. Off indicates no connection established.
LPBK[3]	Green	On indicates the DSL interface is in loopback mode. Off indicates DSL interface normal operation.
PPP	Green	On if at least one PPP connection is established.
VPN	Green	On if at least one VPN tunnel is established.
LINK[4]	Green	On indicates that an ISDN S/T connection has been established. Off indicates that no ISDN S/T connection has been established.
B1[4]	Green	Blinking green indicates activity on the first B channel. Off indicates no activity on the first B channel.
B2[4]	Green	Blinking green indicates activity on the second B channel. Off indicates no activity on the second B channel.
SPD[5]	Green	On indicates a connection at high speed (V.90/V.92). Off indicates a connection at low speed (V.32/V.32b/V.34).
BUSY[5]	Green	Blinking green indicates activity over the modem line. Off indicates no activity.
CF	Green	On when CompactFlash memory is busy. Do not remove CompactFlash memory when this light is on.

1. Inline power is a field-upgradable option only. It is not installed by default.
2. This LED does not exist on the Cisco 1812.
3. This LED exists on the Cisco 1801, Cisco 1802, and Cisco 1803 only.
4. This LED does not exist on the Cisco 1811.
5. This LED exists on the Cisco 1811 only.

For LED troubleshooting information, including possible trouble causes and corrective actions, see Table 6-1 in the "Troubleshooting" chapter.

Integrated 802.11a/b/g Radio Module (Wireless Models Only)

The Cisco 1800 series fixed-configuration routers with the wireless option have an integrated IEEE 802.11a/b/g radio module that operates as a wireless access point in infrastructure mode. The wireless routers have two reverse-polarity threaded Neill-Concelman (RP-TNC) connectors on the back panel. The dipole swivel antennas that were shipped with the router connect to the RP-TNC connectors to operate the 802.11a/b/g radio module.

The wireless operations can be configured by using the Cisco Router and Security Device Manager (SDM) web-based application, or by using the Cisco IOS command-line interface (CLI). See the *Cisco Router and Security Device Manager (SDM) Quick Start Guide* or the *Cisco Access Router Wireless Configuration Guide* for more information.

Supported Cisco Radio Antennas (Wireless Models Only)

Table 1-4 lists the Cisco antennas that are supported on the Cisco 1800 series fixed-configuration wireless routers.

Table 1-4   Cisco Antennas Supported on the Cisco 1800 Series Fixed-Configuration Wireless Routers

Cisco Part Number	Antenna Type	Maximum Gain	Description
AIR-ANTM2050D-R	Omnidirectional	2.0 dBi gain for 2.4GHz 5.0 dBi for 5GHz	This is the default antenna. Swivel-mount dipole antenna operating in the 2.4- to 2.5-GHz band. This antenna is designed for use with Cisco wireless products utilizing an RP-TNC connector. For more information, see the *Cisco Multiband Swivel-Mount Dipole Antenna* document.
AIR-ANTM4050V-R	Omnidirectional	4.0 dBi gain for 2.4GHz 5.0 dBi for 5GHz	Ceiling-mount antenna operating in the 2.4- to 2.5-GHz band. This antenna has a clip that allows it to be mounted to a drop-ceiling cross member. For more information, see the *Cisco Multiband Diversity Omnidirectional Ceiling-Mount Antenna* document.
AIR-ANTM5560P-R	Patch	5.5 dBi gain for 2.4GHz 6.0 dBi for 5GHz	Wall-mount antenna operating in the 2.4- to 2.5-GHz band. For more information, see the *Cisco Multiband Wall-Mount, Corner-Mount, or Mast-Mount Antenna* document.

Chassis Ventilation

Cisco 1800 series fixed-configuration routers have an internal multispeed fan that provides chassis cooling, controlled by an onboard temperature sensor. The internal fan operates at a continuously variable speed to minimize fan noise while providing sufficient chassis cooling.

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 and to timestamp syslog messages. Cisco 1800 series fixed-configuration routers have a socketed lithium battery. This battery lasts the life of the router under the operating environmental conditions specified for the router; the battery is not field-replaceable.

Note   If the lithium battery in a Cisco 1800 series fixed-configuration router fails, the router must be returned to Cisco for repair.

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

Kensington Lock

All Cisco 1800 series fixed-configuration routers include a Kensington lock located at the top left corner of the back panel for physical security.
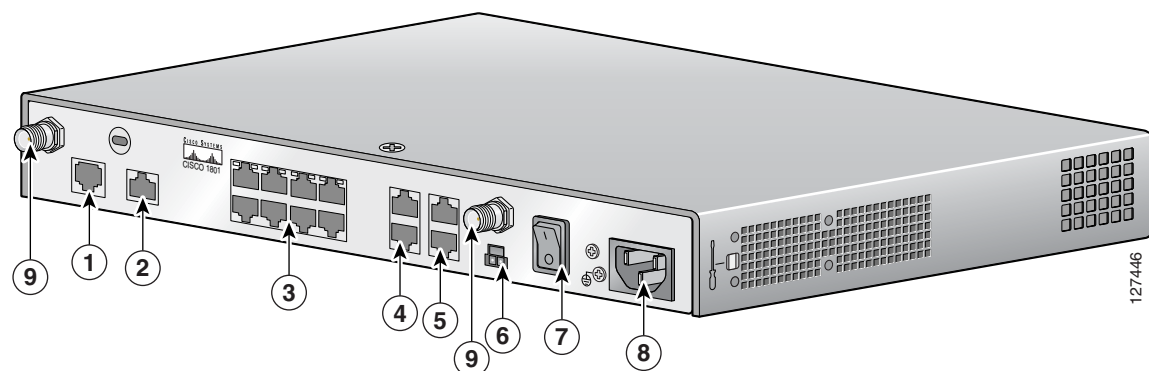
Chassis Views

This section contains views of the front and rear panels of the Cisco 1800 series fixed-configuration routers, showing locations of the power and signal interfaces, module slots, status indicators, and chassis identification labels.

Figure 1-3   *Front Panel of Cisco 1801 Router*
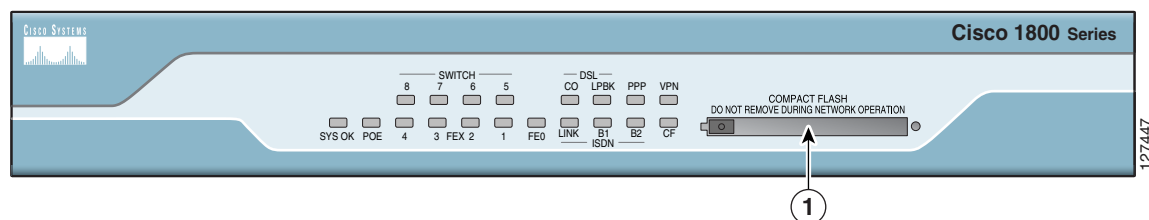
1	CompactFlash Slot

Figure 1-4   *Back Panel of Cisco 1801 Router*

1	ADSL over POTS WAN port	6	POE connector[1]
2	ISDN BRI S/T port	7	Power switch

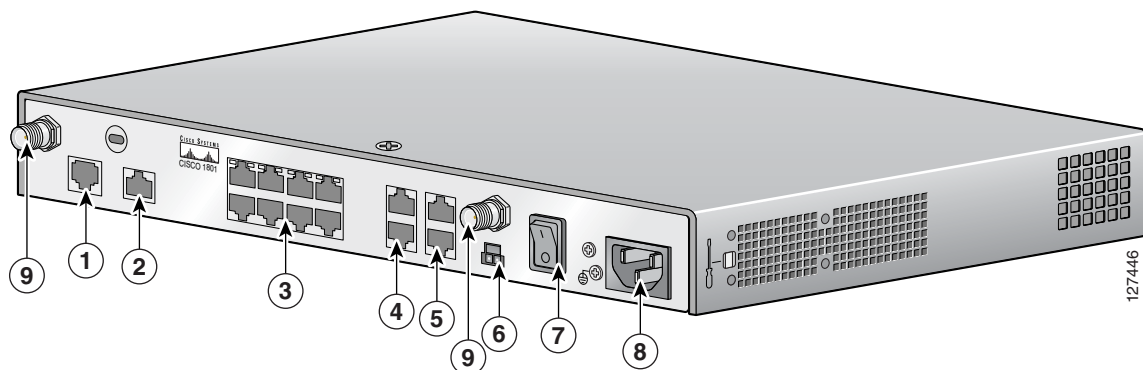| 3	Managed 8-port FE switch	8	Power connector
4	FE WAN port[2]	9	RP-TNC antenna connectors (wireless models only)
5	Console and AUX ports		

1. Inline power is a field-upgradable option only. It is not installed by default.

2. The Cisco 1801 only has one FE WAN port, which is the lower of the two ports shown. The upper port is disabled, and reserved for a future purpose.

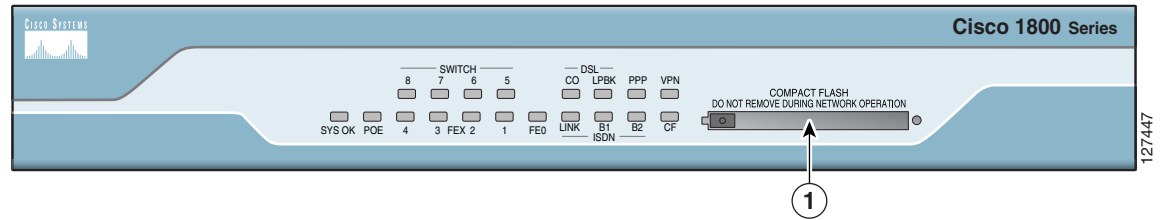*Figure 1-5   Front Panel of Cisco 1802 Router*
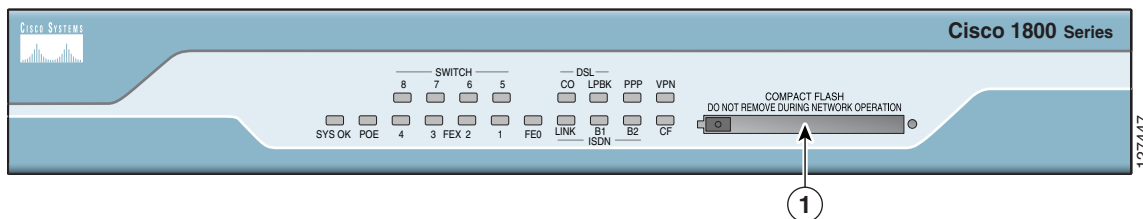
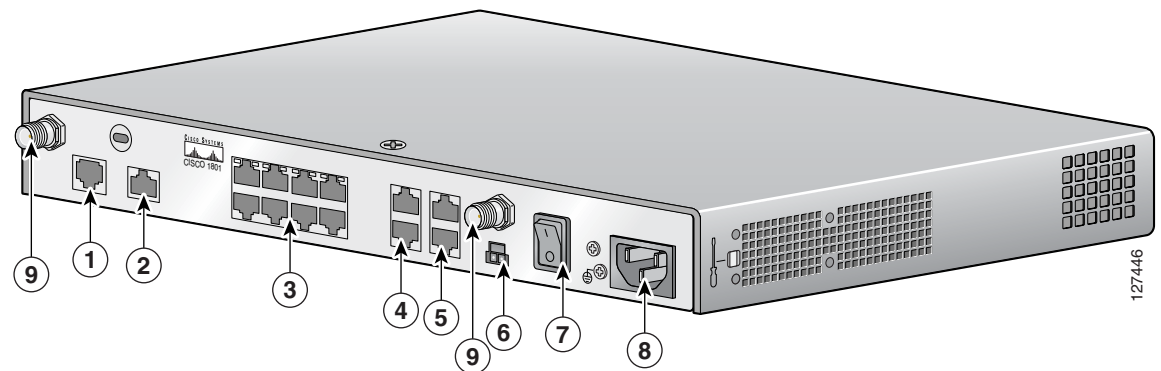| 1	CompactFlash Slot

Figure 1-6   Back Panel of Cisco 1802 Router

1	ADSL over ISDN WAN port	6	POE connector[1]
2	ISDN BRI S/T port	7	Power switch
3	Managed 8-port FE switch	8	Power connector
4	FE WAN port[2]	9	RP-TNC antenna connectors (wireless models only)
5	Console and AUX ports		

1. Inline power is a field-upgradable option only. It is not installed by default.

2. The Cisco 1802 only has one FE WAN port, which is the lower of the two ports shown. The upper port is disabled, and reserved for a future purpose.

Figure 1-7   Front Panel of Cisco 1803 Router

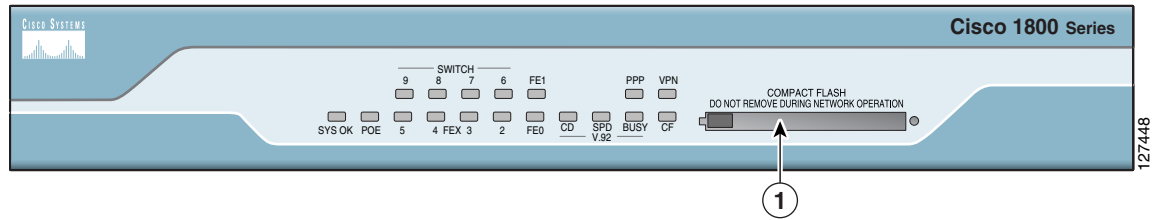| **1**	CompactFlash Slot

Figure 1-8   Back Panel of Cisco 1803 Router

1	G.SHDSL WAN port	**6**	POE connector[1]
2	ISDN BRI S/T port	**7**	Power switch
3	Managed 8-port FE switch	**8**	Power connector
4	FE WAN port[2]	**9**	RP-TNC antenna connectors (wireless models only)
5	Console and AUX ports		

1. Inline power is a field-upgradable option only. It is not installed by default.

2. The Cisco 1803 only has one FE WAN port, which is the lower of the two ports shown. The upper port is disabled, and reserved for a future purpose.

Cisco 1811 Chassis

Figure 1-9 shows the front panel of a Cisco 1811 router. Figure 1-10 shows the rear panel of a Cisco 1811 router.

■ **Chassis Views**

Figure 1-9   *Front Panel of Cisco 1811 Router*

1	CompactFlash Slot

Figure 1-10   *Back Panel of Cisco 1811 Router*
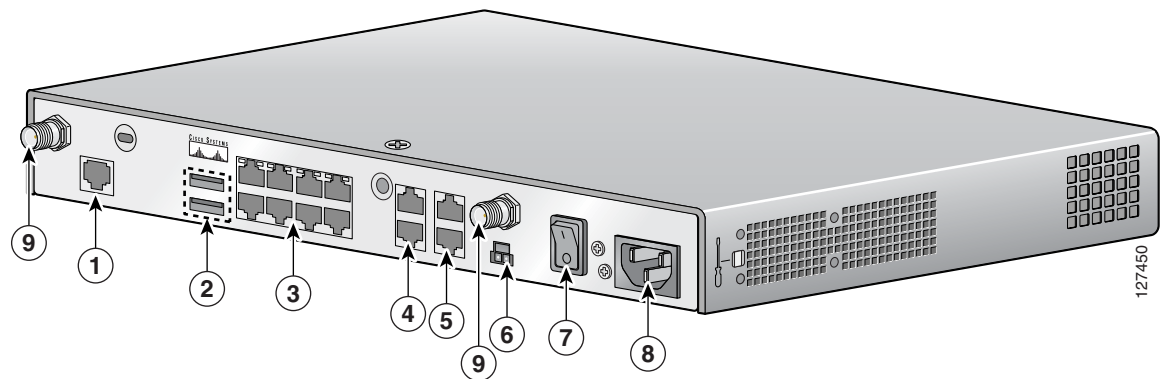
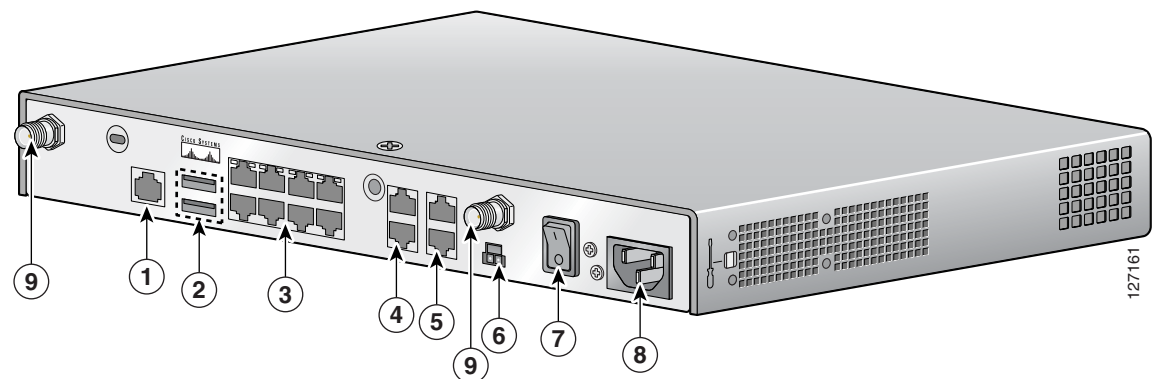| **1**	V.92 Modem port	**6**	POE connector[1]
2	USB 2.0 ports	**7**	Power switch
3	Managed 8-port FE switch	**8**	Power connector
4	FE WAN ports	**9**	RP-TNC antenna connectors (wireless models only)
5	Console and AUX ports		

1. Inline power is a field-upgradable option only. It is not installed by default.

Cisco 1812 Chassis

Figure 1-11 shows the front panel of a Cisco 1812 router. Figure 1-12 shows the back panel of a Cisco 1812 router.

Figure 1-11   *Front Panel of Cisco 1812 Router*
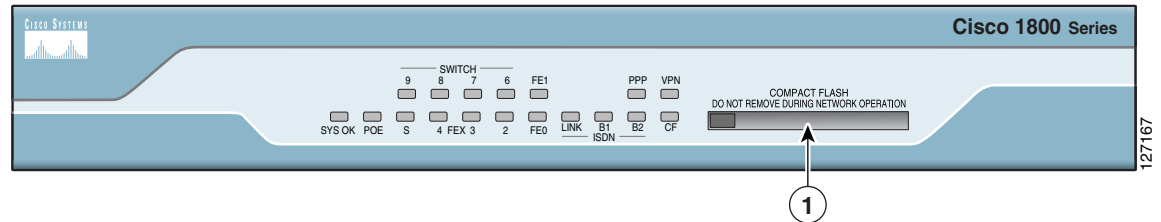
1	CompactFlash Slot

Figure 1-12   *Back Panel of Cisco 1812 Router*

1	ISDN BRI S/T port	**6**	POE connector[1]
2	USB 2.0 ports	**7**	Power switch
3	Managed 8-port FE switch	**8**	Power connector
4	FE WAN ports	**9**	RP-TNC antenna connectors (wireless models only)
5	Console and AUX ports		

1. Inline power is a field-upgradable option only. It is not installed by default.

Interface Numbering

The WAN and LAN interfaces on a Cisco 1800 series fixed-configuration router are numbered as follows:

- On the Cisco 1811 and Cisco 1812 routers, the Fast Ethernet 10/100 WAN ports are numbered FE 0 and FE 1; the lower of the two ports is FE 0.

- On the Cisco 1801, Cisco 1802, and Cisco 1803 routers, the Fast Ethernet 10/100 WAN port is numbered FE 0.

- On the Cisco 1811 and Cisco 1812 routers, the Fast Ethernet LAN switch ports are numbered FE 2 through FE 9. The FE 2 port is the lower port, farthest on the right (as viewed from the rear of the router), and switch ports are numbered incrementally, FE 2 through FE 5, to the left along the bottom row, and then incrementally, FE 6 through FE 9, to the left along the top row.

- On the Cisco 1801, Cisco 1802, and Cisco 1803 routers, the Fast Ethernet LAN switch ports are numbered FE 1 through FE 8. The FE 1 port is the lower port, farthest on the right (as viewed from the rear of the router), and switch ports are numbered incrementally, FE 1 through FE 4, to the left along the bottom row, and then incrementally, FE 5 through FE 8, to the left along the top row.

- The ADSL over POTS, ADSL over ISDN, G.SHDSL, ISDN S/T, and V.92 modem WAN ports are all numbered port 0 of their various type.

- On the Cisco 1811 and Cisco 1812 routers, the USB 2.0 ports are numbers usb 0 and usb 1. The usb 0 port is the lower of the two ports and usb 1 is the upper port.

Specifications

Table 1-5 provides the specifications for Cisco 1800 series fixed-configuration routers.

Table 1-5   Specifications for Cisco 1800 Series Fixed-Configuration Routers

Description	Specification
Dimensions (W x D)	12.5 x 9.5 in. (31.75 x 24.13 cm)
	Height without rubber feet: 1.73 in. (4.39 cm)
	Height with rubber feet: 1.87 in. (4.75 cm)
Weight	Maximum: 6.1 lb (2.8 kg)
AC input power	74 W maximum
Input voltage	100 to 240 VAC
Frequency	50 or 60 Hz
Input current	1.2 to 0.6 A
Inrush surge current	50 A maximum, one cycle (–48V power included)
Power dissipation (maximum)	153 BTU/hr
Console and auxiliary ports	RJ-45 connector
Operating humidity	10 to 85% noncondensing operating; 5 to 95% noncondensing, nonoperating
Operating temperature	32 to 104° F (0 to 40° C)
Nonoperating temperature	–4 to 149° F (–20 to 65° C)
Noise level	<78° F/25.6°C: 34 dBA >78°F/25.6°C through <104°F/40°C: 37 dBA >104°F/40°C: 42 dBA
Safety compliance	UL 60950; CAN/CSA C22.2 No. 60950; IEC 60950-1; EN 60950-1; AS/NZS 60950
	For detailed compliance information, see the *Regulatory Compliance and Safety Information for Cisco 1800 Integrated Services Routers (Fixed)* document.

Table 1-5   Specifications for Cisco 1800 Series Fixed-Configuration Routers (continued)

Description	Specification
EMC Immunity compliance	EN300386; EN55024(CISPR24); EN61000-4-2; EN61000-4-3; EN61000-4-4; EN61000-4-5; EN61000-4-6; EN61000-4-8; EN61000-4-11; EN55082-1; EN61000-6-2; ITU-T K.21 For detailed compliance information, see the *Regulatory Compliance and Safety Information for Cisco 1800 Integrated Services Routers (Fixed)* document.
EMC Emissions compliance	CFR 47 Part 15, Class A; ICES-003 Class A; EN55022 Class A; CISPR22 Class A; AS/NZS 3548 Class A; VCCI Class A; EN 300386; EN61000-3-2; EN61000-3-3 For detailed compliance information, see the *Regulatory Compliance and Safety Information for Cisco 1800 Integrated Services Routers (Fixed)* document.

Regulatory Compliance

For compliance information, see the *Regulatory Compliance and Safety Information for Cisco 1800 Integrated Services Routers (Fixed)* document that accompanied the router shipment.

C H A P T E R 2

Preinstallation Requirements

This chapter describes the site requirements and equipment necessary for installing your Cisco 1800 series fixed-configuration integrated services router. This chapter includes the following sections:

- Safety Recommendations, page 2-2
- General Site Requirements, page 2-4
- Installation Checklist, page 2-5
- Creating a Site Log, page 2-6
- Inspecting the Router, page 2-7
- Required Tools and Equipment for Installation and Maintenance, page 2-7

Note To see translations of the warnings that appear in this publication, see the *Regulatory Compliance and Safety Information for Cisco 1800 Integrated Services Routers (Fixed)* document and for wireless routers, the *Declarations of Conformity and Regulatory Information for Cisco Access Products with 802.11a/b/g and 802.11b/g Radios* document that accompany your router.

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

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

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

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

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.
- Wear safety glasses when working in 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

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. ESD 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).

Additional Warnings for Wireless Routers

⚠

Warning   **In order to comply with FCC radio frequency (RF) exposure limits, antennas should be located at a minimum of 7.9 inches (20 cm) or more from the body of all persons.** Statement 332

⚠

Warning   **Do not operate your wireless network device near unshielded blasting caps or in an explosive environment unless the device has been modified to be especially qualified for such use.** Statement 245B

General Safety Guidelines for Wireless Routers

The following are guidelines for the wireless router models:

- Do not touch or move antenna(s) while the unit is transmitting or receiving.
- Do not hold any component containing a radio so that the antenna is very close to or touching any exposed parts of the body, especially the face or eyes, while transmitting.
- The use of wireless devices in hazardous locations is limited to the constraints posed by the local codes, the national codes, and the safety directors of such environments.

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 you begin the installation. If you experience shutdowns or unusually high error rates with your existing equipment, the information in this section can 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 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 2-1 lists power requirements for the Cisco 1800 series fixed-configuration routers.

Table 2-1   Power Requirements for Cisco 1800 Series Fixed-Configuration Routers

Router	Input Power	Input Voltage Tolerance Limits
Without inline power support	100–120V/200–240V, 1.2A/0.6A	90 to 264 VAC
With inline power support	100–120V/200–240V, 1.2A/0.6A	90 to 264 VAC

Site Environment

The Cisco 1800 series fixed-configuration router can be placed on a desktop, installed in a rack, or mounted on a wall or other vertical surface. The location of your router and the layout of your equipment rack or wiring room are extremely important considerations for proper operation. Having 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 the front panel and the back panel of the router. When facing the router front-bezel, airflow is from left to right,

When you plan your site layout and equipment locations, keep in mind the precautions listed in the "Site Configuration" section on page 2-5 to help prevent equipment failures and reduce the possibility of environmentally caused shutdowns. If you are experiencing shutdowns or an unusually high number of errors with your existing equipment, these precautions may help you isolate the cause of the failures and prevent future problems.

Wireless LAN Considerations

The type of antenna used with your wireless router and its location greatly impact the quality of wireless connections to the router. Cisco 1800 series fixed-configuration routers are compatible with three different antenna types—swivel-mount dipole antennas that mounts on the back panel of the router, a wall-mount antenna, and a ceiling-mount antenna.

For more information about antenna coverage and optimal usage, see the following documents:

- *Cisco Multiband Swivel-Mount Dipole Antenna*
- *Cisco Multiband Diversity Omnidirectional Ceiling-Mount Antenna*
- *Cisco Multiband Wall-Mount, Corner-Mount, or Mast-Mount Antenna*

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 adequate air circulation in the room where your router operates. Electrical equipment generates heat. Without adequate air circulation, ambient air temperature may not cool equipment to acceptable operating temperatures.
- To avoid damaging equipment, always follow the ESD-prevention procedures described in the "Preventing Electrostatic Discharge Damage" section on page 2-3. Damage from static discharge can cause immediate or intermittent equipment failure.
- Ensure that the chassis cover and module back 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.

Installation Checklist

The sample installation checklist lists items and procedures for installing a new router. Make a copy of this checklist and record the information in each column as you complete each task. Include a copy of the checklist for each router in your Site Log (described in the "Creating a Site Log" section on page 2-6).

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		

Installation Checklist for Site_____

Router Name_____

Task	Verified by	Date
Regulatory Compliance and Safety Information for Cisco 1800 Integrated Services Routers (Fixed) document received		
Declarations of Conformity and Regulatory Information for Cisco Access Products with 802.11a/b/g and 802.11b/g Radios document received (wireless routers only)		
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

Use a Site Log to keep a record of all actions related to the router. Keep it in an accessible place near the chassis so that 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. Record information as each procedure is completed.

- Upgrade and maintenance procedures—Use the Site Log as a record of ongoing router maintenance and expansion. 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
  - Performance of maintenance procedures
  - Observations of 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. Unpack the router only when you are ready to install it.

The router, cables, publications, and any optional equipment that 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
- Cable management bracket
- RJ-45-to-DB-9 console cable
- DB-9-to-DB-25 connector adapter
- Two swivel-mount dipole antennas (wireless models only)
- Optional equipment (such as network connection cables or rack-mount brackets)
- Cabling and installation document
- *Regulatory Compliance and Safety Information for Cisco 1800 Integrated Services Routers (Fixed)* document
- (Wireless routers only) *Declarations of Conformity and Regulatory Information for Cisco Access Products with 802.11a/b/g and 802.11b/g Radios* 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 have problems installing or configuring your router, contact customer service. Warranty, service, and support information is given in the cabling and installation document 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 screwdriver 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 14 (2 mm^2) or larger wire for NEC-compliant chassis grounding
    - AWG 18 (1 mm^2) 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 inch (5 to 7 millimeters)

In addition, depending on your planned network configuration, you might need the following equipment to connect a port to an external network:

- Ethernet cables for connection to the Fast Ethernet WAN and LAN ports

    ✎
    Note   For more information on cable specifications, see the online document *Cisco Modular Access Router Cable Specifications* on Cisco.com.

- Ethernet hub or PC with a network interface card for connection to a Fast Ethernet (LAN) port

- Console terminal (an ASCII terminal or a PC that is 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)

- NT1 device for ISDN BRI S/T interfaces (if this device was not supplied by your service provider)

- Wall-mount or ceiling-mount antennas for wireless routers (if you do not intend to use the supplied dipole antennas)

C H A P T E R **3**

Chassis Installation Procedures

This chapter describes how to install your Cisco 1800 series fixed-configuration router on a desktop or on a wall. It includes the following sections:

Note   To see translations of the warnings that appear in this publication, see the *Regulatory Compliance and Safety Information for Cisco 1800 Integrated Services Routers (Fixed)* document that accompanied this device.

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

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

Setting Up the Chassis

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 a Cisco 1800 series fixed-configuration router on a desktop or mount it on a wall. See the applicable instructions in the following sections.

- Setting a Cisco 1800 Series Fixed-Configuration Router on a Desktop
- Chassis Grounding
- Mounting a Cisco 1800 Series Fixed-Configuration Router on a Wall

⚠

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

Setting a Cisco 1800 Series Fixed-Configuration Router on a Desktop

You can place Cisco 1800 series fixed-configuration routers on a desktop or shelf. Do not place anything on top of the router that weighs more than 10 pounds (4.5 kilograms), and do not stack routers on a desktop. Excessive weight on top of the router could damage the chassis.

⚠

Caution   Your chassis installation must allow unrestricted airflow for chassis cooling. When placing the router on a desktop, keep at least 1 inch (2.5 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 3-3.

Chassis Grounding

After you install the router, 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 3-3.

Mounting a Cisco 1800 Series Fixed-Configuration Router on a Wall

The Cisco 1800 series fixed-configuration routers have slots on the bottom of the chassis for mounting the unit on a wall or other vertical surface.

⚠

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 location for wall-mounting the router, consider cable limitations and wall structure.

🔍

Tip   If your router has the optional wireless LAN feature, before you mount the router on a wall, connect the antennas to the back panel. It is difficult to attach the antennas after the router has been mounted to a wall.

To attach the router to a wall, use the following hardware:

- For attaching to a wall stud, use two number-10 wood screws (round- or pan-head) with number-10 washers, or two number-10 washer-head screws. The screws must be long enough to penetrate at least 3/4 inch (20 millimeters) into the supporting wood or metal wall stud.

- For hollow-wall mounting, use two number-10 wall anchors with washers.

Figure 3-1 shows the underside of a Cisco 1800 series fixed-configuration router and the locations of the wall-mount holes.

Figure 3-1   Mount Holes on Underside of Cisco 1800 Series Fixed-Configuration Router Chassis
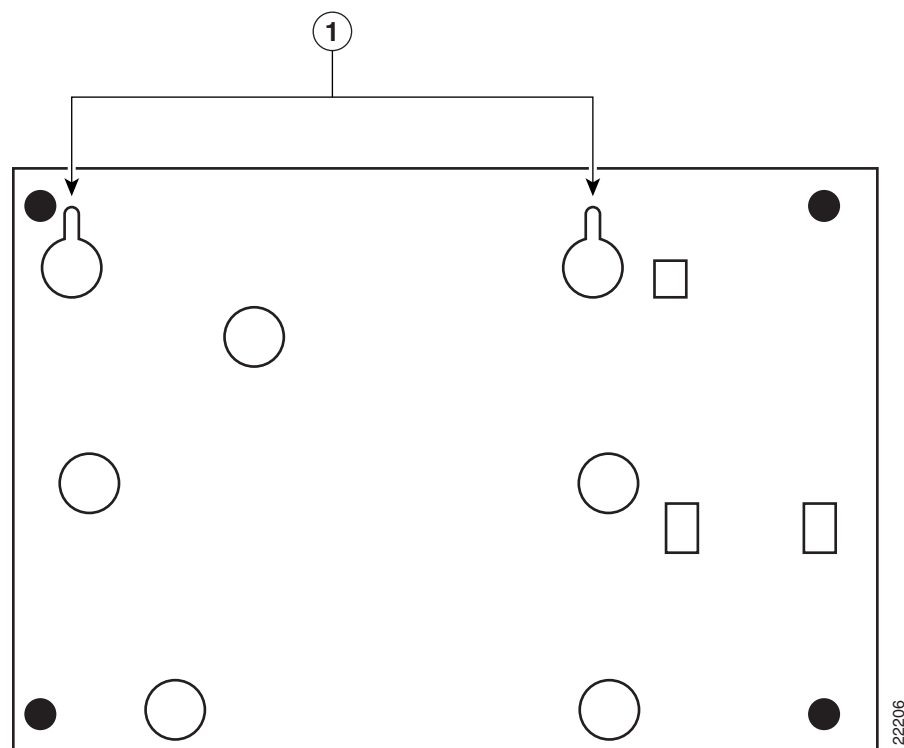
| 1 | Holes for wall-mounting |

After you install the router, 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 3-3.

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

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

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

Follow these steps to install the ground connection:

Step 1   Strip one end of the ground wire to the length required for the ground lug or terminal.

Step 2   Crimp the ground wire to the ground lug or ring terminal, using a wire crimper of the appropriate size.

Step 3   Attach the ground lug or ring terminal to the chassis. For a ground lug, use the provided two screws with captive locking washers. 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).

Note   To see an illustration of this procedure, go to the following URL:

http://www.cisco.com/en/US/docs/routers/access/1800/1841/hardware/quick/guide/1800qsg.html

Step 4   Connect the other end of the ground wire to a known reliable earth ground point at your site.

After you install and properly ground the router, you can connect the power wiring, the WAN and LAN cables, and the cables for administrative access as required for your installation. For information about connecting the cables, see Chapter 4, "Power, Cable, and Antenna Connection Procedures."

C H A P T E R 4

Power, Cable, and Antenna Connection Procedures

This chapter describes how to connect your Cisco 1800 series fixed-configuration router to a power source and to networks and external devices. It includes the following sections:

- Power Connections, page 4-1
- Connecting WAN and LAN Cables, page 4-2
- Connecting to a Console Terminal or Modem, page 4-5
- Connecting the Radio Antennas to the Wireless Router, page 4-8

Note To see translations of the warnings that appear in this publication, see the *Regulatory Compliance and Safety Information for Cisco 1800 Integrated Services Routers (Fixed)* document and for wireless routers, the *Declarations of Conformity and Regulatory Information for Cisco Access Products with 802.11a/b/g and 802.11b/g Radios* document that accompany your router.

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

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 power to a Cisco 1800 series fixed-configuration router. It covers the following topics:

- Connecting Routers to AC Power, page 4-2
- Connecting WAN and LAN Cables, page 4-2

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

Connect your router to a 15A, 120-VAC (10A, 240-VAC) circuit with overcurrent protection.

> **Note**   The input voltage tolerance limits for AC power are 90 and 264 VAC.

> **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

> **Warning**   **This equipment has been designed for connection to TN and IT power systems.** Statement 1007

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

> **Warning**   **When installing or replacing the unit, the ground connection must always be made first and disconnected last.** Statement 1046

Connecting WAN and LAN Cables

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

- Preparing to Connect to a Network, page 4-3
- Ports and Cabling, page 4-4
- Connection Procedures and Precautions, page 4-5

> **Note**   Ethernet cables and transceivers can be ordered from Cisco Systems. For ordering information, contact customer service. For cable pinouts, refer to the *Cisco Modular Access Router Cable Specifications* document.

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

Warning   **Do not use this product near water; for example, near a bath tub, wash bowl, kitchen sink or laundry tub, in a wet basement, or near a swimming pool.** Statement 1035

Warning   **Never install telephone jacks in wet locations unless the jack is specifically designed for wet locations.** Statement 1036

Warning   **Never touch uninsulated telephone wires or terminals unless the telephone line has been disconnected at the network interface.** Statement 1037

Warning   **To report a gas leak, do not use a telephone in the vicinity of the leak.** Statement 1039

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

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

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.

See the network connection considerations for the following network interfaces:

- Ethernet Connections
- ISDN BRI Connections

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

- *Cisco Interface Cards Hardware Installation Guide*
- *Cisco Modular Access Router Cable Specifications*

Ethernet Connections

The IEEE has established Ethernet as standard IEEE 802.3. The Cisco 1800 series fixed-configuration routers support the following Ethernet implementations:

- 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).

See the *Cisco Modular Access Router Cable Specifications* online document for information about Ethernet cables, connectors, and pinouts.

ISDN BRI Connections

The ISDN BRI S/T interface on the Cisco 1801, Cisco 1802, Cisco 1803 and Cisco 1812 routers provides an ISDN BRI connection for dial-backup purposes. The BRI S/T interface requires an external Network Terminator 1 (NT1).

Use a BRI cable (not included) to connect the BRI S/T interface card directly to an ISDN NT1. Table 4-1 lists the specifications for ISDN BRI cables. Also, see the *Cisco Modular Access Router Cable Specifications* online document for pinouts. This document is located on Cisco.com.

Table 4-1   ISDN BRI Cable Specifications

Specification	High-Capacitance Cable	Low-Capacitance Cable
Resistance (at 96 kHz)	160 ohm/km	160 ohm/km
Capacitance (at 1 kHz)	120 nF[1]/km	30 nF/km
Impedance (at 96 kHz)	75 ohm	150 ohm
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

Ports and Cabling

Table 4-2 summarizes WAN and LAN connections for Cisco 1800 series fixed-configuration routers. The connections summarized in Table 4-2 are also described in detail in the following documents:

- *Cisco Modular Access Router Cable Specifications*

- *Cisco Network Modules Hardware Installation Guide*

- *Cisco Interface Cards Hardware Installation Guide*

Table 4-2   *WAN and LAN Connections*

Port or Connection	Port Type, Color[1]	Connection Device	Cable
Ethernet[2]	RJ-45, yellow	Ethernet hub, Ethernet switch, or Ethernet network interface card (NIC)	Category 5 or higher Ethernet
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
BRI S/T WAN (external NT1)	RJ-45/CB-1D, orange	NT1 device or private integrated services network exchange (PINX)	RJ-45 straight-through
Analog Modem	RJ-11	PSTN	RJ-11 straight-through

1. Cable color codes are specific to Cisco cables.

2. Ethernet connection information applies to both WAN ports and Ethernet LAN switch ports.

Connection Procedures and Precautions

Follow these steps to connect your router to the network:

Step 1   Confirm that the router is powered off.

Step 2   Connect each WAN or LAN cable to the appropriate connector on the chassis. For locations of the chassis WAN and LAN ports, see the "Chassis Views" section on page 1-7.

- Position the cables carefully, so that they do not put strain on the connectors.
- Bundle the cables so that they 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.

Step 3   Connect the other end of each WAN or LAN cable to the appropriate network device. See Table 4-2 for information about which network devices to connect each cable to.

Note   For cable pinouts, see 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 Systems 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 DB-9-to-DB-25 adapter

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 4-3 summarizes the system management connections.

Table 4-3   System Management Connections

Port	Color	Connected Device	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-9 console cable with a DB-9-to-DB25 adapter

For information about cable pinouts, see the *Cisco Modular Access Router Cable Specifications* document.

⚠ **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

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

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 provides important information about cabling that you should consider before you connect the router to a console terminal or a modem.

The main difference between the console port and the auxiliary port 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. Because console terminals send data at slower speeds than modems, 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 will appear as a DTE or DCE device at the end of the cable.

Your router is supplied with an RJ-45-to-DB-9 adapter cable for connecting to a PC that is running terminal emulation software.

To connect the router to an ASCII terminal, use the RJ-45-to-DB-9 cable and a DB-9-to-DB-25 adapter.

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 4-5.

For cable and port pinouts, see the online document *Cisco Modular Access Router Cable Specifications*. This document is located on Cisco.com.

Connecting to the Console Port

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

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

> **Note**   On the Cisco 1800 series fixed-configuration 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, and no parity; set flow control to "none."

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

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.

Your router is supplied with a DB-9-to-DB-25 adapter for connecting to a modem.

For detailed information about connecting devices to the auxiliary port, see the "Connecting to a Console Terminal or Modem" section on page 4-5.

For cable and port pinouts, see the *Cisco Modular Access Router Cable Specifications* online document on Cisco.com.

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. Follow these steps to connect a modem to the auxiliary port on the router:

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 115,200 bps is supported) and hardware flow control with data carrier detect (DCD) and data terminal ready (DTR) operations.

Connecting the Radio Antennas to the Wireless Router

If your router has the wireless LAN option, connect the antennas by screwing the antenna connectors in a clockwise direction onto the reverse-polarity threaded Neill-Concelman (RP-TNC) connectors on the back panel of the router. Figure 4-1 shows an example of how to connect the swivel-mount dipole antennas to the router.

Note   For more information about the antennas compatible with the Cisco 1800 series fixed-configuration routers, see the "Supported Cisco Radio Antennas (Wireless Models Only)" section.

Figure 4-1   Connecting Swivel-Mount Dipole Antennas to the Router RP-TNC Connectors
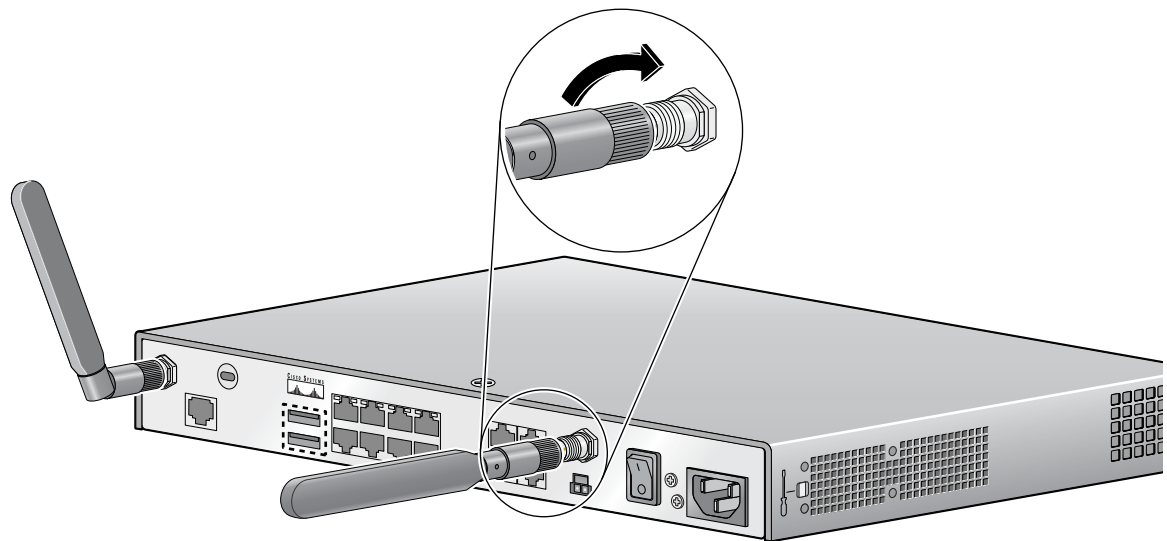
After you have attached the antennas, you must orient them. For best radio performance, the dipole antennas are usually oriented so that they are perpendicular to the ground. Figure 4-2 shows this orientation for a router that is mounted in a rack or placed on a horizontal surface. A wall-mounted router would typically have the dipole antennas pointing straight up or straight down.

Figure 4-2 *Dipole Antenna Orientation*
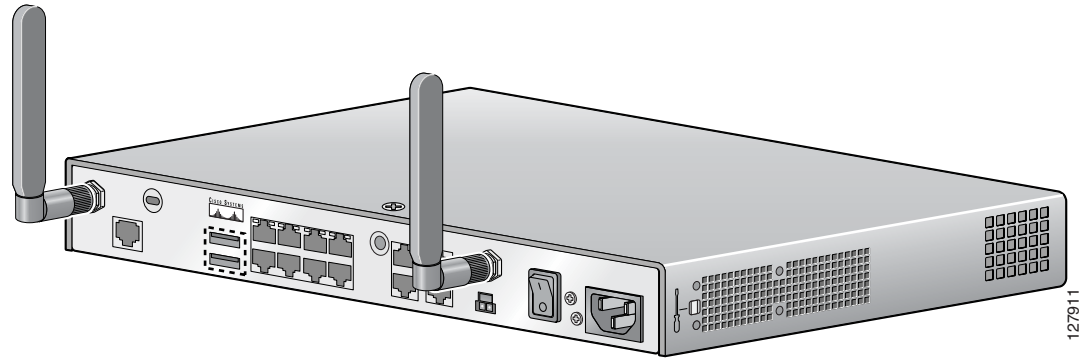
C H A P T E R **5**

Power-Up and Initial Configuration Procedures

This chapter describes how to power up your Cisco 1800 series fixed-configuration router and perform an initial configuration for network access. This chapter includes the following sections:

- Powering Up Cisco 1800 Series Fixed-Configuration Routers, page 5-1
- Configuring the Router, page 5-3

Powering Up Cisco 1800 Series Fixed-Configuration Routers

This section includes the following topics:

- Checklist for Power Up
- Power-Up Procedure
- Verifying the Front Panel LED Indications
- Verifying the Hardware Configuration

Checklist for Power Up

After you ensure that the following conditions have been met, you can power up the Cisco 1800 series fixed-configuration router:

- The chassis is securely mounted and grounded.
- The power and interface cables are connected.
- The external CompactFlash memory card is properly seated into its slot. For installation instructions, see the "Removing and Installing CompactFlash Cards" section on page 7-7.
- A 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, and no parity, and flow control is set to "none."
- A 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 completes initialization and self-test, follow the procedure below. After you complete this procedure, you can configure the router.

If you encounter problems when you power on the router, see the "Troubleshooting" chapter.

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

Step 1   Make sure that your PC is powered up and connected as described in the "Checklist for Power Up" section on page 5-1.

Step 2   Move the power switch to the ON position.

The following indications appear:

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

If you encounter problems when you power up the router, see the "Troubleshooting" chapter.

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

> ⚠
> **Caution**   *Do not press any keys on the keyboard until the messages stop and the SYS OK LED is solid green.* Any keys pressed during this time are interpreted as the first command entered when the messages stop, which might cause the router to power off and start over. The messages will stop after a few minutes.

You may see various 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 these messages do not appear, then the Cisco SDM software 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 configure your router using SDM, or to obtain SDM and install it on your router, see the "Initial Configuration Using Cisco Router and Security Device Manager" section on page 5-4.

- 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 use the setup command facility to configure the router, see the "Initial Configuration Using the Setup Command Facility" section on page 5-4.

To use the CLI to configure the router, see the "Initial Configuration Using the Cisco CLI—Manual Configuration" section on page 5-7.

> **Note** If the `rommon 1>` prompt appears, your system has booted in ROM monitor mode.

Verifying the Front Panel LED Indications

The front-panel indicator LEDs described in Table 5-1 provide power, activity, and status information useful during power up. For more detailed information about the LEDs, see the "LED Indicators" section on page 1-4.

Table 5-1   *LED Indicators for the Cisco 1800 Series Fixed-Configuration Router*

LED Label	LED Color or State	Meaning
SYS OK	Solid green	System is operating normally
	Blinking green	System is booting or is in ROM monitor mode
	Off	Power is off, or there is a power fault
POE[1]	Green	Inline power supply is installed and operating normally
	Amber	Inline power supply fault
	Off	Inline power supply is not installed
CF	Blinking green or solid green	CompactFlash memory is being accessed; do not eject
	Off	CompactFlash memory is not being accessed; OK to eject

1. Inline power is a field-upgradable option on Cisco 1800 series fixed-configuration routers; inline power is not installed by default.

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 controllers and interface processors.

Configuring the Router

This section includes the following topics:

- Initial Configuration Using Cisco Router and Security Device Manager
- Initial Configuration Using the Setup Command Facility
- Initial Configuration Using the Cisco CLI—Manual Configuration
- Verifying the Initial Configuration

- [Completing the Configuration](#)

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 5-4.

- Setup command facility—See the "Initial Configuration Using the Setup Command Facility" section on page 5-4.

- Command-line interface (CLI)—See the "Initial Configuration Using the Cisco CLI—Manual Configuration" section on page 5-7.

Note   For a description of the interface and port numbering, see the "Interface Numbering" section on page 1-11.

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 Cisco Router and Security Device Manager (SDM), see the *Cisco Router and Security Device Manager (SDM) Quick Start Guide* that shipped with your router. If the above messages do not appear, then the Cisco SDM software 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 from the following location:

http://www.cisco.com/pcgi-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 and click the Technical Documentation link.

For a description of the interface and port numbering, see the "Interface Numbering" section on page 1-11.

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 SDM 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, see the

> **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 enter **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 you view 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: xxxxxx
```

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 you view 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: xxxxxx
```

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: xxxxxx
```

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.

```
Current interface summary

Any interface listed with OK? value "NO" does not have a valid configuration

Interface               IP-Address        OK? Method Status                 Protocol
Async1                  unassigned        YES unset  down                   down
FastEthernet0           unassigned        NO  unset  up up
FastEthernet1           unassigned        NO  unset  up down
FastEthernet2           unassigned        NO  unset  initializing down
FastEthernet3           unassigned        NO  unset  initializing down
FastEthernet4           unassigned        NO  unset  initializing down
FastEthernet5           unassigned        NO  unset  initializing down
FastEthernet6           unassigned        NO  unset  initializing down
FastEthernet7           unassigned        NO  unset  initializing down
FastEthernet8           unassigned        NO  unset  initializing down
FastEthernet9           unassigned        NO  unset  initializing down
Vlan1                   unassigned        YES unset  up                     down
```

Step 8 Choose 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
```

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

```
Configuring interface FastEthernet0:
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: 172.16.2.3
    Subnet mask for this interface [255.255.0.0] : 255.255.0.0
    Class B network is 172.16.0.0, 16 subnet bits; mask is /16
```

Step 10 The configuration is displayed:

```
The following configuration command script was created:

hostname Router
enable secret 5 $1$AaVU$9tl.HLXo/M1oYglcLDVIN1
enable password 654321
line vty 0 4
password 123456
snmp-server community public
!
no ip routing

!
interface FastEthernet0
no shutdown
media-type 100BaseX
full-duplex
ip address 172.16.2.3 255.255.0.0
!
interface FastEthernet1
shutdown
no ip address
!
interface FastEthernet2
shutdown
no ip address
!
interface FastEthernet3
```

```
shutdown
no ip address
!
interface FastEthernet4
shutdown
no ip address
!
interface FastEthernet5
shutdown
no ip address
!
interface FastEthernet6
shutdown
no ip address
!
interface FastEthernet7
shutdown
no ip address
!
interface FastEthernet8
shutdown
no ip address
!
interface FastEthernet9
shutdown
no ip address
!
interface Vlan1
shutdown
no ip address
!
end
```

Step 11   Respond to the following prompts. Enter **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 12   Verify the initial configuration. See the for verification procedures.

Initial Configuration Using the Cisco CLI—Manual Configuration

This section describes 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, then the Cisco SDM software 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 5-4.

For a description of interface and port numbering, see the "Interface Numbering" section on page 1-11.

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   To terminate autoinstall and continue with manual configuration, press **Return**:

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

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

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

Step 3   To bring up the `Router>` prompt, press **Return**:

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

Step 4   Enter privileged EXEC mode:

```
Router> enable
Router#
```

Step 5   For configuration procedures, see the online document *Cisco 1800 Series Integrated Services Router (Fixed) Software Configuration Guide*.

> **Note**   To avoid losing the work that 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   After you finish the initial configuration, you need to verify the initial configuration. See the "Verifying the Initial Configuration" section on page 5-8 for verification procedures.

Verifying the Initial Configuration

To verify that the new interfaces are operating correctly, enter commands as follows:

- To verify that the interfaces are operating correctly and that the interfaces and line protocol are in the correct state—up or down—enter **show interfaces**.

- To display a summary status of the interfaces configured for IP, enter **show ip interface brief**.

- To verify that you configured the correct hostname and password, enter **show configuration**.

After you complete and verify the initial configuration, you can configure your Cisco 1800 series fixed-configuration router for specific functions. See the "Completing the Configuration" section on page 5-9 for information about locating documentation for advanced configuration procedures.

Completing the Configuration

After you complete and verify the initial configuration, you can configure your Cisco 1800 series fixed-configuration router for specific functions. For advanced configuration procedures, use either SDM or the CLI.

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

For configuration procedures using the CLI, see the online document *Cisco 1800 Series Integrated Services Router (Fixed) Software Configuration Guide*. The software configuration guide includes the following topics:

- Basic software configuration
- Feature documentation
- Configuration examples
- Troubleshooting and maintenance

Troubleshooting

If you encounter problems with your Cisco 1800 series fixed-configuration router, use the information in this chapter 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 6-1
- Reading System LEDs, page 6-4
- Reading Port and Connection LEDs, page 6-4
- System Messages, page 6-6
- Recovering a Lost Password, page 6-7
- More Troubleshooting Help—Cisco Technical Assistance Center, page 6-7

If you cannot locate the source of the problem, contact a customer service representative for information on how to proceed. For technical support information, see the "Obtaining Documentation and Submitting a Service Request" section of the Preface. Before you call the Cisco Technical Assistance Center (TAC), 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 each problem to a specific subsystem by comparing what the router is doing to what it should be doing.

Observing the LED indicators on the front and back panels of the router can help you determine router performance and operation. See the following sections:

- Reading System LEDs, page 6-4
- Reading Port and Connection LEDs, page 6-4

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.
- 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. To attempt to isolate the problem, check the items identified in the sections that follow.

Normal Indications

With the power switch on, the normal indications are:

- SYS OK LED on green and continuous
- Fans operating
- POE LED on green and continuous if the inline power supply 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 OK LED on?
  - If the LED is green and continuous, the router is receiving power and is functional.
  - If the LED is off, check the power source and power cable.
- With the power switch on and the SYS OK LED on and green, do the fans operate?
  - If no, check the fans.
  - If yes, the power system is functioning.
- Does the router shut down after being on a short time?
  - Check for an environmentally induced shutdown. See the "Environmental Reporting Features" section on page 6-2.
  - Check the environmental site requirements in the "General Site Requirements" section on page 2-4.
  - Check for a power supply failure by inspecting the SYS OK LED on the front panel. If the LED is green, the power supply is functional.
- Does the router partially boot, but the LEDs do not come on?
  - Check for a power supply failure by inspecting the SYS OK LED on the front panel of the router. If the SYS OK LED is blinking or continuous green, the power supply is functional.
  - If the SYS OK LED is not on, see the "Cisco One-Year Limited Hardware Warranty Terms" section of the Preface for warranty information, or contact customer service.

Environmental Reporting Features

The following system messages indicate environmental problems:

- 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

  - Blocked cooling vents

  Take steps to correct the problem. Also see the "Site Environment" section on page 2-4.

- If the fan is not rotating at the desired speed, the following message is displayed on the console screen:

  ```
  %ENVMON-3-FAN_FAILED: Fan not rotating.
  ```

  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.

Troubleshooting Cables and Connections

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

- The interface ports do not initialize.

  - Check external cable connections.

- The router does not boot properly, or it constantly or intermittently reboots.

  - Check the router chassis or software. See the "Cisco One-Year Limited Hardware Warranty Terms" and the "Obtaining Documentation and Submitting a Service Request" sections of the Preface for warranty and customer service contact information.

- The router boots, but the console screen is frozen, it displays no output, or it 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

- The router powers on and boots only when a particular cable is disconnected.

  - There may be a problem with the module or cable. See the "Cisco One-Year Limited Hardware Warranty Terms" and the "Obtaining Documentation and Submitting a Service Request" sections of the Preface for warranty and customer service contact information.

Reading System LEDs

Check the system LEDs on the front panel of the router for information about the power, data packet activity, and CompactFlash activity. See Table 6-1.

Table 6-1   System LEDs on Cisco 1800 Series Fixed-Configuration Routers

LED Indicator	State	Meaning	Possible Causes and Corrective Actions
SYS OK	Off	If the fan is not running— • No output from the internal power supply.	Power is not switched on at the router. Power is not available from source. Faulty input power wires or connections. Failed power supply in the router.
		If the fan is running— • Router fault	Failure in one or more system board components. Contact Cisco technical support. See the "Obtaining Documentation and Submitting a Service Request" section of the Preface.
	Solid green	Router is receiving power, and the internal power supply is functional.	Normal indication. No action is required.
	Blinking green	During bootup, router is booting up normally.	Normal indication. No action is required.
		After bootup, router is operating in ROM monitor mode.	See the router rebooting and ROM monitor information in the *Cisco IOS Configuration Fundamentals Configuration Guide* for your Cisco IOS software release.
POE[1]	Off	Inline power is not installed.	No action is required.
	Solid green	Inline power is functional.	Normal indication. No action is required for inline power supply.
	Solid amber	Inline power output has failed.	Replace inline power supply. See the "Installing the Optional Inline Power Supply" section on page 7-5.
CF	Off	The CompactFlash memory is not being accessed.	Normal indication. No action is required. The CompactFlash memory card can be removed if the CF LED remains off.
	Solid green or blinking	The CompactFlash memory is being accessed.	Normal indication. No action is required. Caution: Do not remove the CompactFlash memory card while it is being accessed.

1.   Inline power is a field-upgradable option on Cisco 1800 series fixed-configuration routers, and is not installed by default.

Reading Port and Connection LEDs

Check the port and connection LEDs to determine router performance and operation. See Table 6-2.

Table 6-2   Port and Connection Indicators on Cisco 1800 Series Fixed-Configuration Routers

LED Indicator	State	Meaning	Corrective Action
FE*x*	Off	The Ethernet interface next to the LED is not receiving packets.	Ethernet is not active or is not connected. Check Ethernet connections and make corrections as necessary. Router is not configured properly. Check configuration and make corrections as necessary.
	Solid or blinking green	The Ethernet interface next to the LED is receiving packets.	Normal indication. No action is required.
CD[1] (on Cisco 1801, Cisco 1802, and Cisco 1803 routers)	Off	No DSL connection is established.	Normal indication unless a DSL connection is required. If a DSL connection is expected, check DSL connections and make corrections as necessary. Router is not configured properly. Check configuration and make corrections as necessary.
	Green	DSL connection is established.	Normal indication. No action is required.
CD[1] (on Cisco 1811 routers)	Off	No analog modem connection is established.	Normal indication unless a modem connection is required. If a modem connection is expected, check modem connections and make corrections as necessary. Router is not configured properly. Check configuration and make corrections as necessary.
	Green	Analog modem connection is established.	Normal indication. No action is required.
LPBK[2]	Off	DSL interface is operating in normal mode.	Normal indication. No action is required.
	Green	DSL interface is in loopback mode.	—
LINK[3]	Off	No ISDN BRI S/T connection is established.	Normal indication unless an ISDN BRI connection is required. If an ISDN BRI connection is expected, check ISDN BRI S/T connections and make corrections as necessary. Router is not configured properly. Check configuration and make corrections as necessary.
	Green	An ISDN BRI S/T D channel connection is established.	Normal indication. No action is required.
B1[3]	Blinking green	Activity on the first B channel.	Indication is for information only.
B2[3]	Blinking green	Activity on the second B channel.	Indication is for information only.

Table 6-2   Port and Connection Indicators on Cisco 1800 Series Fixed-Configuration Routers (continued)

LED Indicator	State	Meaning	Corrective Action
SPD[4]	Green	Connection running at high speed (V.90)	Indication is for information only.
	Off	Connection running at low speed (V.32/V.32b/V.34)	Indication is for information only.
BUSY[4]	Blinking green	Activity on the analog modem connection	Indication is for information only.

1. This LED does not exist on Cisco 1812 routers.

2. This LED exists on Cisco 1801, Cisco 1802, and Cisco 1803 routers only.

3. This LED does not exist on Cisco 1811 routers.

4. This LED exists on Cisco 1811 routers only.

System Messages

This section describes system and recovery messages that may appear during operation of a Cisco 1800 series fixed-configuration router. 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 4-5.)

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 6-3 describes system error and recovery messages and the LED conditions that might accompany them.

Table 6-3   System Error and Recovery Messages

LED Type	LED Color	Message, Meaning, and Recommended Action
—	—	Error: `%ENVMON-3-FAN_FAILED: Fan not rotating.` Explanation: The fan is not rotating at the desired speed. Recovery: Make sure that the fan power cable is properly attached to the system board fan power connector. If the problem persists, contact your technical support representative.
—	—	Message: `%ENVMON-1-NO_PROCESS: Failed to create environmental monitor process` Explanation: The router failed to establish the environmental monitor process. The amount of memory available in the router may not be sufficient. Recommended action: Increase the amount of memory (RAM) in the router.

Recovering a Lost Password

You can recover a lost enable password. However, 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 1800 series fixed-configuration routers, see 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.

<Image: A person seated in casual business attire, photographed in black and white>

<Image: Cisco logo-style graphic element>

C H A P T E R 7

Installing and Upgrading Internal Modules

This chapter describes how to install or upgrade modules that are located within your Cisco 1800 series fixed-configuration router, such as memory modules and an inline power supply card. You need to remove the router chassis cover to install or remove these items. This chapter contains the following sections:

All the module replacement procedures in this section require removal of the chassis cover. Before you perform any of the module replacement procedures, disconnect the power and remove the cover, as described in the "Removing the Chassis Cover" section on page 7-2. After you complete the module replacement procedures, install the chassis cover as described in the "Installing the Chassis Cover" section on page 7-6.

Safety Warnings

Warning   **During this procedure, wear grounding wrist straps to avoid ESD damage to the card. Do not directly touch the backplane with your hand or any metal tool, or you could shock yourself.** Statement 93

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

Warning   **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

The Cisco 1800 series fixed-configuration routers have a cover that slides off the front of the chassis. Follow these steps to remove the cover from a Cisco 1800 series fixed-configuration router:

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 screw that fastens the chassis cover, as shown in Figure 7-1.

Figure 7-1   *Removing the Chassis Cover Screw*
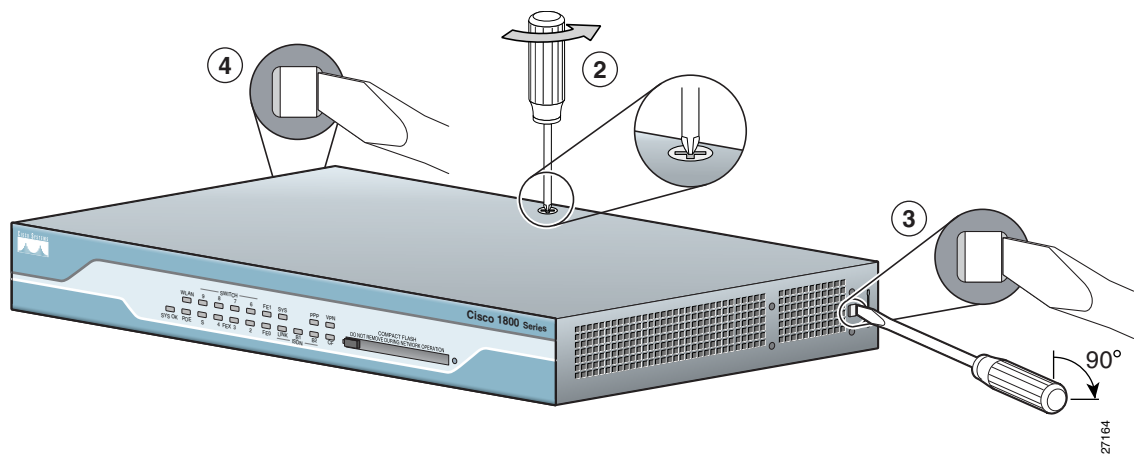
Step 3   Insert a flat-blade screwdriver between the chassis and chassis cover at the screwdriver pry point on one side of the chassis, as indicated in Figure 7-1. Rotate the screwdriver 90 degrees to disengage the chassis cover from the chassis.

Step 4   Repeat Step 3 on the other side of the chassis, as indicated in Figure 7-1.

Step 5   Gently slide the chassis cover of the router away from the bottom of the chassis.

⚠

Caution   Be sure to slide the chassis cover all the way off before you lift it off the chassis. The plastic eject button on the CompactFlash slot can be broken if you do not slide the chassis cover all the way off the chassis before you lift it off the chassis.

Step 6   Place the router bottom on an antistatic mat, and begin installing modules.

Locating Modules

Figure 7-2 shows the locations of the fan, DIMM, power supply, and the holes in the system board used to install an inline power supply card in the Cisco 1800 series fixed-configuration routers.

Figure 7-2   Module Locations in Cisco 1800 Series Fixed-Configuration Routers
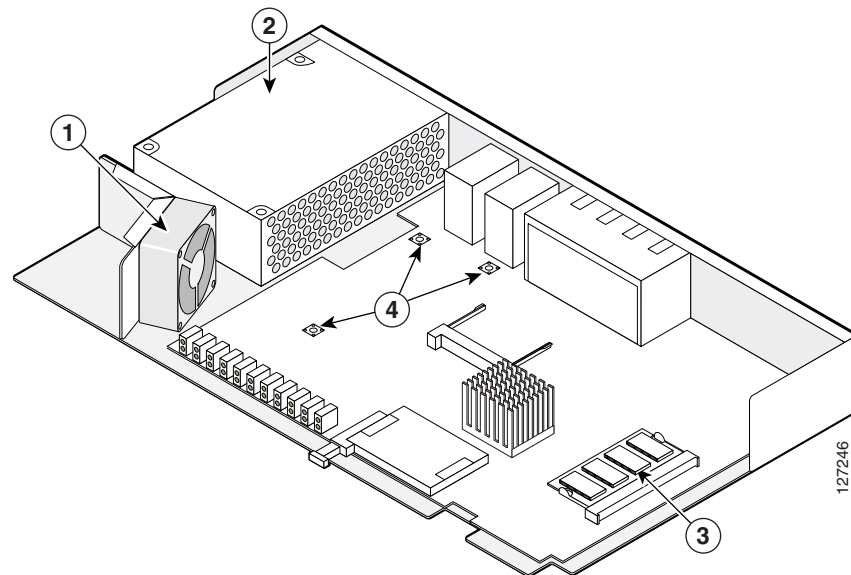
1	Fan
2	Power supply
3	DIMM module
4	Holes used for inline power supply card installation

Installing and Removing DIMMs

Cisco 1800 series fixed-configuration routers have 128 MB of DDR 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.

Before you remove or install a DIMM, remove the chassis cover as described in the "Removing the Chassis Cover" section on page 7-2.

⚠

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

Removing a DIMM

Follow these steps to remove a DIMM from the system board:

Step 1   Locate the DIMM on the system board. Figure 7-2 shows the location of the DIMM connector.

Step 2   Pull the latches away from the DIMM at both ends; pulling the latches away lifts the DIMM slightly. Now you can lift the DIMM out of the connector. See Figure 7-3.

Figure 7-3   *Removing a DIMM*
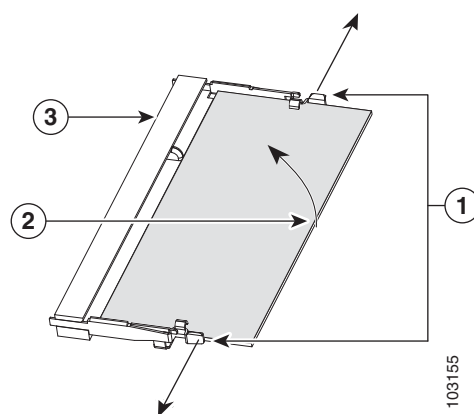
1	Release the latches	2	Remove the DIMM

Step 3   Place the DIMM in an antistatic bag to protect it from ESD damage.

Installing a DIMM

Follow these steps to install a DIMM in a Cisco 1800 series fixed-configuration router:

Step 1   Locate the DIMM on the system board. See Figure 7-2 for the location of the DIMM connector.

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 then gently pulling the DIMM up and away from the socket. See Figure 7-3.

Step 3   Insert the DIMM into the DIMM socket, as shown in Figure 7-4.

Figure 7-4   Installing a DIMM
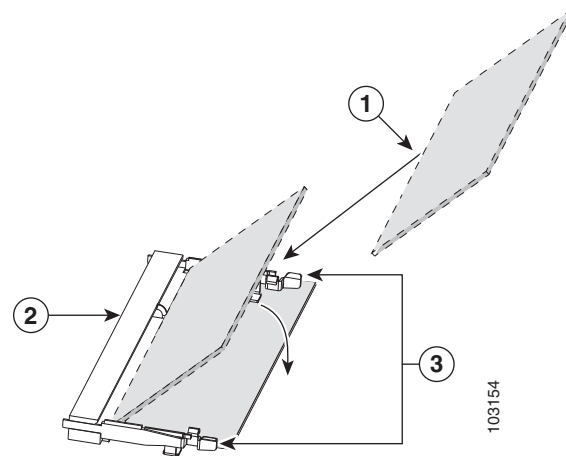
1	DIMM	**2**	Insert and rotate into socket.

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 the Optional Inline Power Supply

The inline power supply option for the Cisco 1800 series fixed-configuration routers includes an inline power supply card that must be installed inside the router, and an external power supply. Perform the following steps to install the inline power supply card. See Figure 7-2 for the locations of connectors and other components within the router.

Warning   **Voltages that present a shock hazard may exist on Power over Ethernet (PoE) circuits if interconnections are made using uninsulated exposed metal contacts, conductors, or terminals. Avoid using such interconnection methods, unless the exposed metal parts are located within a restricted access location and users and service people who are authorized within the restricted access location are made aware of the hazard. A restricted access area can be accessed only through the use of a special tool, lock and key or other means of security.** Statement 1072

Warning **Installation of the equipment must comply with local and national electrical codes.** Statement 1074

Caution Ensure that the inline power supply is not connected to the back of the router prior to installation of the inline power supply card. Failure to do so may result in damage to the inline power supply card or to the router.

Caution When installing the inline power supply card, ensure that the card is installed in the proper direction. Improper installation will result in damage to the inline power supply card. Installation of the inline power supply card requires the installation of three metal standoffs, to which the card is then secured using three screws. Be sure to use all three screws to ensure that the card is installed properly—if the card is not installed in the correct direction, the three screw holes will not match up with the three metal standoffs.

Step 1 Find the metal standoff attachment locations on the system board, which are indicated by a star pattern surrounding each of the three holes in the system board.

Step 2 Install the three metal standoffs into the system board in the metal standoff attachment locations (denoted by a star pattern around the holes). Use a 1/4-inch nut driver to tighten the standoffs.

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

Step 3 Place the inline power supply card on top of the three metal standoffs, lining up the metal standoffs with the screw holes in the inline power supply card.

Step 4 Insert the screws provided in the accessory kit through the inline power supply card and into the metal standoffs. Carefully tighten the screws with a Phillips screwdriver.

After you install the inline power supply card in the router, install the router cover and connect the inline power supply to the power connector on the back of the router.

Installing the Chassis Cover

The Cisco 1800 series fixed-configuration router has a cover that slides onto the chassis from the back of the chassis. Follow these steps to install the chassis cover on a Cisco 1800 series fixed-configuration router:

Step 1 Gently slide the cover of the router onto the chassis.

Step 2 Replace the cover screw that you removed when you opened the chassis. See the "Removing the Chassis Cover" section on page 7-2.

Removing and Installing CompactFlash Cards

This section describes how to install and replace CompactFlash cards in Cisco 1800 series fixed-configuration routers. It contains the following sections:

- Preventing Electrostatic Discharge Damage
- Removing a CompactFlash Memory Card
- Installing a CompactFlash Memory Card

Preventing Electrostatic Discharge Damage

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

To prevent ESD damage, follow these guidelines:

- Always use an ESD wrist 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 your clothing. The wrist strap protects the card from ESD voltages on the body only; ESD voltages on clothing can still cause damage.
- Do not remove the wrist strap until the installation is complete.

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

Removing a CompactFlash Memory Card

To remove a CompactFlash memory card from the chassis, perform the following steps. See Figure 7-5.

⚠️ **Caution**   Do not remove a CompactFlash memory card from the chassis while it is being accessed. A blinking CF LED indicates that the CompactFlash memory is being accessed. Removing the CompactFlash memory card from the router while it is being accessed can damage 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 partway 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 it is not being used to eject a CompactFlash memory card.

Figure 7-5   *CompactFlash Memory Card Slot in Cisco 1800 Series Fixed-Configuration Routers*
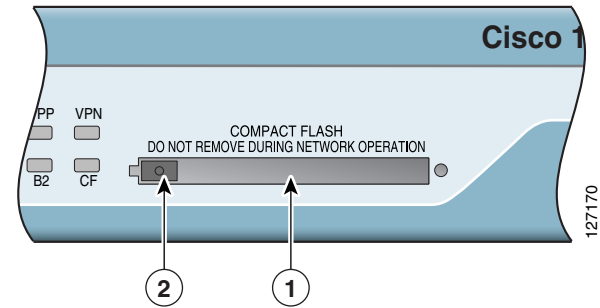
1	CompactFlash slot	2	Ejector button

Installing a CompactFlash Memory Card

To install a CompactFlash memory card, perform the following steps (see Figure 7-5):

Step 1   Make sure that the ejector button is pressed flush with the front panel, so that it does not project beyond the panel.

> **Note**   If the ejector button is projecting beyond 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 pressed flush against the front panel when it is not being used to eject a CompactFlash memory card.

I N D E X

Cisco 1800 Series Integrated Services Routers (Fixed) Hardware Installation Guide