CISCO SYSTEMS

Cisco AS5400 Universal Gateway Chassis Installation Guide

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Cisco AS5400 Universal Gateway Chassis Installation Guide

CONTENTS

Preface

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

Document Organization

This publication is designed for people who have some experience installing networking equipment such as routers, hubs, servers, and switches. The person installing the server should be familiar with electronic circuitry and wiring practices and have experience as an electronic or electromechanical technician.

Table 1 describes the contents of each chapter in this document.

Table 1 Organization

Chapter	Title	Description
Chapter 1	Overview	Overview of the Cisco AS5400 universal gateway.
Chapter 2	Preparing to Install	Describes the tasks you must perform before you begin to install the chassis.
Chapter 3	Installing the Cisco AS5400 and Cisco AS5400HPX Universal Gateways	Describes the tasks you must perform to install the Cisco AS5400 and Cisco AS5400HPX chassis.
Chapter 4	Troubleshooting	Describes how to troubleshoot the chassis by referring to the chassis LEDs.
Appendix A	Replacing Memory Components	Describes how to replace memory chips in the chassis field-replaceable units.
Appendix B	Replacing the Power Supply	Describes how to replace the power supply.
Appendix C	Cabling Specifications	Describes cabling and pinout information for the chassis.

Document Conventions

This publication uses the following conventions to convey instructions and information.

Convention	Description
boldface font	Commands and keywords.
italic font	Variables for which you supply values.
[ ]	Keywords or arguments that appear within square brackets are optional.
{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 italic font is not available.
[ ]	Default responses to system prompts appear in square brackets.

Note Means *reader take note*. Notes contain helpful suggestions or references to additional information and material.

Timesaver This symbol means *the described action saves time*. You can save time by performing the action described in the paragraph.

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

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

Warning **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 *Regulatory Compliance and Safety Information* document that accompanied this device.**

Waarschuwing **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 standaard maatregelen om ongelukken te voorkomen. Voor vertalingen van de waarschuwingen die in deze publicatie verschijnen, kunt u het document *Regulatory Compliance and Safety Information* (Informatie over naleving van veiligheids- en andere voorschriften) raadplegen dat bij dit toestel is ingesloten.**

Varoitus **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 julkaisussa esiintyvien varoitusten käännökset löydät laitteen mukana olevasta *Regulatory Compliance and Safety Information* -kirjasesta (määräysten noudattaminen ja tietoa turvallisuudesta).**

Attention **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 le document *Regulatory Compliance and Safety Information* (Conformité aux règlements et consignes de sécurité) qui accompagne cet appareil.**

Warnung **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 finden Sie im Dokument *Regulatory Compliance and Safety Information* (Informationen zu behördlichen Vorschriften und Sicherheit), das zusammen mit diesem Gerät geliefert wurde.**

Avvertenza **Questo simbolo di avvertenza indica un pericolo. La situazione potrebbe causare infortuni alle persone. Prima di lavorare su qualsiasi apparecchiatura, occorre conoscere i pericoli relativi ai circuiti elettrici ed essere al corrente delle pratiche standard per la prevenzione di incidenti. La traduzione delle avvertenze riportate in questa pubblicazione si trova nel documento *Regulatory Compliance and Safety Information* (Conformità alle norme e informazioni sulla sicurezza) che accompagna questo dispositivo.**

Advarsel **Dette varselsymbolet betyr fare. Du befinner deg i en situasjon som kan føre til personskade. Før du utfører arbeid på utstyr, må du vare oppmerksom på de faremomentene som elektriske kretser innebærer, samt gjøre deg kjent med vanlig praksis når det gjelder å unngå ulykker. Hvis du vil se oversettelser av de advarslene som finnes i denne publikasjonen, kan du se i dokumentet *Regulatory Compliance and Safety Information* (Overholdelse av forskrifter og sikkerhetsinformasjon) som ble levert med denne enheten.**

Aviso **Este símbolo de aviso indica perigo. Encontra-se numa situação que lhe poderá causar danos físicos. Antes de começar a trabalhar com qualquer equipamento, familiarize-se com os perigos relacionados com circuitos eléctricos, e com quaisquer práticas comuns que possam prevenir possíveis acidentes. Para ver as traduções dos avisos que constam desta publicação, consulte o documento *Regulatory Compliance and Safety Information* (Informação de Segurança e Disposições Reguladoras) que acompanha este dispositivo.**

¡Advertencia! **Este símbolo de aviso significa peligro. Existe riesgo para su integridad física. Antes de manipular cualquier equipo, considerar los riesgos que entraña la corriente eléctrica y familiarizarse con los procedimientos estándar de prevención de accidentes. Para ver una traducción de las advertencias que aparecen en esta publicación, consultar el documento titulado *Regulatory Compliance and Safety Information* (Información sobre seguridad y conformidad con las disposiciones reglamentarias) que se acompaña con este dispositivo.**

Varning! **Denna varningssymbol 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 vanligt förfarande för att förebygga skador. Se förklaringar av de varningar som förkommer i denna publikation i dokumentet *Regulatory Compliance and Safety Information* (Efterrättelse av föreskrifter och säkerhetsinformation), vilket medföljer denna anordning.**

Obtaining Documentation

These sections explain how to obtain documentation from Cisco Systems.

World Wide Web

You can access the most current Cisco documentation on the World Wide Web at this URL:

http://www.cisco.com

Translated documentation is available at this URL:

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

Documentation CD-ROM

Cisco documentation and additional literature are available in a Cisco Documentation CD-ROM package, which is shipped with your product. The Documentation CD-ROM is updated monthly and may be more current than printed documentation. The CD-ROM package is available as a single unit or through an annual subscription.

Ordering Documentation

You can order Cisco documentation in these ways:

- Registered Cisco.com users (Cisco direct customers) can order Cisco product documentation from the Networking Products MarketPlace:

  http://www.cisco.com/cgi-bin/order/order_root.pl

- Registered Cisco.com users can order the Documentation CD-ROM through the online Subscription Store:

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

- Nonregistered Cisco.com users can order documentation through a local account representative by calling Cisco Systems Corporate Headquarters (California, U.S.A.) at 408 526-7208 or, elsewhere in North America, by calling 800 553-NETS (6387).

Documentation Feedback

You can submit comments electronically on Cisco.com. In the Cisco Documentation home page, click the **Fax** or **Email** option in the "Leave Feedback" section at the bottom of the page.

You can e-mail your comments to bug-doc@cisco.com.

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

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

We appreciate your comments.

Obtaining Technical Assistance

Cisco provides Cisco.com as a starting point for all technical assistance. Customers and partners can obtain online documentation, troubleshooting tips, and sample configurations from online tools by using the Cisco Technical Assistance Center (TAC) Web Site. Cisco.com registered users have complete access to the technical support resources on the Cisco TAC Web Site.

Cisco.com

Cisco.com is the foundation of a suite of interactive, networked services that provides immediate, open access to Cisco information, networking solutions, services, programs, and resources at any time, from anywhere in the world.

Cisco.com is a highly integrated Internet application and a powerful, easy-to-use tool that provides a broad range of features and services to help you with these tasks:

- Streamline business processes and improve productivity
- Resolve technical issues with online support
- Download and test software packages
- Order Cisco learning materials and merchandise
- Register for online skill assessment, training, and certification programs

If you want to obtain customized information and service, you can self-register on Cisco.com. To access Cisco.com, go to this URL:

http://www.cisco.com

Technical Assistance Center

The Cisco Technical Assistance Center (TAC) is available to all customers who need technical assistance with a Cisco product, technology, or solution. Two levels of support are available: the Cisco TAC Web Site and the Cisco TAC Escalation Center.

Cisco TAC inquiries are categorized according to the urgency of the issue:

- Priority level 4 (P4)—You need information or assistance concerning Cisco product capabilities, product installation, or basic product configuration.
- Priority level 3 (P3)—Your network performance is degraded. Network functionality is noticeably impaired, but most business operations continue.
- Priority level 2 (P2)—Your production network is severely degraded, affecting significant aspects of business operations. No workaround is available.
- Priority level 1 (P1)—Your production network is down, and a critical impact to business operations will occur if service is not restored quickly. No workaround is available.

The Cisco TAC resource that you choose is based on the priority of the problem and the conditions of service contracts, when applicable.

Cisco TAC Web Site

You can use the Cisco TAC Web Site to resolve P3 and P4 issues yourself, saving both cost and time. The site provides around-the-clock access to online tools, knowledge bases, and software. To access the Cisco TAC Web Site, go to this URL:

http://www.cisco.com/tac

All customers, partners, and resellers who have a valid Cisco service contract have complete access to the technical support resources on the Cisco TAC Web Site. The Cisco TAC Web Site requires a Cisco.com login ID and password. If you have a valid service contract but do not have a login ID or password, go to this URL to register:

http://www.cisco.com/register/

If you are a Cisco.com registered user, and you cannot resolve your technical issues by using the Cisco TAC Web Site, you can open a case online by using the TAC Case Open tool at this URL:

http://www.cisco.com/tac/caseopen

If you have Internet access, we recommend that you open P3 and P4 cases through the Cisco TAC Web Site.

Cisco TAC Escalation Center

The Cisco TAC Escalation Center addresses priority level 1 or priority level 2 issues. These classifications are assigned when severe network degradation significantly impacts business operations. When you contact the TAC Escalation Center with a P1 or P2 problem, a Cisco TAC engineer automatically opens a case.

To obtain a directory of toll-free Cisco TAC telephone numbers for your country, go to this URL:

http://www.cisco.com/warp/public/687/Directory/DirTAC.shtml

Before calling, please check with your network operations center to determine the level of Cisco support services to which your company is entitled: for example, SMARTnet, SMARTnet Onsite, or Network Supported Accounts (NSA). When you call the center, please have available your service agreement number and your product serial number.

Related Documentation

This guide describes how to install and maintain the Cisco AS5400 universal gateway chassis. You will also need the following publications to configure the universal gateway:

- Refer to the *Cisco AS5400 Universal Gateway Regulatory Compliance and Safety Information* guide to familiarize yourself with safety guidelines.
- Use the *Cisco AS5350 and Cisco AS5400 Universal Gateway Card Installation Guide* to install, replace, and troubleshoot cards and modules.
- Refer to the *Cisco AS5350 and Cisco AS5400 Universal Gateway Software Configuration Guide* for basic software configuration instructions.
- Refer to the appropriate Cisco IOS software configuration guides, command reference publications, *Dial Solutions Configuration Guide*, and the *Dial Solutions Command Reference* for more advanced configuration topics. These publications are available on the Documentation CD-ROM that came with your universal gateway, on the World Wide Web from Cisco's home page, or you can order printed copies.

New Hardware Features

A description of new hardware features available after the release of this document can be found at the following URL:

http://www.cisco.com/univercd/cc/td/doc/product/access/acs_serv/as5400/index.htm

Overview

This chapter provides an overview of the Cisco AS5400 and Cisco AS5400HPX universal gateways, a versatile voice and data communications platform that provides high performance, high density, and hot swappability in only two rack units. (See Figure 1-1 and Figure 1-2.)

The Cisco AS5400 and Cisco AS5400HPX are intended for large companies and service providers who require dense and scalable solutions to create new multi-service access networks, replace existing hardware, or expand and enhance their current access offering. The Cisco AS5400HPX provides enhanced performance for processor-intensive voice and fax applications. The Cisco AS5400 and Cisco AS5400HPX provide you with a cost-effective platform for deploying the widest range of IP based services.

Note Unless specifically noted, all references to the Cisco AS5400 also apply to the Cisco AS5400HPX.

This chapter includes the following sections:

Chassis Components

The Cisco AS5400 universal gateway chassis has a system board, high-speed backplane, and seven slots for dial feature cards (DFCs). The chassis includes four backplane slots. Three backplane slots accept DFC carrier cards and the other backplane slot accepts one DFC. Each DFC carrier card accepts two DFCs which allow online insertion and removal (OIR).

Tips To help identify your universal gateway, starting with Cisco IOS Release 12.2(11)T, the **show version** and **show diag** commands will identify the universal gateway as an *AS5400* or *AS5400HPX*. Prior to this release, these commands showed the universal gateway as an *AS5400*, even if it was an *AS5400HPX*.

The chassis consists of the following components:

- One Building Integrated Timing System (BITS) interface port
- One alarm port
- Two Fast Ethernet (2FE) LAN ports
- Two T serial ports for backhaul WAN support
- One fast console port for local administrative access
- An integral redundant AC or DC power supply, with two power input lines

Figure 1-1 Cisco AS5400 Front Panel

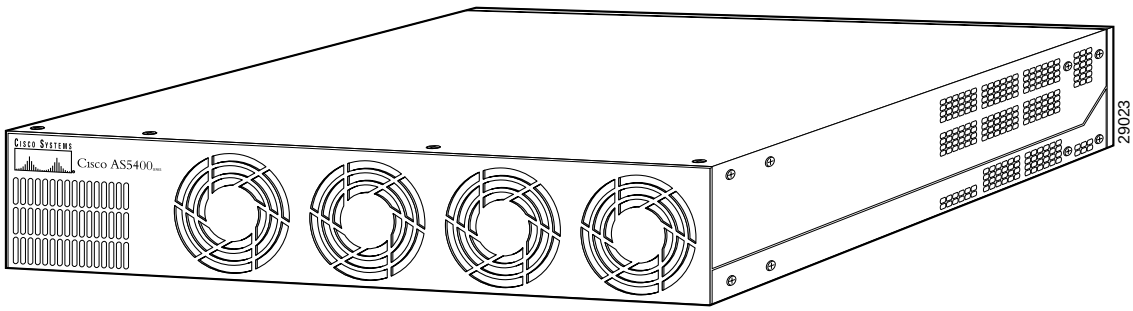
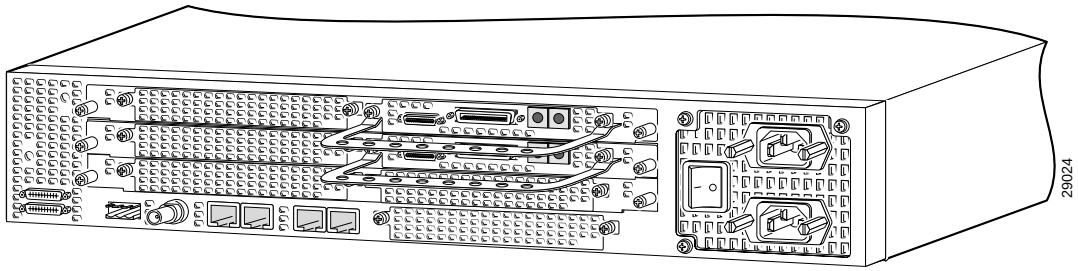


Figure 1-2 Cisco AS5400 Rear Panel



Dial Feature Cards (DFCs)

Each DFC is a 5.1 by 13 inch PCI-based interface board. The following is a brief description of the trunk types supported:

- North American robbed-bit signaling (RBS) is supported on T1 trunks, including a variety of North American RBS protocol, framing, and encoding types on these trunks.
- CAS is supported for E1 trunks, with R2 signaling.
- Many countries require an E1 R2 variant. Per-country defaults are provided for supervisory and inter-register signaling.
- The CT3 DFC provides physical line termination for a channelized T3 ingress trunk line, and it uses an onboard multiplexer to multiplex 28 channelized T1 lines into a single channelized T3 line.
- Universal access (analog modem or digital calls) is supported when an interface is configured for ISDN PRI signaling. PRI signaling is available for both T1 and E1 trunks.

In any single DFC slot, you can install your choice of:

- One T1 dial feature card
- One E1 dial feature card
- One T3 dial feature card

Note The Cisco AS5400 supports only one type of WAN DFC at a time. For more information, see the "Mixing WAN DFCs" section on page 4-3.

Power Supply

The power system is comprised of a fully redundant switching power supply with two AC (or DC) inputs to the main power modules. Each input and output is 100 percent fully redundant, with dual fans for added reliability.

The output of each power module is rated at 300 watts (nonredundant mode), and is composed of four independent output voltages: 3.3V, 5V, 12V and -12V. AC input units have power factor correction, and low harmonic distortion. Units that are in redundant mode run at one-half the power capability. If a power supply failure occurs, these units are capable of powering the complete system either at the input side or the DC load side. Power failures are reported through environmental monitoring software.

Specifications

Table 1-1 provides system specifications for the Cisco AS5400.

Table 1-1 Specifications

Description	Specification
Dimensions (H x W x D)	3.5 x 17.5 x 18.25 in. (8.89 x 44.45 x 46.36 cm)
Weight	35 lb maximum (15.8 kg)
Processor	250 MHz (Cisco AS5400) 390 MHz (Cisco AS5400HPX)
Operating environment	32 to 104° F (0 to 40° C)
Nonoperating temperature	–40 to 185° F (–40 to 85° C)
Operating humidity	5 to 95%, noncondensing
Noise level	70 dB[1] @ 3 ft (0.914 m)

Table 1-1 Specifications (continued)

Description	Specification
Input voltage, AC power supply Current Frequency Power factor Input AC power	100 to 240 VAC[2]; -10%, +6% tolerance 5 to 2A 50/60 Hz 0.80 to 0.95 200 to 400W (maximum)
Input voltage, DC power supply Maximum input current Typical input current Efficiency Input DC power	–48 to –60 VDC[3]; -10%, +6% tolerance 9.0A 2.0 to 4.0A 63% 200 to 400W (maximum)
WAN interface options	T1, E1, T3
Serial interfaces (for backhaul WAN support)	2 serial line interfaces
LAN interface options	Fast Ethernet 10/100BASE-T (RJ-45)
Console and auxiliary ports	Asynchronous serial (RJ-45)
Regulatory compliance	See the *Regulatory Compliance and Safety Information* guide that came with your gateway.

1. dB = decibels.
2. VAC = volts alternating current.
3. VDC = volts direct current.

Preparing to Install

This chapter describes the tasks you must perform before you begin to install the universal gateway and includes the following sections:

Note Unless specifically noted, all references to the Cisco AS5400 also apply to the Cisco AS5400HPX.

Safety Recommendations

Any device that uses electricity must be handled carefully; follow these guidelines to ensure general safety:

- Keep the chassis area clear and dust-free during and after installation.
- Put the removed chassis cover in a safe place.
- Keep tools away from walk areas where you and others could fall over them.
- 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 if you are working under any conditions that might be hazardous to your eyes.
- Do not perform any action that creates a potential hazard to people or makes the equipment unsafe.

Warning **Ultimate disposal of this product should be handled according to all national laws and regulations. To see translations of the warnings that appear in the publication, refer to the *Regulatory Compliance and Safety Information* document that accompanied this device.**

Maintaining Safety with Electricity

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 can weld the metal object to the terminals. To see translations of the warnings that appear in the publication, refer to the *Regulatory Compliance and Safety Information* document that accompanied this device.**

Follow these guidelines when you work on equipment powered by electricity.

- Locate the emergency power-OFF switch for the room in which you are working. Then, if an electrical accident occurs, you can act quickly to turn OFF the power.
- Before working on the system, unplug the power cord.
- Disconnect all power before doing the following:
  - Installing or removing a chassis
  - Working near power supplies

Warning **When installing the unit, the ground connection must always be made first and disconnected last. Do not work alone if potentially hazardous conditions exist. To see translations of the warnings that appear in this publication, refer to the *Regulatory Compliance and Safety Information* document that accompanied this device.**

- Never assume that power is disconnected from a circuit. Always check.

Warning **Read the installation instructions before you connect the system to its power source. To see translations of the warnings that appear in the publication, refer to the *Regulatory Compliance and Safety Information* document that accompanied this device.**

- Look carefully for possible hazards in your work area, such as moist floors, ungrounded power extension cables, frayed power cords, and missing safety grounds.
- If an electrical accident occurs, proceed as follows:
  - Use caution; do not become a victim yourself.
  - Turn OFF power to the system.
  - If possible, send another person to get medical aid. Otherwise, assess the condition of the victim and then call for help.
  - Determine if the person needs rescue breathing or external cardiac compressions; then take appropriate action.

Warning **This product relies on the building's installation for short-circuit (overcurrent) protection. Ensure that a fuse or circuit breaker no larger than 120 VAC, 15A U.S. (240 VAC, 10A international) is used on the phase conductors (all current-carrying conductors). To see translations of the warnings that appear in the publication, refer to the *Regulatory Compliance and Safety Information* document that accompanied this device.**

Preventing Electrostatic Discharge Damage

Electrostatic discharge (ESD) can damage equipment and impair electrical circuitry. ESD damage occurs when electronic components are improperly handled and can result in complete or intermittent failures.

Always follow ESD-prevention procedures when you remove and replace components. Ensure that the chassis is electrically connected to earth ground. Wear an ESD-preventive wrist strap, ensuring that it makes good skin contact. Connect the grounding clip to an unpainted surface of the chassis frame to safely ground unwanted ESD voltages. To guard against ESD damage and shocks, the wrist strap and cord must operate properly. If no wrist strap is available, ground yourself by touching the metal part of the chassis.

Caution For safety, periodically check the resistance value of the antistatic strap, which should be between 1 and 10 megohm (Mohm).

Required Tools and Equipment

The following items are included with the universal gateway:

- 19- and 24-inch rack-mount kits
- Rubber feet for desktop installation
- RJ-45-to-DB-9 female DTE adapter (labeled TERMINAL)
- RJ-45-to-DB-25 female DTE adapter (labeled TERMINAL)
- RJ-45-to-DB-25 male DCE adapter (labeled MODEM)
- RJ-45-to-RJ-45 rollover console cable
- ESD-preventive wrist strap
- Nylon cable tie
- Cable tie holder
- Grounding lug

You might need the following equipment, which is not included:

- Straight-through RJ-45-to-RJ-45 cable for an Ethernet connection
- Ethernet hub or PC with a network interface card for Ethernet LAN connections
- One breakout cable consisting of a 36-pin connector connected to eight RJ-45 adapters for CT1/CE1 connections
- 75-ohm coaxial cable for a CT3 connection
- PC running terminal emulation software for local administrative access
- Modem for remote administrative access

Preparing to Connect to a Network

When you set up the chassis, consider distance limitations and potential electromagnetic interference (EMI) as defined by the Electronic Industries Association (EIA).

Warning **Hazardous network voltages are present in WAN ports regardless of whether power to the router is OFF or ON. To avoid electric shock, use caution when working near WAN ports. When detaching cables, detach the end away from the router first. To see translations of the warnings that appear in the publication, refer to the *Regulatory Compliance and Safety Information* document that accompanied this device.**

Warning **The ISDN connection is regarded as a source of voltage that should be inaccessible to user contact. Do not attempt to tamper with or open any public telephone operator (PTO)-provided equipment or connection hardware. Any hardwired connection (other than by a nonremovable, connect-one-time-only plug) must be made only by PTO staff or suitably trained engineers. To see translations of the warnings that appear in the publication, refer to the *Regulatory Compliance and Safety Information* document that accompanied this device.**

Network Specifications

Table 2-1 lists the network specifications to consider before connecting a T1 DFC to a network.

Table 2-1 T1 Network Specifications

Description	Specification
Line rate	1.544 Mbps
Data rates (per port)	*number* x 56 or *number* x 64 kbps, where *number* = 1 to 24
Standards	AT&T Pub. 62411, 54016, and 43081, and ANSI T1.403
Input impedance	100-ohms per port

Table 2-2 lists the network specifications to consider before connecting an E1 DFC to a network.

Table 2-2 E1 Network Specifications

Description	Specification
Line rate	2.048 Mbps
Data rate (per port)	*number* x 56 or *number* x 64 kbps, where *number* = 1 to 31.
Input impedance	75 or 120-ohms per port **Note** The factory default setting for the E1 ports is 120 ohm. Use a software command to change the impedance.

Table 2-3 lists the network specifications to consider before connecting a T3 DFC to a network.

Table 2-3 T3 Network Specifications

Description	Specification
Line rate	44.736 Mbps
Data rates	672 DS0 channels at 64 Kbps

Note For information on installing and removing dial feature cards, refer to the *Cisco AS5350 and Cisco AS5400 Universal Gateway Card Installation Guide.*

Ethernet Connections

Two Fast Ethernet (FE) ports are RJ-45 ports located on the rear panel of the chassis: FE0 and FE1 (selectable). To configure the Ethernet ports, refer to the *Cisco AS5350 and Cisco AS5400 Universal Gateway Software Configuration Guide*. Both ports use unshielded twisted-pair (UTP) cable and require Category 5 cable. The maximum segment distance is 328 feet (100 meters). UTP cables look like the cables used for ordinary telephones; however, UTP cables meet certain electrical standards that telephone cables do not. Cables are not included.

Console and Auxiliary Ports

The chassis includes an asynchronous serial console port and an auxiliary port. The console and auxiliary ports provide access either locally (with a console terminal) or remotely (with a modem). This section discusses important cabling information to consider before connecting a console terminal (an ASCII terminal or PC running terminal emulation software) to the console port or modem to the auxiliary port.

Console Port

The chassis includes an EIA/TIA-232 asynchronous serial console port (RJ-45). Depending on the cable and the adapter used, this port appears as a data terminal equipment (DTE) or data communications equipment (DCE) device at the end of the cable. Your chassis arrives with cables and adapters to connect a console terminal (an ASCII terminal or PC running terminal emulation software) to the console port. To connect an ASCII terminal to the console port, use the RJ-45 rollover cable with the female RJ-45-to-DB-25 adapter (labeled TERMINAL).

To connect a PC running terminal emulation software to the console port, use the RJ-45 rollover cable with the female RJ-45-to-DB-9 adapter (labeled TERMINAL). The default parameters for the console port are 9600 baud, 8 data bits, no parity, and 2 stop bits. The console port does not support hardware flow control.

For detailed information about installing a console terminal, see Chapter 3, “Installing the Cisco AS5400 and Cisco AS5400HPX Universal Gateways.” See Appendix C, “Cabling Specifications” for cable and port pinouts.

Auxiliary Port

The chassis includes an EIA/TIA-232 asynchronous serial auxiliary port (RJ-45) that supports flow control. 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 chassis arrives with a cable and an adapter to connect a modem to the auxiliary port. To connect a modem to the auxiliary port, use the RJ-45 rollover cable with the male RJ-45-to-DB-25 adapter (labeled MODEM).

For detailed information about connecting devices to the auxiliary port, see Chapter 3, "Installing the Cisco AS5400 and Cisco AS5400HPX Universal Gateways." See Appendix C "Cabling Specifications" for cable and port pinouts.

2T Serial Ports

Two high-speed 12-in-1 serial ports on the rear panel of the chassis provide backhaul WAN and IP support.

The following types of serial interface standards (in DTE/DCE) are supported:

- EIA/TIA-232
- EIA/TIA-449
- EIA/TIA-530
- EIA/TIA-530A
- EIA/TIA-X.21
- CCITT V.35

Each port supports up to 8 Mbps.

For detailed information about connecting devices to the serial ports, see Chapter 3, "Installing the Cisco AS5400 and Cisco AS5400HPX Universal Gateways." See Appendix C "Cabling Specifications" for cable and port pinouts.

Alarm Port

The three pins on the alarm port are connected to the output of a relay. This relay is controlled by system software. With the alarm ports connected and configured, Cisco IOS software polls every one second to detect the failure events that are configured and turns ON the alarm when it detects any failure event.

For detailed information about connecting devices to the alarm port, see Chapter 3, "Installing the Cisco AS5400 and Cisco AS5400HPX Universal Gateways." See Appendix C "Cabling Specifications" for cable and port pinouts.

BITS Port

The BITS port is a coaxial interface that provides external synchronized clocking through a Timing Signal Generator (TSG).

For detailed information about connecting devices to the BITS port, see Chapter 3, "Installing the Cisco AS5400 and Cisco AS5400HPX Universal Gateways." See Appendix C "Cabling Specifications" for cable and port pinouts.

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 to work with TN power systems. To see translations of the warnings that appear in the publication, refer to the *Regulatory Compliance and Safety Information* document that accompanied this device.**

The universal gateway AC power supply includes the following features:

- Full range operation—100 to 240 VAC.
- All units include a 6-foot (1.8-m) electrical power cord. (A label near the power cord indicates the correct voltage, frequency, and current draw for the unit.)

For detailed information about connecting power, see Chapter 3, "Installing the Cisco AS5400 and Cisco AS5400HPX Universal Gateways." For information on replacing the power supply see Appendix B, "Replacing the Power Supply"

Warning **This product relies on the building's installation for short-circuit (overcurrent) protection. Ensure that a fuse or circuit breaker no larger than 120 VAC, 15A U.S. (240 VAC, 10A international) is used on the phase conductors (all current-carrying conductors). To see translations of the warnings that appear in the publication, refer to the *Regulatory Compliance and Safety Information* document that accompanied this device.**

Caution In a DC power supply installation, do not connect the 48 VDC Return to chassis ground at the Cisco AS5400. A single-point ground is recommended at the power distribution rack.

CHAPTER 3

Installing the Cisco AS5400 and Cisco AS5400HPX Universal Gateways

This chapter guides you through the installation of the Cisco AS5400 and Cisco AS5400HPX universal gateways and includes the following sections:

Note Unless specifically noted, all references to the Cisco AS5400 also apply to the Cisco AS5400HPX.

Warning **Only trained and qualified personnel should be allowed to install or replace this equipment. To see translations of the warnings that appear in the publication, refer to the *Regulatory Compliance and Safety Information* document that accompanied this device. To see translations of the warnings that appear in the publication, refer to the Regulatory Compliance and Safety Information document that accompanied this device.**

Warning **This equipment is intended to be grounded. Ensure that the host is connected to earth ground during normal use. To see translations of the warnings that appear in the publication, refer to the *Regulatory Compliance and Safety Information* document that accompanied this device.**

Warning **Incorrect connection of this or connected equipment to the general purpose outlet could result in a hazardous situation. To see translations of the warnings that appear in the publication, refer to the *Regulatory Compliance and Safety Information* document that accompanied this device.**

Setting Up the Chassis

You can set the chassis on a desktop or install it in a rack. Use the procedure in this section that best meets the needs of your network:

- Setting the Chassis on a Desktop
- Rack-Mounting the Chassis

Warning **When installing the unit, the ground connection must always be made first and disconnected last. To see translations of the warnings that appear in the publication, refer to the *Regulatory Compliance and Safety Information* document that accompanied this device.**

Warning **This unit is intended for installation in restricted access areas. A restricted access area is where access can only be gained by service personnel through the use of a special tool, lock and key, or other means of security, and is controlled by the authority responsible for the location. To see translations of the warnings that appear in the publication, refer to the *Regulatory Compliance and Safety Information* document that accompanied this device.**

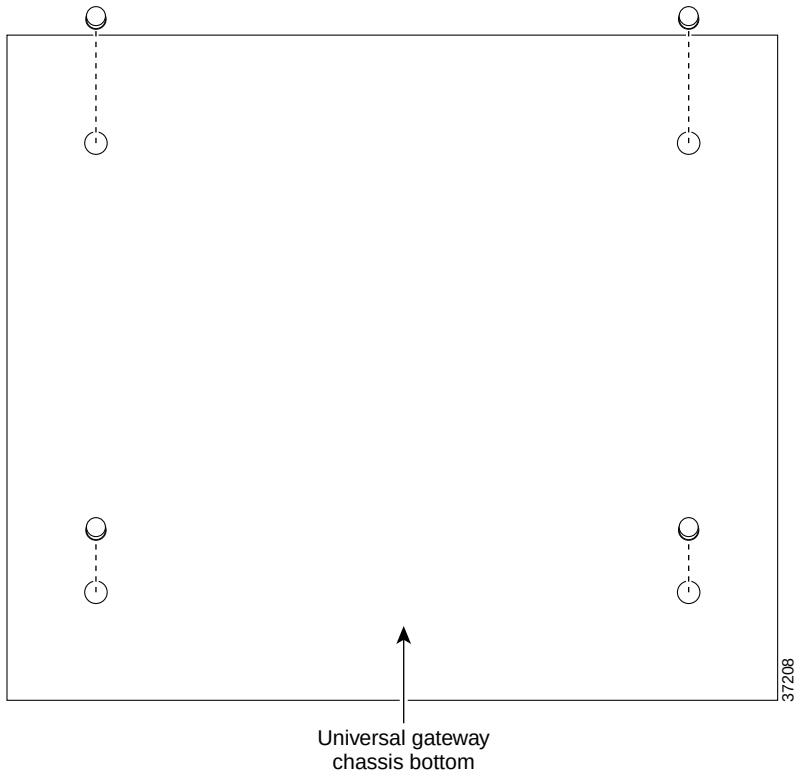
Setting the Chassis on a Desktop

The location of the chassis is extremely important for proper operation. Equipment placed too close together, inadequate ventilation, and inaccessible panels can cause malfunctions and shutdowns, and can make maintenance difficult. The following information will help you to plan the location of the chassis:

- Plan for access to both front and rear panels of the chassis.
- Ensure that the room where the chassis operates has adequate ventilation. Remember that electrical equipment generates heat. Ambient air temperature may not cool equipment to acceptable operating temperatures without adequate ventilation.

Attach the rubber feet as shown in Figure 3-1. Rubber feet are included in the accessory kit that shipped with your universal gateway.

Figure 3-1 Attaching the Rubber Feet



Rack-Mounting the Chassis

This section describes how to rack-mount the chassis. The universal gateway arrives with 19-inch rack-mount brackets and larger brackets for use with a 23- or 24-inch rack. (See Figure 3-2.)

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

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

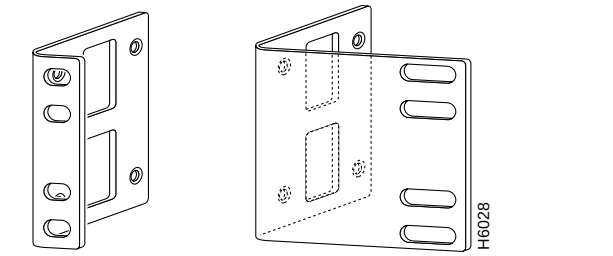
Warning **Before working on a chassis or working near power supplies, unplug the power cord on AC units; disconnect the power at the circuit breaker on DC units. To see translations of the warnings that appear in the publication, refer to the *Regulatory Compliance and Safety Information* document that accompanied this device.**

Required Tools and Equipment

You need the following tools and equipment to rack-mount the chassis:

- Number 2 Phillips screwdriver (not included)
- Screws for attaching the chassis to the rack (not included)
- Standard rack-mount brackets (included)

Figure 3-2 Standard Rack-Mount Brackets



Installing in a Rack

Step 1 To install the chassis in a rack, attach the brackets as follows:

- With the standard brackets on the side panels of the universal gateway and the front panel forward or rear panel forward, as shown in Figure 3-3 and Figure 3-4.

Figure 3-3 Standard Bracket Installation—Front Panel Forward

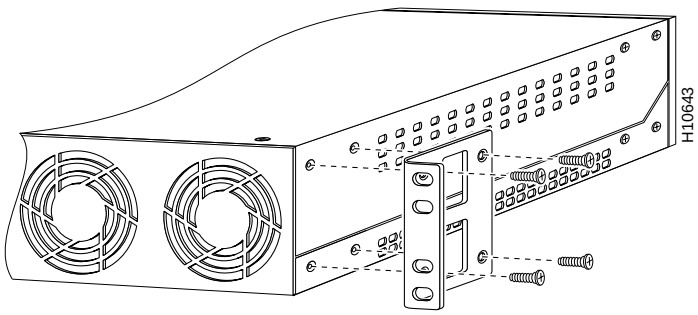
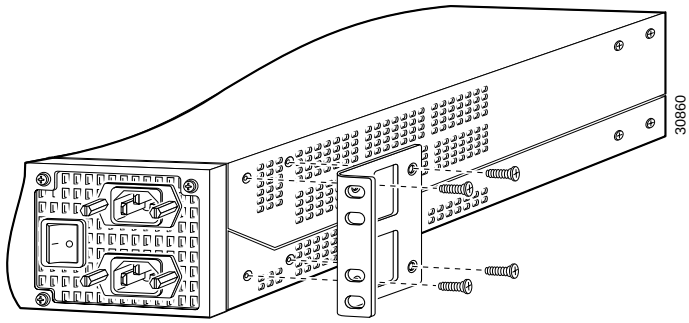


Figure 3-4 Standard Bracket Installation—Rear Panel Forward

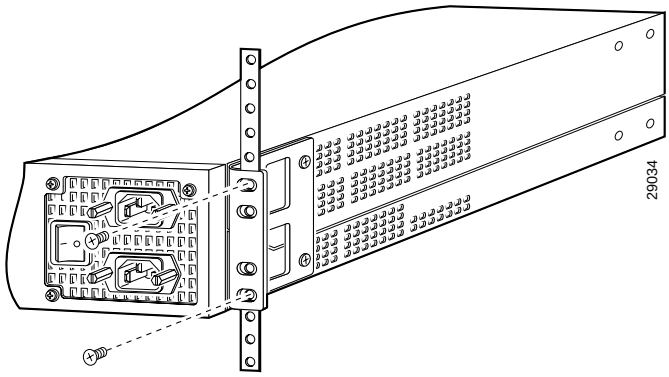


Note: The second bracket attaches to the other side of the chassis.

Caution Do not use the handles on the dial feature cards to assist in lifting the chassis.

Step 2 After the brackets are secured to the chassis, and using the screws that you provide, attach the chassis to the rack as shown in Figure 3-5.

Figure 3-5 Attaching the Chassis to the 19-Inch Rack—Rear Panel Forward



Note: The second bracket attaches to the rack at the other side of the chassis. The brackets can also be installed with the front panel forward.

Connecting to the Network

This section describes how to connect the universal gateway to your network. The cables required to connect to a network are not provided. For ordering information, contact customer service (see the "Obtaining Technical Assistance" section on page -xi in the Preface) or see Appendix C, "Cabling Specifications" for cable and port pinouts.

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 use both RJ-45 connectors. Use caution when connecting cables. To see translations of the warnings that appear in the publication, refer to the *Regulatory Compliance and Safety Information* document that accompanied this device.**

Warning **Do not work on the system or connect or disconnect cables during periods of lightning activity. To see translations of the warnings that appear in the publication, refer to the *Regulatory Compliance and Safety Information* document that accompanied this device.**

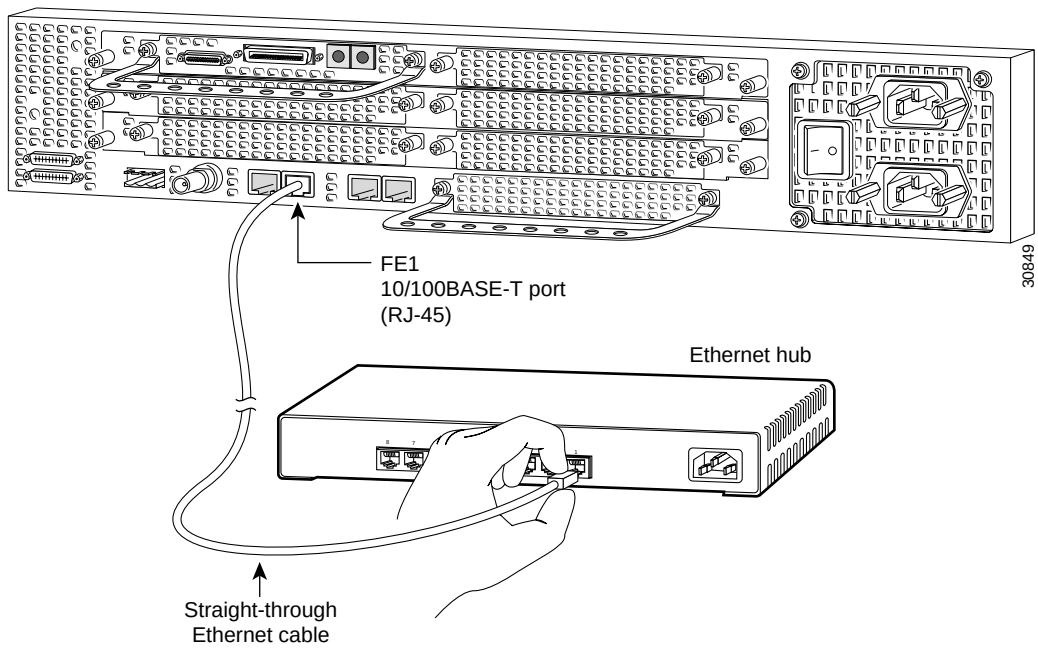
Caution If the universal gateway is configured with fewer than seven DFCs, make sure that a blank slot cover is installed over each open slot to ensure proper airflow.

Note The universal gateway arrives with all carrier cards and DFCs already installed, unless you order a card separately as a spare. Refer to the *Cisco AS5350 and Cisco AS5400 Universal Gateway Card Installation Guide* for card installation instructions.

Connecting to an Ethernet Network

You can connect the universal gateway to an Ethernet network by using a straight-through RJ-45-to-RJ-45 Ethernet cable to connect the Fast Ethernet port to an Ethernet hub. (See Figure 3-6.)

Figure 3-6 Connecting to an Ethernet Hub (10/100BASE-T Shown)



Connecting to a WAN

Warning **The telecommunications lines must be disconnected 1) before unplugging the main power connector and/or 2) while the housing is open. To see translations of the warnings that appear in the publication, refer to the *Regulatory Compliance and Safety Information* document that accompanied this device.**

Warning **Hazardous network voltages are present in WAN ports regardless of whether power to the router is OFF or ON. To avoid electric shock, use caution when working near WAN ports. When detaching cables, detach the end away from the router first. To see translations of the warnings that appear in the publication, refer to the *Regulatory Compliance and Safety Information* document that accompanied this device.**

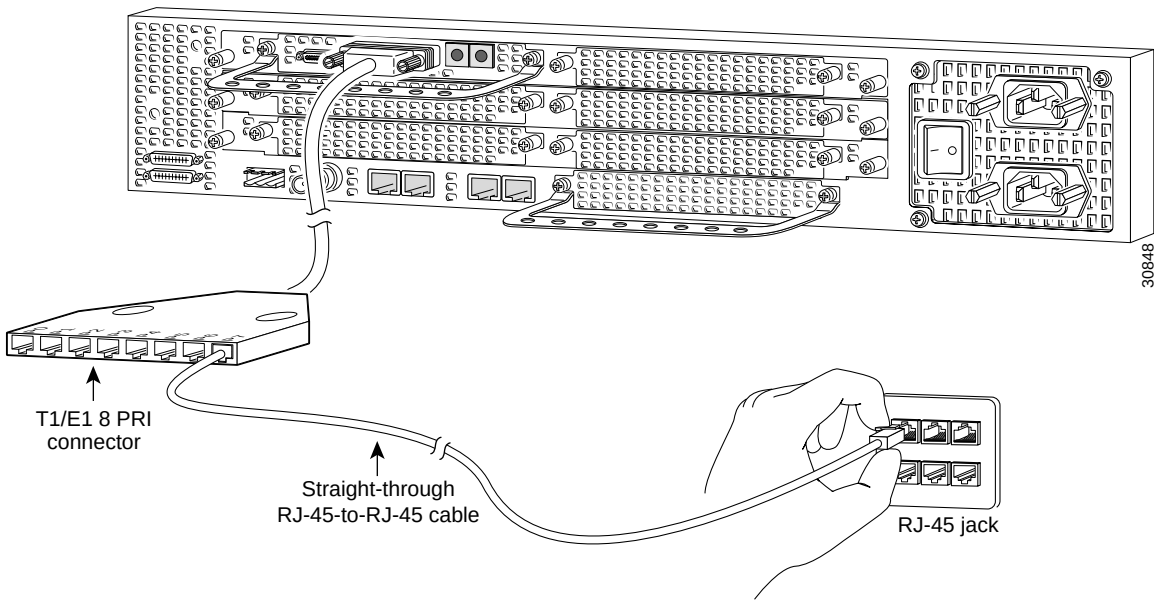
Warning **This equipment is to be installed and maintained by service personnel only as defined by AS/NZS 3260 Clause 1.2.14.3 Service Personnel. To see translations of the warnings that appear in the publication, refer to the *Regulatory Compliance and Safety Information* document that accompanied this device.**

Warning **To reduce the risk of fire, use only No. 26 AWG or larger telecommunication line cord. To see translations of the warnings that appear in the publication, refer to the *Regulatory Compliance and Safety Information* document that accompanied this device.**

You can connect the universal gateway to a WAN in the following ways:

- Use a breakout cable and straight-through RJ-45-to-RJ-45 cable for CT1 connections. (See Figure 3-7.)

Figure 3-7 Connecting to an RJ-45C (T1) Jack

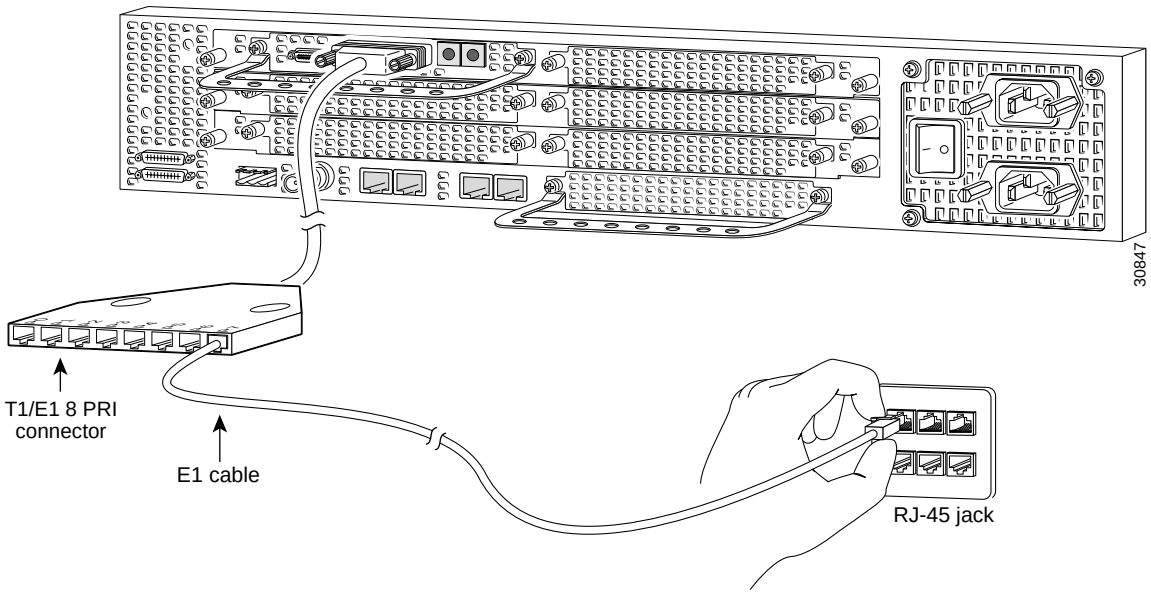


- Use an E1 cable to connect each E1/PRI port to an E1 channel service unit (CSU) or data service unit (DSU). (See Figure 3-8.)

Note If you choose a port with 75-ohm input impedance, use an RJ-45-to-75-ohm coaxial cable adapter and plug it into that port. Use software commands to choose a particular port and the line termination on that port. For information on software commands, refer to the *Cisco AS5350 and Cisco AS5400 Universal Gateway Software Configuration Guide*.

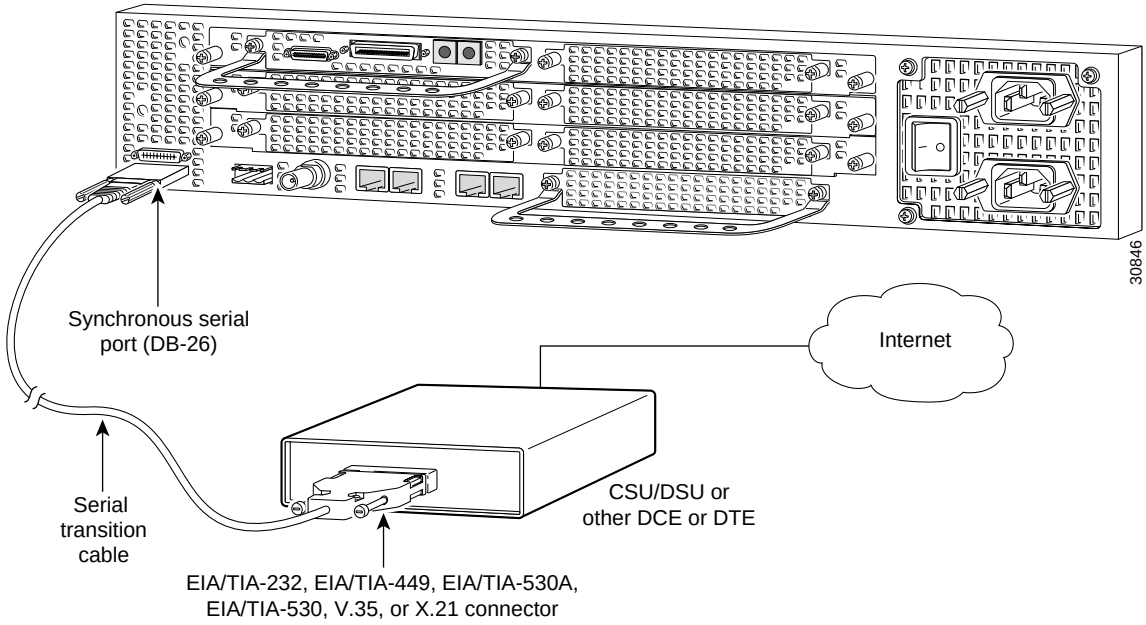
Warning **The E1 interface card may only be installed in an ACA-permitted customer equipment or a Data Terminal Equipment (DTE) that is exempted from ACA's permit requirements. The customer equipment must only be housed in a cabinet that has screw-down lids to stop user access to overvoltages on the customer equipment. The customer equipment has circuitry that may have telecommunications network voltages on them. To see translations of the warnings that appear in the publication, refer to the *Regulatory Compliance and Safety Information* document that accompanied this device.**

Figure 3-8 Connecting to an RJ-45 Jack



- Use a serial transition cable to connect one of the two synchronous serial ports to a modem or a CSU/DSU. (See Figure 3-9.)

Figure 3-9 Connecting to a CSU/DSU



Note For cable and port pinouts for specific dial feature cards, refer to Appendix C, "Cabling Specifications" in the *Cisco AS5350 and Cisco AS5400 Universal Gateway Card Installation Guide.*

Connecting the Console Terminal and Modem

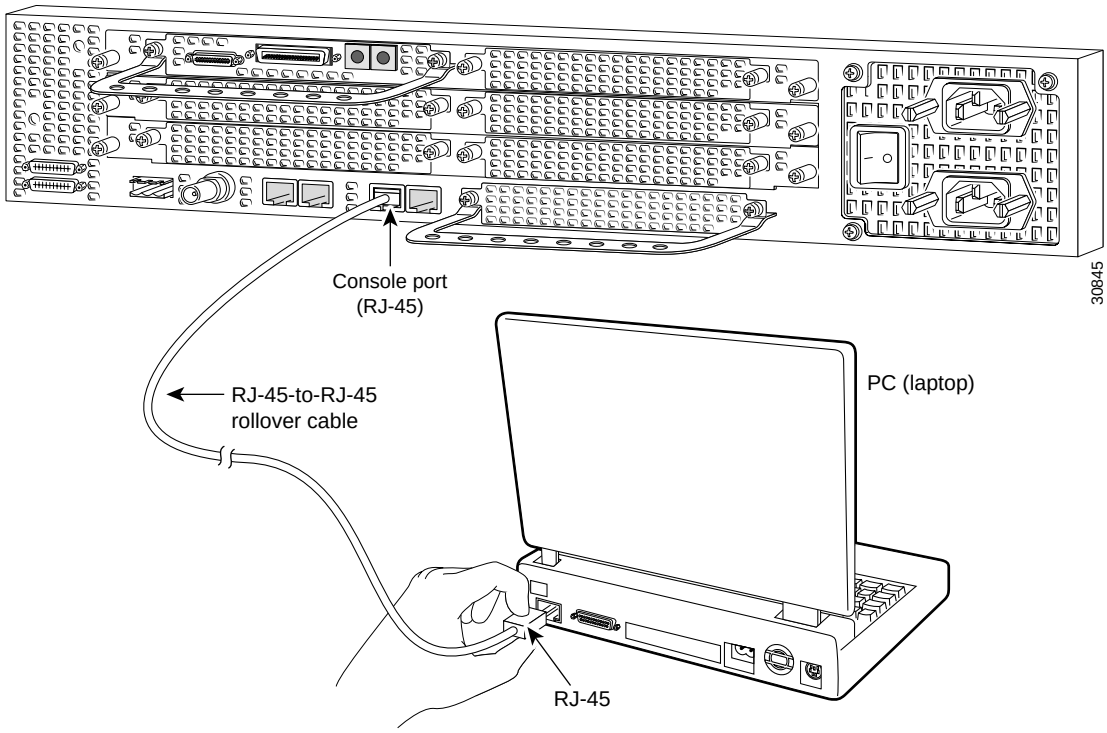
Use the console terminal for local administrative access to the universal gateway. You can only connect a terminal to the console port. You can use the auxiliary port to connect a terminal or a modem for remote access.

Connecting to the Console Port

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

Step 1 Connect the terminal using an RJ-45 rollover cable and an RJ-45-to-DB-25 or RJ-45-to-DB-9 adapter. The adapters provided are labeled TERMINAL. Other types of adapters are not included. (See Figure 3-10.)

Figure 3-10 Connecting the Console Terminal



Note For additional information on rollover cable pinouts, see Appendix C "Cabling Specifications."

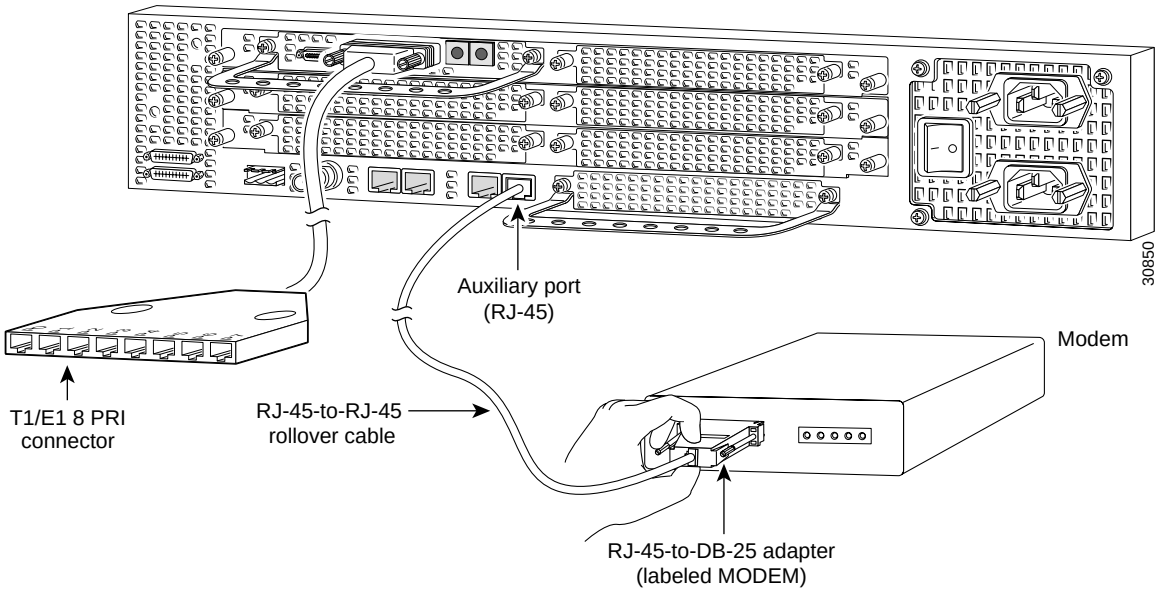
Step 2 Configure your terminal or PC terminal emulation software for 9600 baud, 8 data bits, no parity, and 2 stop bits. To configure the console port, refer to the *Cisco AS5350 and Cisco AS5400 Universal Gateway Software Configuration Guide*.

Connecting a Modem to the Auxiliary Port

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

Step 1 Connect a modem to the auxiliary port using an RJ-45 rollover cable with an RJ-45-to-DB-25 adapter. The adapter provided is labeled MODEM. (See Figure 3-11.)

Figure 3-11 Connecting a Modem to the Auxiliary Port

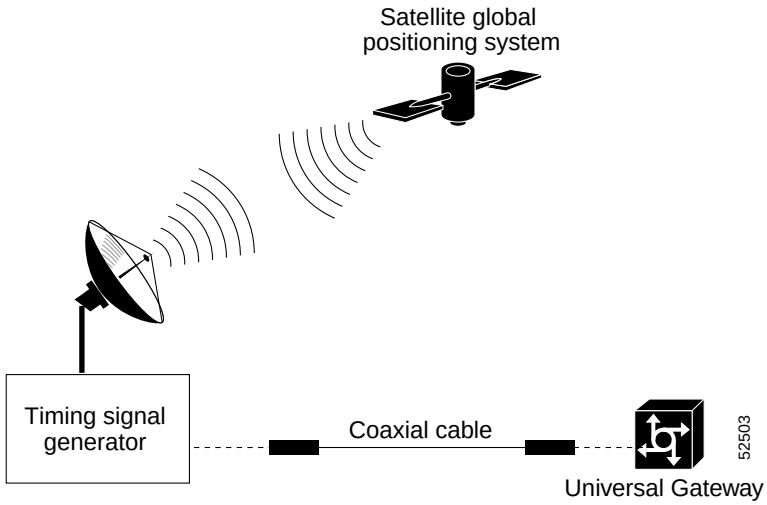


Step 2 Make sure that your modem and the auxiliary port on the universal gateway are configured for the same transmission speed (38400 baud is typical) and hardware flow control with Data Carrier Detect (DCD) and Data Terminal Ready (DTR) operations.

Connecting to the BITS Port

Use a coaxial cable to connect a Timing Signal Generator (TSG) to the BITS port. The BITS port is used for external clocking. (See Figure 3-12.)

Figure 3-12 Connecting to the BITS Port

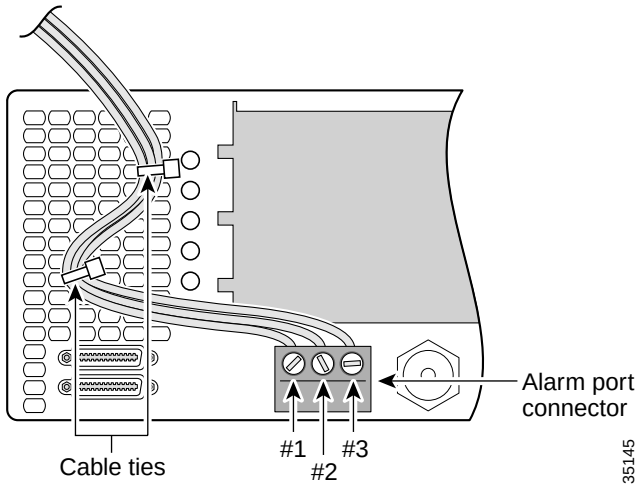


Connecting to the Alarm Port

Connect to the alarm port as follows:

Step 1 Insert the three-pin alarm port connector into the alarm port terminal block. (See Figure 3-13.)

Figure 3-13 Connecting to the Alarm Port



Note Connect the alarm port only to a safety extra-low voltage (SELV) source using 22 AWG, or thicker, copper wire. SELV ratings are maximum 30 Volts AC (RMS), maximum 60 Volts DC, and maximum 50 VA Power. The alarm port is rated for 2.0 Amp maximum current.

Step 2 Strip a minimum 1/4 in. (0.625 cm) off the wire insulation to connect the stranded wires to the alarm connector. The maximum insulation strip length is 0.31 in. (0.78 cm).

Step 3 Secure the wires to the alarm connector with screws.

Caution The maximum tightening torque on the screws is 7 in.-lb (0.79 N-m).

Step 4 Connect the wires to strain relief clamps that are inserted into the holes in the ventilation grid.

Note See Appendix C “Cabling Specifications” for alarm port cable assembly and port pinouts.

Supplying Power

The power system is comprised of a fully redundant switching power supply with two AC (or two DC) inputs to the main power modules. Each input and output is 100 percent fully redundant, with dual fans for added reliability.

The output of each power module is rated at 300 watts (nonredundant mode), and is composed of four independent output voltages: 3.3V, 5V, 12V, and -12V. AC input units have power factor correction, and low Total Harmonic Distortion. Units that are in redundant mode run at one-half the power capability. If a power supply failure occurs, these units are capable of powering the complete system either at the input side or the DC load side. Power failures are reported through software SNMP alarm traps.

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.

The universal gateway AC power supply includes the following features:

- Full range operation—100 to 240 VAC.
- All units include two 6-foot (1.8-meter) electrical power cords. (A label near the power inlets indicates the correct voltage, frequency, current draw, and power dissipation for the unit.)

Caution In a DC power supply installation, do not connect the 48 VDC Return to chassis ground at the Cisco AS5400. A single-point ground is recommended at the power distribution rack.

Warning **Do not touch the power supply when the power cord is connected. For systems with a power switch, line voltages are present within the power supply even when the power switch is off and the power cord is connected. For systems without a power switch, line voltages are present within the power supply when the power cord is connected. To see translations of the warnings that appear in the publication, refer to the *Regulatory Compliance and Safety Information* document that accompanied this device.**

Warning **This product relies on the building’s installation for short-circuit (overcurrent) protection. Ensure that a fuse or circuit breaker no larger than 120 VAC, 15A U.S. (240 VAC, 10A international) is used on the phase conductors (all current-carrying conductors). To see translations of the warnings that appear in the publication, refer to the *Regulatory Compliance and Safety Information* document that accompanied this device.**

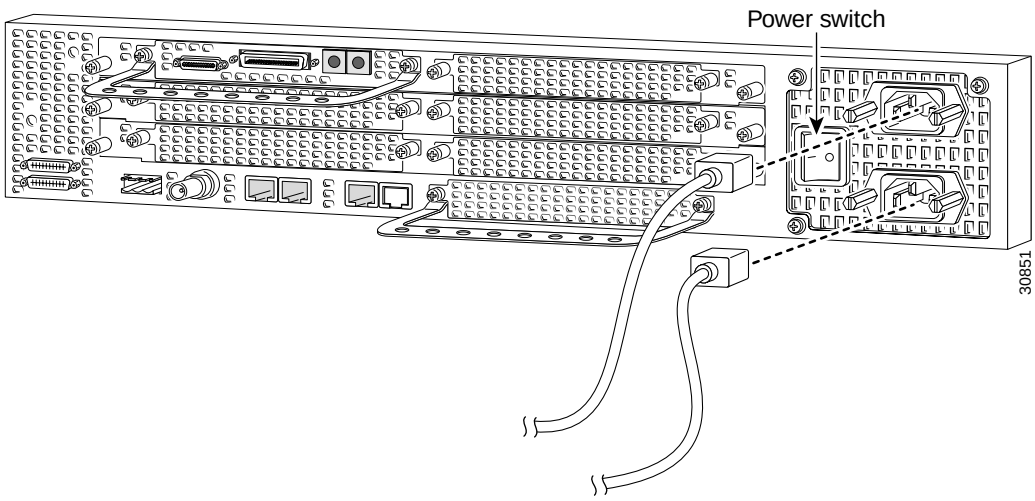
Warning **The device is designed to work with TN power systems. To see translations of the warnings that appear in the publication, refer to the *Regulatory Compliance and Safety Information* document that accompanied this device.**

Connecting the AC Power Cord

To connect the power cord, follow these steps:

Step 1 Connect one end of each power cord to the power connectors on the rear panel. (See Figure 3-14.)

Figure 3-14 Connecting the AC Power Cord



Step 2 Latch the clips provided on the power supply of the chassis to each power cord.

Step 3 Connect the other end of the power cords to the power outlets.

Warning **The plug-socket combination must be accessible at all times because it serves as the main disconnecting device. To see translations of the warnings that appear in the publication, refer to the *Regulatory Compliance and Safety Information* document that accompanied this device.**

Step 4 Power ON the universal gateway.

The internal power supply fan should power on.

Wiring the DC Power Supply

If you ordered the universal gateway with a DC power supply, follow the procedure in this section to wire the terminal block.

Warning **A readily accessible two-poled disconnect device must be incorporated in the fixed wiring. To see translations of the warnings that appear in the publication, refer to the *Regulatory Compliance and Safety Information* document that accompanied this device.**

Warning **Before performing any of the following procedures, ensure that power is removed from the DC circuit. To ensure that all power is OFF, locate the circuit breaker on the panel board that services the DC circuit, switch the circuit breaker to the OFF position, and tape the switch handle of the circuit breaker in the OFF position. To see translations of the warnings that appear in the publication, refer to the *Regulatory Compliance and Safety Information* document that accompanied this device.**

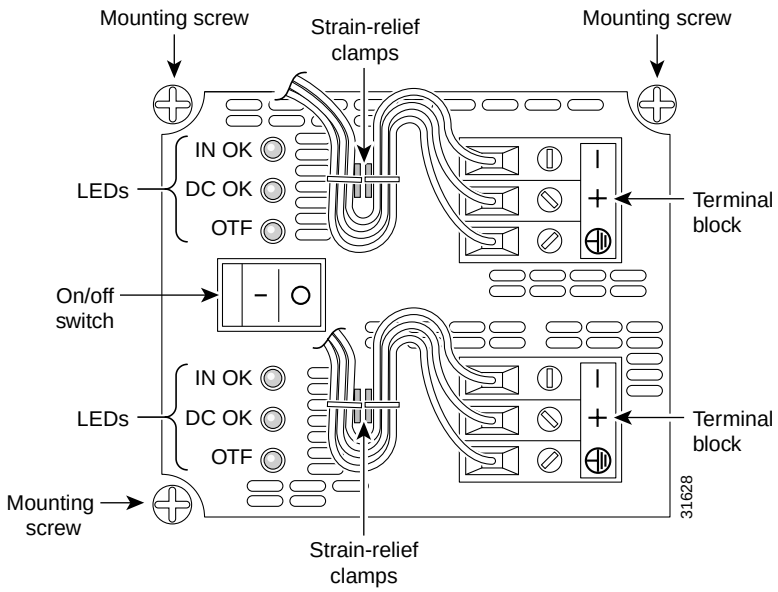
Note This product is intended for installation in restricted access areas and is approved for connection using 12 or 14 AWG copper conductors only. The installation must comply with all applicable codes.

Refer to Figure 3-15 and follow these steps to wire the terminal blocks:

Step 1 Note the orientation of the DC power supply. The power supply cord should have three wires: 48 VDC Return, -48 VDC, and a safety ground (green wire).

Warning **The illustration shows the DC power supply terminal block. Wire the DC power supply using the appropriate wire terminations at the wiring end, as illustrated. The proper wiring sequence is ground to ground, return to return, and negative to negative. Note that the ground wire should always be connected first and disconnected last. To see translations of the warnings that appear in the publication, refer to the *Regulatory Compliance and Safety Information* document that accompanied this device.**

Figure 3-15 DC Power Supply Connections



Caution In a DC power supply installation do not connect the 48 VDC Return to chassis ground at the Cisco AS5400. A single-point ground is recommended at the power distribution rack.

Step 2 Strip off a quarter of an inch (1/4 in. [0.625 cm]) of insulation on the safety ground, 48 VDC Return, and -48 VDC input wires.

Step 3 Install the safety grounds (green wire) into the terminal block ground connectors and tighten the locking screws. Ensure that no bare wire is exposed.

Note For central office installations, we recommend using a copper 6 AWG green ground wire with one end connected to reliable earth. The other end of the wire should be crimped onto the double-hole lug provided in the installation pack. The lug should be secured to the mating holes on either side of the chassis with the two screws included in the accessory pack.

Caution Do not overtorque the terminal block contact screws. The recommended torque is 5.0 in.-lb (0.56 N-m).

Step 4 Insert both 48 VDC Return wires into the terminal block positive connectors (+) and tighten the locking screws. Ensure that no bare wire is exposed.

Step 5 Insert both -48 VDC wires into the terminal block negative connectors (-) and tighten the locking screws. Ensure that no bare wire is exposed.

Step 6 Secure the power supply cords to the cable strain-relief clamps on the DC power supply with cable ties. (See Figure 3-15.)

Warning **After wiring the DC power supply, remove the tape from the circuit breaker switch handle and reinstate power by moving the handle of the circuit breaker to the ON position. To see translations of the warnings that appear in the publication, refer to the *Regulatory Compliance and Safety Information* document that accompanied this device.**

Step 7 Power ON the universal gateway.

The internal power supply fan should power on.

Where to Go Next

When you power ON the universal gateway for the first time, messages will begin to appear on your console screen. Refer to the *Cisco AS5350 and Cisco AS5400 Universal Gateway Software Configuration Guide* for configuration instructions. The remaining chapters and appendixes of this guide include reference material for replacing spare parts, troubleshooting, and creating your own cables:

- Chapter 4 “Troubleshooting”
- Appendix A “Replacing Memory Components”
- Appendix B “Replacing the Power Supply”
- Appendix C “Cabling Specifications”

CHAPTER 4

Troubleshooting

This chapter describes how to troubleshoot the Cisco AS5400 and Cisco AS5400HPX universal gateways by referring to the LEDs on the chassis and DFCs, and using the Bantam Jacks. The chapter contains the following sections:

Note Unless specifically noted, all references to the Cisco AS5400 also apply to the Cisco AS5400HPX.

Tips To help identify your universal gateway, starting with Cisco IOS Release 12.2(11)T, the **show version** and **show diag** commands will identify the universal gateway as an *AS5400* or *AS5400HPX*. Prior to this release, these commands showed the universal gateway as an *AS5400*, even if it was a *AS5400HPX*.

LEDs

The LEDs indicate the current operating condition of the universal gateway. You can observe the LEDs, note any fault condition that the product is encountering, and then contact your system administrator or a customer service representative (see "Obtaining Technical Assistance" in the Preface), if necessary. Refer to Figure 4-1 to see the location of the LEDs. Refer to Table 4-1 for a description of the LEDs.

Figure 4-1 Universal Gateway Rear Panel LEDs

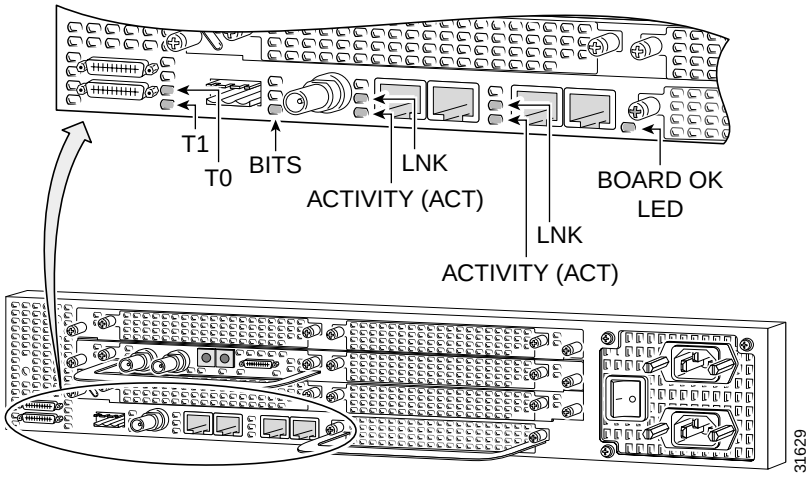


Table 4-1 Chassis LEDs

LED	State	Description
Alarm	On	An alarm error is detected.
	Off	Remains off when operation is normal.
Fast Ethernet Activity (ACT)	Flickering	The Fast Ethernet LAN connection is transmitting and receiving data normally.
Fast Ethernet Link (LNK)	On	Fast Ethernet cable is connected properly.
	Off	The Ethernet LAN connection is not transmitting or receiving data. Check the Ethernet cable connections.
OK/MAINT	On	System board is operating normally.
	Off	Power is off or system has not booted.
	Blinking	A memory failure occurred.
Serial Ports Activity (ACT)	Flickering	The serial port connection is transmitting and receiving data normally.
Serial Ports Link (LNK)	On	The serial port cable is connected properly.
	Off	The serial port cable is not connected properly.
BITS Port	On	Indicates a valid signal on the BITS port.
	Off	Remains off when operating condition is normal.

Table 4-1 Chassis LEDs (continued)

LED	State	Description
Remote Alarm (RA)	On	Indicates a T1 alarm condition encountered by software.
	Off	Remains off when operating condition is normal.
Local Alarm (LA)	On	Indicates a T1 alarm condition encountered by software for a particular port.
	Off	Remains off when operating condition is normal.

Mixing WAN DFCs

The Cisco AS5400 supports only one type of WAN DFC at a time. The DFCs that can be installed at one time are:

- Four T1 DFCs or
- Four E1 DFCs or
- One CT3 DFC and three T1 DFCs

The Cisco AS5400 software recognizes DFCs in the order of the slots they are in. For example, a DFC in slot 2 is recognized before a DFC in slot 3. The system recognizes if there is a mix of WAN DFCs during both power up and OIR:

- During power up, the first WAN DFC recognized by the system is the only type brought up.
- If there are two or more WAN DFCs of the same type and one is hot-swapped with another of a different type, the new one is not recognized.

In both situations, an error message appears on the console that is similar to the following example:

```
00:01:12:%CARRIER-2-T1_E1_MIX:Cannot mix T1 and E1 8PRI DFC cards in chassis, do not power
up invalid card in slot 7
```

To see what types of DFCs are in the chassis, use the **show chassis slot** command in privileged EXEC mode:

```
Router# show chassis slot

Slot 1:
DFC type is AS5400 T1 8 PRI DFC

OIR events:
        Number of insertions = 0, Number of removals = 0
DFC State is DFC_S_OPERATIONAL

Slot 2:
Carrier Slot is Empty

Slot 3:
Carrier Slot is Empty

Slot 4:
DFC type is AS5400 NP108 DFC
```

```
OIR events:
        Number of insertions = 0, Number of removals = 0
DFC State is DFC_S_OPERATIONAL

Slot 5:
DFC type is AS5400 Empty DFC
DFC is not powered

OIR events:
        Number of insertions = 0, Number of removals = 0

Slot 6:
Carrier Slot is Empty

Slot 7:
Carrier Slot is Empty
```

Environment Monitoring

The Cisco AS5400 contains temperature sensors to detect abnormal temperature conditions during system operation. The three levels of sensor detection are as follows:

1. When the operating temperature of the system exceeds 45° C, the system reaches a warning state. A warning message appears on the console. When the operating temperature of the system drops below 45° C, another message is displayed on the console indicating a recovery. At this level of sensor detection, there is no disruption in system operation.
2. When the operating temperature of the system continues to rise above 45° C and reaches a temperature of 60° C, the system reaches a critical state.

   Cisco IOS software busys out the DFCs in the chassis and shuts down the first DFC. If the operating temperature continues to be critical after 10 minutes, Cisco IOS software shuts down another DFC.

Note DFC slot numbering starts from the system board and works up from left to right. Slot 0 is reserved for the system board. The DFC slots are numbered sequentially from 1 to 7.

   This process is repeated at 10 minute intervals until the final DFC is shut down. The console displays the slot number of the DFC and the type of DFC that was shut down.

   If the operating temperature cools down to 45° C, Cisco IOS software powers on the first DFC, repeating the process for each DFC at 10 minute intervals.
3. When the operating temperature of the system rises above 65° C, Cisco IOS software shuts down all DFCs immediately.

Displaying Environment Status

You can use the command line interface (CLI) to check environment monitoring status of the Cisco AS5400. To check environment monitoring status, enter the **show environment** command in privileged EXEC mode:

```
Router> show environment
```

- The following display appears on your console during normal operating conditions. The slot number corresponds to the DFC in that slot. The outlet and inlet sensors read the temperature of the air circulating inside the chassis.

```
Router> show environment
Temperature:
        Temperature Reading:
                Temperature at inlet is measured as 22C/71F.
                Temperature at outlet is measured as 27C/80F.
        Temperature State:
                Temperature is in normal state.
Fans:
        Fans temperature delta is measured as 5C.
        All fans are running well.
Power Supply:
        Redundant Power System is present.
```

- The following display appears on your console when the system reaches a warning state.

```
Router> show environment
Temperature:
        Temperature Reading:
                Temperature at inlet is measured as 52C/125F.
                Temperature at outlet is measured as 64C/147F.
        Temperature State:
                Temperature is in warning state.
Fans:
        Fans temperature delta is measured as 6C.
        All fans are running well.
Power Supply:
        Redundant Power System is present.
        RPS Input Voltage status: normal
        RPS Output Voltage status: normal
        RPS Fan status: normal
        RPS Thermal status: normal
        RPS OverVoltage status: normal
Environmental monitor experienced the following events:
        Temperature:sensor failed.
        Fans:monitor dropped.
        Temperature:warning.
        Temperature:sensor recovered.
        Fans:monitor recovered.
        Fans:normal.
```

- The following display appears on your console when the system reaches a critical state.

```
Router> show environment
Temperature:
        Temperature Reading:
                Temperature at inlet is measured as 62C/143F.
                Temperature at outlet is measured as 74C/165F.
        Temperature State:
                Temperature is in critical state.
        DFC Busyout/Power-down:
                A DFC is powered down. Slot:1, Type:NP108 DFC
                A DFC is busyout. Slot:2, Type:T1 8 PRI DFC
                A DFC is busyout. Slot:3, Type:NP108 DFC
Fans:
        Fans temperature delta is measured as 6C.
        All fans are running well.
Power Supply:
        Redundant Power System is present.
        RPS Input Voltage status: normal
        RPS Output Voltage status: normal
        RPS Fan status: normal
        RPS Thermal status: normal
        RPS OverVoltage status: normal
Environmental monitor experienced the following events:
        Temperature:sensor failed.
        Fans:monitor dropped.
        Temperature:warning.
        Temperature:sensor recovered.
        Fans:monitor recovered.
        Fans:normal.
        Temperature:critical.
```

- The following display appears on your console when the system reaches a shutdown state.

```
Router> show environment
Temperature:
        Temperature Reading:
                Temperature at inlet is measured as 70C/158F.
                Temperature at outlet is measured as 82C/179F.
        Temperature State:
                Temperature is in shutdown state.
        DFC Busyout/Power-down:
                A DFC is powered down. Slot:1, Type:NP108 DFC
                A DFC is powered down. Slot:2, Type:T1 8 PRI DFC
                A DFC is powered down. Slot:3, Type:NP108 DFC
Fans:
        Fans temperature delta is measured as 6C.
        All fans are running well.
Power Supply:
        Redundant Power System is present.
        RPS Input Voltage status: normal
        RPS Output Voltage status: normal
        RPS Fan status: normal
        RPS Thermal status: normal
        RPS OverVoltage status: normal
Environmental monitor experienced the following events:
        Temperature:sensor failed.
        Fans:monitor dropped.
        Temperature:warning.
        Temperature:sensor recovered.
        Fans:monitor recovered.
        Fans:normal.
        Temperature:critical.
        Temperature:shutdown.
```

Using the Bantam Jacks for Test Port Functionality

Test port functionality is supported by Cisco IOS Release 12.1(2)XD and later releases.

Monitoring Mode for the T1, E1, and T3 DFCs

The monitor mode is available on the T1, E1, and T3 dial feature cards.

If a T1 controller does not come up, or there is a large number of errors associated with a particular controller, you might be able to determine whether the problem is in the DFC or in an external T1 line by using the test port. The test port is a set of bantam jack connectors located on the front panel of the DFCs.

In monitor mode, you can monitor only the ingress side of the T1 line without disrupting that line.

The bantam jack connectors located on the front panel of the DFCs allow the connection of an external test device (for example, a FIREBERD test device) to monitor the individual T1 circuit in monitor mode. Use software commands to select a T1 line. For information on software commands, refer to the *Cisco AS5350 and Cisco AS5400 Universal Gateway Software Configuration Guide* for details.

Passive monitoring equipment is used to listen on the TX MON and RX MON jacks during regular operation to detect T1 errors.

Connecting test equipment to the following bantam jack connectors provides various functions:

- TX MON can monitor signals coming out of the test port without interrupting normal data transmission.
- RX MON can monitor signals going in to the test port without interrupting normal data transmission.

Drop and Insert Mode for the CT3 DFC

Drop and Insert mode is available on the CT3 dial feature card.

The bantam jack connectors located on the front panel card allow the connection of an external test device (for example, a FIREBERD test device) to test any of the 28 individual T1 circuits in drop-insert mode. In drop-insert mode, the T1 line is dropped out of service.

Note In Drop and Insert mode, the T1 line is dropped out of service. To prevent accidental use of the push button in Drop and Insert mode, use the **test trunk drop-insert** privileged EXEC command to disable the Drop and Insert mode on the specified T3 controller.

The **test trunk drop-insert** privileged EXEC command is used to enable or disable Drop and Insert mode on a T3 controller. When the system initially boots up, the Drop and Insert mode is disabled on all T3 controllers.

To drop a particular T1 line to the test port, follow these steps:

Step 1 Enable Drop and Insert mode by entering the **test trunk drop-insert on** privileged EXEC command as follows:

```
Router# test trunk drop-insert on t1port
```

Note The *t1 port* is the particular T1 line that you wish to drop. T1 port numbers range from 1 to 28.

Step 2 Disable the Drop and Insert mode after testing the T1 lines. We recommend that you disable Drop and Insert mode to prevent accidental use of the push button on the CT3 card.

To disable Drop and Insert mode, enter the **test trunk drop-insert off** privileged EXEC command as follows:

```
Router# test trunk drop-insert off t1 port
```

Troubleshooting Network Interfaces

For information about isolating problems with the network connections to your universal gateway, refer to the publication *Internetwork Troubleshooting Guide* available on Cisco.com and the Cisco Documentation CD-ROM that shipped with the Cisco AS5400. For more information, see the "Related Documentation" section on page -xiii in the Preface.

Flash Memory Installation

It is critical that the correct Flash memory SIMM modules be installed in the Cisco AS5400 and Cisco AS5400HPX universal gateways. The Cisco AS5400 only supports 5V Flash memory SIMM modules and the Cisco AS5400HPX only supports 3.3V Flash memory. In addition, system flash and boot flash modules for the Cisco AS5400 are not interchangeable with those for the Cisco AS5400HPX. Using the incorrect memory will cause the system to malfunction and may cause damage to the system board or memory card. For installation instructions, refer to Appendix A, "Replacing Flash Memory SIMMs"

Cisco AS5400HPX Images

The Cisco AS5400HPX platform only supports Cisco IOS Software Release 12.2(2)XB images and later. Problems may occur if images earlier than Cisco IOS Software Release 12.2(2)XB are loaded on the universal gateway. For more information about unsupported images on the Cisco AS5400HPX, refer to the Cisco AS5400 field notices on cisco.com at:
http://www.cisco.com/warp/public/tech_tips/index/hardware/access/as5400/fn.html

Note To help identify your universal gateway, starting with Cisco IOS release 12.2(11)T, the **show version** and **show diag** commands will identify the universal gateway as a *AS5400* or *AS5400HPX*. Prior to this release, these commands showed the universal gateway as a *AS5400*, even if it was a *AS5400HPX*.

Getting Help

For information about technical support, onsite service, and exchange and repair services, refer to the "Obtaining Technical Assistance" in the Preface.

Replacing Memory Components

This appendix contains procedures on how to replace memory chips in the Cisco AS5400 and Cisco AS5400HPX. The appendix contains the following sections:

Note Unless specifically noted, all references to the Cisco AS5400 also apply to the Cisco AS5400HPX.

Removing the Chassis Cover

This section describes how to open the chassis by removing the chassis cover.

Required Tools

You need the following tools:

- Medium Phillips screwdriver
- Small or medium flat-blade screwdriver

Safety Recommendations

Note the following safety recommendations:

Warning **Before opening the chassis, disconnect the telephone-network cables to avoid contact with telephone-network voltages. To see translations of the warnings that appear in this publication, refer to the *Regulatory Compliance and Safety Information* document that accompanied this device.**

Warning **Do not work on the system or connect or disconnect cables during periods of lightning activity. To see translations of the warnings that appear in this publication, refer to the *Regulatory Compliance and Safety Information* document that accompanied this device.**

Warning **Before working on a chassis or working near power supplies, unplug the power cord on AC units; disconnect the power at the circuit breaker on DC units. To see translations of the warnings that appear in this publication, refer to the *Regulatory Compliance and Safety Information* document that accompanied this device.**

NVRAM in the universal gateway uses an internal lithium battery to maintain data. Although this is not a field-serviceable component, we are required to provide the following safety warning:

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. To see translations of the warnings that appear in this publication, refer to the *Regulatory Compliance and Safety Information* document that accompanied this device.**

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. To see translations of the warnings that appear in this publication, refer to the *Regulatory Compliance and Safety Information* document that accompanied this device.**

Chassis Cover Removal

You must open the chassis to gain access to its interior components: boot read-only memory (ROM) software, synchronous dynamic random-access memory dual in-line memory modules (SDRAM DIMMs), and Flash memory SIMMs. (When you replace the boot ROMs, you must also remove all feature cards in the chassis.)

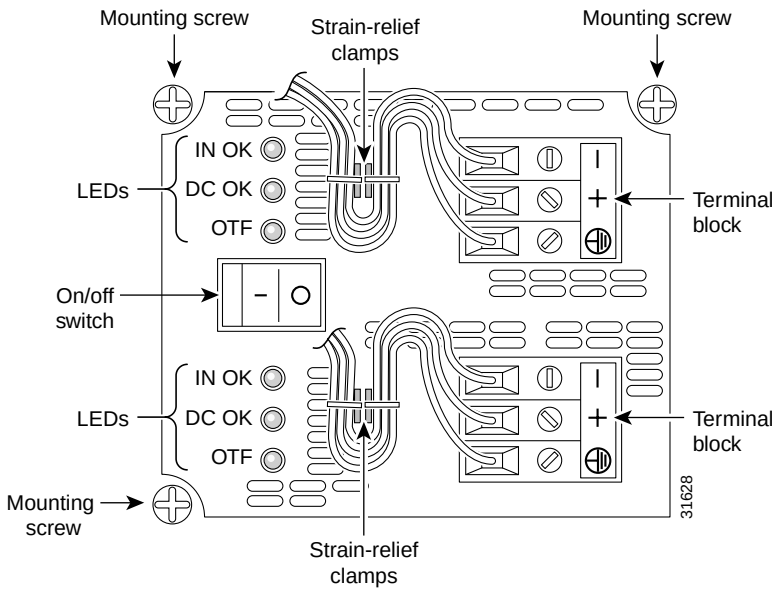
Take these steps:

Step 1 Turn the power switch OFF and disconnect site power. (Note that the power switch is part of the power supply.)

Step 2 If using a DC-powered unit, refer to Figure A-1 and complete Step a through Step d.

Warning **Before performing any of the following procedures, ensure that power is removed from the DC circuit. To ensure that all power is OFF, locate the circuit breaker on the panel board that services the DC circuit, switch the circuit breaker to the OFF position, and tape the switch handle of the circuit breaker in the OFF position. To see translations of the warnings that appear in this publication, refer to the *Regulatory Compliance and Safety Information* document that accompanied this device.**

Figure A-1 DC Power Supply Connections



a. Loosen the six locking screws for the negative, return, and ground connections on the DC power supply terminal blocks.

b. Remove the -48 VDC wires from the terminal block negative connectors (-).

c. Remove the 48 VDC wires from the terminal block positive connectors (+).

d. Remove the safety ground (green wires) from the terminal block ground connectors.

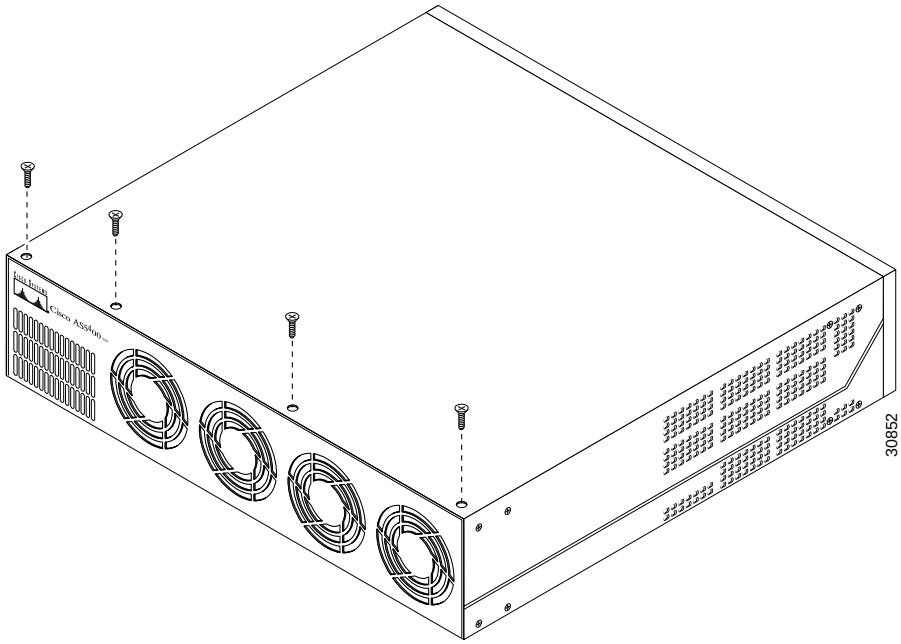
Step 3 Remove all interface cables from the rear panel of the chassis.

Step 4 Place the chassis so that the front panel is facing you.

Step 5 Remove the four screws on the chassis cover. (See Figure A-2.)

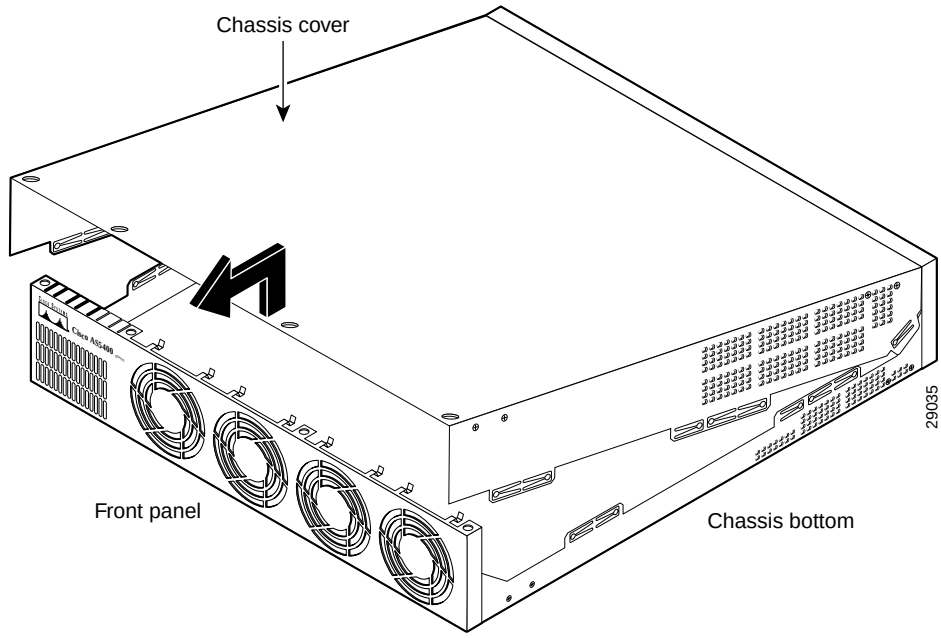
Caution Do not connect a 48 VDC wire to chassis. A single-point ground is recommended at the power distribution rack.

Figure A-2 Removing the Chassis Cover Screws



Step 6 Gently pry the cover off with a flat-blade screwdriver. Lift the chassis cover upward, and pull it away from the tabs on the rear of the chassis. (See Figure A-3.)

Figure A-3 Removing the Chassis Cover



Replacing the Boot ROM

To upgrade the boot ROM software to a new software image, you must replace the existing boot ROM.

Required Tools and Equipment

You will need the following tools and equipment:

- ROM extraction tool
- One boot ROM
- ESD-preventive wrist strap
- Tape

Boot ROM Replacement

To replace the boot ROM, follow these steps:

Step 1 Turn the power switch OFF and disconnect site power.

For DC-powered units, note the following warning:

Warning **Before performing any of the following procedures, ensure that power is removed from the DC circuit. To ensure that all power is OFF, locate the circuit breaker on the panel board that services the DC circuit, switch the circuit breaker to the OFF position, and tape the switch handle of the circuit breaker in the OFF position. To see translations of the warnings that appear in this publication, refer to the *Regulatory Compliance and Safety Information* document that accompanied this device.**

Warning **Before opening the chassis, disconnect the telephone-network cables to avoid contact with telephone-network voltages. To see translations of the warnings that appear in this publication, refer to the *Regulatory Compliance and Safety Information* document that accompanied this device.**

Step 2 Remove all interface cables from the DFCs.

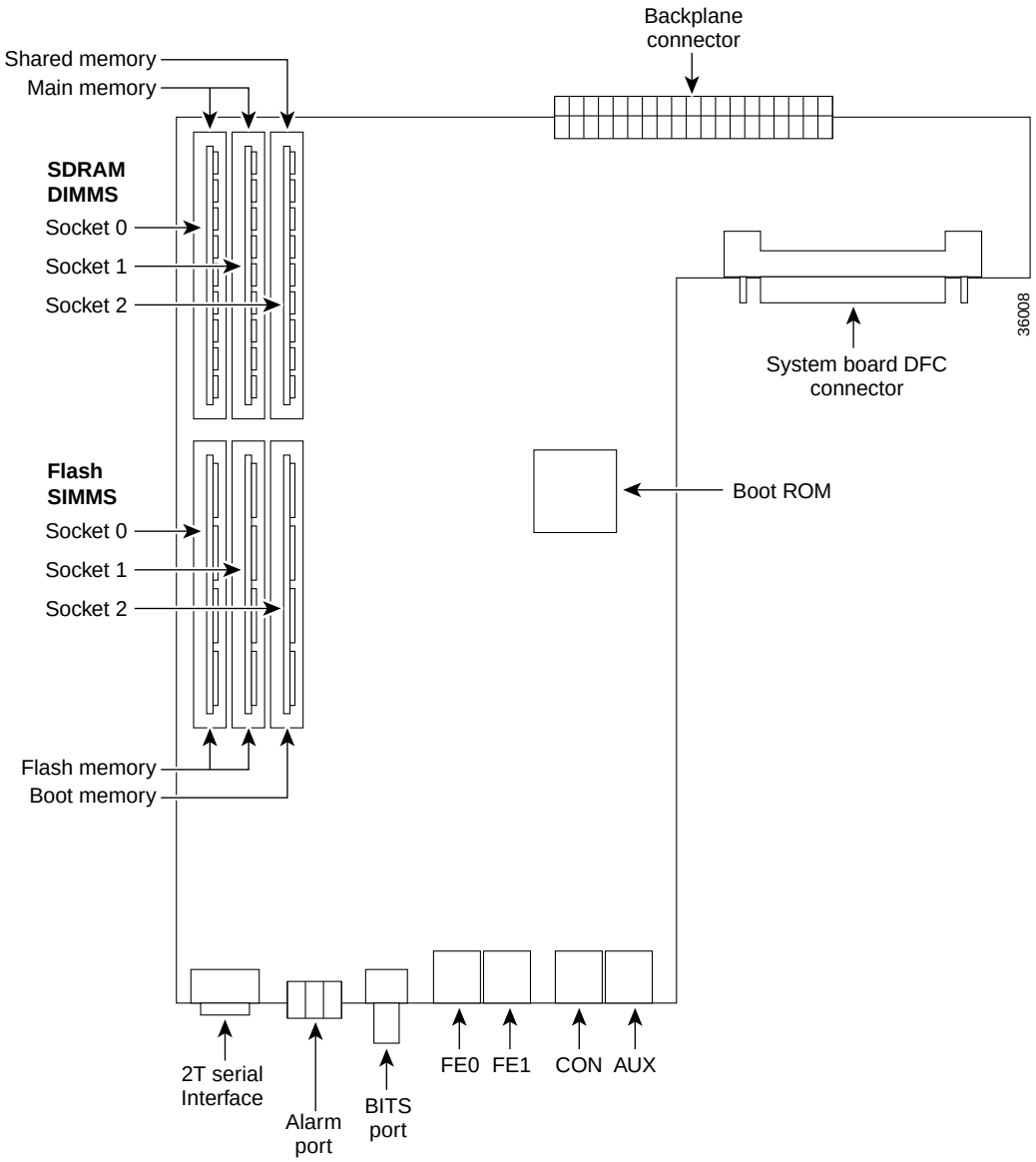
Step 3 Attach an ESD-preventive wrist strap.

Step 4 Remove the chassis cover. (See the instructions in the “Removing the Chassis Cover” section on page A-1.)

Step 5 Remove all cards to access the system board. (Refer to the *Cisco AS5350 and Cisco AS5400 Universal Gateway Card Installation Guide* for instructions on removing various dial feature cards.)

Step 6 Locate the boot ROM on the system board. (See Figure A-4.)

Figure A-4 Memory Locations



Step 7 Gently extract the old ROM with a ROM extraction tool and set the old boot ROM on a nonconductive surface. Do not use excessive force because the socket might break.

Step 8 Insert the new boot ROM into the socket. Be careful not to bend or crush any of the bottom pins. If necessary, use needlenose pliers to straighten out any bent pins.

Caution The notch in the ROM must align with the notch in the socket on the system board. If the ROM is installed backward, damage will occur when the universal gateway is powered ON.

Step 9 Replace any cards removed. (Refer to *Cisco AS5350 and Cisco AS5400 Universal Gateway Card Installation Guide* for instructions on installing specific dial feature cards.)

Step 10 Replace the chassis cover. (See the instructions in the "Replacing the Chassis Cover" section on page A-13.)

Step 11 Power ON the universal gateway. If error messages relating to memory are displayed, remove the new boot ROMs and reinstall them, taking care to seat the ROMs firmly in their sockets.

Replacing SDRAM DIMMs

This section describes how to replace SDRAM DIMMs on the system board. You might need to upgrade the SDRAM DIMMs for the following reasons:

- You have upgraded to a new Cisco IOS feature set or release that requires more memory.
- You are using very large routing tables or many protocols (for example, when the universal gateway is set up as a connection device between large external networks and your internal network).

The system board contains three sockets for SDRAM DIMMs (see Figure A-4):

- Two sockets hold main memory SDRAM DIMMs with each DIMM at 256 MB. Main memory is used by the CPU to store the operating configuration, routing tables, and queues. The Cisco AS5400 is shipped with one DIMM installed in its socket; the second socket is empty. To increase the memory capacity to 512 MB, install an additional 256 MB DIMM in the empty socket.
- One socket holds a packet memory SDRAM DIMM. Packet memory is used to store incoming and outgoing packets. The maximum packet memory supported is 128 MB.

Required Tools and Equipment

You need the following tools and equipment:

- ESD-preventive wrist strap
- The appropriate SDRAM DIMM(s)

SDRAM DIMM Replacement

To replace the SDRAM, follow these steps:

Step 1 Turn the power switch OFF and disconnect site power.

For DC-powered units only, note the following warning.

Warning **Before performing any of the following procedures, ensure that power is removed from the DC circuit. To ensure that all power is OFF, locate the circuit breaker on the panel board that services the DC circuit, switch the circuit breaker to the OFF position, and tape the switch handle of the circuit breaker in the OFF position. To see translations of the warnings that appear in this publication, refer to the *Regulatory Compliance and Safety Information* document that accompanied this device.**

Step 2 Remove all interface cables from the DFC cards.

Warning **Before opening the chassis, disconnect the telephone-network cables to avoid contact with telephone-network voltages. To see translations of the warnings that appear in this publication, refer to the *Regulatory Compliance and Safety Information* document that accompanied this device.**

Step 3 Attach an ESD-preventive wrist strap.

Step 4 Remove the chassis cover. (See the instructions in the section "Replacing the Chassis Cover" earlier in this appendix.)

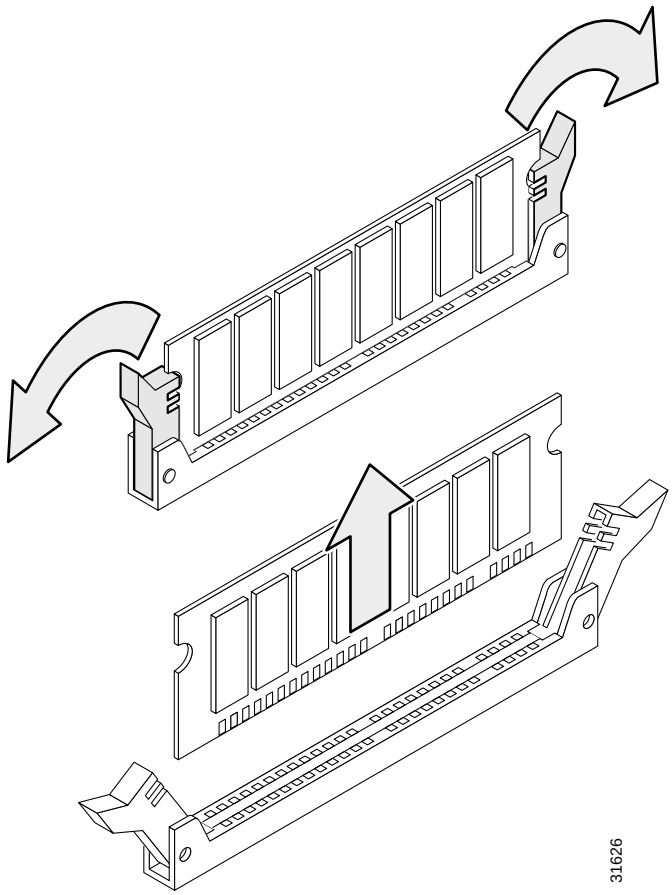
Step 5 Remove all cards to access the system board. (Refer to the *Cisco AS5350 and* Cisco *AS5400 Universal Gateway Card Installation Guide* for instructions on removing specific cards.)

Step 6 Use Figure A-4 to locate the DIMM you are replacing.

Step 7 Pull the socket latches away from the DIMM, and pull the DIMM out of the socket. (See Figure A-5.) The latches hold the DIMM tightly, so be careful not to break the socket.

Caution To prevent damage, do not press on the center of the DIMM. Handle the DIMM carefully.

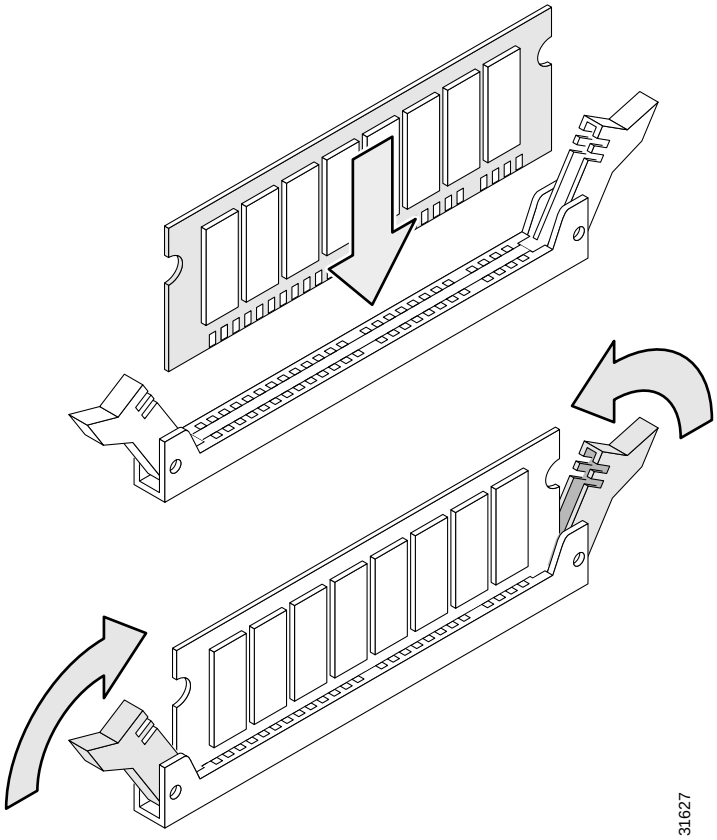
Figure A-5 Removing the SDRAM DIMM



Step 8 Position the new DIMM so that the polarization notch is located at the right end of the DIMM socket.

Step 9 Insert the new SDRAM DIMM by sliding the end with the metal fingers into the DIMM socket. (See Figure A-6.)

Figure A-6 Inserting the New SDRAM DIMM into the Socket



Step 10 Snap the latches into place. Do not use excessive force because the socket might break.

Step 11 Replace the chassis cover. (See the "Replacing the Chassis Cover" section on page A-13.)

Step 12 Replace the feature cards. (Refer to the *Cisco AS5350 and Cisco AS5400 Universal Gateway Card Installation Guide* for instructions on replacing specific dial feature cards.)

Step 13 Power ON the universal gateway. If error messages relating to memory are displayed, remove the SDRAM DIMM and reinstall it, taking care to seat the DIMM firmly in its socket.

Replacing Flash Memory SIMMs

The system card contains three sockets for flash memory SIMMs (see Figure A-4):

- Two sockets hold SIMMs containing the Cisco IOS software image. Each SIMM is 32 MB.
- Cisco recommends that you first install SIMM0. To increase the memory capacity to 64 MB, install the second SIMM in SIMM1.

Caution It is critical that the correct Flash memory SIMM modules be installed in the Cisco AS5400 and Cisco AS5400HPX universal gateways. The Cisco AS5400 only supports 5V Flash memory SIMM modules and the Cisco AS5400HPX only supports 3.3V Flash memory. In addition, system flash and boot flash modules for the Cisco AS5400 are not interchangeable with those for the Cisco AS5400HPX. Using the incorrect memory will cause the system to malfunction and may cause damage to the system board or memory card.

Tips To help identify your universal gateway, starting with Cisco IOS Release 12.2(11)T, the **show version** and **show diag** commands will identify the universal gateway as an *AS5400* or *AS5400HPX*. Prior to this release, these commands showed the universal gateway as an *AS5400*, even if it was a *AS5400HPX*.

Note Flash memory should be reformatted after adding, replacing, or removing flash memory SIMMS.

- One socket holds a SIMM for the boot helper image (rxboot) software. This SIMM, labeled SIMM, must also be installed. The SIMM can be 8, or 16 MB.

The Flash memory SIMMs must be purchased from Cisco. For ordering information, refer to the "Obtaining Technical Assistance" in the Preface.

Flash Memory Identification

Cisco AS5400HPX

To identify the correct Flash memory SIMMs for the Cisco AS5400HPX, look for a label on the front of the 3.3V memory card with the part number "80-65xx-xx." (See Figure A-7). Table A-1 shows the possible part numbers for the 3.3V Flash memory SIMMs.

Figure A-7 Flash SIMM Module for the Cisco AS5400HPX

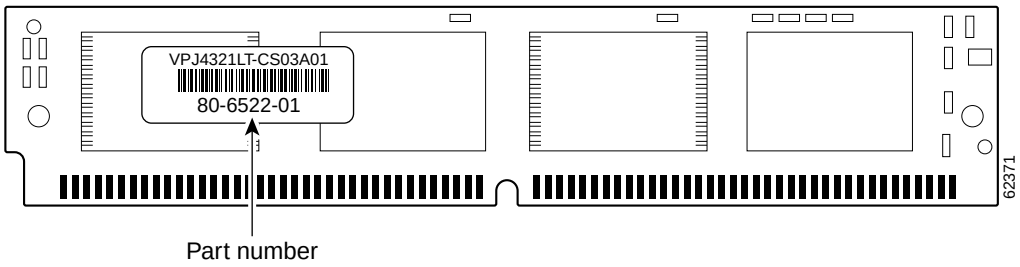


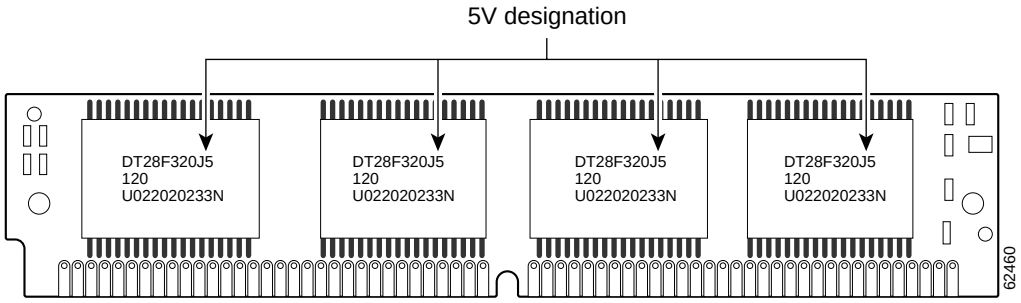
Table A-1 3.3V SIMM Module Part Numbers

Memory Size	Cisco AS5400HPX Part No.
8 MB	80-6520-xx
16 MB	80-6521-xx

Cisco AS5400

To identify the correct Flash memory SIMMs for the Cisco AS5400, look for a model number on the flash chip that ends in "J5". The "J5" identifies the chip as 5V. (See Figure A-8).

Figure A-8 Flash SIMM Module for the Cisco AS5400



Required Tools and Equipment

To replace the Flash memory, you need the following tools and equipment:

- ESD-preventive wrist strap
- The appropriate Flash memory SIMM(s)

Flash Memory SIMM Replacement

To replace flash memory, follow these steps:

Step 1 Backup the current Flash memory. Refer to the *Cisco AS5350 and Cisco AS5400 Universal Gateway Software Configuration Guide* for information about replacing software images.

Step 2 Turn the power switch OFF and disconnect site power.

Step 3 Remove all interface cables from the DFC cards.

For DC-powered units only, note the following warning.

Warning **Before performing any of the following procedures, ensure that power is removed from the DC circuit. To ensure that all power is OFF, locate the circuit breaker on the panel board that services the DC circuit, switch the circuit breaker to the OFF position, and tape the switch handle of the circuit breaker in the OFF position. To see translations of the warnings that appear in this publication, refer to the *Regulatory Compliance and Safety Information* document that accompanied this device.**

Step 4 Attach an ESD-preventive wrist strap.

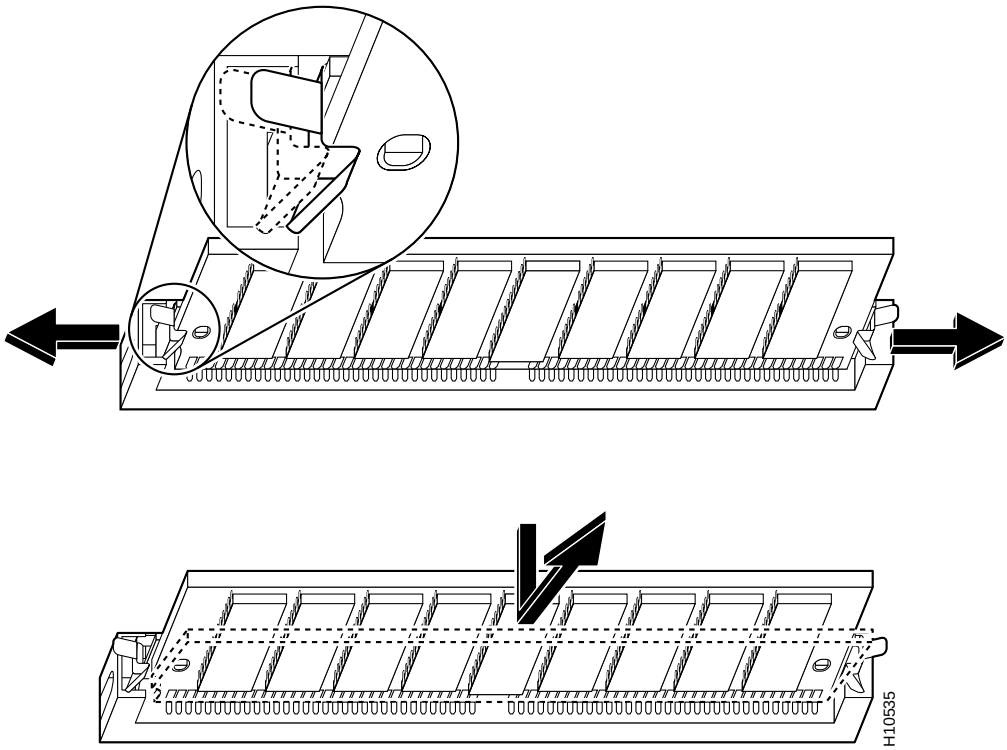
Step 5 Remove the chassis cover. (See the previous procedure in the section "Replacing the Chassis Cover" on page A-1.)

Step 6 Place the chassis so that the system card is oriented with the Flash memory SIMMs toward you. (See Figure A-4.) The system code SIMM sockets are labeled SIMM0 and SIMM1; the rxboot SIMM socket is labeled SIMM.

Step 7 Remove the existing Flash memory SIMM by pulling outward on the socket latches and then lifting the SIMM out of the socket (see Figure A-9).

Caution To prevent damage, do not press on the center of the SIMMs. Handle each SIMM carefully.

Figure A-9 Removing the Flash Memory SIMM

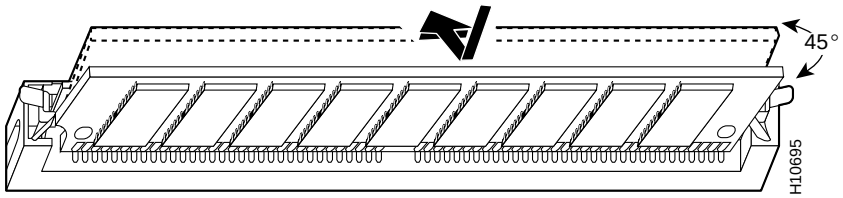


Step 8 Repeat these steps for all the Flash memory SIMMs that you need to replace.

Caution Some Flash memory SIMMs have the components mounted on the rear side. To prevent damage when you insert the SIMM, always use the polarization notch as a reference, *not* the position of the components on the SIMM.

Step 9 Insert the new SIMM by sliding the end with the metal fingers into the appropriate SIMM socket at approximately a 45-degree angle to the system card. (See Figure A-10.)

Figure A-10 Inserting the Flash Memory SIMM



Step 10 Gently rotate the SIMM until the latch on either side snaps into place. Do not use excessive force because the connector might break. When inserting the new SIMM, make sure that the polarization notch is located at the right end of the SIMM socket.

Step 11 Replace the chassis cover. (See the instructions in the following section "Replacing the Chassis Cover.")

Step 12 Replace any cards removed. (Refer to the *Cisco AS5350 and Cisco AS5400 Universal Gateway Card Installation Guide* for instructions on installing various cards.) Connect the universal gateway to a console terminal.

Step 13 Power ON the universal gateway. If any memory-related error messages appear, remove the Flash memory SIMM and reinstall it, taking care to seat the SIMM firmly in the socket.

Step 14 Reformat Flash memory.

Replacing the Chassis Cover

This section describes the procedure for replacing the chassis cover.

Required Tools and Equipment

- Medium Phillips screwdriver
- Four screws
- Cable ties

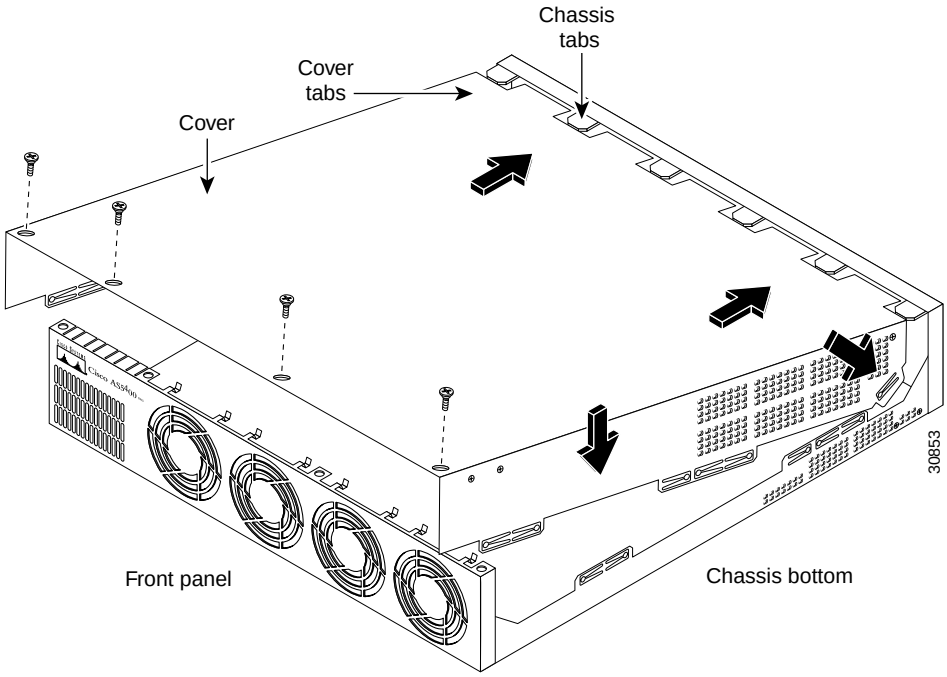
Chassis Cover Replacement

To replace the chassis cover, follow these steps:

Step 1 Place the chassis bottom so that the front panel is facing you.

Step 2 Hold the chassis cover over the chassis bottom, and align each of the cover tabs with the chassis tabs at the top rear of the chassis, as shown in Figure A-11.

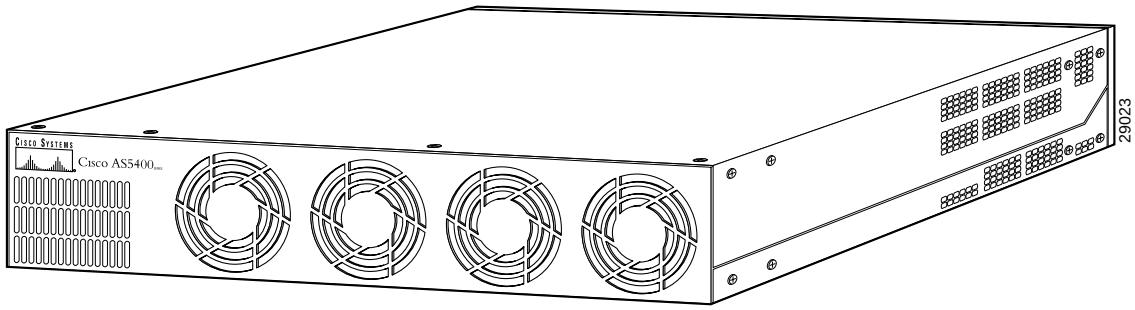
Figure A-11 Replacing the Chassis Cover



Step 3 Lower the front of the top cover to close the chassis, and ensure the following:

- The chassis cover tabs fit under the edge of the chassis rear panel so that they are not exposed.
- The chassis tabs fit under the chassis cover so that they are not exposed. (See Figure A-12.)

Figure A-12 Cisco AS5400 Chassis



Step 4 Secure the chassis cover with four screws.

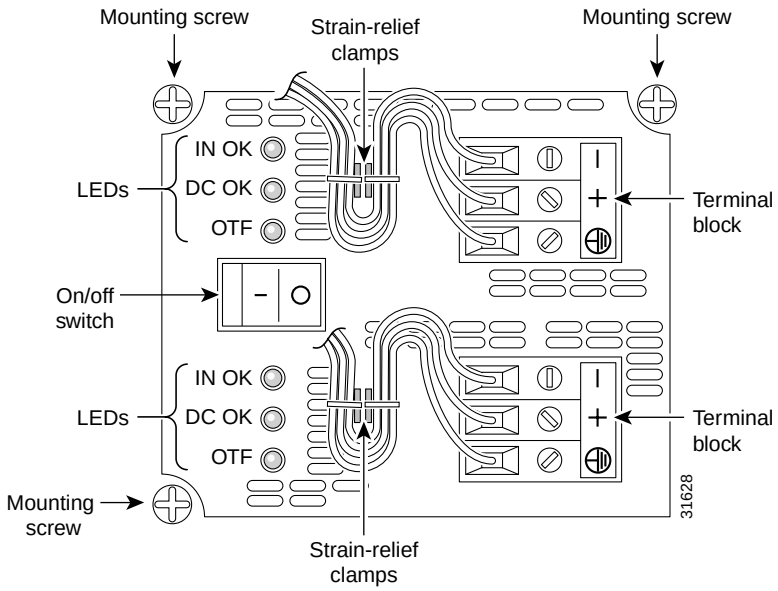
Step 5 Reinstall the chassis on a rack, desktop, or table.

Step 6 Reinstall all interface cables.

Step 7 Reconnect the two AC power cords to the power supply. Or, if using DC power, refer to Figure A-13, and then complete steps a through d.

Warning **The illustration shows the DC power supply terminal block. Wire the DC power supply using the appropriate wire terminations at the wiring end, as illustrated. The proper wiring sequence is ground to ground, return to return, and negative to negative. Note that the ground wire should always be connected first and disconnected last. To see translations of the warnings that appear in this publication, refer to the *Regulatory Compliance and Safety Information* document that accompanied this device.**

Figure A-13 DC Power Supply Connections



Caution Do not overtorque the terminal block contact screws. The recommended torque is 5.0 in.-lb (0.56 N-m).

a. Insert the safety ground (green wires) into the terminal block ground connectors and tighten the locking screws. Ensure that no bare wire is exposed.

b. Insert the 48 VDC wires into the terminal block positive connectors (+) and tighten the locking screws. Ensure that no bare wire is exposed.

c. Insert the -48 VDC wires into the terminal block negative connectors (-) and tighten the locking screws. Ensure that no bare wire is exposed.

d. Make sure the power supply cords are secured to the cable strain-relief clamps on the DC power supply with cable ties.

Warning **After wiring the DC power supply, remove the tape from the circuit breaker switch handle and reinstate power by moving the handle of the circuit breaker to the ON position. To see translations of the warnings that appear in this publication, refer to the *Regulatory Compliance and Safety Information* document that accompanied this device.**

Step 8 Power ON the universal gateway.

The internal power supply fan should turn on.

Caution Do not connect the 48 VDC wire to the chassis. A single-point ground is recommended.

Replacing the Power Supply

This appendix includes information on how to replace the power supply for the Cisco AS5400 and Cisco AS5400HPX and contains the following sections:

The Cisco AS5400 universal gateway has a redundant power supply. A redundant power supply has two power cords to provide higher reliability and load balancing. You can use the redundant power supply to:

- Manage your system with alarms and other management features.
- Provide higher reliability with a second built-in power supply connected to a second power source.
- Balance loads.

Note Unless specifically noted, all references to the Cisco AS5400 also apply to the Cisco AS5400HPX.

Safety Recommendations

Note the following safety recommendations:

Warning **Before opening the chassis, disconnect the telephone-network cables to avoid contact with telephone-network voltages. To see translations of the warnings that appear in this publication, refer to the *Regulatory Compliance and Safety Information* document that accompanied this device.**

Warning **Do not work on the system or connect or disconnect cables during periods of lightning activity. To see translations of the warnings that appear in this publication, refer to the *Regulatory Compliance and Safety Information* document that accompanied this device.**

Warning **Before working on a chassis or working near power supplies, unplug the power cord on AC units; disconnect the power at the circuit breaker on DC units. To see translations of the warnings that appear in this publication, refer to the *Regulatory Compliance and Safety Information* document that accompanied this device.**

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. To see translations of the warnings that appear in this publication, refer to the *Regulatory Compliance and Safety Information* document that accompanied this device.**

Warning **Only trained and qualified service personnel should be allowed to install or replace this equipment. To see translations of the warnings that appear in this publication, refer to the *Regulatory Compliance and Safety Information* document that accompanied this device.**

Caution Before opening the chassis, ensure that you have discharged all static electricity from your body and be sure that the power is OFF.

Required Tools and Equipment

You need the following tools and equipment:

- Medium-size Phillips screwdriver
- Small or medium flat-blade screwdriver
- ESD-preventive wrist strap
- Tie-wraps (optional)
- Antistatic bag (optional)

Removing the Chassis Cover

You must open the chassis to gain access to its interior components.

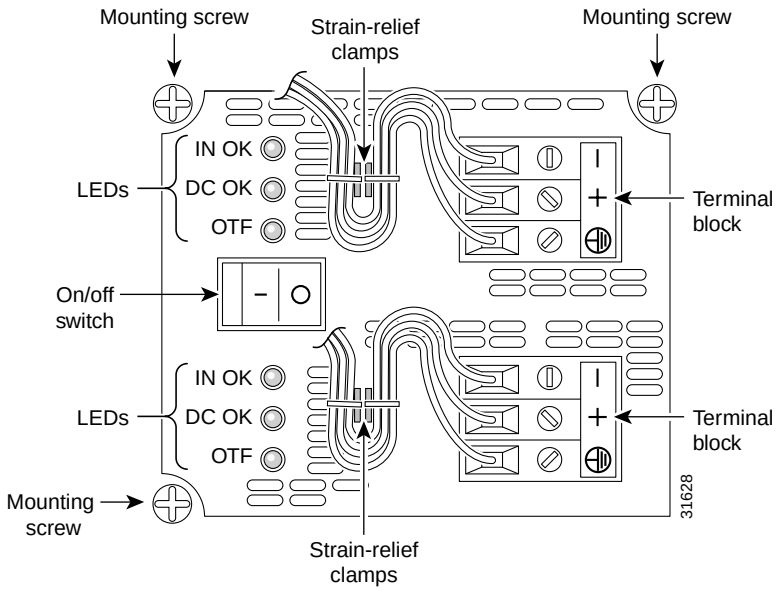
To remove the chassis cover, follow these steps:

Step 1 Turn the power switch OFF and disconnect site power. (Note that the power switch is part of the power supply.)

Note If you are using a DC-powered unit, refer to Figure B-1 and complete Step a through Step d.

Warning **Before performing any of the following procedures, ensure that power is removed from the DC circuit. To ensure that all power is OFF, locate the circuit breaker on the panel board that services the DC circuit, switch the circuit breaker to the OFF position, and tape the switch handle of the circuit breaker in the OFF position. To see translations of the warnings that appear in this publication, refer to the *Regulatory Compliance and Safety Information* document that accompanied this device.**

Figure B-1 DC Power Supply Connections



a. Loosen the six locking screws for the negative, return, and ground connectors on the DC power supply terminal blocks.

b. Remove the -48 VDC wires from the terminal block negative connectors (-).

c. Remove the 48 VDC wires from the terminal block positive connectors (+).

d. Remove the safety ground (green wires) from the terminal block ground connectors.

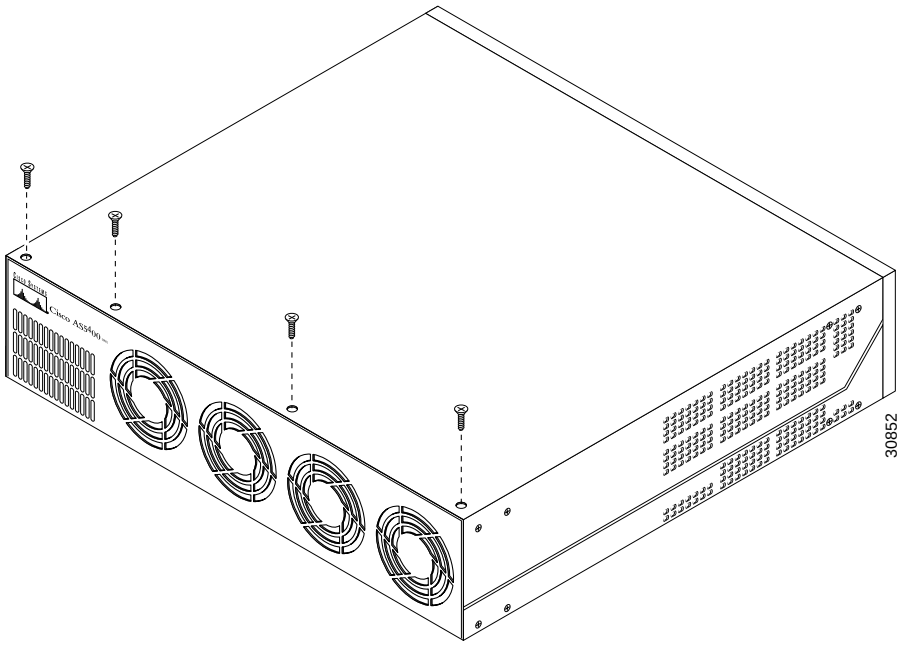
Caution Do not connect the 48 VDC wire to the chassis. A single-point ground is recommended at the power distribution rack.

Step 2 Remove all interface cables from the rear of the chassis.

Step 3 Place the chassis so that the front panel is facing you.

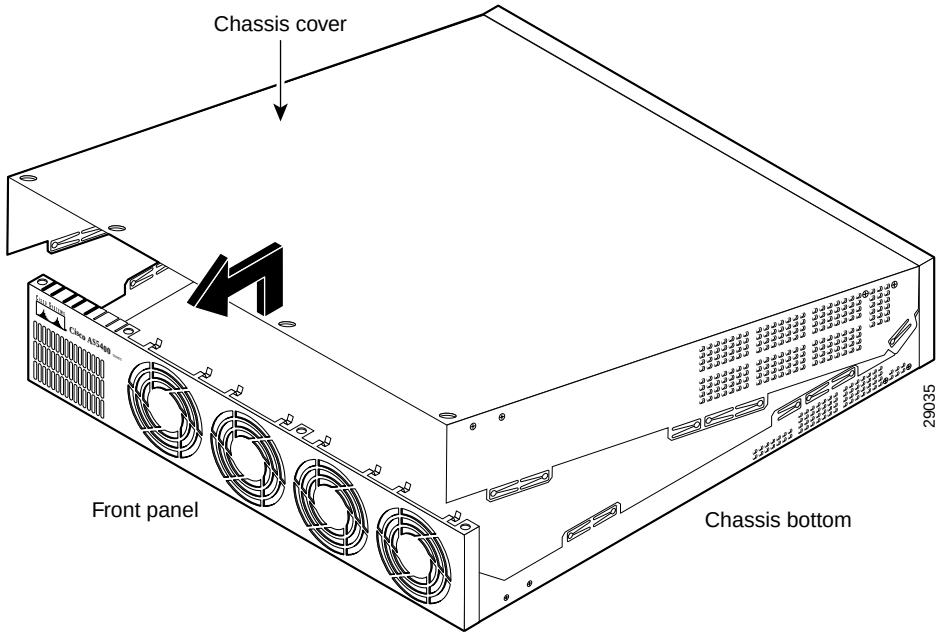
Step 4 Remove the four screws on the chassis cover. (See Figure B-2.)

Figure B-2 Removing the Chassis Cover Screws



Step 5 Gently pry the cover off with a flat-blade screwdriver. Lift the chassis cover upward, and pull it away from the tabs on the rear of the chassis. (See Figure B-3.)

Figure B-3 Removing the Chassis Cover



Step 6 Continue with the following section, "Removing the Power Supply"

Removing the Power Supply

This section describes how to remove the power supply. Note the following safety warnings before you remove the power supply:

Warning **Ultimate disposal of this product should be handled according to all national laws and regulations. To see translations of the warnings that appear in this publication, refer to the *Regulatory Compliance and Safety Information* document that accompanied this device.**

Warning **Only trained and qualified personnel should be allowed to install or replace this equipment. To see translations of the warnings that appear in this publication, refer to the *Regulatory Compliance and Safety Information* document that accompanied this device.**

Warning **Read the installation instructions before you connect the system to its power source. To see translations of the warnings that appear in this publication, refer to the *Regulatory Compliance and Safety Information* document that accompanied this device.**

Warning **Before working on a system that has an on/off switch, turn OFF the power and unplug the power cord. To see translations of the warnings that appear in this publication, refer to the *Regulatory Compliance and Safety Information* document that accompanied this device.**

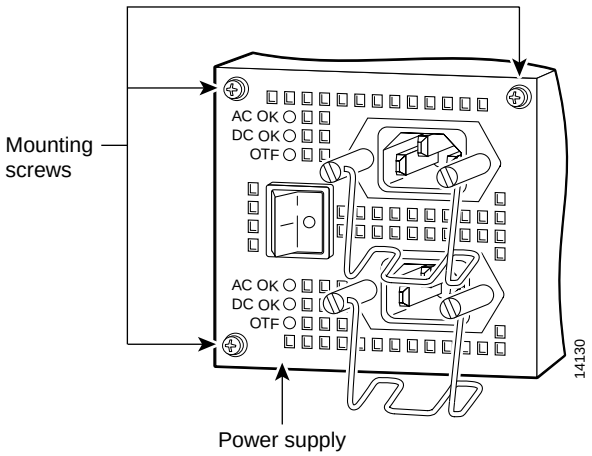
Warning **Before working on equipment that is connected to power lines, remove jewelry (including rings, necklaces, and watches). Metal objects will heat up when connected to power and ground and can cause serious burns or weld the metal object to the terminals. To see translations of the warnings that appear in this publication, refer to the *Regulatory Compliance and Safety Information* document that accompanied this device.**

To remove the power supply, follow these steps:

Step 1 Place the chassis so that the rear panel is facing you.

Step 2 Remove the three mounting screws that secure the power supply to the chassis and set them aside. (See Figure B-4.)

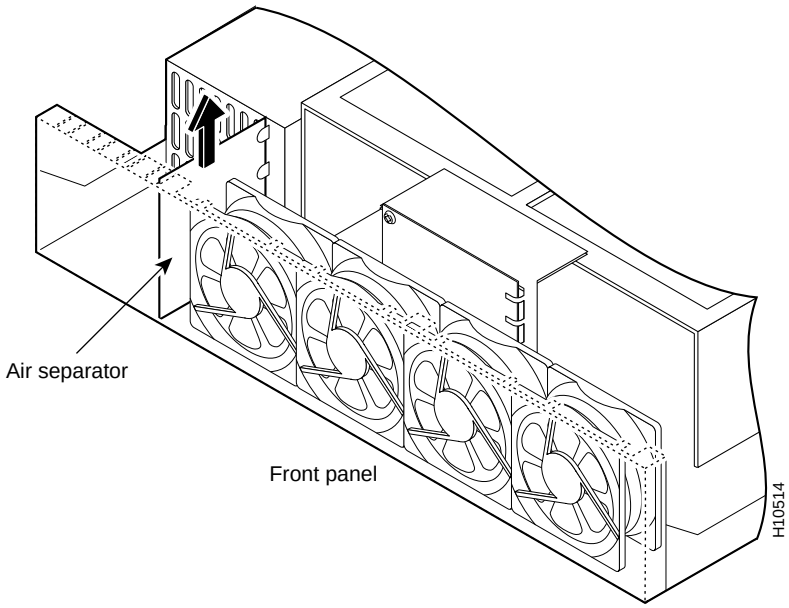
Figure B-4 Removing the Power Supply Mounting Screws



Step 3 Turn the chassis so that the front panel is facing you.

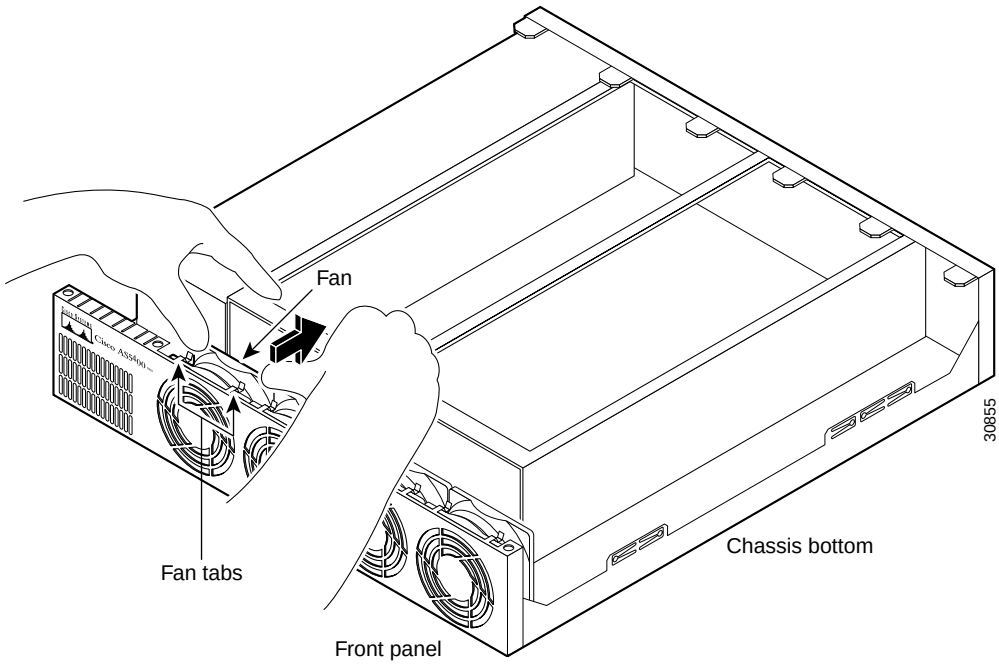
Step 4 Lift the air separator out of the chassis. (See Figure B-5.)

Figure B-5 Removing the Air Separator



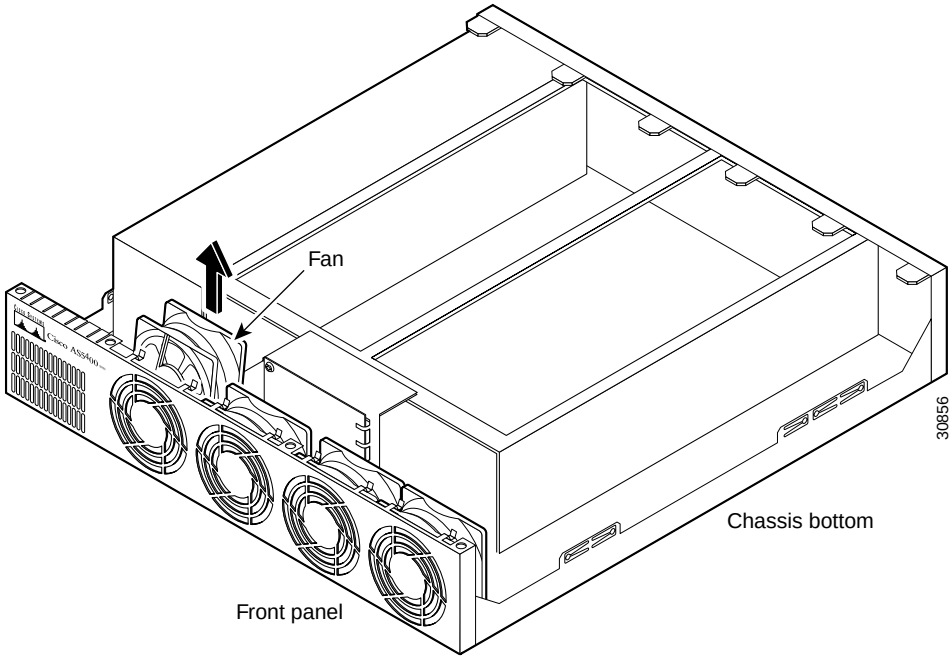
Step 5 Pull the fan closest to the power supply away from the sheet metal tabs. (See Figure B-6.)

Figure B-6 Pulling the Fan Away from the Tabs



Step 6 Lift the fan out of the chassis, and set the fan on top of the power supply. (See Figure B-7.)

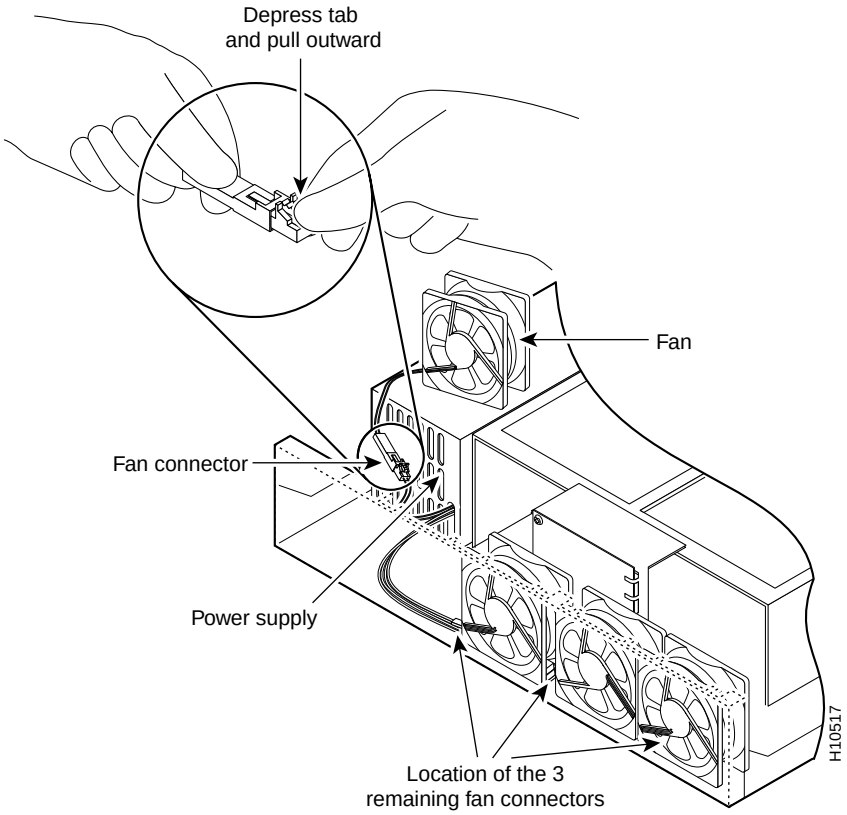
Figure B-7 Removing the Fan



Caution Do not attempt to remove the fan cables without first depressing the tab as shown in Figure B-8. You can damage the fan cables by applying stress if the connector is not removed properly.

Step 7 Disconnect the fan cable, and set aside the fan. (See Figure B-8.)

Figure B-8 Disconnecting the Fan Cable



Step 8 Remove the next fan and disconnect its cable.

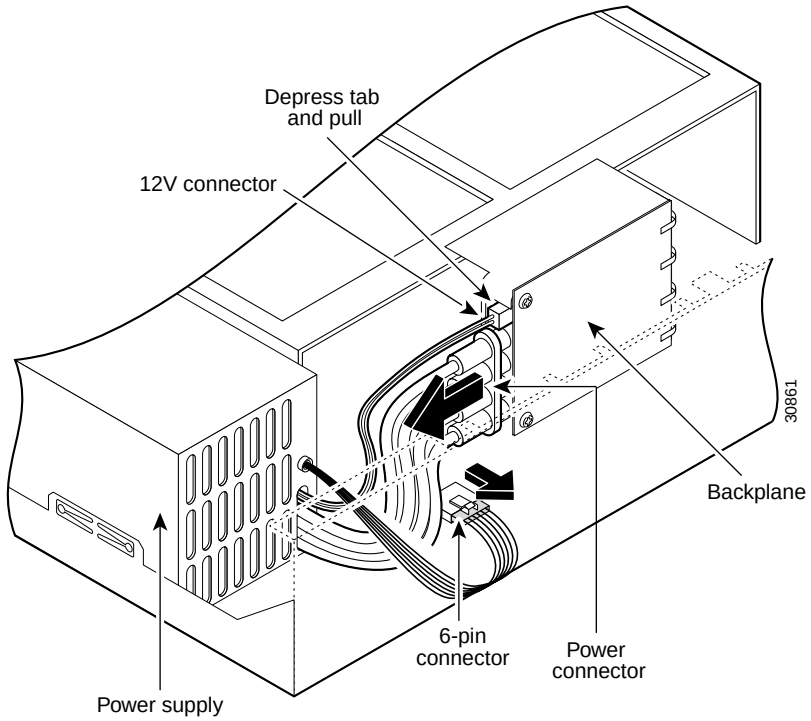
Step 9 Remove the cables for the two remaining fans. You can disconnect these cables without removing the fans.

Note There are three different lengths of 2-wire, 12 VDC power cables. The two shortest cables go to the fan that you removed in Step 6. The two longer cables go to the three remaining fans removed in Step 8 and Step 9. The remaining cable goes to the power connector on the backplane.

These cables are color-coded. If you use an incorrect cable to connect a fan or the backplane, then you will be unable to make one of the other connections. To help with reconnecting the cables, write down which colored cable goes to each fan.

Step 10 Disconnect the power connectors from the backplane. First disconnect the 2-pin 12V connector, then disconnect the power connector's 4-jack harness. (See Figure B-9.)

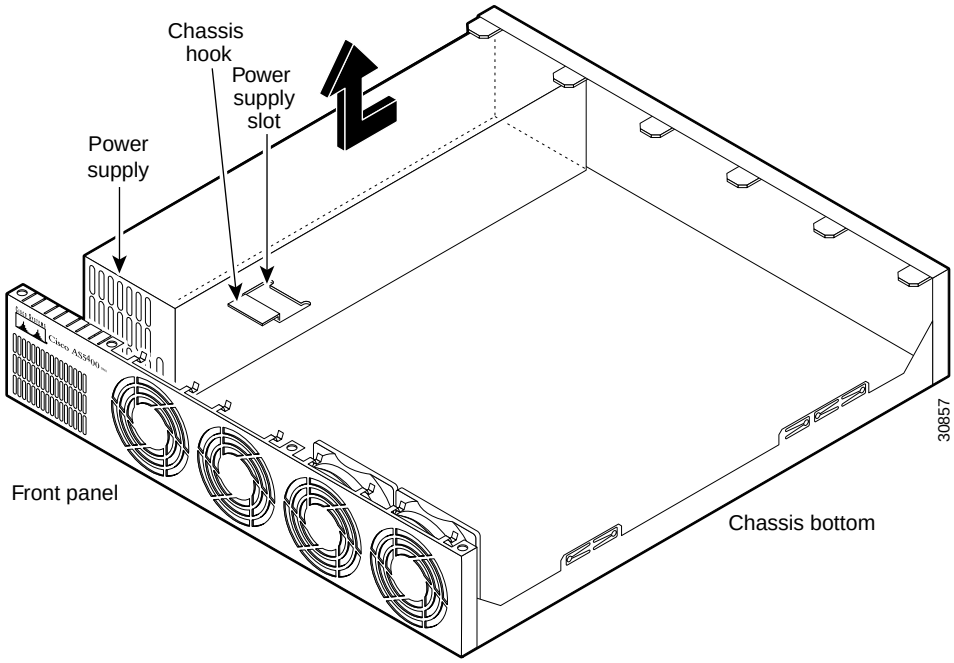
Figure B-9 Disconnecting the Power Connectors from the Backplane



Step 11 Disconnect the 6-pin connector from the system board. (See Figure B-9.)

Step 12 Slide the power supply toward the front panel to disengage the power supply hook from the chassis hook, and remove the power supply from the chassis. (See Figure B-10.)

Figure B-10 Lifting the Power Supply Out of the Chassis



Installing the Power Supply

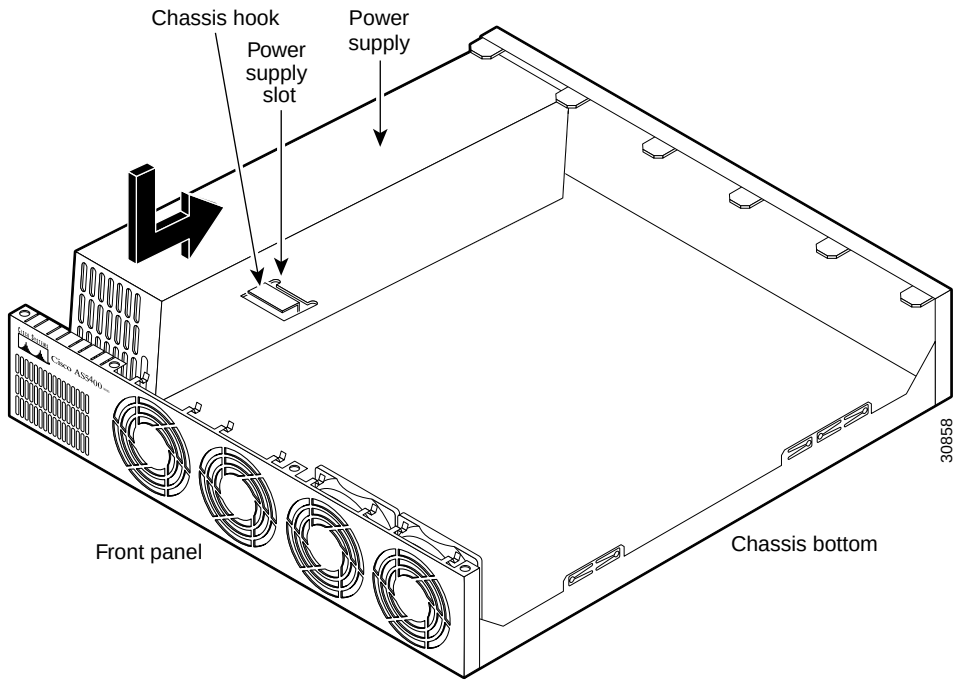
A redundant power supply has two power cords to provide higher reliability and load balancing. Use the redundant power supply to:

- Manage your system with alarms and other management features
- Provide a higher reliability with a second built-in power supply
- Balance loads

To install the redundant power supply, follow these steps:

Step 1 Place the redundant power supply in the chassis, and slide it toward the rear panel. You will be able to feel the chassis hook engage with the slot on the bottom of the power supply. (See Figure B-11.)

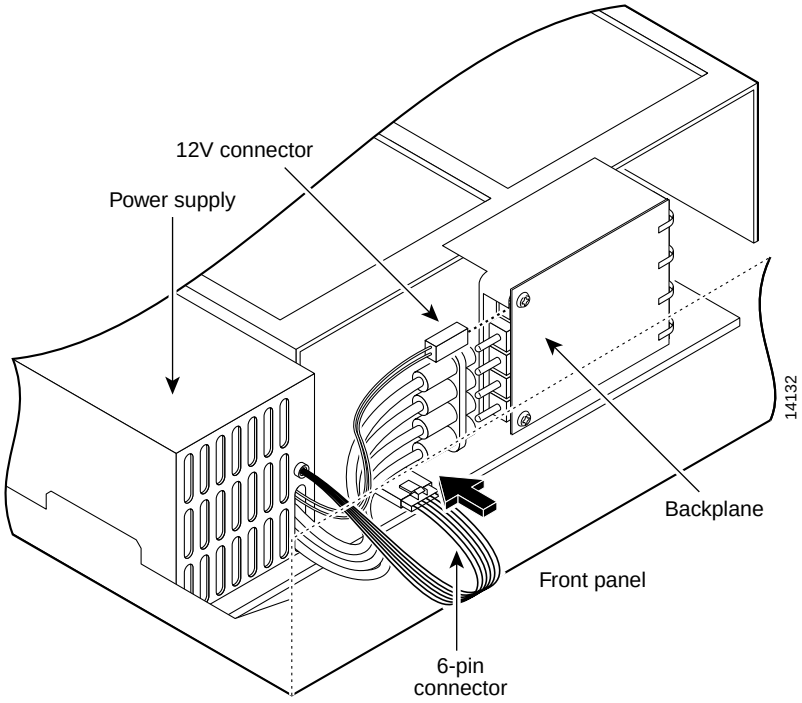
Figure B-11 Inserting the Power Supply in the Chassis



Step 2 Connect the 6-pin connector to the system board. (See Figure B-12.)

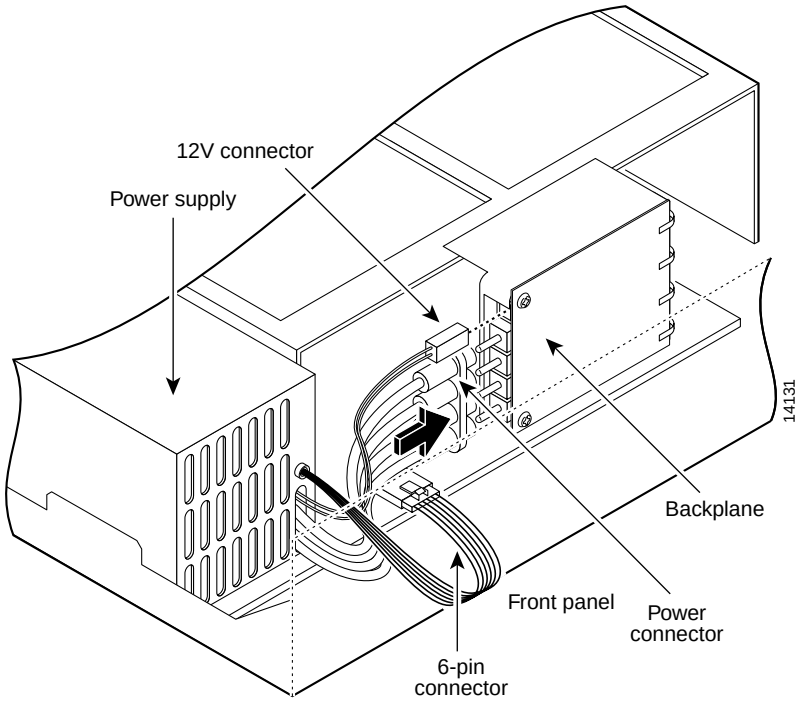
Note For clarity, the illustration does not show the fans in place or the fan cables.

Figure B-12 Connecting the 6-Pin Connector to the System Board



Step 3 Reconnect the power connector's 4-jack harness, then reconnect the 2-pin 12V connector. (See Figure B-13.)

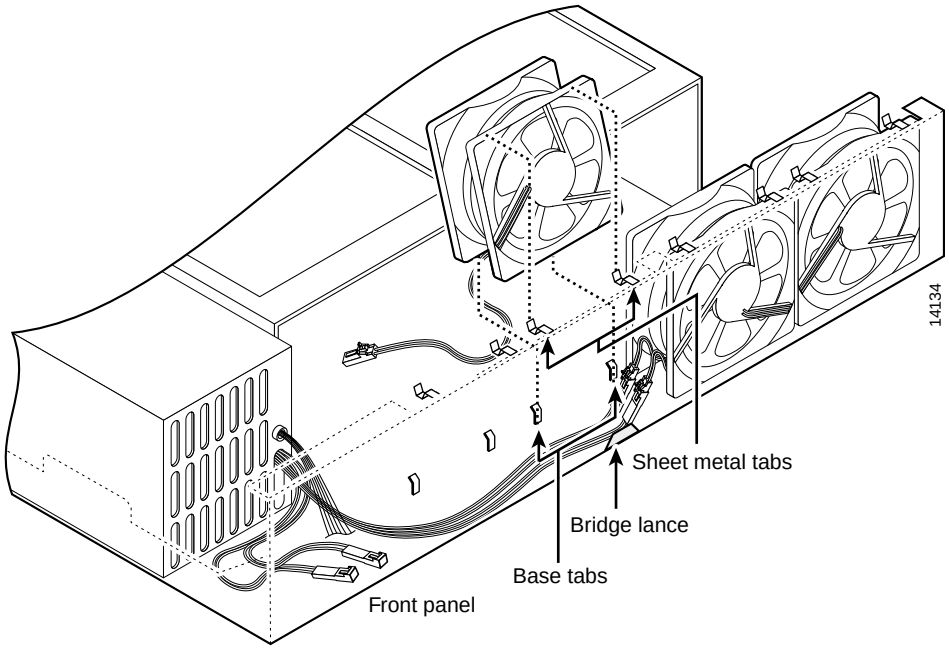
Figure B-13 Reconnecting the Power Cables to the Backplane



Step 4 Route the fan cables as shown in Figure B-14. Note that the two longest cables are connected to the two installed fans on the right. The connectors to these two fans will fit into the space between the second and third fans.

Caution Route the fan cables carefully to avoid pinching the cables near the bridge lance. (See Figure B-14.)

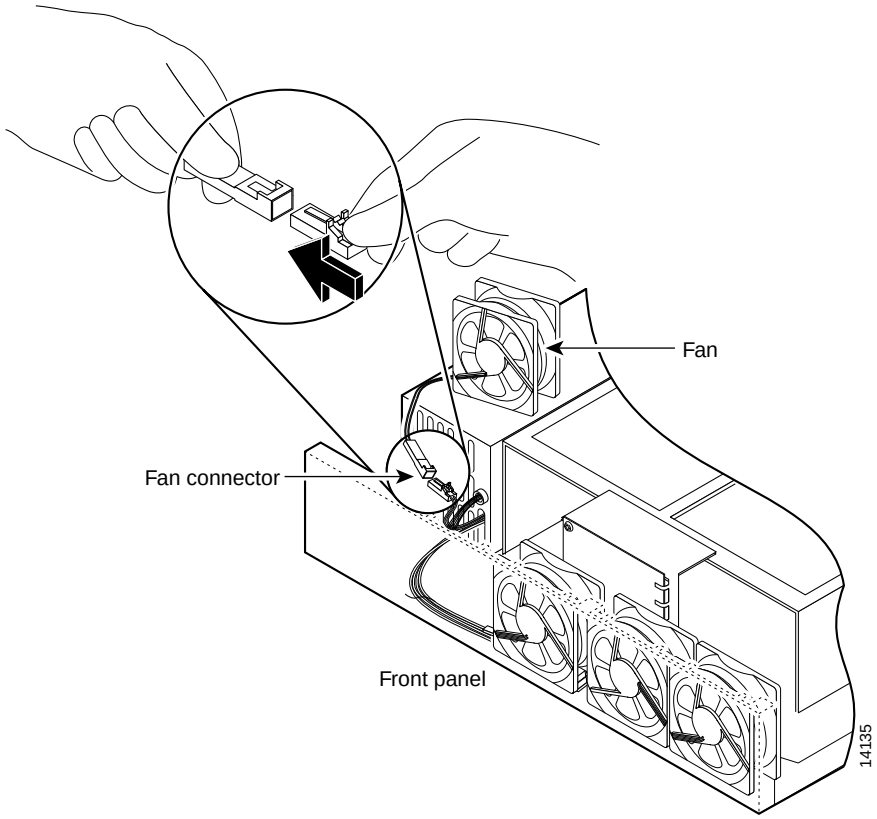
Figure B-14 Routing the Fan Cables



Step 5 Insert the second fan, making sure that the fan cable feeds to your left. Position the cables to the two installed fans so that they will fit under the first and second fans. Press the fan into place between the four sheet metal tabs. (See Figure B-14.)

Step 6 Reconnect the two 2-pin fan cables to the remaining fan. (See Figure B-15.)

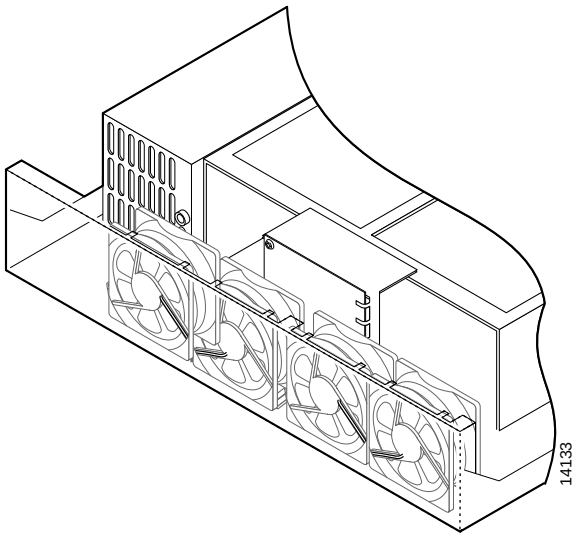
Figure B-15 Reconnecting the Fan Cables



Step 7 Reinstall the remaining fan. Make sure you orient the fan so that the cables feed to the right (toward the second fan). Route the cable completely under the fan before you reconnect it. This takes up the extra length of fan cable and keeps it out of the way.

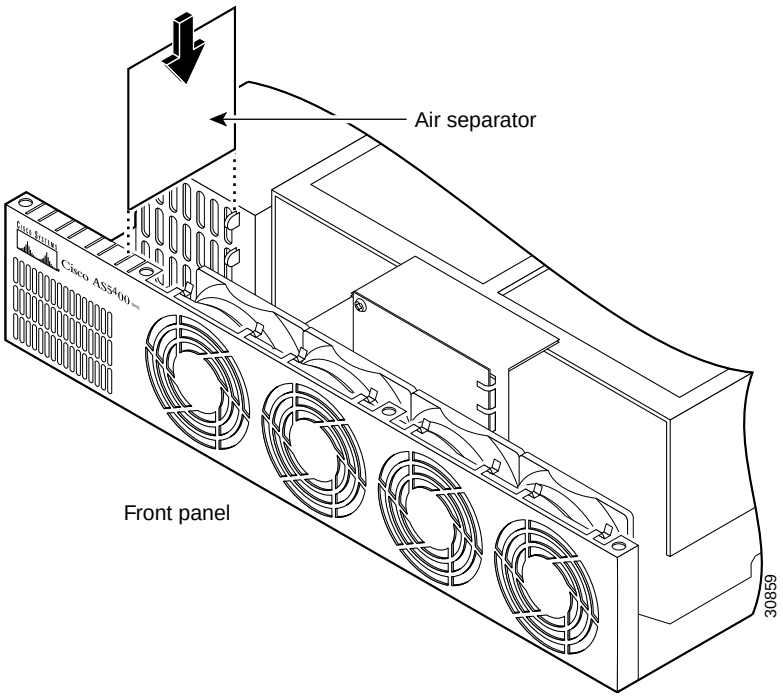
When correctly assembled, the cables appear as shown in Figure B-16.

Figure B-16 Correct Fan Cable Routing



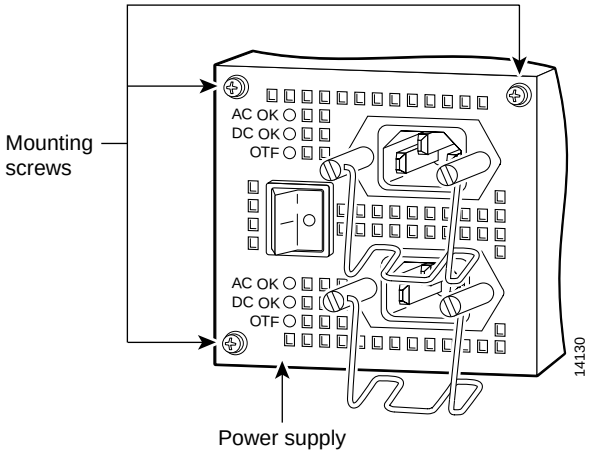
Step 8 Replace the air separator, holding all cables to the right of the separator as you slip it into the chassis. (See Figure B-17.)

Figure B-17 Replacing the Air Separator



Step 9 Turn the chassis so that the rear panel faces you, and reinstall the three mounting screws. (See Figure B-18.)

Figure B-18 Replacing the Redundant Power Supply Mounting Screws



Step 10 Replace the chassis cover using the procedures in the following section, "Replacing the Chassis Cover"

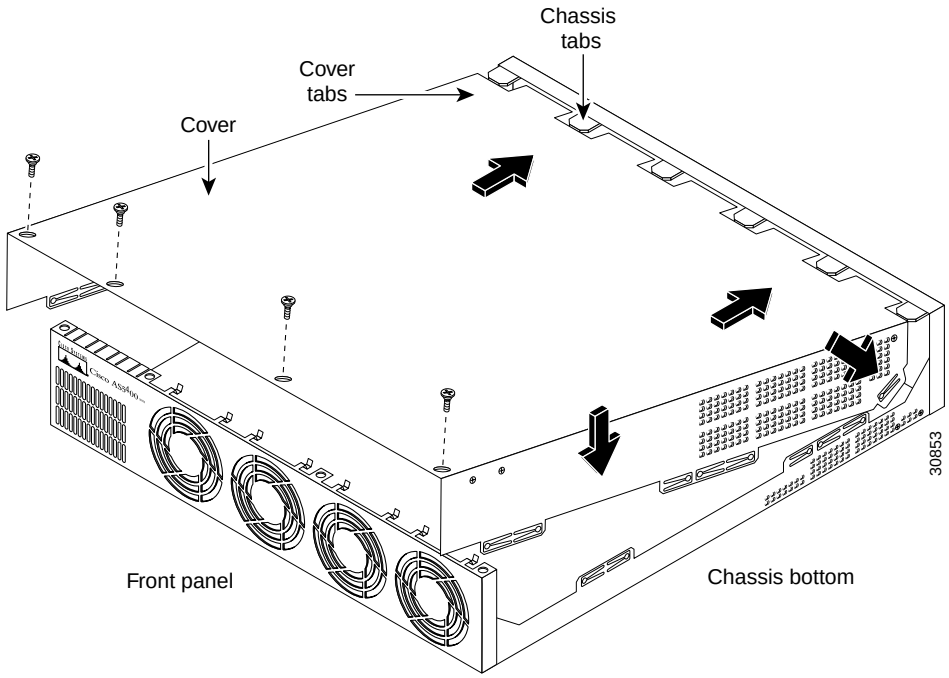
Replacing the Chassis Cover

To replace the chassis cover, follow these steps:

Step 1 Place the chassis bottom so that the front panel is facing you.

Step 2 Hold the chassis cover over the chassis bottom, and align each of the cover tabs with the chassis tabs at the top rear of the chassis. (See Figure B-19.)

Figure B-19 Replacing the Chassis Cover

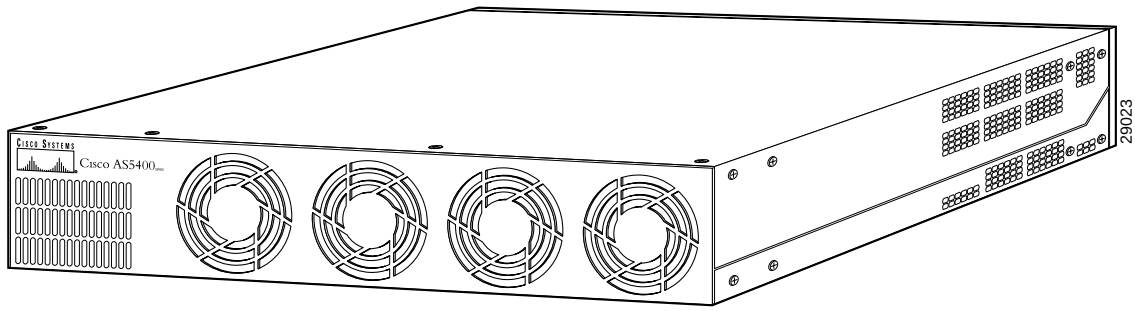


Step 3 Lower the front of the top cover to close the chassis, and ensure the following:

- The chassis cover tabs fit under the edge of the chassis rear panel so that they are not exposed.
- The chassis tabs fit under the chassis cover so that they are not exposed.
- The chassis cover side tabs on both sides fit inside the chassis side panels so that they are not exposed.

When the chassis cover is properly assembled, no tabs are visible. (See Figure B-20.)

Figure B-20 Cisco AS5400 Chassis



Step 4 Secure the chassis cover with four screws. (See Figure B-19.)

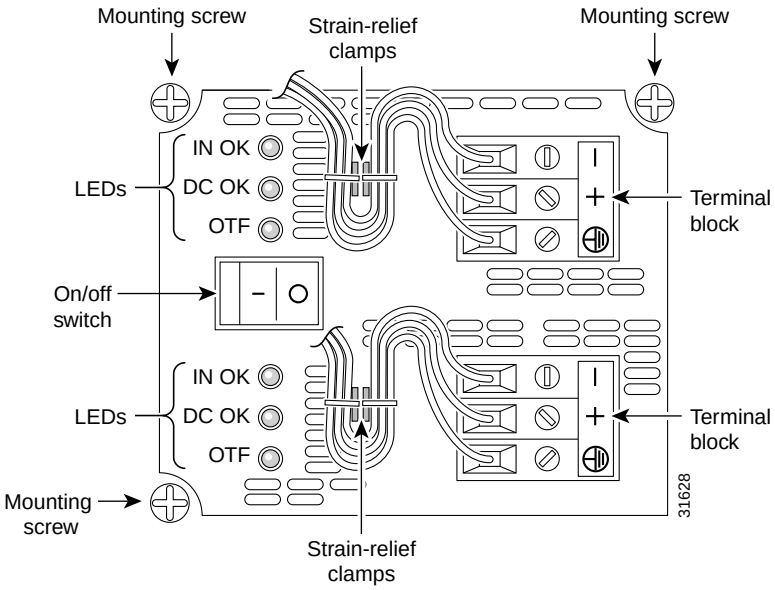
Step 5 Reinstall the chassis on a rack, desktop, or table.

Step 6 Reinstall all interface cables.

Step 7 Reconnect the AC power cord. Or, if using a DC-powered unit, refer to Figure B-21, and complete Step a through Step d.

Warning **The illustration shows the DC power supply terminal block. Wire the DC power supply using the appropriate wire terminations at the wiring end, as illustrated. The proper wiring sequence is ground to ground, return to return, and negative to negative. Note that the ground wire should always be connected first and disconnected last. To see translations of the warnings that appear in this publication, refer to the *Regulatory Compliance and Safety Information* document that accompanied this device.**

Figure B-21 DC Power Supply Connections



Caution Do not overtorque the terminal block contact screws. The recommended torque is 5.0 in.-lb (0.56 N-m).

a. Insert the safety ground (green wires) into the terminal block ground connectors and tighten the locking screws. Ensure that no bare wire is exposed.

b. Insert the 48 VDC Return wires into the terminal block positive connectors (+) and tighten the locking screws. Ensure that no bare wire is exposed.

c. Insert the -48 VDC wires into the terminal block negative connectors (-) and tighten the locking screws. Ensure that no bare wire is exposed.

d. Make sure the power supply cords are secured to the cable strain-relief clamps on the DC power supply with cable ties.

Warning **After wiring the DC power supply, remove the tape from the circuit breaker switch handle and reinstate power by moving the handle of the circuit breaker to the ON position. To see translations of the warnings that appear in this publication, refer to the *Regulatory Compliance and Safety Information* document that accompanied this device.**

Note You can order a Y-connector (CAB-AC-Y) to plug into both power connectors in the power supply. If you use this Y-connector, you remove the backup feature of this power supply by eliminating redundant operations and reducing reliability. Cisco highly recommends that you use both power cords whenever possible.

Step 8 Power ON the universal gateway.

The internal power supply fan should power on. If you are using a redundant power supply, the six green LEDs on the front of the power supply should light. If one LED is not lit, consult the appropriate redundant power supply software message to determine where the problem is located.

Verifying the Status of the Redundant Power Supply

To display the current status of the Redundant Power Supply unit, enter the **show environment** command.

```
5400# show environment
Power Supply:
     Redundant Power System is present.
     RPS Input Voltage status:  normal
     RPS Output Voltage status:  normal
     RPS Fan status:  normal
     RPS Thermal status:  normal
     RPS OverVoltage status:  normal
Board Temperature:
     normal
```

Configuring the Power Supply Alarm

Cisco IOS software can be configured to poll every second to detect the failure of the redundant power supply. By default, the facility alarm is off. To begin monitoring of the redundant power supply, enter the **facility-alarm detect** command. Enter the no version of the command to disable the alarm.

To configure alarm support for the redundant power supply, follow these steps:

Step	Command	Purpose
Step 1	`Router> enable` `Password: password`	Enter enable mode and enter the password.
	`Router#`	You have entered enable mode when the prompt changes to `Router#`.

Step	Command	Purpose
Step 2	`Router# configure terminal`	Enter global configuration mode.
Step 3	`Router(config)# facility-alarm detect rps`	Turns on alarm when a redundant power supply failure is detected. Any of the following failures will turn on the alarm: • I/P voltage failure • O/P voltage failure • Overvoltage condition • Multiple failures

Verify Alarm Configuration

To verify the status of the alarm configuration, enter the **show facility-alarm** command:

```
5400# show facility-alarm

    Device            State
    ------            -----

  FastEthernet0/0      UP
  Modem Card 4         UP

 Facility Alarm is ON
```

Note For information on connecting alarm devices to the alarm port on the Cisco AS5400, refer to the *Cisco AS5400 Universal Gateway Chassis Installation Guide.*

Cabling Specifications

This appendix provides the following cabling and pinout information for the Cisco AS5400 and Cisco AS5400HPX universal gateways:

Note This appendix specifies pinouts only for the pins used. Pins not listed in the tables in this appendix are not connected.

Note Unless specifically noted, all references to the Cisco AS5400 also apply to the Cisco AS5400HPX.

Console and Auxiliary Port Cables and Pinouts

The universal gateway arrives with a console and auxiliary cable kit, which contains the cable and adapters you need to connect a console (an ASCII terminal or PC running terminal emulation software) or modem to your universal gateway. The console and auxiliary cable kit includes:

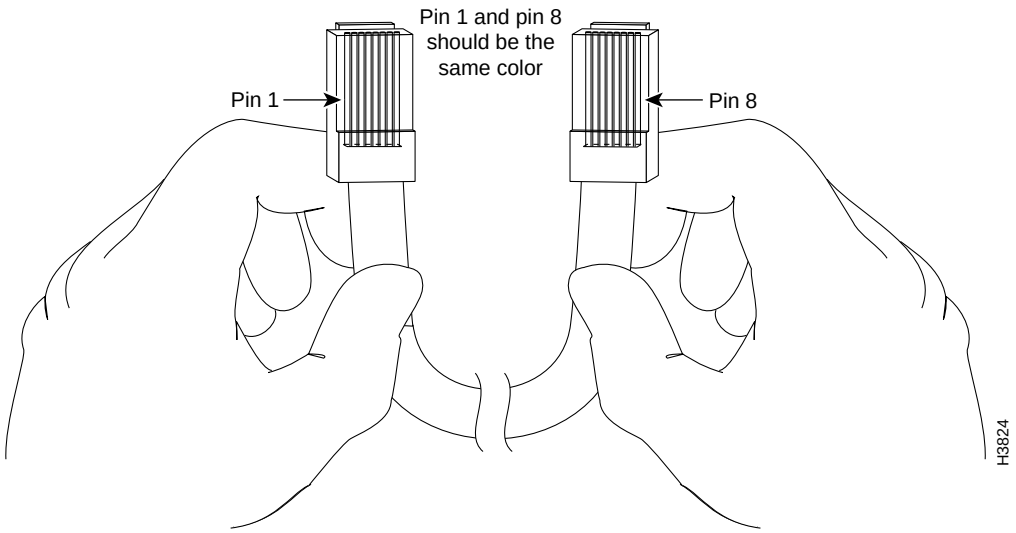
- RJ-45-to-RJ-45 rollover cable. (See the next section, "Identifying a Rollover Cable," for more information.)
- RJ-45-to-DB-9 female DTE adapter (labeled TERMINAL).
- RJ-45-to-DB-25 female DTE adapter (labeled TERMINAL).
- RJ-45-to-DB-25 male DCE adapter (labeled MODEM).

For console connections, proceed to the section "Console Port Cables and Pinouts" on page C-2. For modem connections, proceed to the section "Auxiliary Port Signals and Pinouts" on page C-4.

Identifying a Rollover Cable

You can identify a rollover cable by comparing the two modular ends of the cable. Holding the cables side by side, with the tab at the back, the wire connected to the pin on the outside of the left plug should be the same color as the wire connected to the pin on the outside of the right plug. (See Figure C-1.) If your cable was purchased from Cisco Systems, pin 1 will be white on one connector, and pin 8 will be white on the other connector (a rollover cable reverses pins 1 and 8, 2 and 7, 3 and 6, and 4 and 5).

Figure C-1 Identifying a Rollover Cable



Console Port Cables and Pinouts

Use the RJ-45-to-RJ-45 rollover cable and RJ-45-to-DB-9 female DTE adapter (labeled TERMINAL) to connect the console port to a PC running terminal emulation software. Figure C-2 shows how to connect the console port to a PC. Table C-1 lists the pinouts for the asynchronous serial console port, the RJ-45-to-RJ-45 rollover cable, and the RJ-45-to-DB-9 female DTE adapter (labeled TERMINAL).

Figure C-2 Connecting the Console Port to a PC

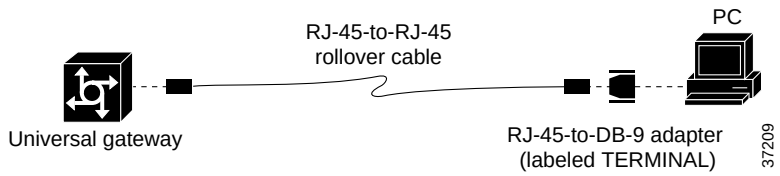


Table C-1 Console Port Signaling and Cabling Using a DB-9 Adapter

Console Port (DTE)	RJ-45-to-RJ-45 Rollover Cable		RJ-45-to-DB-9 Terminal Adapter	Console Device
Signal	**RJ-45 Pin**	**RJ-45 Pin**	**DB-9 Pin**	**Signal**
RTS	1[1]	8	8	CTS
DTR	2	7	6	DSR
TxD	3	6	2	RxD
GND	4	5	5	GND
GND	5	4	5	GND
RxD	6	3	3	TxD
DSR	7	2	4	DTR
CTS	8[1]	1	7	RTS

1. Pin 1 is connected internally to pin 8.

Use the RJ-45-to-RJ-45 rollover cable and RJ-45-to-DB-25 female DTE adapter (labeled TERMINAL) to connect the console port to a terminal. Figure C-3 shows how to connect the console port to a terminal. Table C-2 lists the pinouts for the asynchronous serial console port, the RJ-45-to-RJ-45 rollover cable, and the RJ-45-to-DB-25 female DTE adapter (labeled TERMINAL).

Figure C-3 Connecting the Console Port to a Terminal

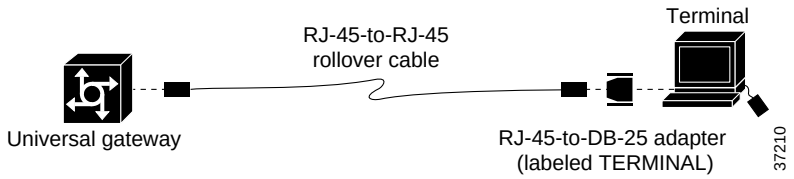


Table C-2 Console Port Signaling and Cabling Using a DB-25 Adapter

Console Port (DTE)[1]	RJ-45-to-RJ-45 Rollover Cable		RJ-45-to-DB-25 Terminal Adapter	Console Device
Signal	**RJ-45 Pin**	**RJ-45 Pin**	**DB-25 Pin**	**Signal**
RTS	1[2]	8	5	CTS
DTR	2	7	6	DSR
TxD	3	6	3	RxD
GND	4	5	7	GND
GND	5	4	7	GND
RxD	6	3	2	TxD
DSR	7	2	20	DTR
CTS	8[1]	1	4	RTS

1. You can use the same cabling to connect a console to the auxiliary port.
2. Pin 1 is connected internally to pin 8.

Auxiliary Port Signals and Pinouts

Use the RJ-45-to-RJ-45 rollover cable and RJ-45-to-DB-25 male DCE adapter (labeled MODEM) to connect the auxiliary port to a modem. Figure C-4 shows how to connect the auxiliary port to a modem. Table C-3 lists the pinouts for the asynchronous serial auxiliary port, the RJ-45-to-RJ-45 rollover cable, and the RJ-45-to-DB-25 male DCE adapter (labeled MODEM).

Figure C-4 Connecting the Auxiliary Port to a Modem

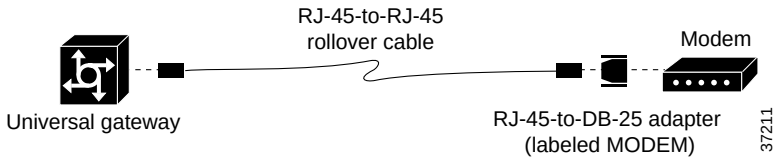


Table C-3 Auxiliary Port Signaling and Cabling Using a DB-25 Adapter

AUX Port (DTE)	RJ-45-to-RJ-45 Rollover Cable		RJ-45-to-DB-25 Modem Adapter	Modem
Signal	**RJ-45 Pin**	**RJ-45 Pin**	**DB-25 Pin**	**Signal**
RTS	1	8	4	RTS
DTR	2	7	20	DTR
TxD	3	6	3	TxD
GND	4	5	7	GND
GND	5	4	7	GND
RxD	6	3	2	RxD
DSR	7	2	8	DCD
CTS	8	1	5	CTS

Ethernet Port Pinouts

Table C-4 lists the pinouts for the Ethernet ports.

Table C-4 10/100BASE-T Port Pinouts

RJ-45 Pin	Description
1	TXD+
2	TXD–
3	RXD+
4	–
5	–
6	RXD–
7	–
8	–

BITS Cable and Port Pinouts

Figure C-5 shows how the BITS port is connected and Table C-5 lists the BITS port pinouts.

Figure C-5 BITS Port Connection

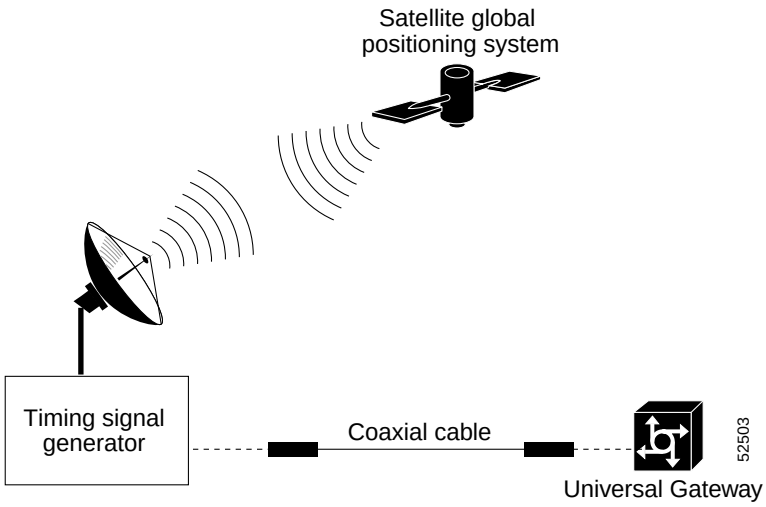


Table C-5 BITS Port Pinouts

Pin	Description
1	BITS signal
2	Ground

Alarm Port Pinouts

Table C-6 lists the pinouts for the alarm port.

Table C-6 Alarm Port Pinouts

Pin	Description
1	Normally open
2	Pole
3	Normally closed

Bantam Jack Port Pinouts

Table C-7 lists the port pinouts for the bantam jacks on the AS54-DFC-8CT1/CE1 and AS54-DFC-CT3.

Table C-7 Bantam Jack Port Pinouts

Pin	Description
1	Tip
2	Ring

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