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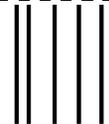
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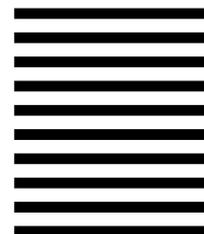
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Version 6.3

Corporate Headquarters
Cisco Systems, Inc.
170 West Tasman Drive
San Jose, CA 95134-1706
USA
<http://www.cisco.com>
Tel: 408 526-4000
800 553-NETS (6387)
Fax: 408 526-4100

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Cisco PIX Firewall Hardware Installation Guide

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About This Guide	vii
Document Objectives	vii
Audience	vii
Document Organization	vii
Document Conventions	viii
Safety Warning	ix
Obtaining Documentation	x
Cisco.com	x
Documentation CD-ROM	xi
Ordering Documentation	xi
Documentation Feedback	xi
Obtaining Technical Assistance	xii
Cisco.com	xii
Technical Assistance Center	xii
Obtaining Additional Publications and Information	xiii

CHAPTER 1

Preparing for Installation	1-1
Installation Overview	1-1
Safety Recommendations	1-2
Maintaining Safety with Electricity	1-2
Preventing Electrostatic Discharge Damage	1-3
General Site Requirements	1-4
Site Environment	1-4
Preventive Site Configuration	1-4
Power Supply Considerations	1-4
Configuring Equipment Racks	1-5

CHAPTER 2

PIX 501	2-1
PIX 501 Product Overview	2-1
Installing the PIX 501	2-3
Connecting a Power Supply Module to the PIX 501	2-3
PIX 501 Cable Lock	2-4

CHAPTER 3

PIX 506E 3-1

- PIX 506E Product Overview 3-1
- Installing the PIX 506E 3-3
- Connecting a Power Supply Module to the PIX 506E 3-3

CHAPTER 4

PIX 515/515E 4-1

- PIX 515/515E Product Overview 4-1
- Installing the PIX 515/515E 4-3
 - Surface Mounting the PIX 515/515E 4-4
 - Rack Mounting the PIX 515/515E 4-4
 - Vertical Mounting the PIX 515/515E 4-5
 - Installing the PIX 515/515E 4-5
- PIX 515/515E Feature Licenses 4-7
 - PIX Firewall VPN Accelerator Card 4-8
 - PIX Firewall VPN Accelerator Card+ 4-8
- Installing Failover 4-9
- Installing LAN-Based Failover 4-11
- Removing and Replacing the PIX 515/515E Chassis Cover 4-12
 - Removing the Chassis Cover 4-12
 - Replacing the Chassis Cover 4-13
- Replacing a Lithium Battery 4-14
- Installing a Memory Upgrade 4-14
 - Memory Installation Steps 4-15
- Installing a Circuit Board in the PIX 515/515E 4-17
 - PIX Firewall VPN Accelerator Circuit Board 4-20
- Installing the PIX 515/515E DC Model 4-20

CHAPTER 5

PIX 520 5-1

- PIX 520 Product Overview 5-1
- Installing the PIX 520 5-4
- PIX 520 Feature Licenses 5-6
- Installing Failover 5-7
- Installing LAN-Based Failover 5-8
- Removing and Replacing the PIX 520 Chassis Cover 5-10
 - Removing the Chassis Cover 5-10
 - Replacing the Chassis Cover 5-11
- Replacing a Lithium Battery 5-12

Installing a Memory Upgrade	5-12
Memory Installation Steps	5-13
Installing a Circuit Board in the PIX 520	5-15
PIX Firewall 16 MB Flash Circuit Board	5-18
PIX Firewall VPN Accelerator Circuit Board	5-19
Gigabit Ethernet Circuit Board	5-20
Installing the PIX 520 DC Model	5-21

CHAPTER 6

PIX 525 6-1

PIX 525 Product Overview	6-1
Installing the PIX 525	6-3
PIX 525 Feature Licenses	6-5
PIX Firewall VPN Accelerator Card	6-6
PIX Firewall VPN Accelerator Card+	6-6
Installing Failover	6-6
Installing LAN-Based Failover	6-8
Removing and Replacing the PIX 525 Chassis Cover	6-9
Removing the Chassis Cover	6-9
Replacing the Chassis Cover	6-11
Replacing a Lithium Battery	6-12
Installing a Memory Upgrade	6-12
Memory Installation Steps	6-12
Installing a Circuit Board in the PIX 525	6-14
PIX Firewall VPN Accelerator Circuit Board	6-17
Gigabit Ethernet Circuit Board	6-18
Installing a DC Power Supply	6-19
Rerouting the Fan Wiring	6-24

CHAPTER 7

PIX 535 7-1

PIX 535 Product Overview	7-1
PIX 535 Network Interface Description	7-4
Installing the PIX 535	7-5
Before Installing the PIX 535	7-5
Mounting the PIX 535	7-5
PIX 535 Network Interface Installation	7-5
PIX 535 Feature Licenses	7-6
PIX Firewall VPN Accelerator Card	7-7
PIX Firewall VPN Accelerator Card+	7-7

Installing Failover **7-7**

Installing LAN-Based Failover **7-9**

Replacing a Lithium Battery **7-10**

Installing a Memory Upgrade **7-10**

 Memory Installation Steps **7-11**

Installing a Circuit Board in the PIX 535 **7-13**

 PIX 535 Circuit Board Options **7-13**

 Circuit Board Slot Description **7-15**

 Installing a Circuit Board **7-16**

 PIX Firewall 16 MB Flash Circuit Board **7-17**

 PIX Firewall VPN Accelerator Circuit Board **7-19**

 Gigabit Ethernet Circuit Board **7-19**

Installing the PIX 535 DC Model **7-20**

APPENDIX A

Cable Pinouts A-1

10BaseT and 100BaseTX Connectors **A-1**

Console Port (RJ-45) **A-2**

RJ-45 to DB-9 or DB-25 Serial Cable **A-4**

Failover Cable Pinouts **A-4**

INDEX



About This Guide

This preface includes the following sections:

- Document Objectives, page vii
- Audience, page vii
- Document Organization, page vii
- Document Conventions, page viii
- Safety Warning, page ix
- Obtaining Documentation, page x
- Obtaining Technical Assistance, page xii
- Obtaining Additional Publications and Information, page xiii

Document Objectives

This guide describes how to install the Cisco PIX Firewall hardware components.

Audience

This guide is for network administrators who perform any of the following tasks:

- Managing network security
- Installing and configuring firewalls
- Managing default and static routes, and TCP and UDP services

Document Organization

This guide includes the following chapters:

- Chapter 1, “Preparing for Installation” describes the installation overview, safety recommendations, and general site requirements.
- Chapter 2, “PIX 501” describes the PIX 501 product overview, and the installation and configuration procedures.

- Chapter 3, “PIX 506/506E” describes the PIX 506E product overview, installation and configuration, as well as how to connect the PIX 506E to a power supply.
- Chapter 4, “PIX 515/515E” describes the PIX 515/515E product overview, installation and configuration of the PIX 515/515E, as well as the procedure to remove and replace the chassis cover. This chapter also includes installation procedures for the circuit board and installation of the DC model.
- Chapter 5, “PIX 520” describes the PIX 520 product overview, installation, and configuration of the PIX 520, as well as the procedure to remove and replace the chassis cover. This chapter also includes the procedure for installation of the DC model.
- Chapter 6, “PIX 525” describes the PIX 525 product overview, installation, and configuration of the PIX 525, as well as the procedure to remove and replace the chassis cover. This chapter also includes installation procedures for the circuit board and installation of the DC model.
- Chapter 7, “PIX 535” describes the PIX 535 product overview, installation, and configuration of the PIX 535, as well as the installation procedure for the circuit board and installation of the DC model.
- Appendix A “Cable Pinouts” describes the cable pinouts.

Document Conventions

Command descriptions use these conventions:

- Braces ({ }) indicate a required choice.
- Square brackets ([]) indicate optional elements.
- Vertical bars (|) separate alternative, mutually exclusive elements.
- **Boldface** indicates commands and keywords that are entered literally as shown.
- *Italics* indicate arguments for which you supply values.

Examples use these conventions:

- Examples depict screen displays and the command line in *screen font*.
- Information you need to enter in examples is shown in **boldface screen font**.
- Variables for which you must supply a value are shown in *italic screen font*.

Graphic user interface access uses these conventions:

- **Boldface** indicates buttons and menu items.
- Selecting a menu item (or screen) is indicated by the following convention:
Click **Start>Settings>Control Panel**.



Note

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

Safety Warning



Warning	This warning symbol means <i>danger</i> . 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 <i>Regulatory Compliance and Safety Information</i> 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 <i>Regulatory Compliance and Safety Information</i> (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 <i>Regulatory Compliance and Safety Information</i> -kirjastesta (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 <i>Regulatory Compliance and Safety Information</i> (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 <i>Regulatory Compliance and Safety Information</i> (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 <i>Regulatory Compliance and Safety Information</i> (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 være 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 <i>Regulatory Compliance and Safety Information</i> (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 <i>Regulatory Compliance and Safety Information</i> (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 <i>Regulatory Compliance and Safety Information</i> (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 <i>Regulatory Compliance and Safety Information</i> (Efterrättelse av föreskrifter och säkerhetsinformation), vilket medföljer denna anordning.

Obtaining Documentation

Cisco provides several ways to obtain documentation, technical assistance, and other technical resources. These sections explain how to obtain technical information from Cisco Systems.

Cisco.com

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

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

You can access the Cisco website at this URL:

<http://www.cisco.com>

International Cisco web sites can be accessed from 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 may have 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.

Registered Cisco.com users can order the Documentation CD-ROM (product number DOC-CONDOCCD=) through the online Subscription Store:

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

Ordering Documentation

You can find instructions for ordering documentation at this URL:

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

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/en/US/partner/ordering/index.shtml>

- Registered Cisco.com users can order the Documentation CD-ROM (Customer Order Number DOC-CONDOCCD=) through the online Subscription Store:

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- 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).

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We appreciate your comments.

Obtaining Technical Assistance

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

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- Register for online skill assessment, training, and certification programs

To obtain customized information and service, you can self-register on Cisco.com at this URL:

<http://www.cisco.com>

Technical Assistance Center

The Cisco 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 website and the Cisco TAC Escalation Center. The avenue of support that you choose depends on the priority of the problem and the conditions stated in service contracts, when applicable.

We categorize Cisco TAC inquiries according to urgency:

- 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.

Cisco TAC Website

You can use the Cisco TAC website 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 website, 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 website. Some services on the Cisco TAC website require 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://tools.cisco.com/RPF/register/register.do>

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

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

If you have Internet access, we recommend that you open P3 and P4 cases through the Cisco TAC website so that you can describe the situation in your own words and attach any necessary files.

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.

Obtaining Additional Publications and Information

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

- The *Cisco Product Catalog* describes the networking products offered by Cisco Systems as well as ordering and customer support services. Access the *Cisco Product Catalog* at this URL:
http://www.cisco.com/en/US/products/products_catalog_links_launch.html
- Cisco Press publishes a wide range of networking publications. Cisco suggests these titles for new and experienced users: *Internetworking Terms and Acronyms Dictionary*, *Internetworking Technology Handbook*, *Internetworking Troubleshooting Guide*, and the *Internetworking Design Guide*. For current Cisco Press titles and other information, go to Cisco Press online at this URL:
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http://www.cisco.com/en/US/about/ac123/ac147/about_cisco_the_internet_protocol_journal.html
- Training—Cisco offers world-class networking training, with current offerings in network training listed at this URL:
http://www.cisco.com/en/US/learning/le31/learning_recommended_training_list.html



Preparing for Installation

This chapter describes how to install and add PIX Firewall hardware upgrades that accompany the unit. The information in this guide applies to the PIX 501, PIX 506E, PIX 515/515E, PIX 520, PIX 525, and PIX 535. In this guide, the term “PIX Firewall” refers to all models unless specifically noted otherwise.



Caution

Installing a PIX Firewall Version 6.0(1) or higher, such as a PIX Firewall “Classic,” PIX10000, or PIX 510 on an older unit, causes a continuous reboot until a version previous to 6.0(1) is reinstalled.

This chapter includes the following sections:

- Installation Overview, page 1-1
- Safety Recommendations, page 1-2
- General Site Requirements, page 1-4

Installation Overview

Complete these steps to prepare for the installation of a PIX Firewall:



Note

If your PIX Firewall model supports a failover configuration, perform the steps that follow only on the primary (active) unit. (Not applicable to the PIX 501 or the PIX 506E.)

- Step 1** Review the safety precautions outlined in the *Regulatory Compliance and Safety Information for the Cisco PIX Firewall* document.
- Step 2** Completely read the release notes for your respective software version.
- Step 3** Unpack the PIX Firewall. The PIX Firewall consists of two main components, the PIX Firewall unit and a separate accessory kit. The accessory kit contains documentation, a power supply or cord, rack mounting hardware (not applicable to the PIX 501 or the PIX 506E), and additional software you can use with your PIX Firewall.
- Step 4** Place the PIX Firewall on a stable work surface.

Safety Recommendations

Use the following guidelines and the information in the following sections to help ensure your safety and protect the PIX Firewall equipment. The list of guidelines may not address all potentially hazardous situations in your working environment, so be alert and exercise good judgement at all times.



Note

If you need to open the PIX Firewall case to install a hardware component such as additional memory or an interface card, doing so does not affect your Cisco warranty. Upgrading the PIX Firewall does not require any special tools and does not create any radio frequency leaks.

The safety guidelines are as follows:

- Keep the chassis area clear and dust-free before, during and after installation.
- Keep tools away from walk areas where you and others could fall over them.
- Do not wear loose clothing or jewelry, such as earrings, bracelets, or chains, that could get caught in the chassis.
- 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.
- Never attempt to lift an object that is too heavy for one person to handle.

This section includes the following topics:

- Maintaining Safety with Electricity, page 1-2
- Preventing Electrostatic Discharge Damage, page 1-3

Maintaining Safety with Electricity



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.

Follow these guidelines when working on equipment powered by electricity:

- Before beginning procedures that require access to the interior of the PIX Firewall, 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.
- Do not work alone if potentially hazardous conditions exist anywhere in your work space.
- Never assume that power is disconnected from a circuit; always check the circuit.
- 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.
 - Disconnect power from 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.
- Use the PIX Firewall within its marked electrical ratings and product usage instructions.
- Install the PIX Firewall in compliance with local and national electrical codes as listed in the *Regulatory Compliance and Safety Information for the Cisco PIX Firewall* document.
- PIX Firewall models equipped with AC-input power supplies are shipped with a 3-wire electrical cord with a grounding-type plug that fits only a grounding-type power outlet. This is a safety feature that you should not circumvent. Equipment grounding should comply with local and national electrical codes.
- PIX Firewall models equipped with DC-input power supplies must be terminated with the DC input wiring on a DC source capable of supplying at least 15 amps. A 15-amp circuit breaker is required at the 48 VDC facility power source. An easily accessible disconnect device should be incorporated into the facility wiring. Be sure to connect the grounding wire conduit to a solid earth ground. We recommend that you use a closed loop ring to terminate the ground conductor at the ground stud.

Other DC power guidelines are listed in the *Regulatory Compliance and Safety Information for the Cisco PIX Firewall* document.

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 removing and replacing 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 ESD voltages. To properly guard against ESD damage and shocks, the wrist strap and cord must operate effectively. If no wrist strap is available, ground yourself by touching the metal part of the chassis.
- For safety, periodically check the resistance value of the antistatic strap, which should be between 1 and 10 megohms (Mohms).

General Site Requirements

The topics in this section describe the requirements your site must meet for safe installation and operation of your system. Ensure that your site is properly prepared before beginning installation.

This section includes the following topics:

- Site Environment, page 1-4
- Preventive Site Configuration, page 1-4
- Power Supply Considerations, page 1-4
- Configuring Equipment Racks, page 1-5

Site Environment

The PIX Firewall can be placed on a desktop. Except for the PIX 501 and the PIX 506E, all other PIX Firewall models can be mounted in a rack. The location of the PIX Firewall and the layout of your equipment rack or wiring room are extremely important for proper system operation. Equipment placed too close together, inadequate ventilation, and inaccessible panels can cause system malfunctions and shutdowns, and can make PIX Firewall maintenance difficult.

When planning your site layout and equipment locations, keep in mind the precautions described in the next section “Preventive Site Configuration,” to help avoid equipment failures and reduce the possibility of environmentally caused shutdowns. If you are currently experiencing shutdowns or unusually high errors with your existing equipment, these precautions may help you isolate the cause of failures and prevent future problems.

Preventive Site Configuration

The following precautions help you plan an acceptable operating environment for your PIX Firewall and help you avoid environmentally caused equipment failures:

- Electrical equipment generates heat. Ambient air temperature might not be adequate to cool equipment to acceptable operating temperatures without adequate circulation. Ensure that the room in which you operate your system has adequate air circulation.
- Always follow the ESD-prevention procedures described previously to avoid damage to equipment. Damage from static discharge can cause immediate or intermittent equipment failure.
- Ensure that the chassis top panel is secure. The chassis is designed to allow cooling air to flow effectively within it. An open chassis allows air leaks, which may interrupt and redirect the flow of cooling air from internal components.

Power Supply Considerations

The PIX 515/515E, PIX 520, PIX 525, PIX 535, and PIX10000, have AC power supplies. The PIX 515/515E, PIX 520, PIX 525, and PIX 535 models can have either an AC or DC power supply. The PIX 501 and the PIX 506E have an external power supply that converts AC to DC.

Observe the following considerations:

- Check the power at your site before installing the PIX Firewall to ensure that you are receiving “clean” power (free of spikes and noise). Install a power conditioner if necessary, to ensure proper voltages and power levels in the source voltage for the system.
- Install proper grounding for the site to avoid damage from lightning and power surges.
- In units equipped with AC-input power supplies, use the following guidelines:
 - The PIX Firewall and PIX10000 models automatically select operating ranges of a low range of 90 to 135 volts or a high range of 180 to 270 volts.
 - The PIX 510 and PIX 520 models operate with a source voltage ranging from 100 to 240 VAC; the input power supply requires a 20 amp service minimum for North America and 10 amp or 16 amp for the international area.
 - The PIX 515/PIX 515E, PIX 525, and PIX 535 do not have a selectable operating range. Refer to the label on each model for the correct AC-input power requirement.
 - Several styles of AC-input power supply cords are available; make sure you have the correct style for your site.
 - Install an uninterruptible power source for your site, if possible.
 - Install proper site grounding facilities to guard against damage from lightning or power surges.
- In a unit equipped with DC-input power supplies, use the following guidelines:
 - Each DC-input power supply requires dedicated 15 amp service.
 - For DC power cables, we recommend that you use a minimum of 18 AWG wire cable.

Configuring Equipment Racks

The following tips help you plan an acceptable equipment rack configuration:

- PIX 515/515E, PIX 520, PIX 525, and PIX 535 units require you to first attach rack mounting brackets to the unit.
- Enclosed racks must have adequate ventilation. Ensure that the rack is not overly congested because each unit generates heat. An enclosed rack should have louvered sides and a fan to provide cooling air.
- 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 all the way into the rack.
- In an enclosed rack with a ventilation fan in the top, excessive heat generated by equipment near the bottom of the rack can be drawn upward and into the intake ports of the equipment above it in the rack. Ensure that you provide adequate ventilation for equipment at the bottom of the rack.
- Baffles can help to isolate exhaust air from intake air, which also helps to draw cooling air through the chassis. The best placement of the baffles depends on the airflow patterns in the rack. Experiment with different arrangements to position the baffles effectively.



PIX 501

This chapter describes how to install a PIX 501, and includes the following sections:

- PIX 501 Product Overview, page 2-1
- Installing the PIX 501, page 2-3
- Connecting a Power Supply Module to the PIX 501, page 2-3

PIX 501 Product Overview

This section describes the PIX 501 front and rear panels and the panel LEDs.



Note

The PIX 501 chassis cover should not be removed as it does not contain user-serviceable components.

Figure 2-1 shows the front view of the PIX 501.

Figure 2-1 PIX 501 Front Panel

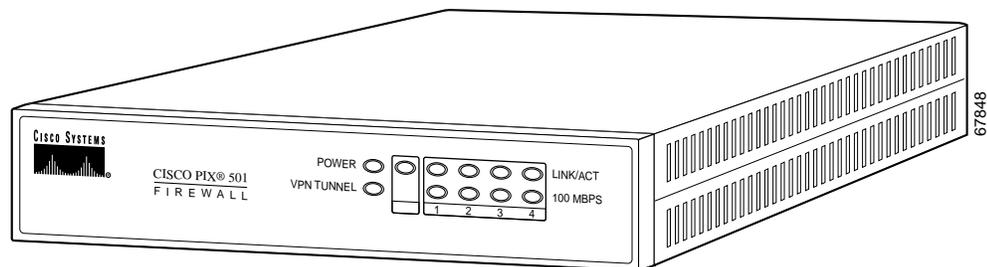


Figure 2-2 shows the rear view of the PIX 501.

Figure 2-2 PIX 501 Rear Panel

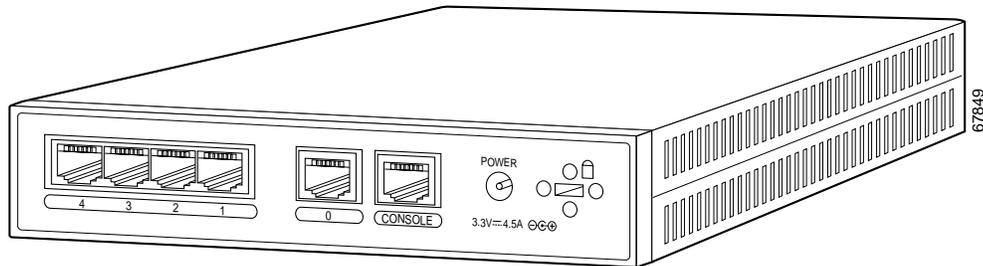


Figure 2-3 shows the PIX 501 front panel LEDs.

Figure 2-3 PIX 501 Front Panel LEDs

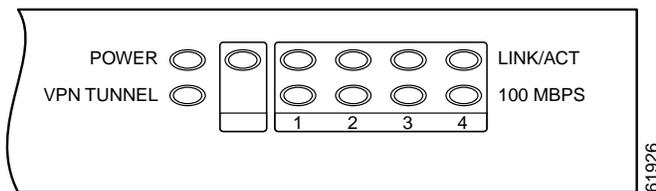


Table 2-1 lists the state of the PIX 501 front panel LEDs.

Table 2-1 PIX 501 Front Panel LEDs

LED	State	Description
POWER	Green	The device is powered on.
	Off	The device is powered off.
LINK/ACT	Flashing green	Network activity, such as Internet access, is present.
	Green	The correct cable is in use, and the connected equipment has power and is operational.
	Off	No link is established.
VPN TUNNEL	Green	One or more IKE/IPSec VPN tunnels are established.
	Off	One or more IKE/IPSec VPN tunnels are disabled. If the standard configuration is not modified to support VPN tunnels, the LED does not light up because it is disabled by default. Also, the LED does not light up when PPTP/L2TP tunnels are established.
100 MBPS	Green	The interface is enabled at 100 Mbps (autonegotiated).
	Off	The interface is enabled at 10 Mbps.



Tip

If the LINK/ACT LED does not light up, you might be using the wrong type of cable. Try replacing the yellow, straight-through Ethernet cable with the orange, crossover Ethernet cable.

Installing the PIX 501

Place the PIX 501 on a flat, stable surface. The PIX 501 is not rack mountable.

Complete these steps to install the PIX 501:

-
- Step 1** Connect Port 0, the outside Ethernet port, to the public network.
- Use the yellow Ethernet cable (72-1482-01) to connect the device to a switch or hub.
 - Use the orange Ethernet cable (72-3515-01) to connect the device to a DSL modem, cable modem, or router.
- Step 2** Connect your PC or the other network devices to one of the four switched inside ports (numbered 1 through 4).
-

Connecting a Power Supply Module to the PIX 501

This section describes how to connect the power supply module to a PIX 501. Use this information in conjunction with the appropriate version of the *Regulatory Compliance and Safety Information for the Cisco PIX Firewall* document.

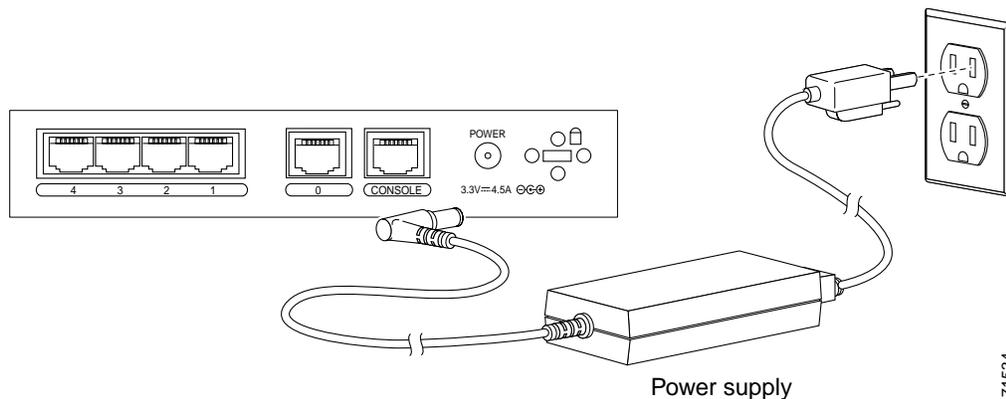
Complete these steps to connect the power supply module to the PIX 501:

-
- Step 1** Connect the small, round connector of the power supply cable to the power connector on the rear panel. (See Figure 2-4.)
- Step 2** Connect the AC power connector of the power supply input cable to an electrical outlet.



Note The PIX 501 does not have a power switch. Completing Step 2 powers on the device.

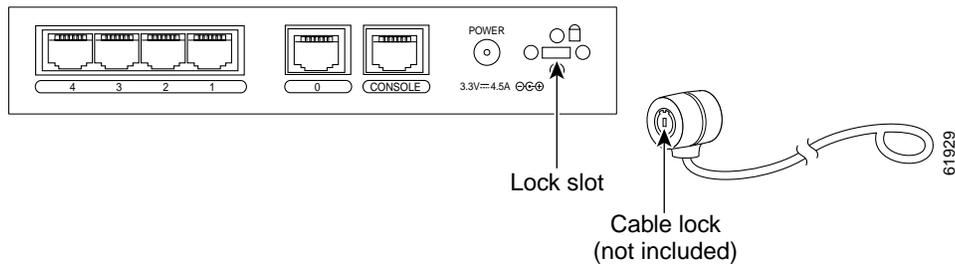
Figure 2-4 Connecting the Power Supply Module to the PIX 501



PIX 501 Cable Lock

The PIX 501 includes a slot that accepts standard desktop cable locks to provide physical security for small portable equipment, such as laptop computers. (See Figure 2-5.)

Figure 2-5 PIX 501 Security Cable Lock



Complete these steps to install a security cable lock:

-
- Step 1** Attach the cable lock to the lock slot on the back panel of the PIX 501.
 - Step 2** Follow the directions from the manufacturer for attaching the other end of the device for securing the PIX 501.
-



PIX 506/506E

This chapter describes how to install a PIX 506/506E, and includes the following sections:

- PIX 506/506E Product Overview, page 3-1
- Installing the PIX 506/506E, page 3-4
- Connecting a Power Supply Module to the PIX 506/506E, page 3-5

The PIX 506 and the PIX 506/506E are the same except the PIX 506/506E has a faster processor and a different power supply.

PIX 506/506E Product Overview

This section describes the PIX 506/506E front and rear panels and the panel LEDs.



Note

The PIX 506/506E chassis cover should not be removed as it does not contain user-serviceable components.

Figure 3-1 shows the front view of the PIX 506.

Figure 3-1 PIX 506 Front Panel

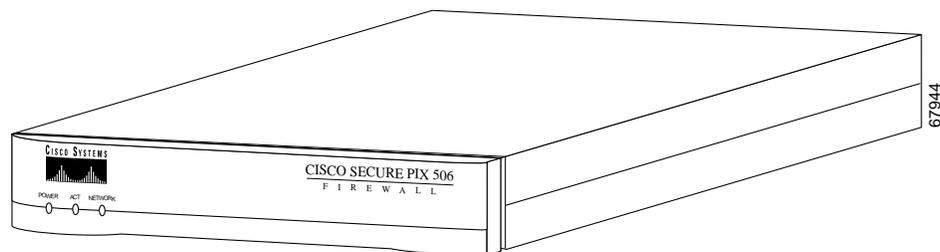


Figure 3-2 shows the front view of the PIX 506/506E .

Figure 3-2 PIX 506/506E Front Panel



Figure 3-3 shows the rear view of the PIX 506.

Figure 3-3 PIX 506 Rear Panel

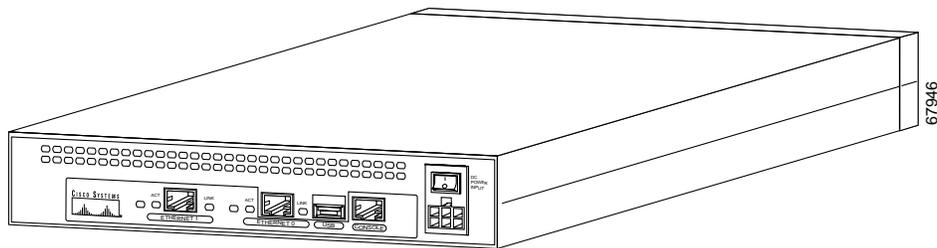


Figure 3-4 shows the rear view of the PIX 506/506E .

Figure 3-4 PIX 506/506E Rear Panel

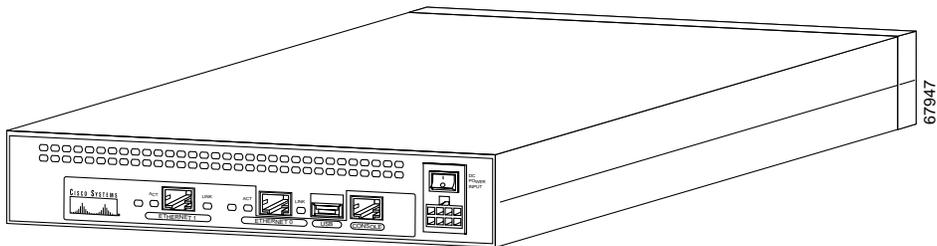


Figure 3-5 shows the PIX 506/506E front panel LEDs.

Figure 3-5 PIX 506/506E Front Panel LEDs

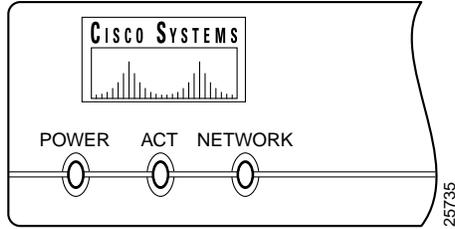


Table 3-1 lists the state of the PIX 506/506E front panel LEDs.

Table 3-1 PIX 506/506E Front Panel LEDs

LED	State	Description
POWER	On	The unit has power.
ACT	Flashing green	Active indicator—On when the software image has been loaded on the PIX 506/506E unit.
NETWORK	Flashing green	On when at least one network interface is passing traffic.

Figure 3-6 shows the PIX 506 rear panel LEDs.

Figure 3-6 PIX 506 Rear Panel LEDs

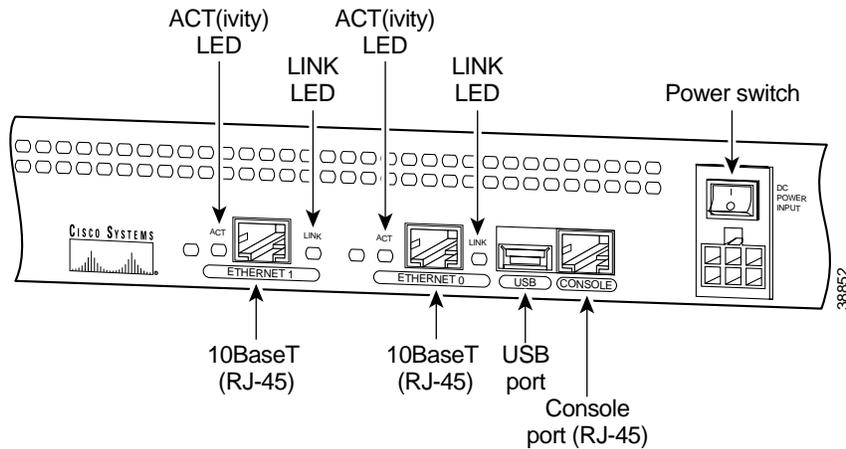


Table 3-2 lists the state of the PIX 506/506E rear panel LEDs.

Table 3-2 PIX 506/506E Rear Panel LEDs

LED	State	Description
ACT	On	Shows network activity.
LINK	On	Shows that data is passing on the network to which the connector is attached.

The USB port at the left of the Console port is not used.

Installing the PIX 506/506E

Place the PIX 506/506E on a flat, stable surface. The PIX 506/506E is not rack mountable.

Complete these steps to install the PIX 506/506E :

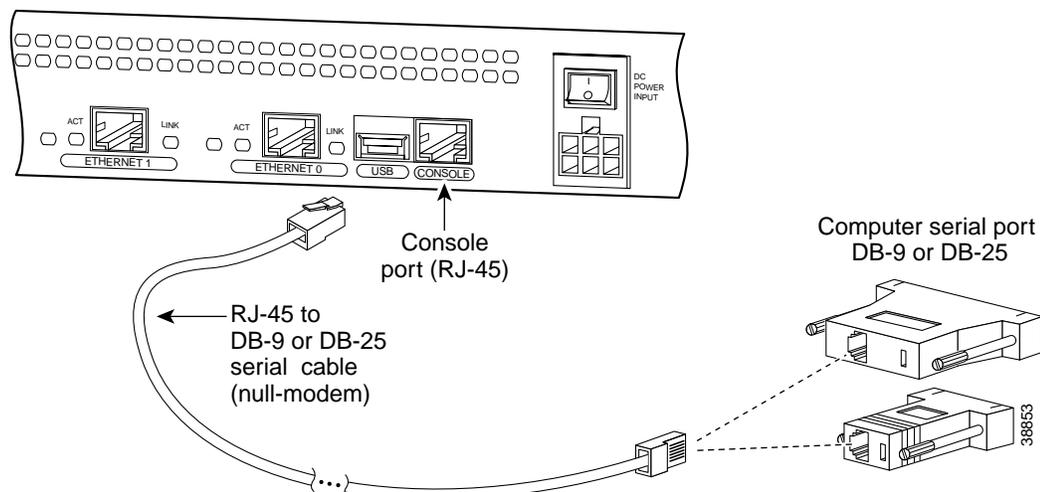
- Step 1** Connect the cable so that you have either a DB-9 or DB-25 connector on one end as required by the serial port for your computer, and the other end is the RJ-45 connector.



Note Use the RJ-45 Console port to connect a computer to enter configuration commands. Locate the serial cable from the accessory kit. The serial cable assembly consists of a null modem cable with RJ-45 connectors, and one DB-9 connector and one DB-25 connector.

- Step 2** Connect the RJ-45 connector to the PIX 506/506E and connect the other end to the serial port connector on your computer.

Figure 3-7 PIX 506 Serial Console Cable



Step 3 Connect the inside network cable to the interface connector marked ETHERNET 0 *or* ETHERNET 1.



Note The inside or outside network connections can be made to either interface port on the PIX 506/506E.

Step 4 Connect the outside network cable to the remaining Ethernet port.

Connecting a Power Supply Module to the PIX 506/506E

This section describes how to connect the power supply module to the PIX 506/506E. Use this information in conjunction with the appropriate version of the *Regulatory Compliance and Safety Information for the Cisco PIX Firewall* document, that shipped with your unit.

The PIX 506/506E uses an external AC to DC power supply. Power is supplied to the PIX 506/506E by connecting the power supply to the back of the PIX 506/506E and connecting a separate AC power cord to the power supply.

Figure 3-9 displays the cable connection from the power supply to the PIX 506, and displays the AC power cord connector (at the opposite end of the power supply).

Figure 3-8 Connecting the Power Supply Module to the PIX 506 6-Pin Connector

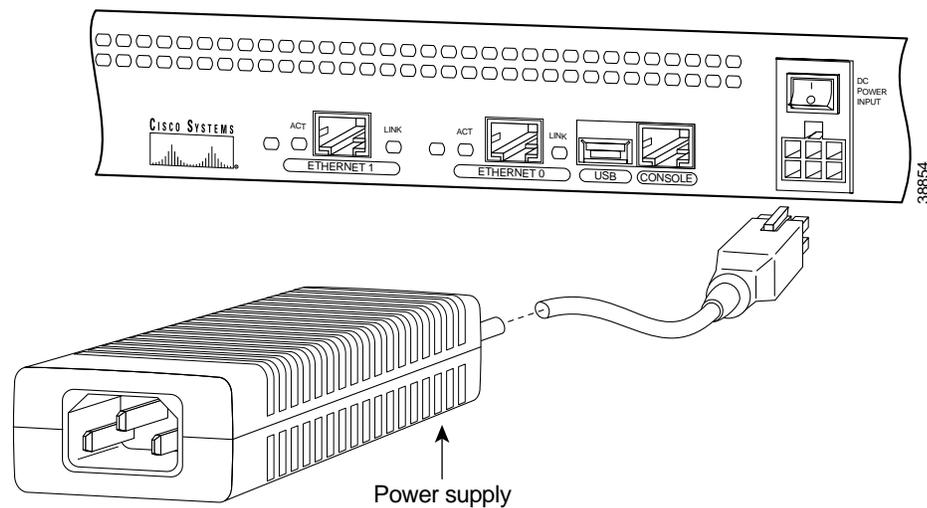
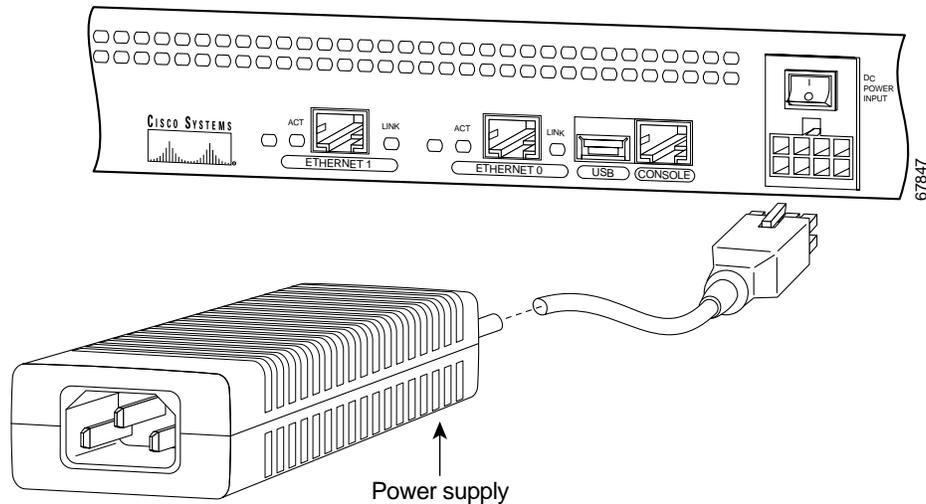


Figure 3-9 displays the cable connection from the power supply to the PIX 506/506E , and displays the AC power cord connector (at the opposite end of the power supply)

Figure 3-9 Connecting the Power Supply Module to the PIX 506/506E 8 - Pin Connector



Complete these steps to connect the power supply module:

-
- Step 1** Place the PIX 506/506E on a flat, stable surface. The PIX 506/506E is not rack mountable.
 - Step 2** Connect the power supply to the back of the PIX 506/506E. See Figure 3-8 for the PIX 506 and Figure 3-9 for the PIX 506E .
 - Step 3** When you are ready to start the PIX 506/506E, power on the unit from the switch at the rear of the unit.
-



PIX 515/515E

This chapter describes how to install the PIX 515/515E, and includes the following sections:

- PIX 515/515E Product Overview, page 4-1
- Installing the PIX 515/515E, page 4-3
- PIX 515/515E Feature Licenses, page 4-7
- Installing Failover, page 4-9
- Installing LAN-Based Failover, page 4-11
- Removing and Replacing the PIX 515/515E Chassis Cover, page 4-12
- Replacing a Lithium Battery, page 4-14
- Installing a Memory Upgrade, page 4-14
- Installing a Circuit Board in the PIX 515/515E, page 4-17
- Installing the PIX 515/515E DC Model, page 4-20

The PIX 515 and the PIX 515E are the same except the PIX 515E has a faster processor.

PIX 515/515E Product Overview

This section describes the PIX 515/515E front and rear panels and the panel LEDs.

Figure 4-1 shows the front view of the PIX 515/515E.

Figure 4-1 PIX 515/515E Front Panel

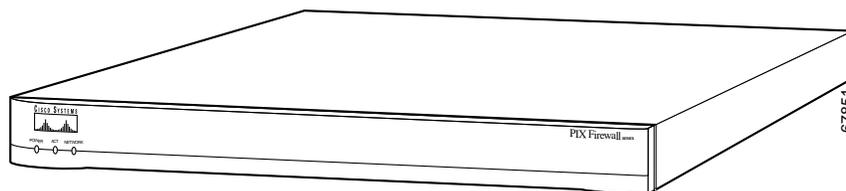


Figure 4-4 shows the PIX 515/515E rear panel LEDs.

Figure 4-4 PIX 515/515E Rear Panel

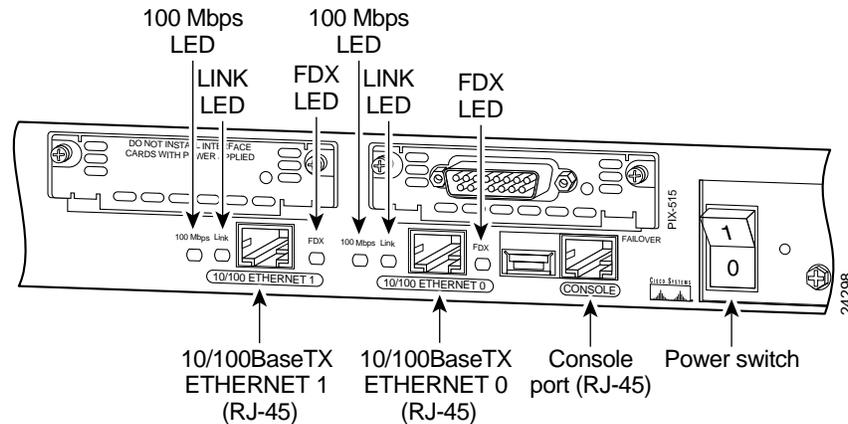


Table 4-2 lists the state of the PIX 515/515E rear panel LEDs.

Table 4-2 PIX 515/515E Rear Panel LEDs

LED	Status	Description
100 Mbps	Light On	100 megabits per second 100BaseTX communication. If the light is off, that port is using 10 megabits per second data exchange.
LINK	Light On	Shows that data is passing on the network to which the connector is attached.
FDX	Light On	Shows that the connection uses full duplex data exchange where data is transmitted and received simultaneously.
	Light Off	If this light is off, half-duplex is in effect.

The inside or outside network connections can be made to any available interface port on the PIX 515/515E. If you are only using the ETHERNET 0 and ETHERNET 1 ports, connect the inside network cable to the interface connector marked ETHERNET 0 *or* ETHERNET 1. Connect the outside network cable to the remaining Ethernet port.

The USB port to the left of the Console port is not used. The detachable plate above the ETHERNET 1 connector is also not used.

Installing the PIX 515/515E

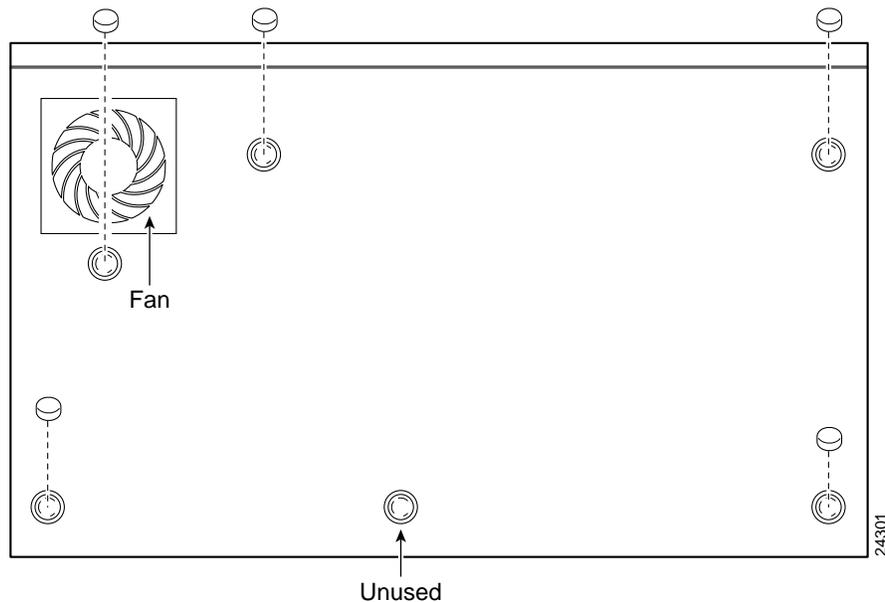
This section contains the following topics:

- Surface Mounting the PIX 515/515E, page 4-4
- Rack Mounting the PIX 515/515E, page 4-4
- Vertical Mounting the PIX 515/515E, page 4-5
- Installing a Circuit Board in the PIX 515/515E, page 4-17

Surface Mounting the PIX 515/515E

If you do not want to rack mount the unit, attach the rubber feet to the bottom of the unit as shown in Figure 4-5.

Figure 4-5 Attaching the Rubber Feet to the PIX 515/515E



Rack Mounting the PIX 515/515E

Observe the following before installing the PIX 515/515E into an equipment rack:

- To install optional circuit boards or memory, install the brackets on the unit for rack mounting, but do not put the PIX 515/515E in the equipment rack before installing the new boards. The chassis cover of the PIX 515/515E must be removed to properly install or remove a circuit board. Refer to “Removing and Replacing the PIX 515/515E Chassis Cover” for information on how to remove and replace the chassis cover.
 - If you need information on installing a circuit board, refer to “Installing a Circuit Board in the PIX 515/515E”.
 - If you need to install additional memory, refer to “Installing a Memory Upgrade”.

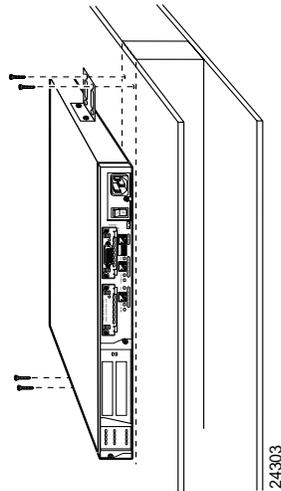
Complete the following to install the PIX 515/515E in a rack:

-
- Step 1** Attach the bracket to the unit using the supplied screws. You can attach the brackets to the holes near the front of the unit.
- Step 2** Attach the unit to the equipment rack.
-

Vertical Mounting the PIX 515/515E

To mount the PIX 515/515E vertically, attach the brackets to the side of the unit and mount the unit vertically as shown in Figure 4-6.

Figure 4-6 Installing the PIX 515/515E Vertically



Installing the PIX 515/515E

Complete the following to install the PIX 515/515E:

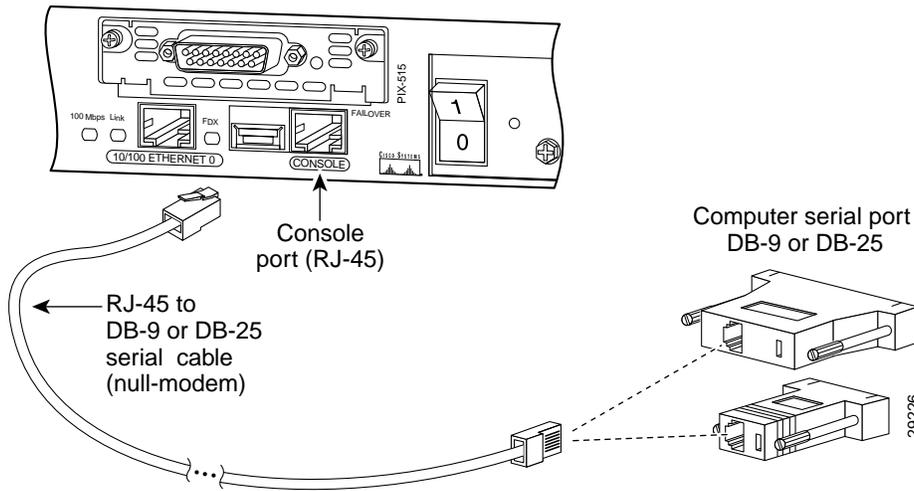
- Step 1** Connect the cable as shown in Figure 4-7 so that you have either a DB-9 or DB-25 connector on one end as required by the serial port for your computer, and the other end is the RJ-45 connector.



Note Use the Console port to connect to a computer to enter configuration commands. Locate the serial cable from the accessory kit. The serial cable assembly consists of a null modem cable with RJ-45 connectors, and one DB-9 connector and a DB-25 connector.

- Step 2** Connect the RJ-45 connector to the PIX 515/515E Console port and connect the other end to the serial port connector on your computer.

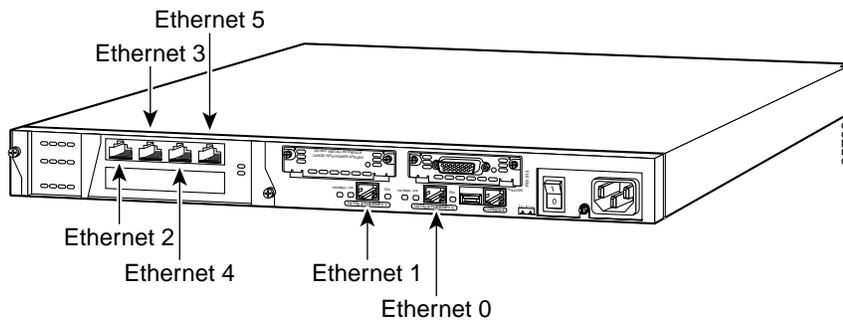
Figure 4-7 PIX 515/515E Serial Console Cable



Note

If your unit has a four-port Ethernet circuit board already installed, refer to Figure 4-8. (The four-port Ethernet circuit board requires the PIX-515/515E-UR license to be accessed.) If it has one or two single-port Ethernet circuit boards, refer to Figure 4-9. If you need to install an optional circuit board, refer to “Removing and Replacing the PIX 515/515E Chassis Cover” for information about how to remove and replace the chassis cover install circuit boards.

Figure 4-8 Four-Port Ethernet Connectors in the PIX 515/515E



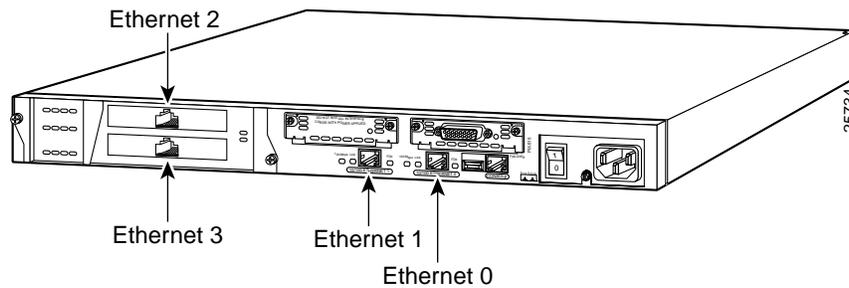
Step 3 Connect the inside, outside, or perimeter network cables to the interface ports. Starting from the top left the connectors are Ethernet 2, Ethernet 3, Ethernet 4, and Ethernet 5. The maximum number of allowed interfaces is 6.



Note

Do not add a single-port circuit board in the extra slot below the four-port circuit board.

Figure 4-9 Two Single-Port Ethernet Connectors in the PIX 515/515E



Note As shown in Figure 4-9, if your unit has one or two single-port Ethernet circuit boards installed in the auxiliary assembly on the left of the unit at the rear, the circuit boards are numbered top to bottom so that the top circuit board is Ethernet 2 and the bottom circuit board is Ethernet 3. (Additional Ethernet circuit boards require the PIX-515/PIX 515E-UR license to be accessed.)

If you have a second PIX Firewall to use as a failover unit, install the failover feature and cable as described in “Installing Failover”.



Note Do not power on the failover units until the active unit has been configured.

Step 4 Power on the unit from the switch at the rear to start the PIX 515/515E.

PIX 515/515E Feature Licenses

If you have the PIX-515/515E-UR unrestricted feature license, the following options are available:

- If you have a second PIX 515/515E to use as a failover unit, install the failover feature and cable as described in “Installing Failover”.
- If needed, install the PIX Firewall Syslog Server as described in the **logging** command page in the *Cisco PIX Firewall Command Reference*.
- Refer to “Removing and Replacing the PIX 515/515E Chassis Cover”, for information about how to remove and replace the chassis cover if you need to install optional circuit boards.



Note It is very important to remove the chassis cover before installing circuit boards in the PIX 515/515E. Even though it may appear possible to add or remove circuit boards from the back panel, removing the chassis cover greatly simplifies the process.

- If you need to install additional memory, refer to “Installing a Memory Upgrade”.



Note If, for any reason, you may choose to downgrade to any software version, note that you must use the **clear flashfs** command before doing so. A new section is added to Flash memory that must be cleared before downgrading.

For information on upgrading feature licenses or downloading the latest software versions, refer to the following website:

http://www.cisco.com/univercd/cc/td/doc/product/iaabu/pix/pix_sw/v_63/config/upgrade.htm

This section includes the following topics:

- PIX Firewall VPN Accelerator Card, page 4-8
- PIX Firewall VPN Accelerator Card+, page 4-8

PIX Firewall VPN Accelerator Card

The VPN Accelerator Card (VAC) for the Cisco PIX Firewall series is a card that provides high-performance, tunneling and encryption services suitable for site-to-site and remote access applications. The VAC is integrated with PIX 515 unrestricted (UR) and failover (FO) bundles. You can also purchase the VAC as a spare for use with PIX 515 units that have a restricted (R) license.

PIX Firewall VPN Accelerator Card+

PIX Firewall Version 6.3 adds support for the VPN Accelerator Card+ (VAC+). The VAC+ is a 64-bit/66 MHz PCI card, that provides faster tunneling and encryption services for Virtual Private Network (VPN) remote access, site-to-site intranet and extranet applications than the VAC. Each VAC+ card occupies a single PCI slot in the system. The VAC+ is supported on any chassis that runs Version 6.3 software, has an appropriate license to run VPN software, and at least one PCI slot available. While the VAC continues to be supported in Version 6.3, if both types of cards, the VAC and the VAC+, are installed in a system running Version 6.3, the VAC card is ignored. The VAC+ is a 64-bit/66 MHz PCI card, that runs in both 32-bit/33 MHz, as well as 64-bit/66 MHz, and does not slow down the bus when other 66 MHz cards are installed. It is strongly recommended that the VAC+ be installed in a 64bit/66 MHz slot. Performance is degraded if this recommendation is not followed.

The 6.3 VAC+ driver supports the following:

- 3DES, DES, AES, SHA1, MD5 for (IPSec) ESP protocol (For AES, only the CBC mode and key sizes of 128, 192, and 256 bits are supported).
- SHA1, MD5 for the (IPSec) AH protocol.
- Load sharing ESP and AH activity between up to three VAC+ cards.
- Diffie Hellman public key and shared secret generation.
- Any other crypto-related activity uses a software implementation.

Installing Failover

Complete the following steps to install a failover connection:

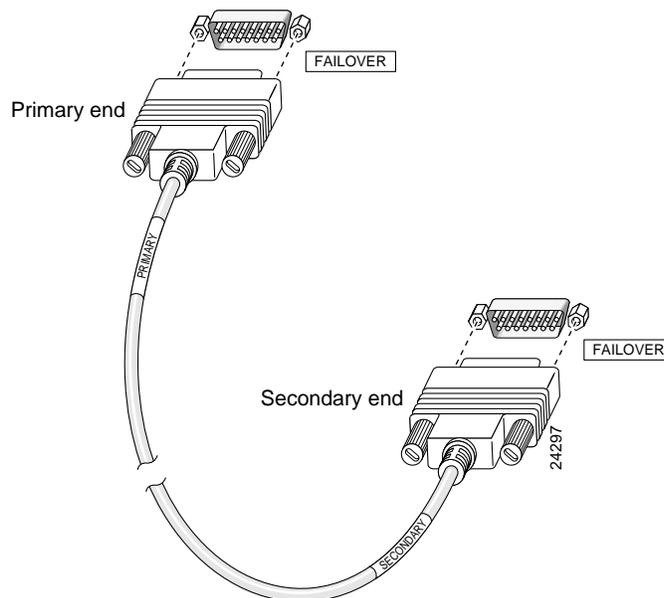
- Step 1** Power off both the primary and secondary units.



Note Both PIX Firewall units has to be the same model number, have at least as much RAM, have the same Flash memory size, and be running the same software version.

- Step 2** Locate the failover cable (shown in Figure 4-10). This cable is shipped separately from the PIX Firewall unit. The cable is labeled Primary on one end and Secondary on the other.
- Install the cable for the PIX 515/515E as shown in Figure 4-10.

Figure 4-10 PIX 515/515E Failover Cable Connection



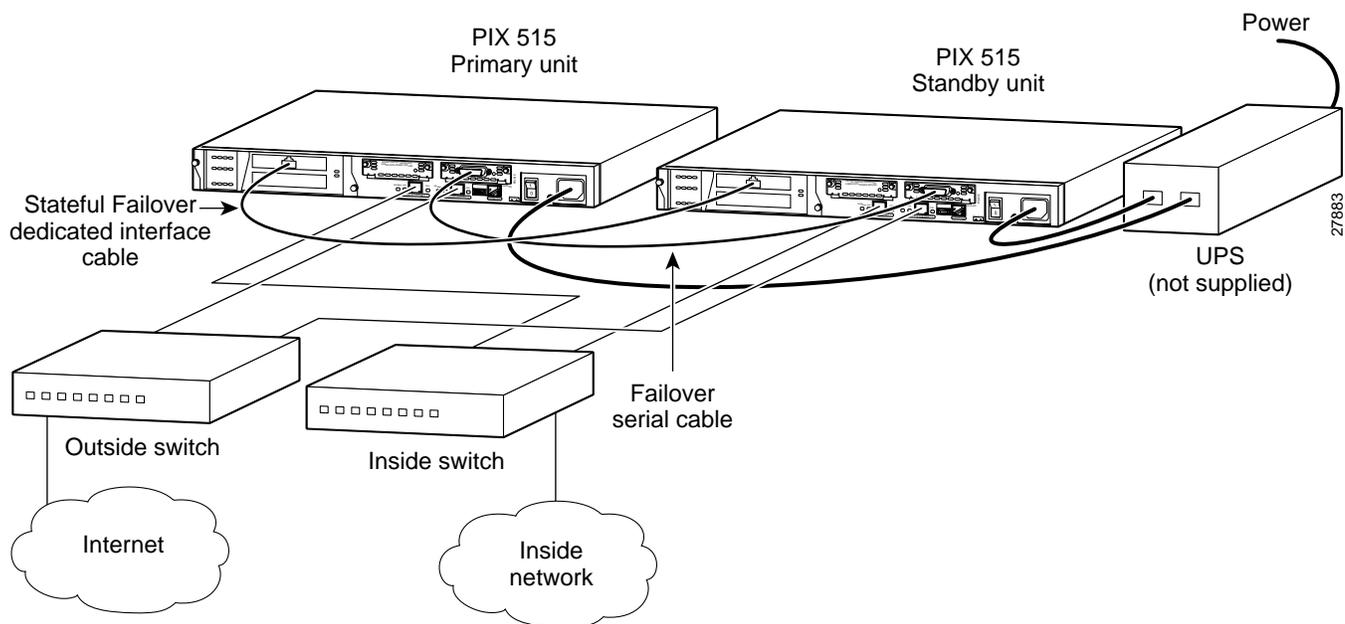
Note You can connect the PIX 515 unit to the PIX 515 unit but you cannot connect the PIX 515 unit to the PIX 515E unit or vice versa. Both units must be identical.

- Step 3** Connect the Primary end of the failover cable to the first PIX Firewall unit, that is, the one you have already configured.
- Step 4** Connect the Secondary end of the failover cable to the standby unit.
- Step 5** Connect a power cord to the power connector on the rear panel of each unit, and the other end of each power cord to (preferably separate) power outlets.

- Step 6** If you are using Stateful Failover, use one of the following types of connections, that is appropriate for your system, between the dedicated interfaces on the PIX Firewall units:
- Cat 5 crossover cable directly connecting the primary unit to the secondary unit.
 - 100BaseTX half-duplex hub using straight Cat 5 cables.
 - 100BaseTX full duplex on a dedicated switch or dedicated VLAN of a switch.

Figure 4-11 shows an example of a minimally configured PIX 515/515E with only the two interfaces on the motherboard used for network traffic.

Figure 4-11 Failover Connections



Note

All enabled interfaces must be connected between the active and standby units. Only configure the active unit. On the PIX 515/515E, the active unit is indicated by the ACT LED on the front of the unit.



Caution

Do not turn the power on until the units are connected and the primary unit is configured completely.

- Step 7** Use the power switch at the back of the units to power on the primary unit and then power on the standby unit.
- Within a few seconds, the active unit automatically downloads its configuration to the standby unit.
- If the primary unit fails, the secondary unit automatically becomes active.

Installing LAN-Based Failover

LAN-based failover supports failover between two units connected over a dedicated Ethernet interface. LAN-based failover eliminates the need for a special failover cable and overcomes the distance limitations imposed by the failover cable.


Note

Both PIX Firewall units must be the same model number, have the same amount of RAM, Flash memory, number and type of interfaces, and be running the same software version.

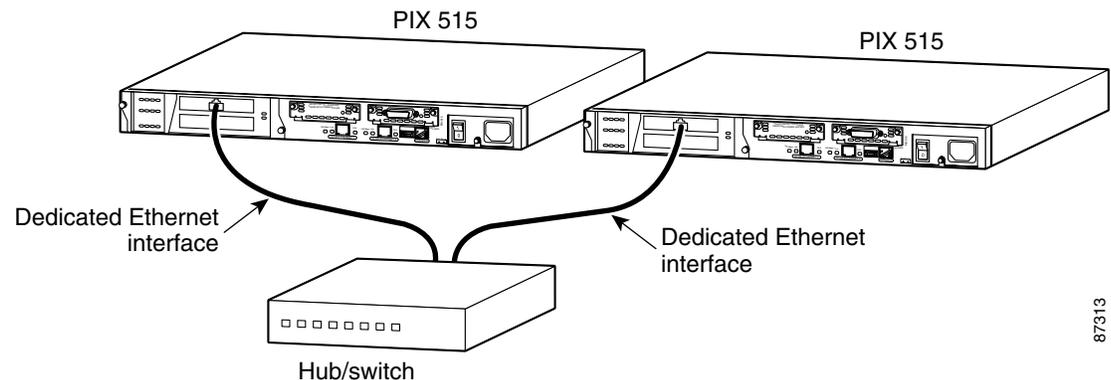
Complete the following to set up a LAN-based failover connection:

- Step 1** Disconnect both the PIX Firewall units, so that there is no traffic flow between them. If the Failover cable is connected to the PIX Firewall, disconnect it.
- Step 2** Configure the PIX Firewall units. For information on configuring the PIX Firewall, refer to “Configuring LAN-Based Failover,” section in Chapter 10 “Using PIX Firewall Failover” in the *Cisco PIX Firewall and VPN Configuration Guide*.
- Step 3** Power off both the units.
- Step 4** Connect the LAN Failover interfaces to the dedicated switch/hub, as shown in Figure 4-12.


Note

A dedicated LAN interface and a dedicated switch (or VLAN) is required to implement LAN-based failover. You cannot use a crossover Ethernet cable to connect the two PIX Firewall units.

Figure 4-12 LAN- Based Failover Connections



- Step 5** If you are using Stateful Failover, use one of the following types of connections, that is appropriate for your system, between the dedicated interfaces on the PIX Firewall units:
 - Cat 5 crossover cable directly connecting the primary unit to the secondary unit.
 - 100BaseTX full duplex on a dedicated switch or dedicated VLAN of a switch.
 - 1000BaseTX full duplex on a dedicated switch or dedicated VLAN of a switch.


Caution

Do not turn the power on until the units are connected and the primary unit is configured completely.

- Step 6** Power the primary unit on first, *then* power on the secondary unit. Within a few seconds, the active unit automatically downloads its configuration to the standby unit.
- If the primary unit fails, the secondary unit automatically becomes active.

Removing and Replacing the PIX 515/515E Chassis Cover

This section describes how to remove and replace the chassis cover from the PIX 515/515E. This section includes the following topics:

- Removing the Chassis Cover, page 4-12
- Replacing the Chassis Cover, page 4-13

Removing the Chassis Cover

Complete the following to remove the chassis cover:



Note

Removing the PIX Firewall case does not affect your Cisco warranty. Upgrading the PIX Firewall does not require any special tools and does not create any radio frequency leaks.

- Step 1** Read the *Regulatory Compliance and Safety Information for the Cisco PIX Firewall* document.
- Step 2** Unplug the power cord from the power outlet. Ensure that the PIX 515/515E is powered off. Once the upgrade is complete, you can safely reconnect the power cord.

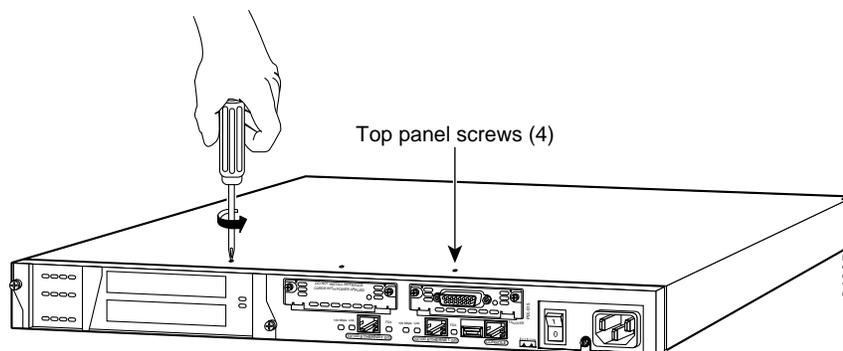


Warning

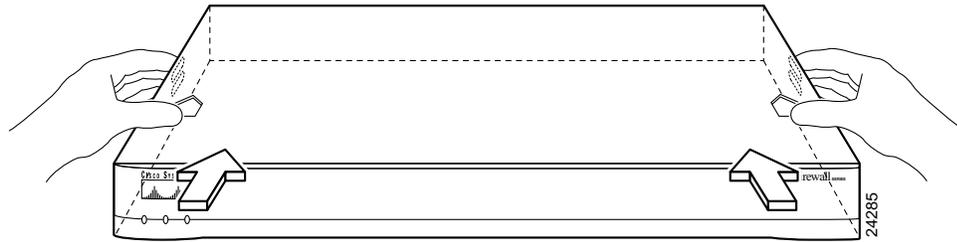
Before working on a system that has an On/Off switch, turn OFF the power and unplug the power cord.

- Step 3** Remove the screws from the front of the chassis on the PIX 515/515E (Figure 4-13).

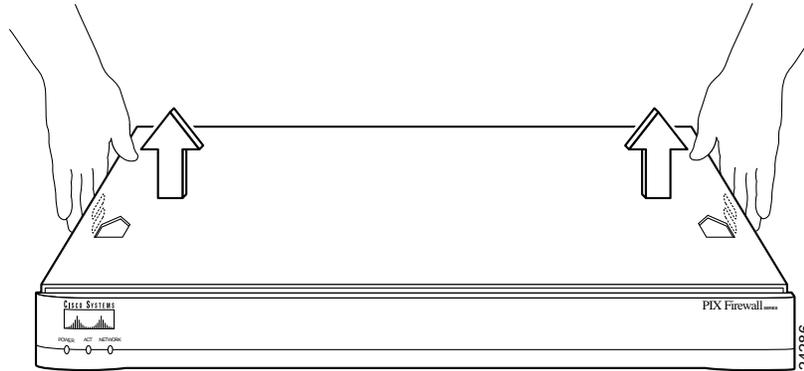
Figure 4-13 Removing PIX 515/515E Top Panel Screws



- Step 4** With the front of the unit facing you, push the top panel back by about one inch as shown in Figure 4-14.

Figure 4-14 Pushing Back the Top Panel

Step 5 Pull the top panel up as shown in Figure 4-15. Put the top panel in a safe place.

Figure 4-15 Pull the Top Panel up to Remove

Replacing the Chassis Cover



Caution

Do not operate PIX Firewall units without the top panel installed. The top panel protects the internal components, prevents electrical shorts, and provides proper air-flow for cooling the electronic components.

Complete the following to replace the chassis cover:

- Step 1** Place the chassis on a secure surface with the front panel facing you.
- Step 2** Hold the top panel so the tabs at the rear of the top panel are aligned with the chassis bottom.
- Step 3** Lower the front of the top panel onto the chassis, making sure that the top panel side tabs fit under the chassis side panels.
- Step 4** Slide the top panel toward the front, making sure that the top panel tabs fit under the chassis back panel, and the back panel tabs fit under the top panel.
- Step 5** Fasten the top panel with the screws you set aside earlier.
- Step 6** Reinstall the chassis on a rack, wall, desktop, or table.

Step 7 Reinstall network interface cables.

Replacing a Lithium Battery

The PIX Firewall has a lithium battery on its main circuit board. This battery has an operating life of about 10 years. When the battery loses its charge, the PIX Firewall cannot function. The lithium battery is not a field replaceable unit (FRU). Contact Cisco TAC to replace the battery.



Note

Do not attempt to replace this battery yourself.



Warning

Danger of explosion exists if the lithium battery is incorrectly replaced. Replace only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer's instructions.

Installing a Memory Upgrade

Observe the following warnings, cautions, and notes when installing additional PIX Firewall system memory.

The following statement applies to DC models:



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.

The following statement applies to both AC and DC models:



Warning

Before working on a system that has an On/Off switch, turn OFF the power and unplug the power cord.



Caution

Always remove old memory before installing new memory.



Note

After installing additional memory in a PIX 515/515E, do not remove the memory strips and power on the unit, or the PIX Firewall unit becomes inoperable.



Caution

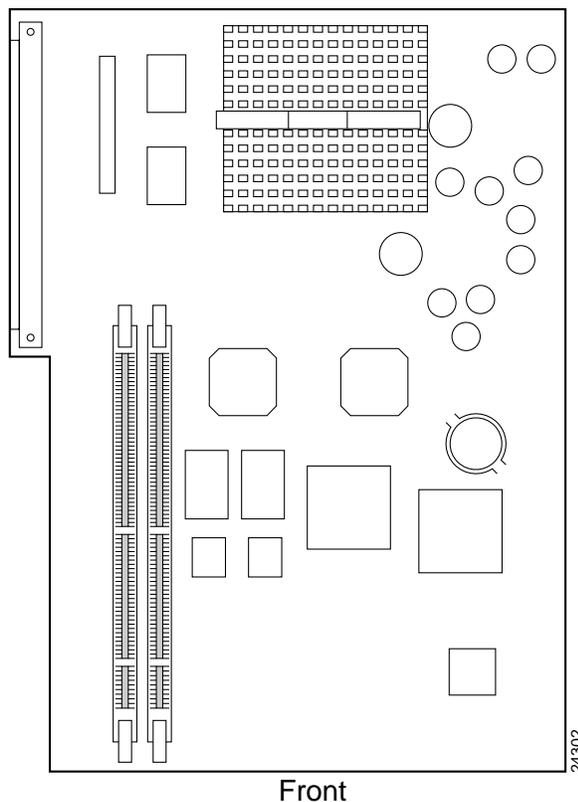
If you remove the PIX Firewall chassis top panel, always reinstall the top panel. Running the PIX Firewall without the top panel may cause overheating and damage to electrical components.

Memory Installation Steps

Complete the following to install additional system memory:

- Step 1** Remove network wires and any cords connecting to the PIX Firewall unit if the unit is rack-mounted. The PIX 515/515E should be removed from the rack and placed on a stable working surface. Ensure that the unit is unplugged from its power source.
- Step 2** Unpack the items in the memory upgrade kit.
Remove the top panel from the PIX Firewall unit. Remove all screws holding the assembly in place. Refer to “Removing and Replacing the PIX 515/515E Chassis Cover” for information on how to remove and replace the top panel.
- Step 3** Determine the location of your system memory sockets (See Figure 4-16).
- Step 4** Use the markings on the motherboard to determine the socket numbers. Always install the first memory board into the lowest socket number. Progressively add memory boards into higher numbered sockets.

Figure 4-16 PIX 515 System Memory Location



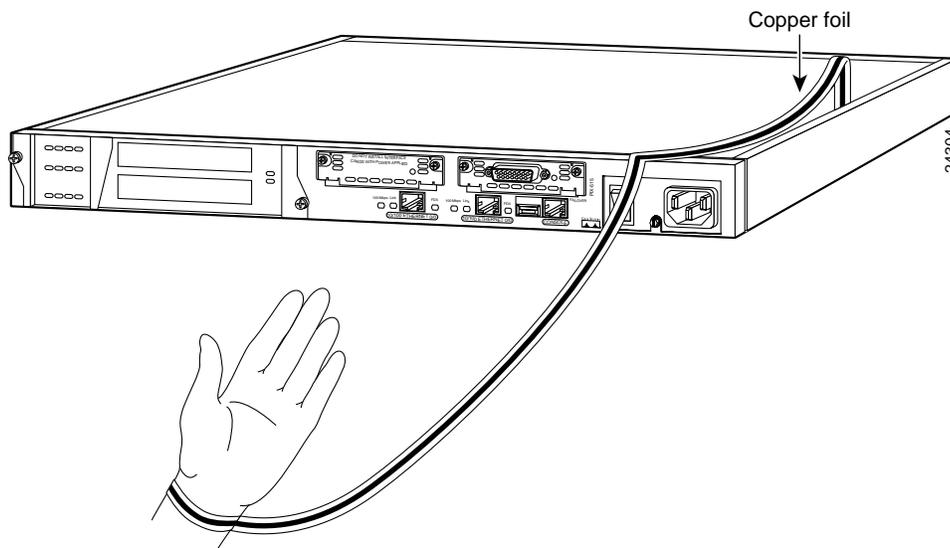
Note

Do not install a 64 MB DIMM in the PIX 515. You will not be able to properly replace the top panel because of the height of a 64 MB DIMM. Operating the PIX Firewall chassis without a top panel installed may cause damage to the unit.

The standard memory configuration for the PIX 515 is a 32 MB DIMM memory strip installed into one of two slots. If you are upgrading a 32 MB system, add a second 32 MB DIMM memory strip into the empty slot.

- Step 5** Locate the wrist grounding strap in the accessory kit and connect one end to the unit as shown in Figure 4-17, or to the PIX Firewall chassis, and securely attach the other to your wrist so it contacts your bare skin.

Figure 4-17 Attaching the Wrist Strap to the PIX 515/515E



- Step 6** With the wrist strap on your wrist, carefully grasp the memory strip from either end. Note that a DIMM strip has notches.
- Step 7** To install a DIMM strip:
- Remove the old memory strip by opening the two plastic wing connectors, and pulling the old strip up. Discard the old strip.
 - The standard memory configuration for the PIX 515 is a 32 MB DIMM memory strip installed into one of two slots. If you are upgrading a 32 MB system, add a second 32 MB DIMM memory strip into the empty slot. Refer to Figure 4-16, Figure 4-18, and Figure 4-19 for more information.



Note You cannot install a 64 MB DIMM in the PIX 515 due to height restraints. You will not be able to properly replace the top panel if you use a 64 MB DIMM. Operating the PIX Firewall chassis without a top panel may cause damage to the unit.

Figure 4-18 Inserting a DIMM Memory Strip in the PIX 515/515E

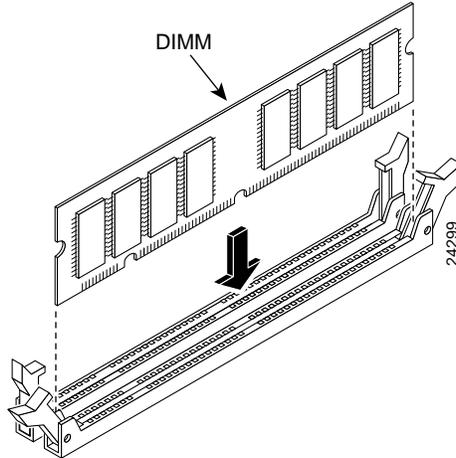
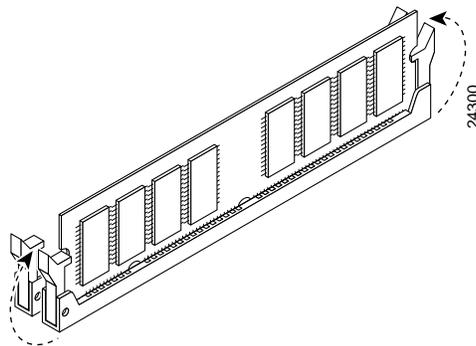


Figure 4-19 Securing a DIMM Memory Strip in the PIX 515/515E



When you finish inserting new RAM memory, replace the top panel on the PIX Firewall chassis. Reattach the screws. If desired, rack mount the PIX Firewall and attach all cables and cords as discussed in previous sections. After the PIX Firewall is installed, you can view the amount of RAM memory in the system startup messages or with the **show version** command.

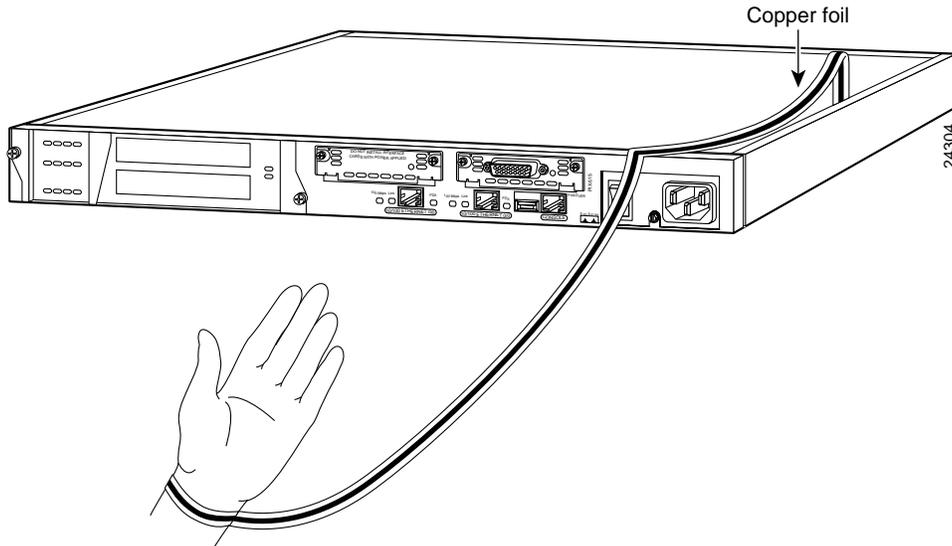
Installing a Circuit Board in the PIX 515/515E

The information in this section refers to both the AC and DC models of the PIX 515/515E.

Complete the following to install a circuit board in the PIX 515/515E:

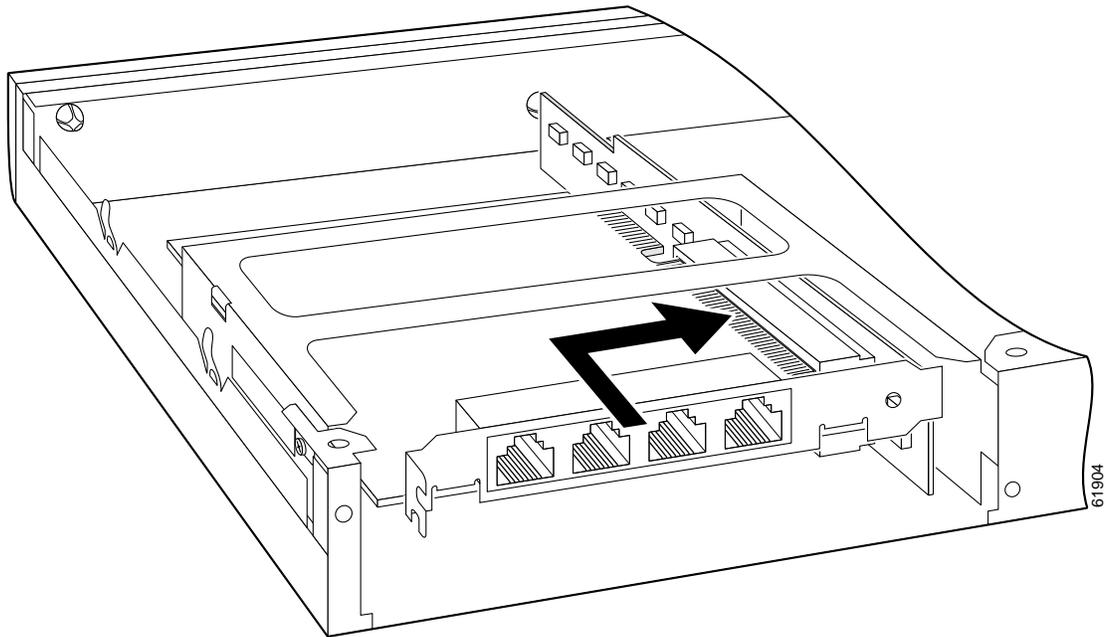
-
- Step 1** Locate the grounding strap from the accessory kit. Fasten the grounding strap to your wrist so that it contacts your bare skin. Attach the other end to bare metal inside the PIX 515/515E chassis as shown in Figure 4-20.

Figure 4-20 Attaching the PIX 515/515E Grounding Strap



- Step 2** Remove the screws from the rear assembly on the left and put the assembly aside.
- Step 3** Insert a circuit board through the cage opening and into the slot as shown in Figure 4-21.

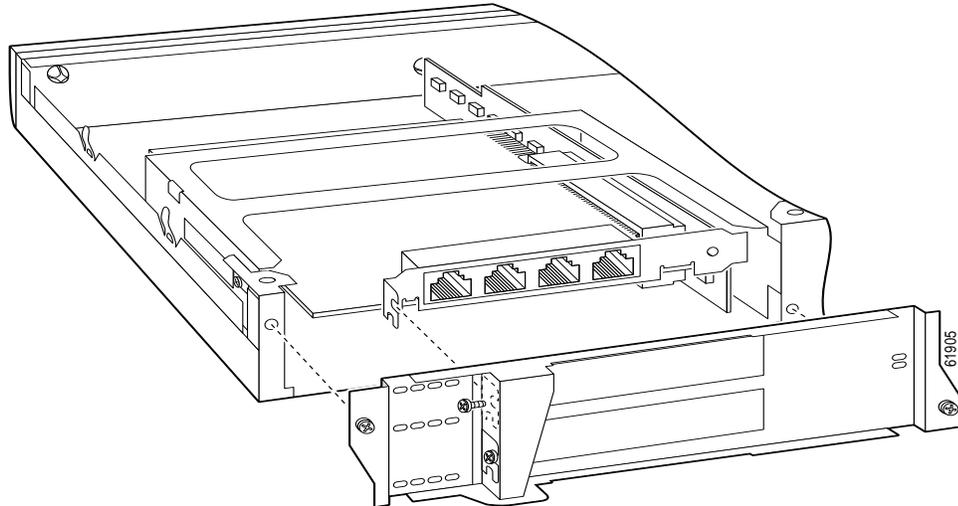
Figure 4-21 Inserting a Circuit Board into the PIX 515/515E



Note When you insert a four-port Ethernet circuit board in the slot, the end of the circuit board's connector extends past the end of the slot. This does not affect the use or operation of the circuit board.

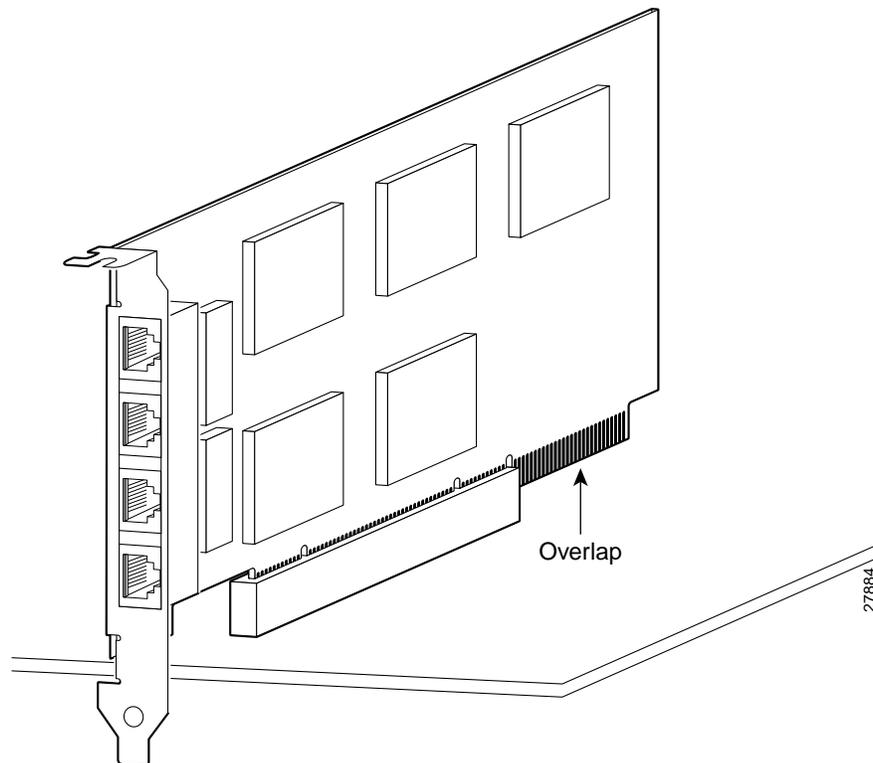
- Step 4** Attach the back cover plate making sure that the connecting flange on the circuit board goes through the slot on the back cover plate as shown in Figure 4-22.

Figure 4-22 Attaching PIX 515/515E Back Cover Plate



- Step 5** Attach the screw to hold the circuit board's connecting flange to the cover plate, and install the screws to attach the cover plate to the PIX 515/515E unit.
- Step 6** Reattach the top panel.

Figure 4-23 4-Port Circuit Board Overlap





Note If you are installing a 4-port circuit board, note that the circuit board will overlap the slot connector on the motherboard. This does not affect the use or operation of the circuit board. Figure 4-23 illustrates how this appears.

PIX Firewall VPN Accelerator Circuit Board

The VPN Accelerator (PIX-VPN-ACCEL) is an encryption and accelerator circuit board. The VPN Accelerator uses a PCI interface and therefore can only be installed in PIX Firewall platforms with PCI slots. The VPN Accelerator begins to function immediately after installation without the need of special installation configurations.



Note The new VPN Accelerator cannot be used with the former PIX Firewall IPSec accelerator in the same chassis. The PIX Firewall IPSec accelerator was also known as the Private Link card.

Installing the PIX 515/515E DC Model



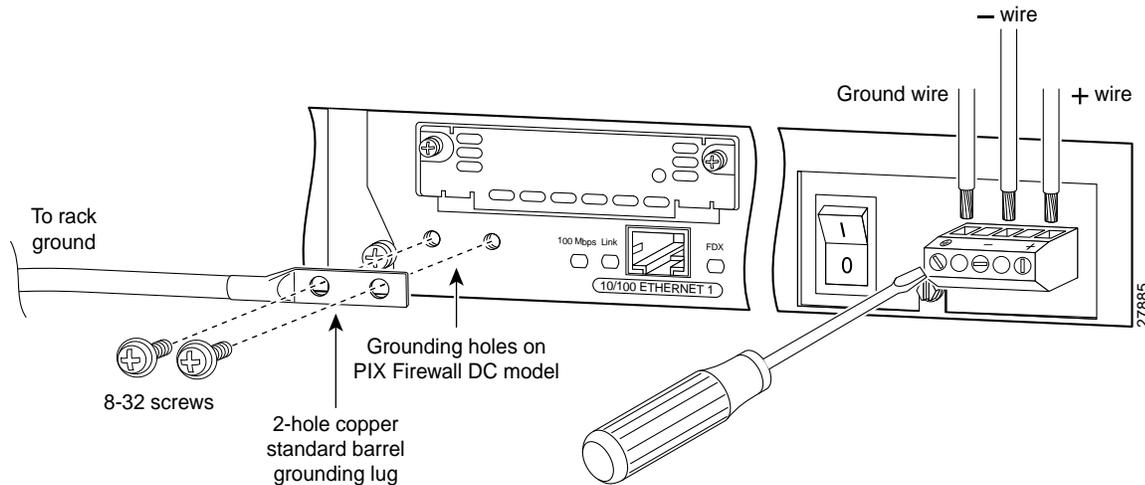
Warning

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.

Complete the following to install the PIX 515/515E DC power model:

-
- Step 1** Read the *Regulatory Compliance and Safety Information for the Cisco PIX Firewall* document.
 - Step 2** Terminate the DC input wiring on a DC source capable of supplying at least 15 amps. A 15-amp circuit breaker is required at the 48 VDC facility power source. An easily accessible disconnect device should be incorporated into the facility wiring.
 - Step 3** Power off the PIX 515/515E by checking the power switch at the rear of the unit.
 - Step 4** As shown in Figure 4-24, the PIX 515/515E is equipped with two grounding holes at the back of the unit, which you can use to connect a two-hole grounding lug to the PIX 515/515E. Use 8-32 screws to connect a copper standard barrel grounding lug to the holes. The PIX 515/515E requires a lug where the distance between the center of each hole is 0.56 inches. A lug is not supplied with the PIX 515/515E.

Figure 4-24 Attaching a Grounding Lug to the PIX Firewall



- Step 5** Power off the unit. 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.
- Step 6** Strip the ends of the wires for insertion into the power connect lugs on the PIX 515/515E.
- Step 7** Insert the ground wire into the connector for the earth ground and tighten the screw on the connector. Refer to Figure 4-24 and using the same method as for the ground wire, connect the negative wire and then the positive wire.
- Step 8** 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.
- Step 9** Install any remaining interface boards as described in “Installing a Circuit Board in the PIX 515/515E”.
- Step 10** Power on the unit from the switch at the rear of the unit.

**Note**

If you need to power cycle the DC PIX 515/515E, wait at least 5 seconds between powering off the unit and powering it back on.



PIX 520

This chapter guides you through the installation of the PIX 520, and includes the following sections:

- PIX 520 Product Overview, page 5-1
- Installing the PIX 520, page 5-4
- PIX 520 Feature Licenses, page 5-6
- Installing Failover, page 5-7
- Installing LAN-Based Failover, page 5-8
- Removing and Replacing the PIX 520 Chassis Cover, page 5-10
- Replacing a Lithium Battery, page 5-12
- Installing a Memory Upgrade, page 5-12
- Installing a Circuit Board in the PIX 520, page 5-15
- Installing the PIX 520 DC Model, page 5-21

PIX 520 Product Overview

This section describes the PIX 520 front and rear panels and the panel LEDs. Figure 5-1 shows the front view of the PIX 520.

Figure 5-1 PIX 520 Front Panel

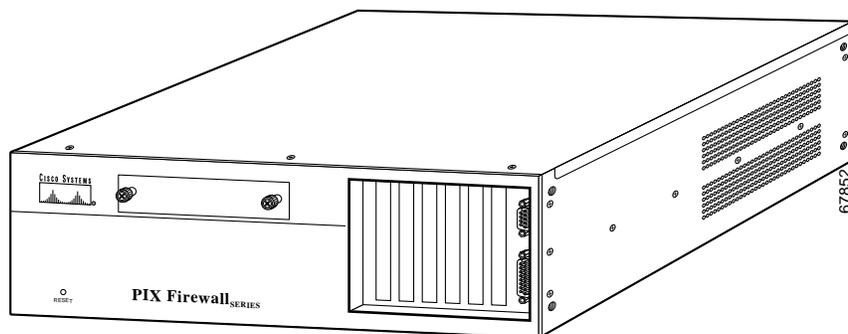
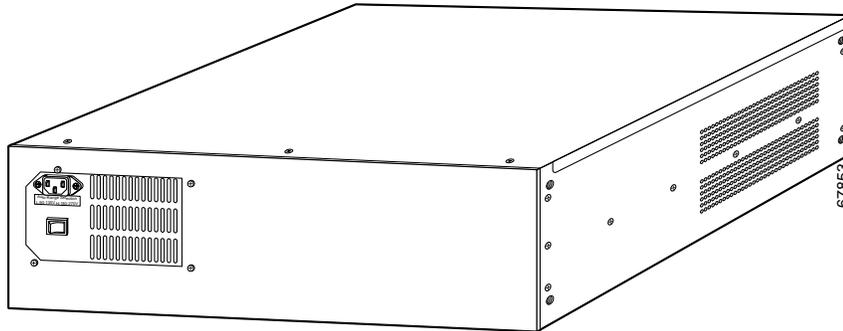


Figure 5-2 shows the rear view of the PIX 520.

Figure 5-2 PIX 520 Rear Panel



Note

Use of the four-port Ethernet circuit board changes the position of the outside and inside interfaces depending on the slot in which the circuit board is installed. Four-port Ethernet connectors are numbered from the top connector down sequentially. On horizontally mounted cards, the slots are numbered left to right.

The PIX 520 can be used with Ethernet circuit boards.

The four-port Ethernet circuit board provides four 10/100 Ethernet connections and has autosense capability. Connectors on the four-port Ethernet circuit board are numbered top to bottom sequentially; however, the actual device number depends on the slot in which the four-port Ethernet circuit board is installed.

Table 5-1 shows how the top connector is numbered.

Table 5-1 Numbering Devices with a Four-Port Connector

Slot 0 Contains	Slot 1 Contains	Slot 2 Contains	Four-Port Top Connector
4-port	Any	Any	ethernet0
Ethernet	4-port	Any	ethernet1
Ethernet	Ethernet	4-port	ethernet2
Token Ring	4-port	Any	ethernet0
Token Ring	Token Ring	4-port	ethernet0
Token Ring	Ethernet	4-port	ethernet1
Ethernet	Token Ring	4-port	ethernet1

With the four-port Ethernet circuit board, having a circuit board in slot 3 makes the number of interfaces greater than six; while the circuit board in slot 3 cannot be accessed, its presence does not cause problems with the PIX Firewall.

Figure 5-3 shows the location of the interfaces if you install a four-port Ethernet circuit board in slot 0.

Figure 5-3 Four-Port Ethernet Circuit Board Installed in Slot 0

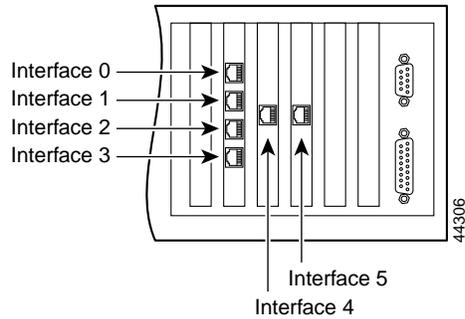


Figure 5-4 shows how the slots are numbered if a single-port Ethernet circuit board is inserted in slot 0, and a four-port Ethernet circuit board is inserted in slot 1.

Figure 5-4 Single-Port Ethernet Circuit Board Installed in Slot 0 and Four-Port Ethernet Circuit Board Installed in Slot 1

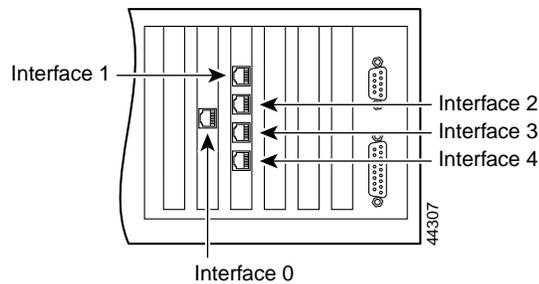
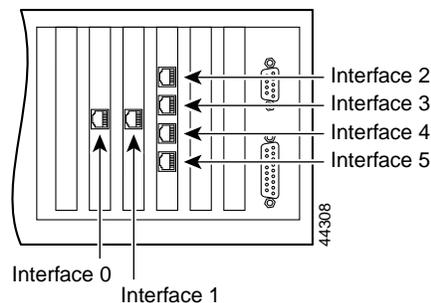


Figure 5-5 shows how the slots are numbered if single-port Ethernet circuit boards are installed in slot 0 and in slot 1, and a four-port Ethernet circuit board is inserted in slot 2.

Figure 5-5 Single-Port Ethernet Circuit Board Installed in Slot 0 and 1 and Four-Port Ethernet Circuit Board Installed in Slot 2

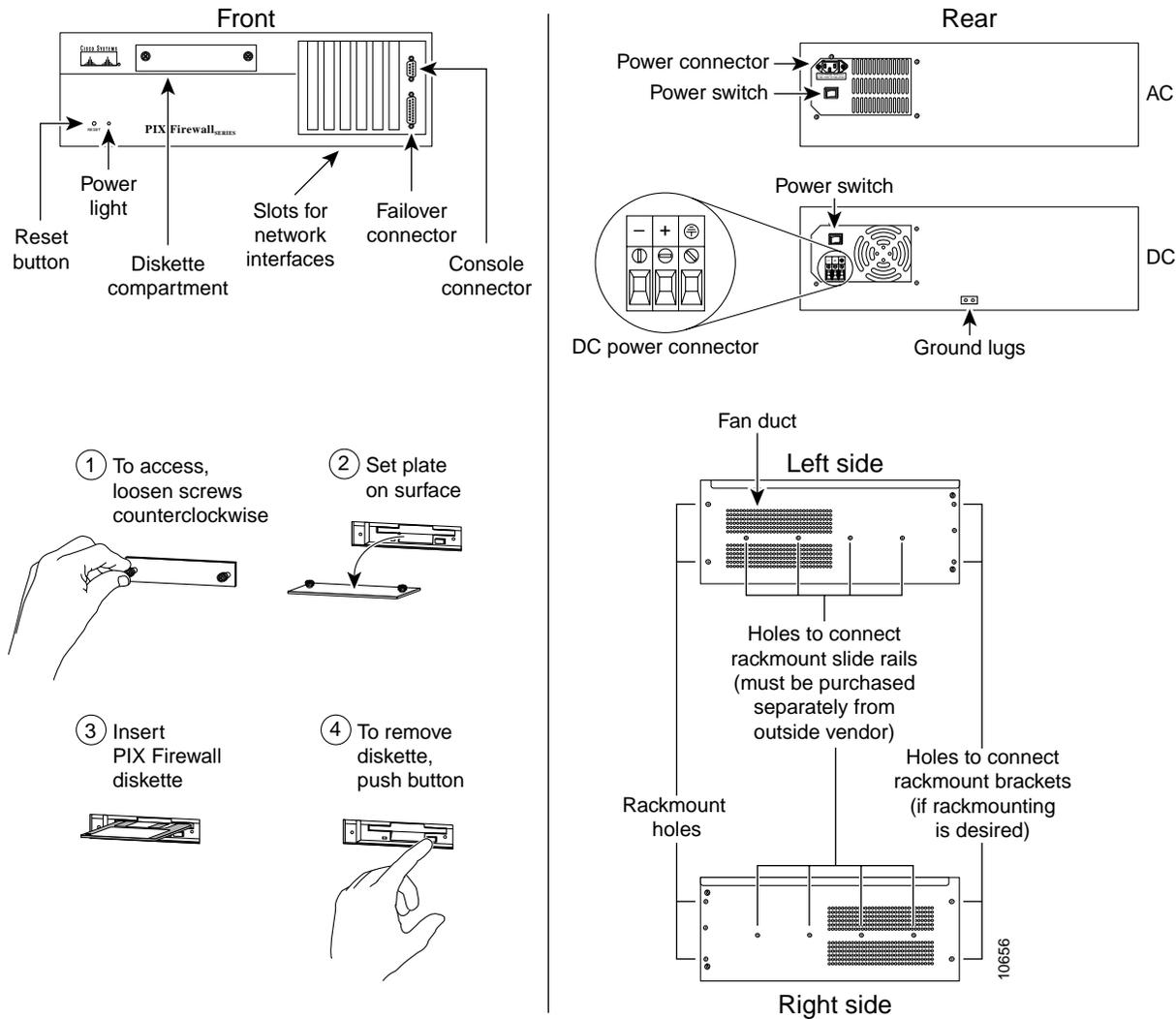


Installing the PIX 520

Complete these steps to install the PIX 520:

Step 1 Refer to Figure 5-6 for information on the features of the PIX 520 unit.

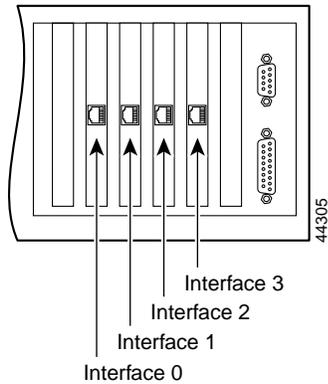
Figure 5-6 PIX 520 Front, Rear, and Side Panels.



Step 2 Connect network cables to each of the PIX Firewall's network interfaces. On the PIX 520, connect the cables at the front of the unit.

If you are not installing a four-port Ethernet circuit board, add the cables as shown in Figure 5-7.

Figure 5-7 Up to Four Single-Port Interfaces in the PIX Firewall

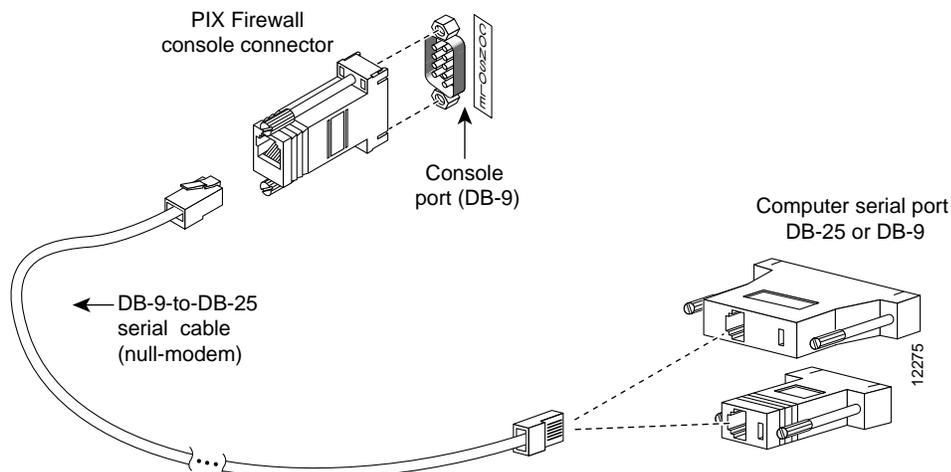


Installing Interface Cables to the PIX 520

Complete these steps to install interface cables to the PIX 520:

- Step 1** Locate the serial cable. The serial cable assembly consists of a null modem cable with RJ-45 connectors, two separate DB-9 connectors, and a separate DB-25 connector as shown in Figure 5-8.
- Step 2** Install the serial cable between the PIX Firewall and your console computer.

Figure 5-8 PIX Firewall Serial Cable Assembly



- Step 3** Connect one of the DB-9 serial connectors to the console connector on the front panel of the PIX Firewall.
- Step 4** Connect one end of the RJ-45 null modem cable to the DB-9 connector.
- Step 5** If you are installing an AC voltage PIX Firewall, connect the PIX Firewall unit's power cord to the power connector on the rear panel of the unit, and to a power outlet.

If you are installing a DC voltage PIX Firewall, refer to “PIX Firewall 16 MB Flash Circuit Board”.

Step 6 The following options are available:

- a. If you have a second PIX Firewall to use as a failover unit, install the failover feature and cable as described in “Installing Failover”.



Note Do not power on the failover units until the primary unit is configured.

- b. If needed, install the PIX Firewall Syslog Server as described in the **logging** command page in the *Cisco PIX Firewall Command Reference*.
- c. If you need to install an optional circuit board such as a single-port Ethernet board, or the four-port Ethernet board, refer to “Installing LAN-Based Failover” for information about how to remove and replace the chassis cover to install circuit boards.
- d. If you need to install additional memory, refer to “Installing a Memory Upgrade”.

Step 7 If you are ready to start configuring the PIX Firewall, power on the unit. Refer to the *Cisco PIX Firewall and VPN Configuration Guide* for configuration information.

Always check the release notes first before configuring the PIX Firewall for the latest release details. This document is also in your accessory kit.

PIX 520 Feature Licenses

If you have a PIX 520-UR unrestricted feature license, the following options are available:

- If you have a second PIX 520 to use as a failover unit, install the failover feature and cable as described in “Installing Failover”.
- If needed, install the PIX Firewall Syslog Server as described in the **logging** command page in the *Cisco PIX Firewall Command Reference*.
- Refer to “Installing LAN-Based Failover”, for information about how to remove and replace the chassis cover if you need to install optional circuit boards.



Note

It is very important to remove the chassis cover before installing circuit boards in the PIX 520. Even though it may appear possible to add or remove circuit boards from the back panel, removing the chassis cover greatly simplifies the process.

- If you need to install additional memory, refer to “Installing a Memory Upgrade”.

Installing Failover

Complete these steps to install a failover connection:



Note

This section only applies to PIX Firewall units with a “UR” (unrestricted) license.

Step 1 Power off both the primary and secondary units.

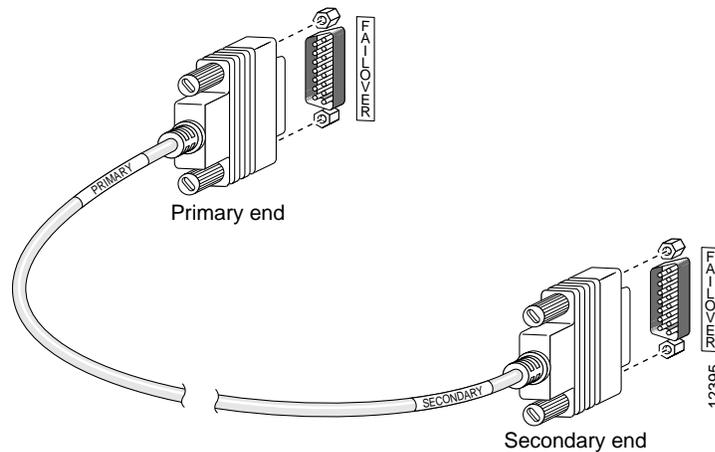


Note

Both PIX Firewall units has to be the same model number, have at least as much RAM, have the same Flash memory size, and be running the same software version.

Step 2 Locate the failover cable (shown in Figure 5-9). This cable is shipped separately from the PIX Firewall unit. The cable is labeled Primary on one end and Secondary on the other. Install the cable for the PIX 520 as shown in Figure 5-9.

Figure 5-9 PIX 520 Failover Cable Connection



- Step 3** Connect the Primary end of the failover cable to the first PIX Firewall unit, that is, the one you have already configured.
- Step 4** Connect the Secondary end of the failover cable to the standby unit.
- Step 5** Connect a power cord to the power connector on the rear panel of each unit, and the other end of each power cord to (preferably separate) power outlets.
- Step 6** If you are using Stateful Failover, use one of the following types of connections, that is appropriate for your system, between the dedicated interfaces on the PIX Firewall units:
- Cat 5 crossover cable directly connecting the primary unit to the secondary unit.
 - 100BaseTX half-duplex hub using straight Cat 5 cables.
 - 100BaseTX full duplex on a dedicated switch or dedicated VLAN of a switch.



Note

All enabled interfaces must be connected between the active and standby units. Only configure the active unit. On the PIX 520, you can access the console and determine which unit is active with the **show failover** command.

**Caution**

Do not turn the power on until the units are connected and the primary unit is configured completely.

Step 7

Use the power switch at the back of the units to power the primary unit on and then power the standby unit on.

Within a few seconds, the active unit automatically downloads its configuration to the standby unit.

If the primary unit fails, the secondary unit automatically becomes active.

Installing LAN-Based Failover

LAN-based failover supports failover between two units connected over a dedicated Ethernet interface. LAN-based failover eliminates the need for a special failover cable and overcomes the distance limitations imposed by the failover cable.

For information on configuring a LAN-based failover, refer to the *Cisco PIX Firewall and VPN Configuration Guide*.

**Note**

Both PIX Firewall units must be the same model number, have the same amount of RAM, Flash memory, number and type of interfaces, and be running the same software version.

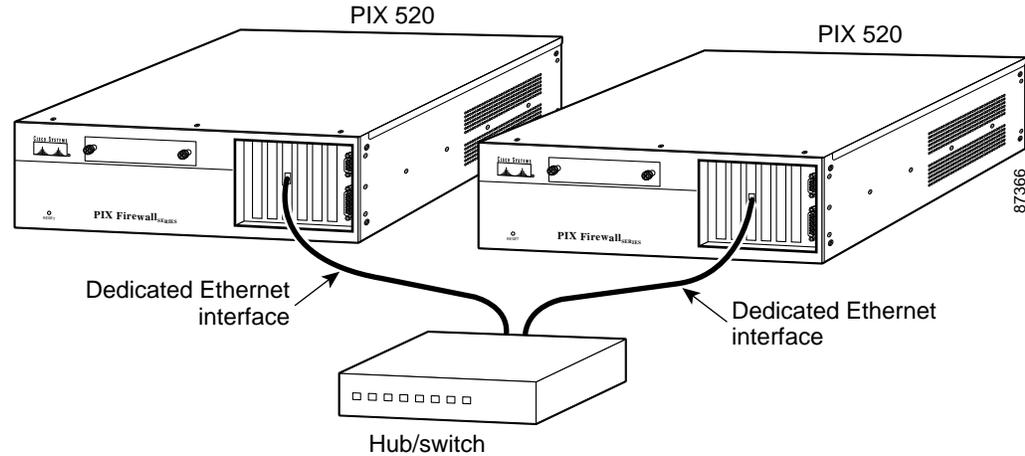
Complete these steps to set up a LAN-based failover connection:

-
- Step 1** Disconnect both the PIX Firewall units, so that there is no traffic flow between them. If the Failover cable is connected to the PIX Firewall, disconnect it.
 - Step 2** Configure the PIX Firewall units. For information on configuring the PIX Firewall, refer to “*Configuring the LAN-Based Failover*,” section in Chapter 10 “Using PIX Firewall Failover” in the Cisco PIX Firewall and VPN Configuration Guide.
 - Step 3** Power off both the units.
 - Step 4** Connect the LAN failover interfaces to the dedicated switch/hub, as shown in Figure 5-10.

**Note**

A dedicated LAN interface and a dedicated switch (or VLAN) is required to implement LAN-based failover. You cannot use a crossover Ethernet cable to connect the two PIX Firewalls.

Figure 5-10 LAN-Based Failover Connections



Step 5 If you are using Stateful Failover, use one of the following types of connections, that is appropriate for your system, between the dedicated interfaces on the PIX Firewall units:

- Cat 5 crossover cable directly connecting the primary unit to the secondary unit.
- 100BaseTX full duplex on a dedicated switch or dedicated VLAN of a switch.
- 1000BaseTX full duplex on a dedicated switch or dedicated VLAN of a switch.



Note For Stateful Failover on the PIX 520, if you have Gigabit Ethernet (GE) interfaces, then the failover link must be GE.



Caution

Do not turn the power on until the units are connected and the primary unit is configured completely.

Step 6 Power the primary unit on first, *then* power on the secondary unit. Within a few seconds, the active unit automatically downloads its configuration to the standby unit.

If the primary unit fails, the secondary unit automatically becomes active.

Removing and Replacing the PIX 520 Chassis Cover

This section describes how to remove and replace the chassis cover from the PIX 520. This section includes the following topics:

- Removing the Chassis Cover, page 5-10
- Replacing the Chassis Cover, page 5-11

Removing the Chassis Cover

Complete these steps to remove the chassis cover:



Note

Removing the PIX Firewall case does not affect your Cisco warranty. Upgrading the PIX Firewall does not require any special tools and does not create any radio frequency leaks.

Step 1 Read the *Regulatory Compliance and Safety Information for the Cisco PIX Firewall* document.

Step 2 Ensure that the PIX Firewall is powered off. Unplug the power cord from the power outlet. Once the upgrade is complete, you can safely reconnect the power cord.

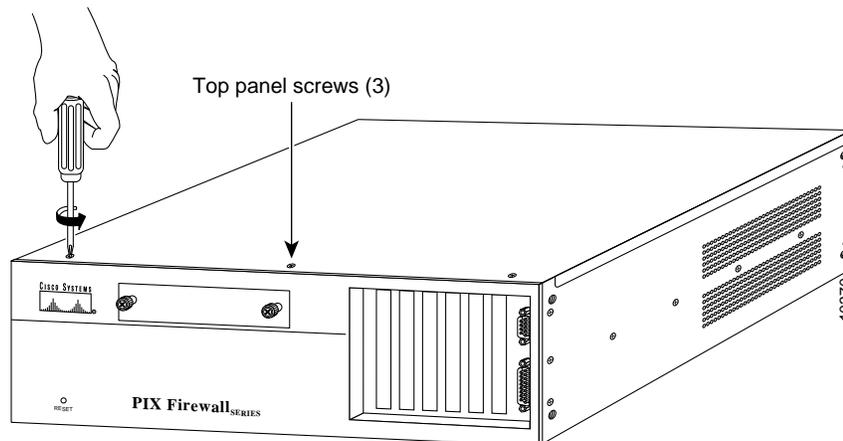


Warning

Before working on a system that has an On/Off switch, turn OFF the power and unplug the power cord.

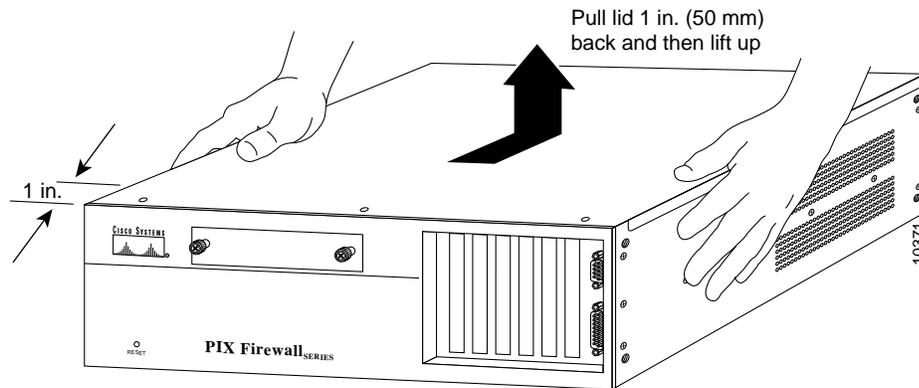
Step 3 Remove the three screws holding the top panel in place, as shown in Figure 5-11.

Figure 5-11 Removing the Top Panel Screws



- Step 4** Remove the top panel as shown in Figure 5-12.

Figure 5-12 Removing the Top Panel



Replacing the Chassis Cover



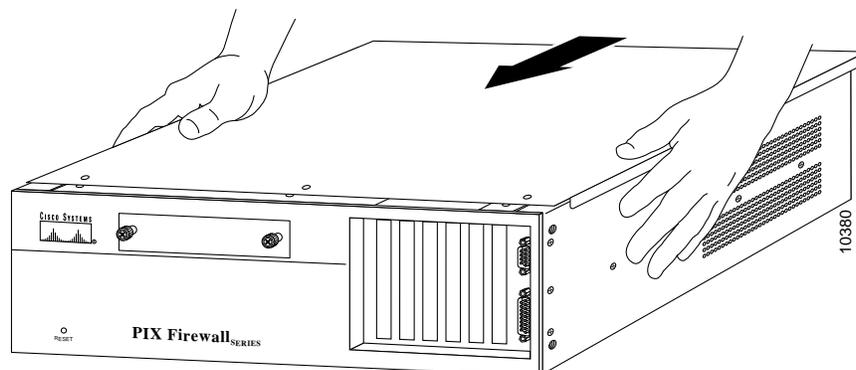
Caution

Do not operate PIX Firewall units without the top panel installed. The top panel protects the internal components, prevents electrical shorts, and provides proper air-flow for cooling the electronic components.

Complete these steps to replace the chassis cover:

- Step 1** Replace the top panel, as shown in Figure 5-13.
Step 2 Secure the three screws.
Step 3 Reinstall all interface cables.

Figure 5-13 Replacing the Top Panel



Replacing a Lithium Battery

The PIX Firewall has a lithium battery on its main circuit board. This battery has an operating life of about 10 years. When the battery loses its charge, the PIX Firewall cannot function. The lithium battery is not a field replaceable unit (FRU). Contact Cisco TAC to replace the battery.



Note

Do not attempt to replace this battery yourself.



Warning

Danger of explosion exists if the lithium battery is incorrectly replaced. Replace only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer's instructions.

Installing a Memory Upgrade

Observe the following warnings, cautions, and notes when installing additional PIX Firewall system memory.

The following statement applies to DC models:



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.

The following statement applies to both AC and DC models:



Warning

Before working on a system that has an On/Off switch, turn OFF the power and unplug the power cord.



Caution

Always remove old memory before installing new memory.



Note

After installing additional memory in the PIX 520, do not remove the memory strips and power on the unit, or the PIX Firewall unit will become inoperable.



Caution

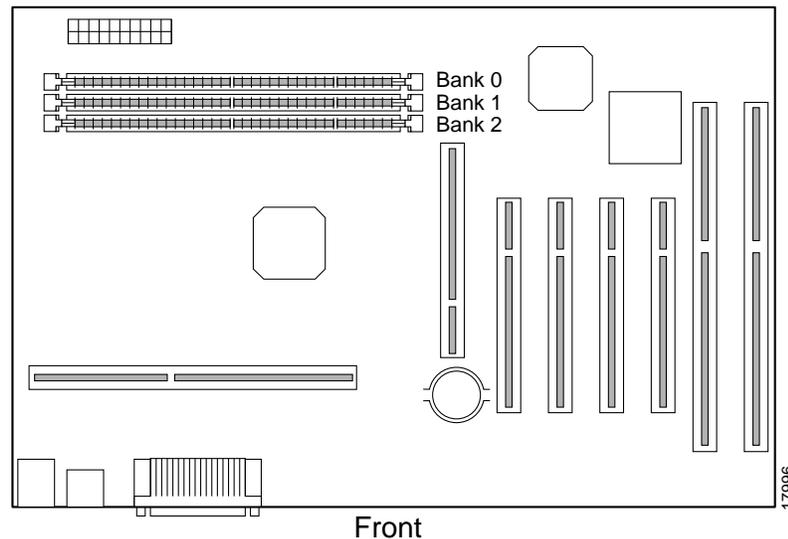
If you remove the PIX Firewall chassis top panel, always reinstall the top panel. Running the PIX Firewall without the top panel may cause overheating and damage to electrical components.

Memory Installation Steps

Complete these steps to install additional system memory:

- Step 1** If the unit is rack-mounted, remove network wires and any cords connecting to the PIX Firewall unit. The PIX 520 should be removed from the rack and placed on a stable working surface. Ensure that the unit is unplugged from its power source.
- Step 2** Unpack the items in the memory upgrade kit.
- Remove the top panel from the PIX Firewall unit. Remove all screws holding the assembly in place. Refer to “Installing LAN-Based Failover” for information on how to remove and replace the top panel.
- Step 3** Determine the location of your system memory sockets (see Figure 5-14).
- Step 4** Use the markings on the motherboard to determine the socket numbers. Always install the first memory board into the lowest socket number. Progressively add memory boards into higher numbered sockets.

Figure 5-14 PIX 520 System Memory Location



- Step 5** Locate the wrist grounding strap in the accessory kit and connect one end to the unit as shown in Figure 5-17, or to the PIX Firewall chassis, and securely attach the other to your wrist so it contacts your bare skin.
- Step 6** With the wrist strap on your wrist, carefully grasp the memory strip from either end. Note that a DIMM strip has notches.
- Step 7** To install a DIMM strip:
- Remove the old memory strip by opening the two plastic wing connectors, and pulling the old strip up. Discard the old strip.
 - When installing the memory strip in the PIX 520, install the new strip in Bank 0 as shown in Figure 5-15 and Figure 5-16, by opening the two plastic wing connectors, inserting the strip, and closing the wing connectors.

Figure 5-15 Inserting a DIMM Memory Strip in the PIX 520

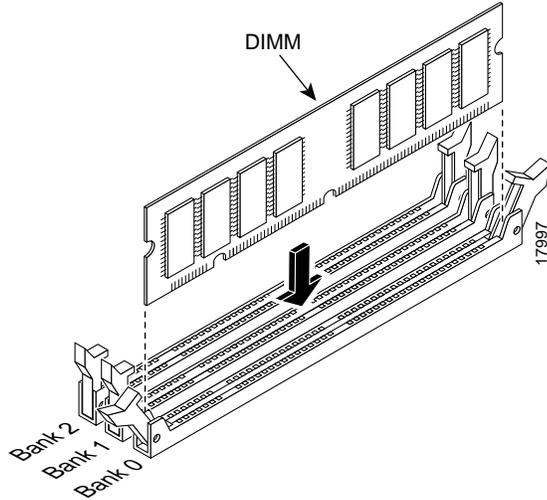
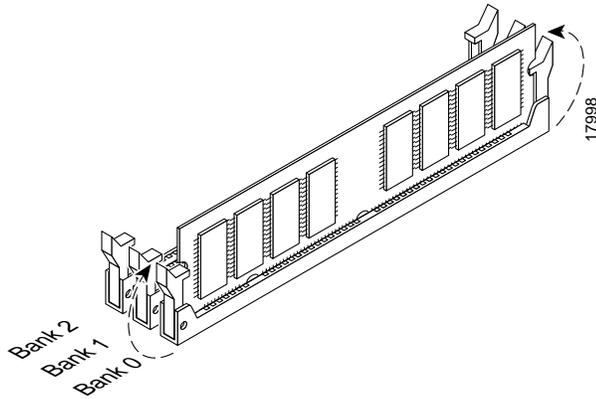


Figure 5-16 Securing a DIMM Memory Strip in the PIX 520



When you finish inserting new RAM memory, replace the top panel on the PIX Firewall chassis. Reattach the screws. If desired, rack mount the PIX Firewall and attach all cables and cords as discussed in previous sections. After the PIX Firewall is installed, you can view the amount of RAM memory in the system startup messages or with the **show version** command.

Installing a Circuit Board in the PIX 520

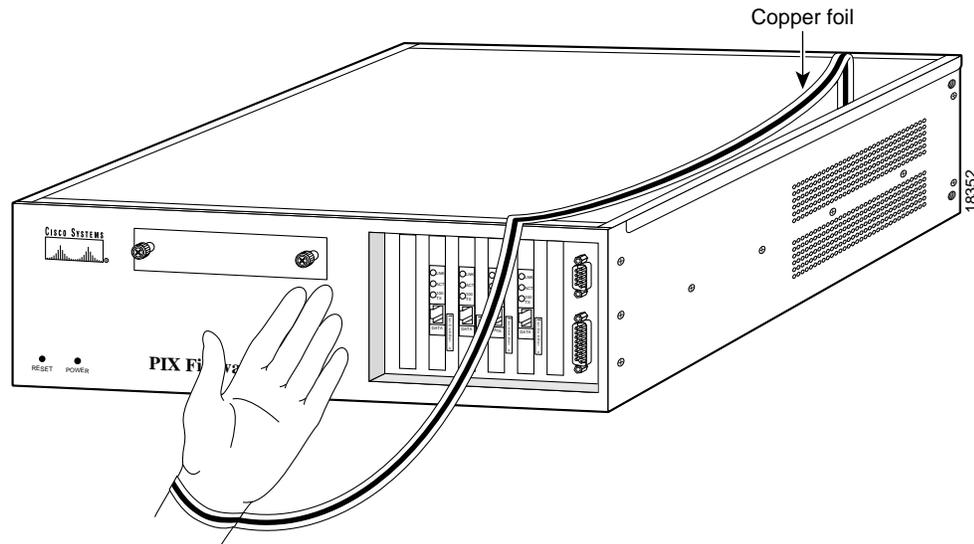
The information in this section refers to the installation of a circuit board in the PIX 520. This section includes the following topics:

- PIX Firewall 16 MB Flash Circuit Board, page 5-18
- PIX Firewall VPN Accelerator Circuit Board, page 5-19
- Gigabit Ethernet Circuit Board, page 5-20
- Installing the PIX 520 DC Model, page 5-21

Complete these steps to install a circuit board in the PIX 520:

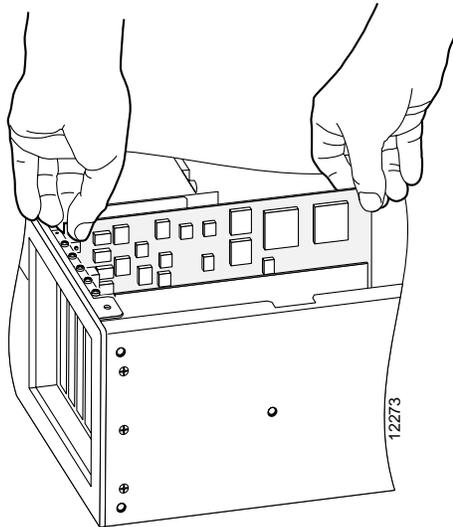
- Step 1** Locate the grounding strap from the accessory kit. Fasten the grounding strap to your wrist so that it contacts your bare skin. Attach the other end to bare metal inside the PIX Firewall chassis as shown in Figure 5-17.

Figure 5-17 Attaching Grounding Strap to Your Wrist and to the PIX Firewall



- Step 2** Insert the new circuit board, as shown in Figure 5-18, and secure it using the screw provided with the circuit board.

Figure 5-18 Installing the New Circuit Board

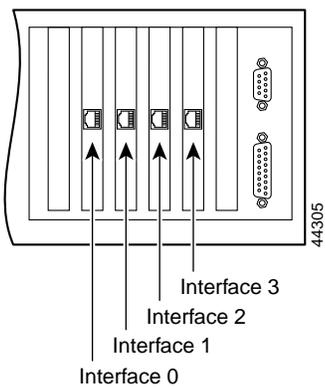


Step 3 Figure 5-19 displays how the circuit boards are numbered according to their position. If you have Version 4.4 and a four-port Ethernet circuit board, refer to “PIX 520 Product Overview”.



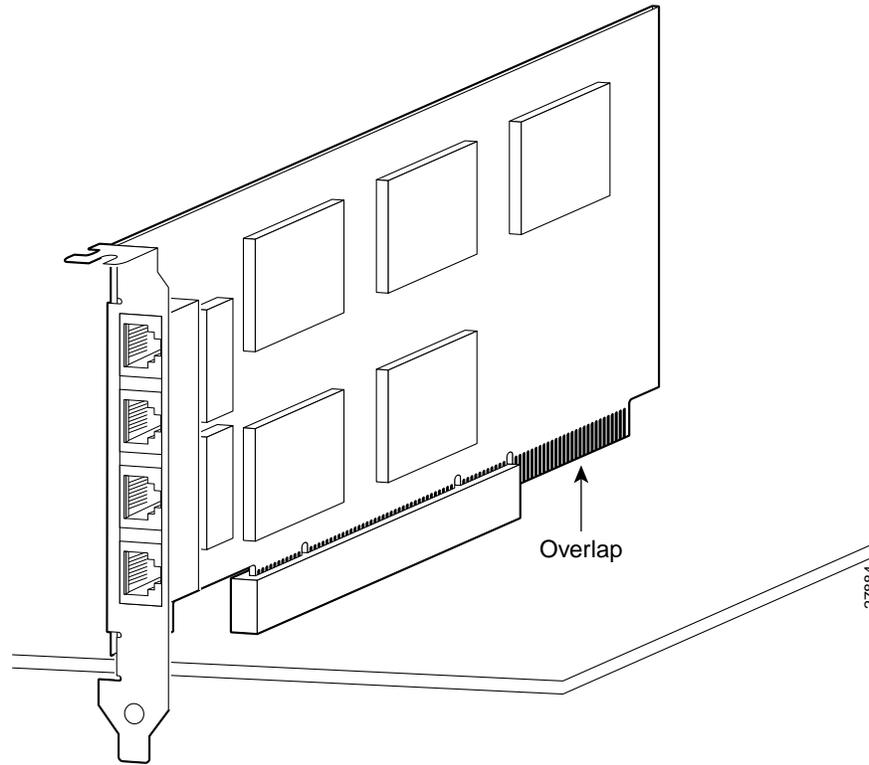
Note When adding a network interface or encryption circuit board, install the new circuit board in the first empty slot to the right of the existing network interface circuit board.

Figure 5-19 PIX Firewall Network Circuit Boards



Step 4 If you are installing a 4-port circuit board, note that the circuit board will overlap the slot connector on the motherboard. This does not affect the use or operation of the circuit board. Figure 5-20 illustrates how this appears.

Figure 5-20 4-Port Circuit Board Overlap

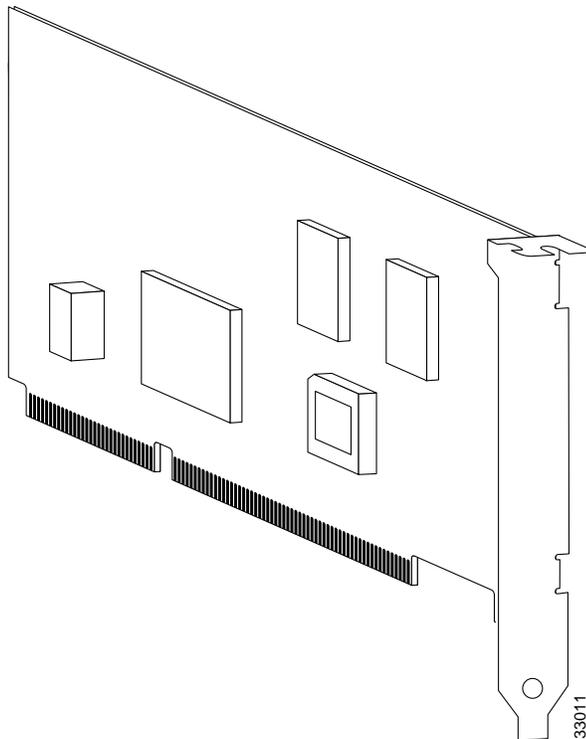


PIX Firewall 16 MB Flash Circuit Board

Along with upgrading your Flash memory to 16 MB, the PIX Firewall 16 MB Flash circuit board includes pre-installed PIX Firewall software and a UR (unrestricted) 56-bit DES encryption license. The 16 MB Flash circuit board installs into the PIX Firewall ISA slot.

An illustration of the 16 MB Flash circuit board is shown in Figure 5-21.

Figure 5-21 PIX Firewall 16 MB Flash Circuit Board



Use the following information to install a 16 MB Flash circuit board:

- The PIX Firewall must have a minimum of 32 MB of RAM memory.
- You must obtain a new activation key if you will be using 3DES.
- The PIX Firewall should not be downgraded to a software revision lower than 5.0(3) after the new software from the 16 MB circuit board is installed.
- If you downgrade from software Version 5.3 to 5.2 or lower, you will lose private data (keys, certifications, and CRLs) that are stored in Flash memory. You need to use the **clear flashfs** command, **downgrade 5.0 | 5.1 | 5.2** options if your PIX Firewall has 16 MB Flash memory, private data stored in the Flash memory, and you used the **ca save all** command to save these items in Flash memory.

Complete the following steps to install the 16 MB Flash circuit board:

-
- Step 1** Record the present PIX Firewall unit serial number.
- Step 2** Record the new serial number from the 16 MB Flash circuit board.

After installation, the serial number of the PIX Firewall will be the serial number supplied with the 16 MB Flash circuit board.

- Step 3** Create a backup of your present configuration (to use later to reconfigure your system).
 - Step 4** Obtain a new Activation key (if using 3DES).
 - Step 5** Remove any previously installed Flash memory circuit boards from the unit.
 - Step 6** The jumper on the PIX Firewall 16 MB Flash circuit board must not be removed or repositioned. The PIX Firewall system will not work if this jumper is moved.
 - Step 7** Install the 16 MB Flash circuit board into an available ISA slot in the PIX Firewall chassis.
-

PIX Firewall VPN Accelerator Circuit Board

The VPN Accelerator (PIX-VPN-ACCEL) is an encryption and accelerator circuit board. The VPN Accelerator uses a PCI interface and therefore can only be installed in PIX Firewall platforms with PCI slots. The VPN Accelerator begins to function immediately after installation without the need of special installation configurations.

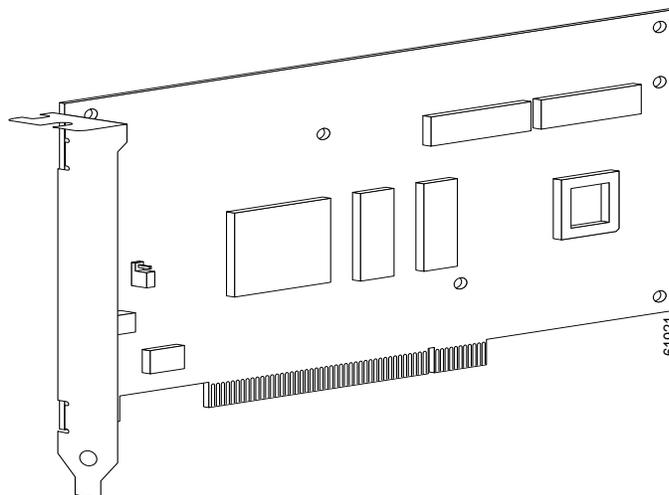


Note

The new VPN Accelerator cannot be used with the former PIX Firewall IPsec accelerator in the same chassis. The PIX Firewall IPsec accelerator was also known as the Private Link card.

An illustration of the VPN Accelerator is shown in Figure 5-22.

Figure 5-22 PIX Firewall VPN Accelerator Circuit Board



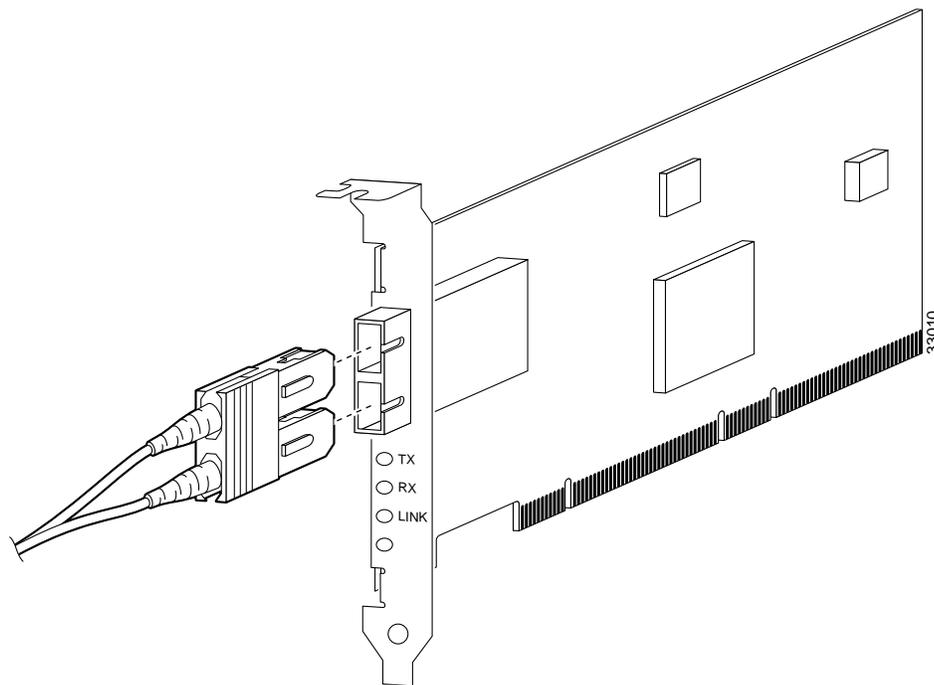
Gigabit Ethernet Circuit Board

PIX Firewall supports 1000 Mbps (Gigabit) Ethernet. The Gigabit Ethernet circuit board uses the **gb-ethernet** device name and only has one hardware speed and the following duplex options:

- 1000SXfull—Forces full-duplex operation
- 1000BaseSX—Forces half-duplex operation
- 1000auto—Auto negotiates full or half duplex

The Gigabit Ethernet circuit board and the fiber optic cable connection are shown in Figure 5-23.

Figure 5-23 Gigabit Ethernet Circuit Board



The Gigabit Ethernet circuit board has three LEDs:

- TX—Transmitting data
- RX—Receiving data
- LINK—The Gigabit Ethernet circuit board has established a network connection

Installing the PIX 520 DC Model



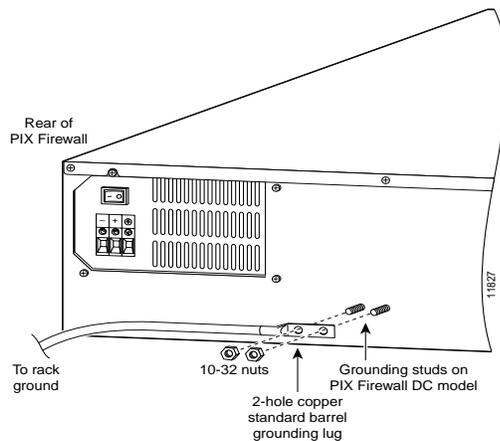
Warning

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.

Complete these steps to install the PIX 520 DC power model:

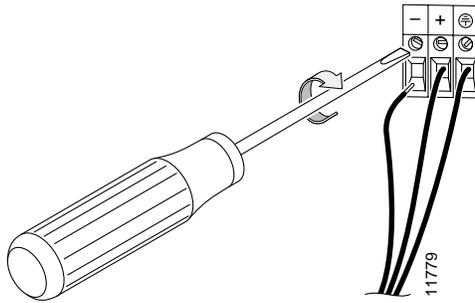
- Step 1** Read the *Regulatory Compliance and Safety Information for the Cisco PIX Firewall* document.
- Step 2** Terminate the DC input wiring on a DC source capable of supplying at least 15 amps. A 15-amp circuit breaker is required at the 48 VDC facility power source. An easily accessible disconnect device should be incorporated into the facility wiring.
- Step 3** Be sure the PIX 520 power is off by checking the power switch at the rear of the unit.
- Step 4** As shown in Figure 5-24, the PIX 520 is equipped with two grounding studs at the back of the unit, which you can use to connect a two-hole grounding lug to the PIX 520. Use the 10-32 nuts provided with the PIX 520 to connect a copper standard barrel grounding lug to the studs. The PIX 520 requires a lug where the distance between the center of each hole is 0.56 inches. A lug is not supplied with the PIX 520.

Figure 5-24 Attaching a Grounding Lug to the PIX Firewall



- Step 5** 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.
- Step 6** Strip the ends of the wires for insertion into the power connect lugs on the PIX 520.
- Step 7** Insert the ground wire into the connector for the earth ground and tighten the screw on the connector (see Figure 5-25). Using the same method as for the ground wire, connect the negative wire and then the positive wire.

Figure 5-25 Attaching DC power cables



- Step 8** Reconnect power to the PIX 520. 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.
- Step 9** Insert the PIX 520 system diskette in the drive at the front of the unit.
- Step 10** If needed, install the interface boards as described in “Installing a Circuit Board in the PIX 520”.
- Step 11** Power on the unit from the switch at the rear of the unit.
-



Note

If you need to power cycle the DC PIX Firewall, wait at least 5 seconds between powering off the unit and powering it back on.



PIX 525

This chapter guides you through the installation of the PIX 525, and includes the following sections:

- PIX 525 Product Overview, page 6-1
- Installing the PIX 525, page 6-3
- PIX 525 Feature Licenses, page 6-5
- Installing Failover, page 6-6
- Installing LAN-Based Failover, page 6-8
- Removing and Replacing the PIX 525 Chassis Cover, page 6-9
- Replacing a Lithium Battery, page 6-12
- Installing a Memory Upgrade, page 6-12
- Installing a Circuit Board in the PIX 525, page 6-14
- Installing a DC Power Supply, page 6-19

PIX 525 Product Overview

Figure 6-1 show the front view of the PIX 525.

Figure 6-1 PIX 525 Front Panel

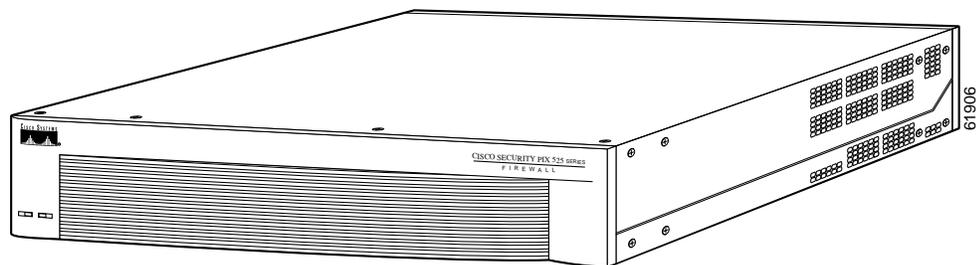
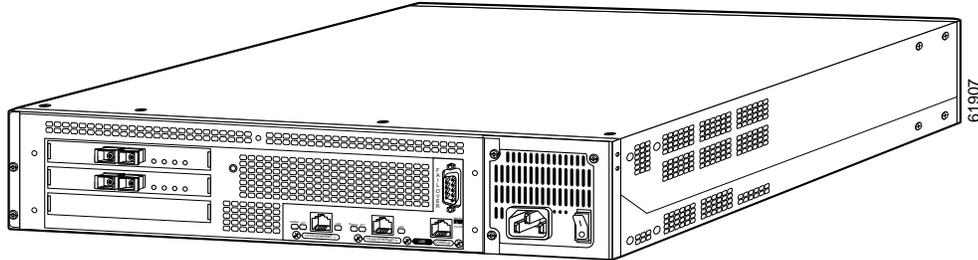


Figure 6-2 shows the rear view of the PIX 525.

Figure 6-2 PIX 525 Rear Panel



There are two LEDs on the front panel of the PIX 525 (see Figure 6-3).

Figure 6-3 PIX 525 Front Panel LEDs

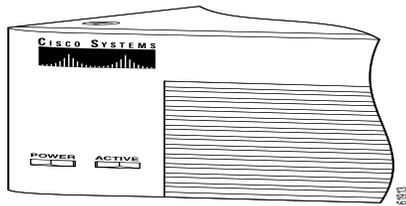


Table 6-1 lists the state of the PIX 525 front panel LEDs.

Table 6-1 PIX 525 Front Panel LEDs

LED	Status	Description
POWER	On	On when the unit has power.
ACT	On	On when the unit is the active failover unit. If failover is present, the light is on when the unit is the active unit.
	Off	off when the unit is in standby mode.

There are three LEDs for the each RJ-45 interface port and three types of fixed interface connectors on the back of the PIX 525.

Figure 6-4 shows the PIX 525 rear panel LEDs.

Figure 6-4 PIX 525 Rear Panel LEDs

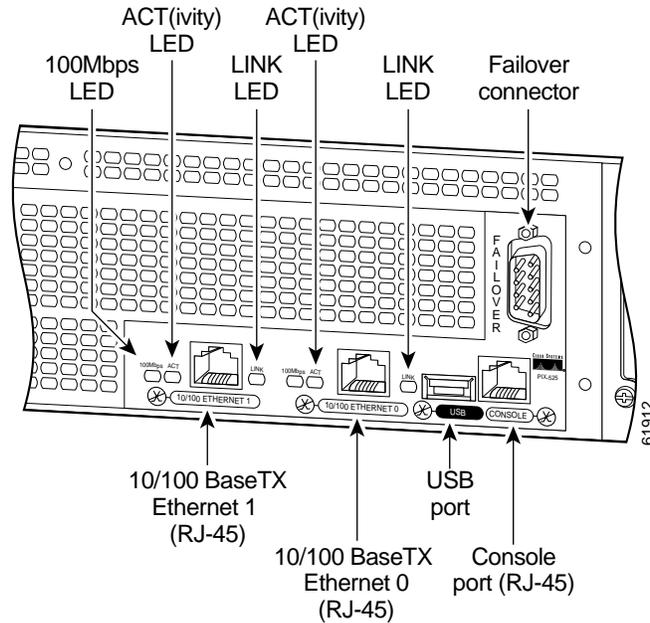


Table 6-2 lists the state of the PIX 525 rear panel LEDs.

Table 6-2 PIX 525 Rear Panel LEDs

LED	Status	Description
100 Mbps	On	Port 100 megabits per second 100BaseTX communication.
	Off	Port is using 10 megabits per second data exchange.
ACT	On	Shows network activity.
LINK	On	Shows that data is passing through that interface.

The PIX 525 has RJ-45, network and console connectors, as well as a DB-15 failover cable connector. The USB port is not used at the present time.

Installing the PIX 525

Complete these steps to install the PIX 525:

- Step 1** The PIX 525 provides one set of brackets for installing the unit in an equipment rack. Complete these steps if the unit is going to be installed into an equipment rack:
- Attach the brackets to the holes near the front of the unit on each side of the PIX 525 using the supplied screws.
 - Attach the unit to the equipment rack.

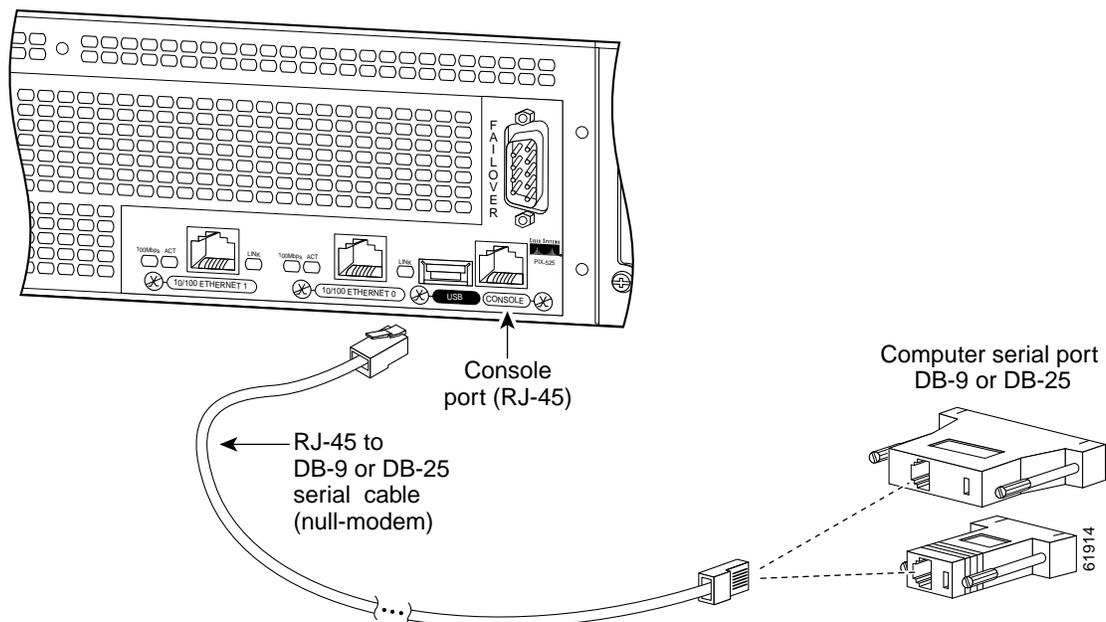
- Step 2** Connect the cable so that you have either a DB-9 or DB-25 connector on one end as required by the serial port for your computer, and the other end is the RJ-45 connector as shown in Figure 6-5.



Note Use the Console port to connect a computer to enter configuration commands. Locate the serial cable from the accessory kit. The serial cable assembly consists of a null modem cable with RJ-45 connectors, and one DB-9 connector and a DB-25 connector.

- Step 3** Connect the RJ-45 serial cable connector to the PIX 525 console connector and connect the other end to the serial port connector on your computer.

Figure 6-5 PIX 525 Rear Panel



- Step 4** Connect the outside network cable to the remaining Ethernet port. Refer to “PIX 525 Feature Licenses” for information on how to configure the ports.



Note The inside or outside network connections can be made to any available interface port on the PIX 525. If you are only using the ETHERNET 0 and ETHERNET 1 ports, connect the inside network cable to the interface connector marked ETHERNET 0 or ETHERNET 1.

- Step 5** If you need to install an optional circuit board, refer to “Installing a Circuit Board in the PIX 525”. If you need to install memory, refer to “Installing a Memory Upgrade” for more information.



Note It is not necessary to remove the chassis cover of the PIX 525 to access the circuit boards or memory.

- Step 6** Connect the network cables to the expansion interface ports. (The inside, outside, or perimeter network connections can be made to any available interface port on the PIX 525.) The first expansion port number, at the top left, is interface 2. Starting from that port and going from left to right and top to bottom, the next port is interface 3, the next is interface 4, and so on. Refer to “PIX 525 Feature Licenses” for information on how to configure the ports.
- Step 7** If you have a second PIX Firewall to use as a failover unit, install the failover feature and cable as described in “Installing Failover”.
-  **Note** Do not power on the standby failover unit until the primary unit is configured.
- Step 8** When you are ready to start the PIX 525, power on the unit from the switch at the rear of the unit.

PIX 525 Feature Licenses

If you have the PIX-525-UR unrestricted feature license, the following options are available:

- If you have a second PIX 525 to use as a failover unit, install the failover feature and cable as described in “Installing Failover”.
- If needed, install the PIX Firewall Syslog Server as described on the **logging** command page in the *Cisco PIX Firewall Command Reference*.
- If you need to install an optional circuit board, refer to “Installing a Circuit Board in the PIX 525”.
- If you need to install additional memory, refer to “Installing a Memory Upgrade”.



Note

If, for any reason, you may choose to downgrade to any software version, note that you must use the **clear flashfs** command before doing so. A new section is added to Flash memory that must be cleared before downgrading.

For information on upgrading feature licenses or downloading the latest software versions, go to the following website:

http://www.cisco.com/univercd/cc/td/doc/product/iaabu/pix/pix_sw/v_63/config/upgrade.htm

This section includes the following topics:

- PIX Firewall VPN Accelerator Card, page 6-6
- PIX Firewall VPN Accelerator Card+, page 6-6

PIX Firewall VPN Accelerator Card

The VPN Accelerator Card (VAC) for the Cisco PIX Firewall series is a card that provides high-performance, tunneling and encryption services suitable for site-to-site and remote access applications. The VAC is integrated with PIX 525 unrestricted (UR) and failover (FO) bundles. You can also purchase the VAC as a spare for use with PIX 525 units that have a restricted (R) license.

PIX Firewall VPN Accelerator Card+

PIX Firewall Version 6.3 adds support for the VPN Accelerator Card+ (VAC+) . The VAC+ is a 64-bit/66 MHz PCI card, that provides faster tunneling and encryption services for Virtual Private Network (VPN) remote access, site-to-site intranet and extranet applications than the VAC. Each VAC+ card occupies a single PCI slot in the system. The VAC+ is supported on any chassis that runs Version 6.3 software, has an appropriate license to run VPN software, and at least one PCI slot available. While the VAC continues to be supported in Version 6.3, if both types of cards, the VAC and the VAC+, are installed in a system running Version 6.3, the VAC card is ignored. The VAC+ is a 64-bit/66 MHz PCI card, that runs at both 32-bit/33 MHz, as well as 64-bit/66 MHz, and does not slow down the bus when other 66 MHz cards are installed. It is strongly recommended that the VAC+ be installed in a 64bit/66 MHz slot. Performance will be degraded if this recommendation is not followed.

The 6.3 VAC+ driver supports the following:

- 3DES, DES, AES, SHA1, MD5 for (IPSec) ESP protocol (For AES, only the CBC mode and key sizes of 128, 192, and 256 bits are supported).
- SHA1, MD5 for the (IPSec) AH protocol.
- Load sharing ESP and AH activity between up to three VAC+ cards.
- Diffie Hellman public key and shared secret generation.
- Any other crypto-related activity uses a software implementation.

Installing Failover

Complete these steps to install a failover connection:

Step 1 Power off both the primary and secondary units.

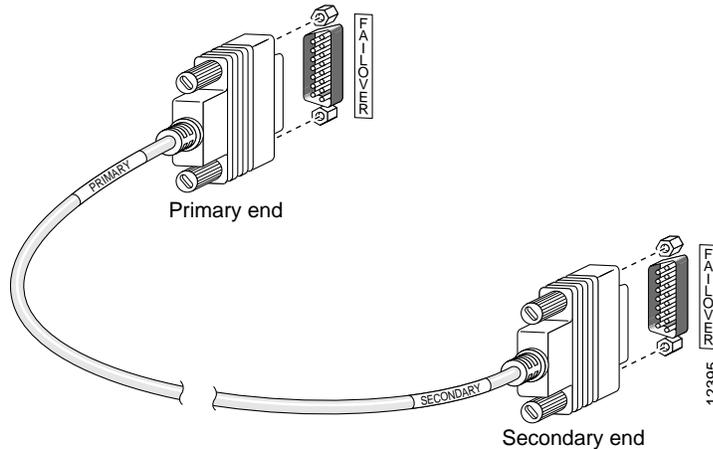


Note Both PIX Firewall units has to be the same model number, have at least as much RAM, have the same Flash memory size, and be running the same software version.

Step 2 Locate the failover cable (shown in Figure 6-6). This cable is shipped separately from the PIX Firewall unit. The cable is labeled Primary on one end and Secondary on the other.

Install the cable for the PIX 525 as shown in Figure 6-6.

Figure 6-6 PIX 525 Failover Cable Connection



- Step 3** Connect the Primary end of the failover cable to the first PIX Firewall unit, that is, the one you have already configured.



Note We highly recommend that you use a GE failover link when connecting the PIX 525 with GE interfaces.

- Step 4** Connect the Secondary end of the failover cable to the standby unit.
- Step 5** Connect a power cord to the power connector on the rear panel of each unit, and the other end of each power cord to (preferably separate) power outlets.
- Step 6** If you are using Stateful Failover, use one of the following types of connections, that is appropriate for your system, between the dedicated interfaces on the PIX Firewall units:
- Category 5 crossover cable directly connecting the primary unit to the secondary unit.
 - 100BaseTX half-duplex hub using straight Cat 5 cables.
 - 100BaseTX full duplex on a dedicated switch or dedicated VLAN of a switch.



Note All enabled interfaces must be connected between the active and standby units. Only configure the active unit. On the PIX 525, the active unit is indicated by the ACT LED on the front of the unit.



Caution Do not turn the power on until the units are connected and the primary unit is configured completely.

- Step 7** Power on the primary unit first, *then* power on the secondary unit. Within a few seconds, the active unit automatically downloads its configuration to the standby unit.
- If the primary unit fails, the secondary unit automatically becomes active.

Installing LAN-Based Failover

LAN-based failover supports failover between two units connected over a dedicated Ethernet interface. LAN-based failover eliminates the need for a special failover cable and overcomes the distance limitations imposed by the failover cable.


Note

Both PIX Firewall units must be the same model number, have the same amount of RAM, Flash memory, number and type of interfaces, and be running the same software version.

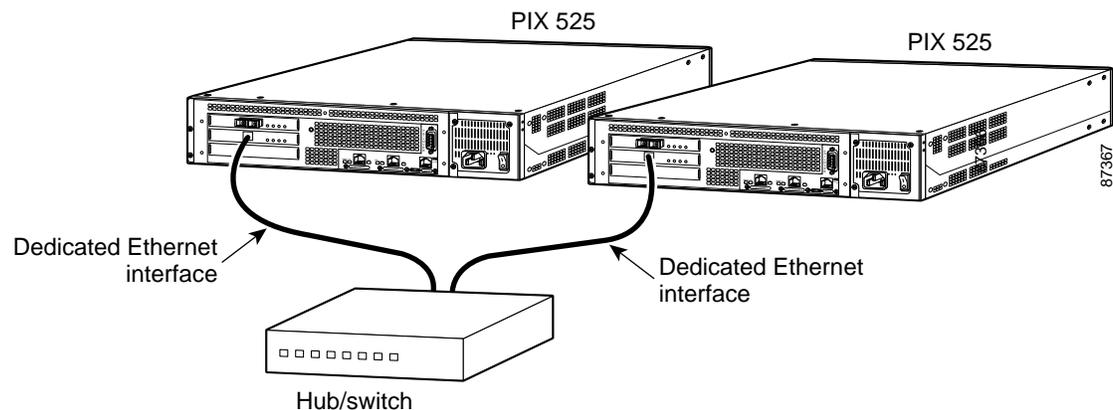
Complete these steps to set up a LAN-based failover connection:

- Step 1** Disconnect both the PIX Firewall units, so that there is no traffic flow between them. If the Failover cable is connected to the PIX Firewall, disconnect it.
- Step 2** Configure the PIX Firewall units. For information on configuring the PIX Firewall, refer to “*Configuring the LAN-Based Failover*,” section in Chapter 10 “Using PIX Firewall Failover” in the *Cisco PIX Firewall and VPN Configuration Guide*.
- Step 3** Power off both the units.
- Step 4** Connect the LAN failover interfaces to the dedicated switch/hub, as shown in Figure 6-7.


Note

A dedicated LAN interface and a dedicated switch (or VLAN) is required to implement LAN-based failover. You cannot use a crossover Ethernet cable to connect the two PIX Firewall units.

Figure 6-7 LAN- Based Failover Connections



- Step 5** If you are using Stateful Failover, use one of the following types of connections, that is appropriate for your system, between the dedicated interfaces on the PIX Firewall units:
- Cat 5 crossover cable directly connecting the primary unit to the secondary unit.
 - 100BaseTX full duplex on a dedicated switch or dedicated VLAN of a switch.
 - 1000BaseTX full duplex on a dedicated switch or dedicated VLAN of a switch.



Caution Do not turn the power on until the units are connected and the primary unit is configured completely.

- Step 6** Power the primary unit on first, *then* power on the secondary unit. Within a few seconds, the active unit automatically downloads its configuration to the standby unit.
- If the primary unit fails, the secondary unit automatically becomes active.
-

Removing and Replacing the PIX 525 Chassis Cover

This section describes how to remove and replace the chassis cover from PIX 525. This section includes the following topics:

- Removing the Chassis Cover, page 6-9
- Replacing the Chassis Cover, page 6-11

Removing the Chassis Cover

This section describes how to remove the PIX 525 chassis cover.



Note Removing the PIX Firewall case does not affect your Cisco warranty. Upgrading the PIX Firewall does not require any special tools and does not create any radio frequency leak.

Complete these steps to remove the chassis cover:

- Step 1** Power off the PIX 525 and disconnect site power.

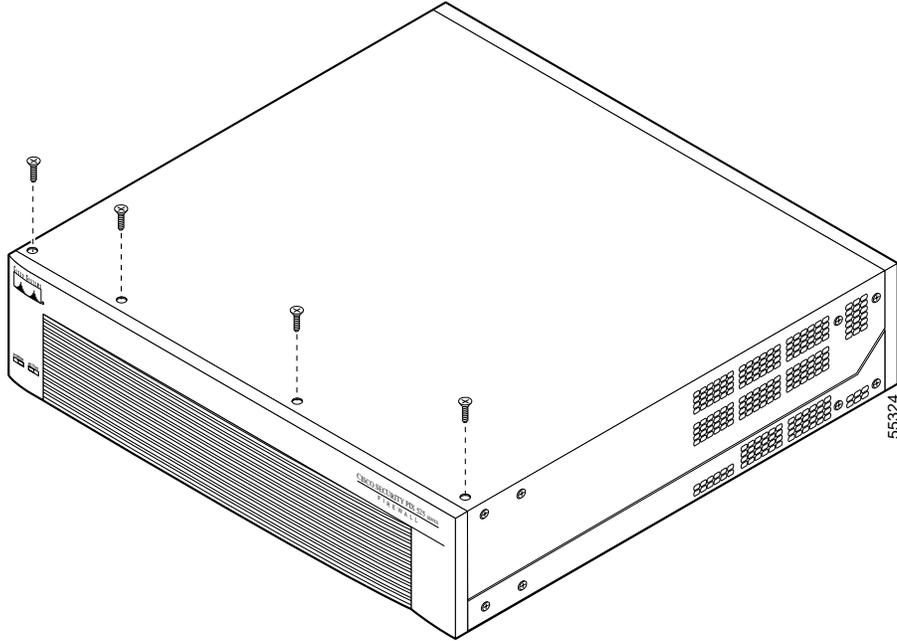


Note Note that the power switch is part of the power supply.

- Step 2** Place the PIX 525 so that the front panel is facing you. If you place the PIX 525 on a table, ensure that you have clear access to all sides.

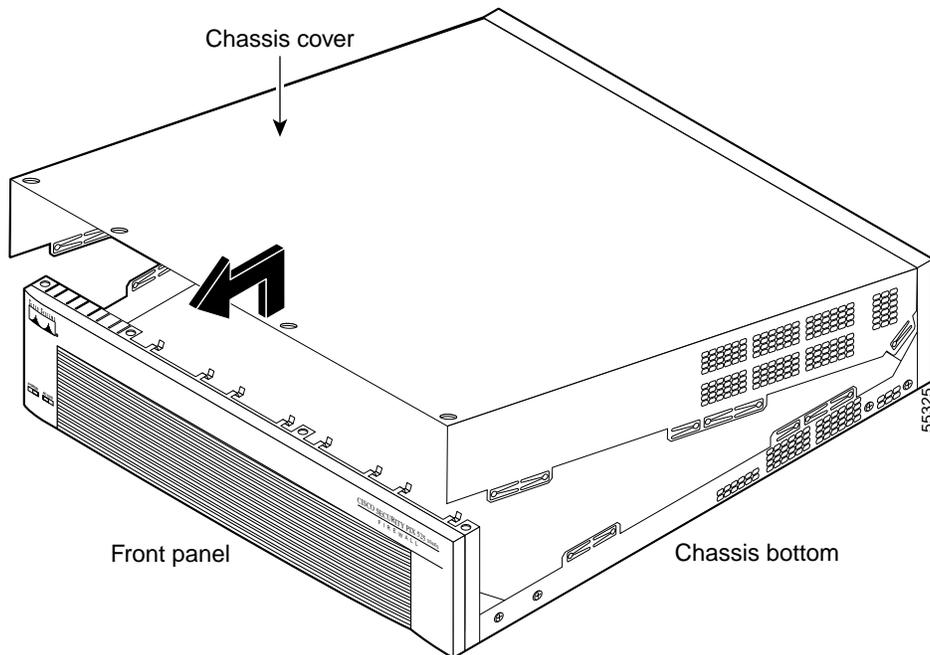
- Step 3** Remove the four screws on the chassis cover. (See Figure 6-8.)

Figure 6-8 Removing the Chassis Cover Screws



Step 4 Lift the chassis cover upward and pull it away from the tabs on the rear of the chassis. (See Figure 6-9.)

Figure 6-9 Removing the Chassis Cover



Replacing the Chassis Cover

This section describes replacing the chassis cover on the PIX 525.

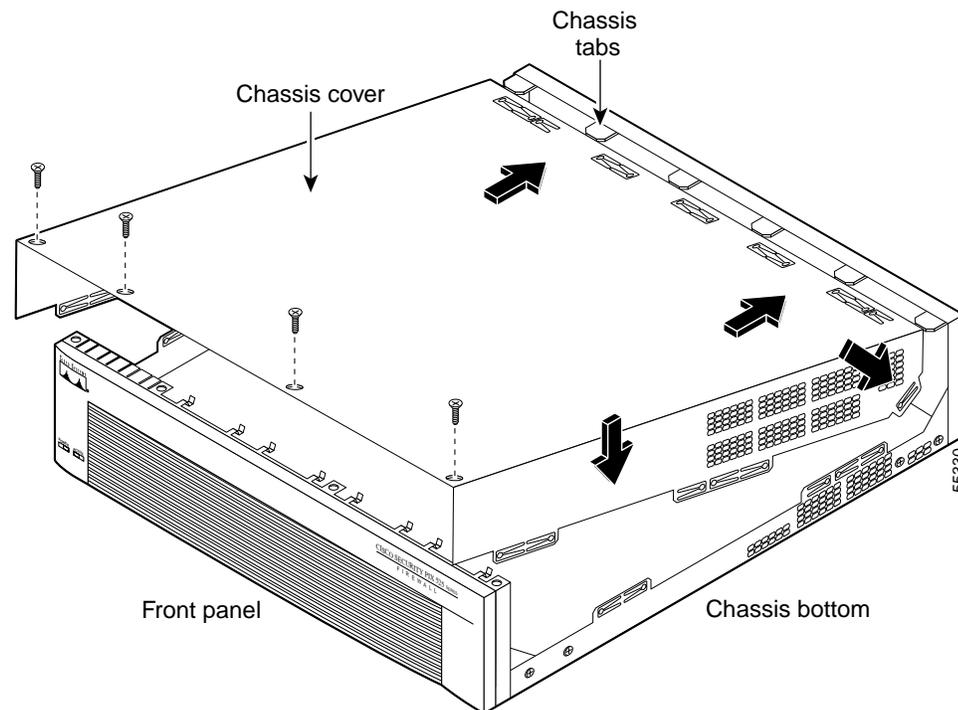
Complete these steps to remove the chassis cover:

-
- 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 6-10.)
- 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.

- Step 4** Secure the chassis cover with four screws.
- Step 5** Reinstall all interface cables.

Figure 6-10 Replacing the Chassis Cover



- Step 6** Connect the power to the site power and power on the PIX 525. The internal power supply fan should go on.
-

Replacing a Lithium Battery

The PIX Firewall has a lithium battery on its main circuit board. This battery has an operating life of about 10 years. When the battery loses its charge, the PIX Firewall cannot function. The lithium battery is not a field replaceable unit (FRU). Contact Cisco TAC to replace the battery.



Note

Do not attempt to replace this battery yourself.



Warning

Danger of explosion exists if the lithium battery is incorrectly replaced. Replace only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer's instructions.

Installing a Memory Upgrade

Observe the following warnings, cautions, and notes when installing additional PIX Firewall system memory.

The following statement applies to DC models:



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.

The following statement applies to both AC and DC models:



Warning

Before working on a system that has an On/Off switch, turn OFF the power and unplug the power cord.



Caution

Always remove old memory before installing new memory.



Caution

If you remove the PIX Firewall chassis top panel, always reinstall the top panel. Running the PIX Firewall without the top panel may cause overheating and damage to electrical components.

Memory Installation Steps

Complete these steps to install additional system memory:

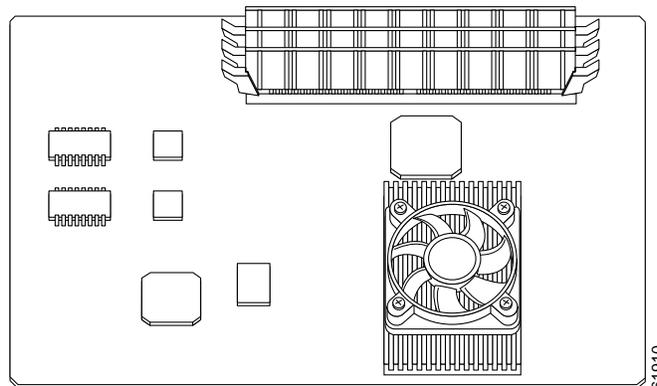
- Step 1 If the unit is rack-mounted, remove network wires and any cords connecting to the PIX Firewall unit. Ensure that the unit is unplugged from its power source.
- Step 2 Unpack the items in the memory upgrade kit.

Remove the component tray and all the screws holding the assembly in place. Refer to “Removing and Replacing the PIX 525 Chassis Cover” for information on how to remove and replace the top panel.

Determine the location of your system memory sockets (see Figure 6-11).

- Step 3** Use the markings on the motherboard to determine the socket numbers. Always install the first memory board into the lowest socket number. Progressively add memory boards into higher numbered sockets.

Figure 6-11 System Memory Location on the PIX 525 Component Tray



- Step 4** Locate the wrist grounding strap in the accessory kit and connect one end to the unit or to the PIX Firewall chassis, and securely attach the other to your wrist so it contacts your bare skin.
- Step 5** With the wrist strap on your wrist, carefully grasp the memory strip from either end. Note that a DIMM strip has notches.
- Step 6** To install a DIMM strip:
- Remove the old memory strip by opening the two plastic wing connectors, and pulling the old strip up. Discard the old strip.
 - When installing the memory strip in a PIX 525, install the new strip in Bank 0 as shown in Figure 6-12 and Figure 6-13, by opening the two plastic wing connectors, inserting the strip, and closing the wing connectors.

Figure 6-12 Inserting a DIMM Memory Strip in the PIX 525

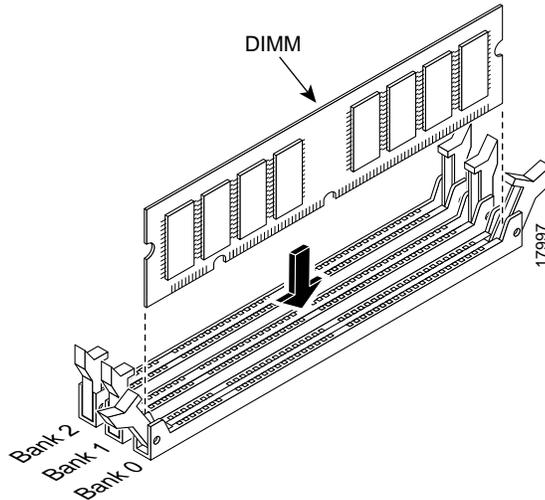
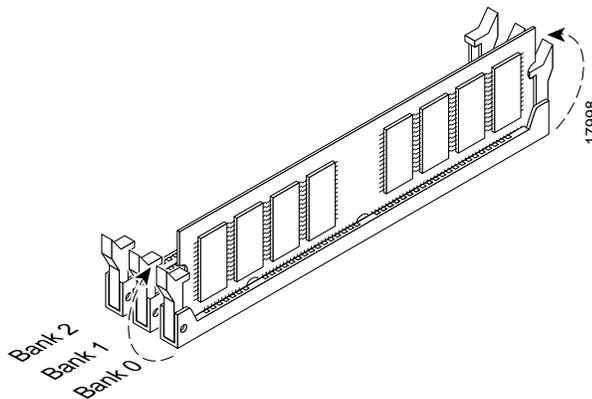


Figure 6-13 Securing a DIMM Memory Strip in the PIX 525



When you finish inserting new RAM memory, reinstall the tray on the PIX 525. Reattach the screws. If desired, rack mount the PIX Firewall and attach all cables and cords as discussed in previous sections. After the PIX Firewall is installed, you can view the amount of RAM memory in the system startup messages or with the **show version** command.

Installing a Circuit Board in the PIX 525

The information in this section refers to all PIX 525 models. Table 6-3 lists the optional circuit board combinations that are available for the PIX 525. This section includes the following topics:

- PIX Firewall VPN Accelerator Circuit Board, page 6-17
- Gigabit Ethernet Circuit Board, page 6-18

**Note**

The PIX 525 Restricted Interface Options can have a maximum of 6 interfaces, and for the Unrestricted Interface Options, a maximum of 8 interfaces.

Table 6-3 lists the possible options/examples of configuration choices available for the PIX 525 restricted and unrestricted interface options.

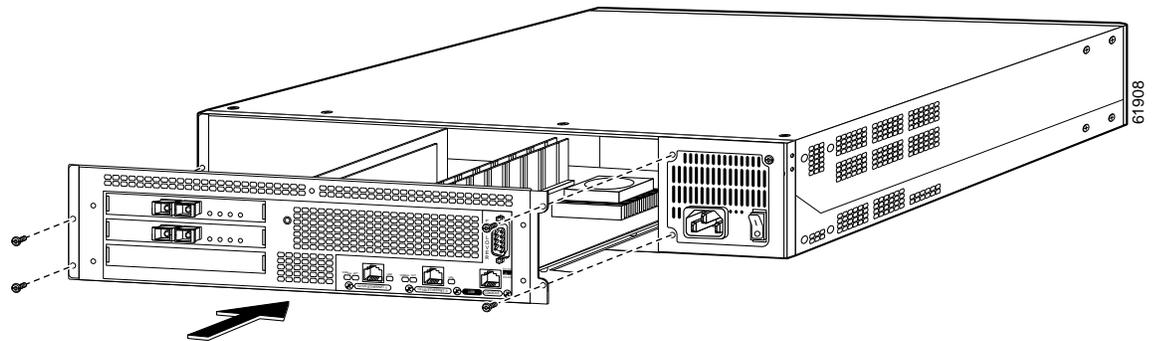
Table 6-3 PIX 525 Interface Options

Restricted Interface Options	Unrestricted Interface Options
3 FE	3 FE
2 FE + 1 VPN Accelerator	2 FE + 1 VPN Accelerator
3 GE	3 GE
2 GE + 1 VPN Accelerator	2 GE + 1 VPN Accelerator
1 GE + 1 FE	1 GE + 2 FE
1 GE + 1 FE + 1 VPN Accelerator	1 GE + 1 FE + 1 VPN Accelerator
1 4-Port FE	1 4-port FE
1 4-Port FE + 1 VPN Accelerator	1 4-port FE + 2 FE
	1 4-port FE + 2 GE
2 4-port Fast Ethernet	2 4-port Fast Ethernet
	1 4-port FE + 1 VPN Accelerator
	1 4-port FE + 1 VPN Accelerator + 1 FE
	1 4-port FE + 1 VPN Accelerator + 1 GE

Complete these steps to install a circuit board in the PIX 525:

- Step 1** Locate the grounding strap from the accessory kit. Fasten the grounding strap to your wrist so that it contacts your bare skin. Attach the other end to bare metal on the PIX 525 chassis.
- Step 2** Remove the screws from the rear panel of the component tray and slide the tray out (see Figure 6-14).

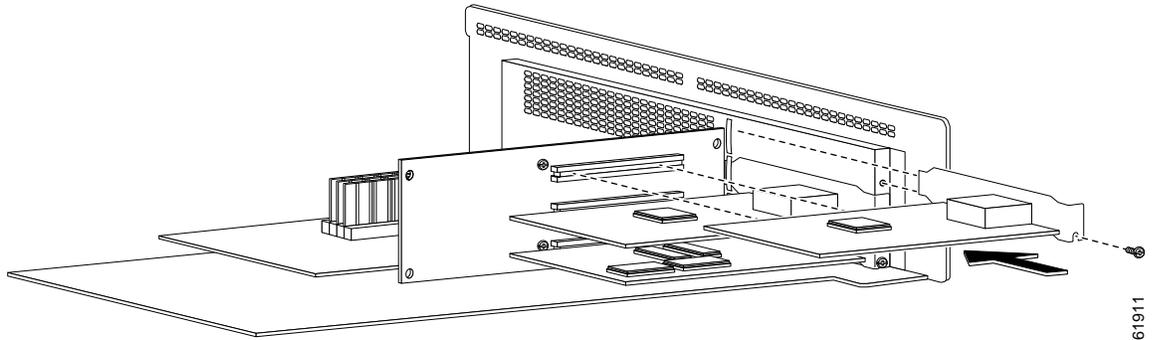
Figure 6-14 The Component Tray at the Back of the PIX 525



- Step 3** Remove the screw and cover plate from the circuit board slot.
- Step 4** Use Figure 6-15 as a guide to install a circuit board into a PCI slot on the component tray.

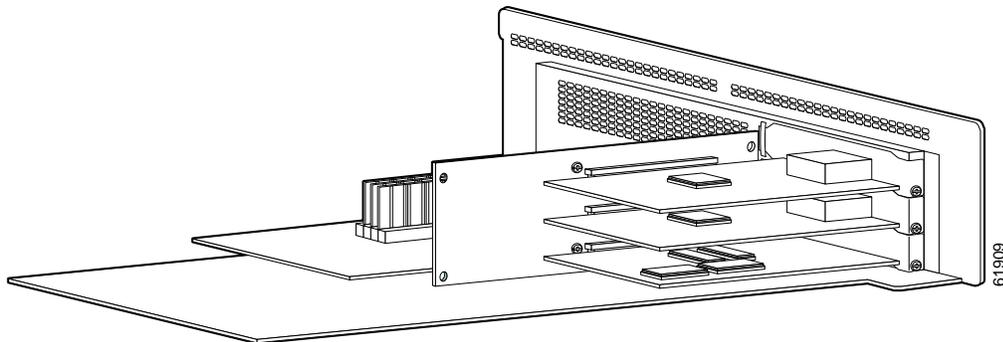
- Step 5** Attach the screw to hold the circuit board's connecting flange to the rear cover plate on the component tray.

Figure 6-15 Inserting an Expansion Board into a PCI Slot on the PIX 525 Component Tray



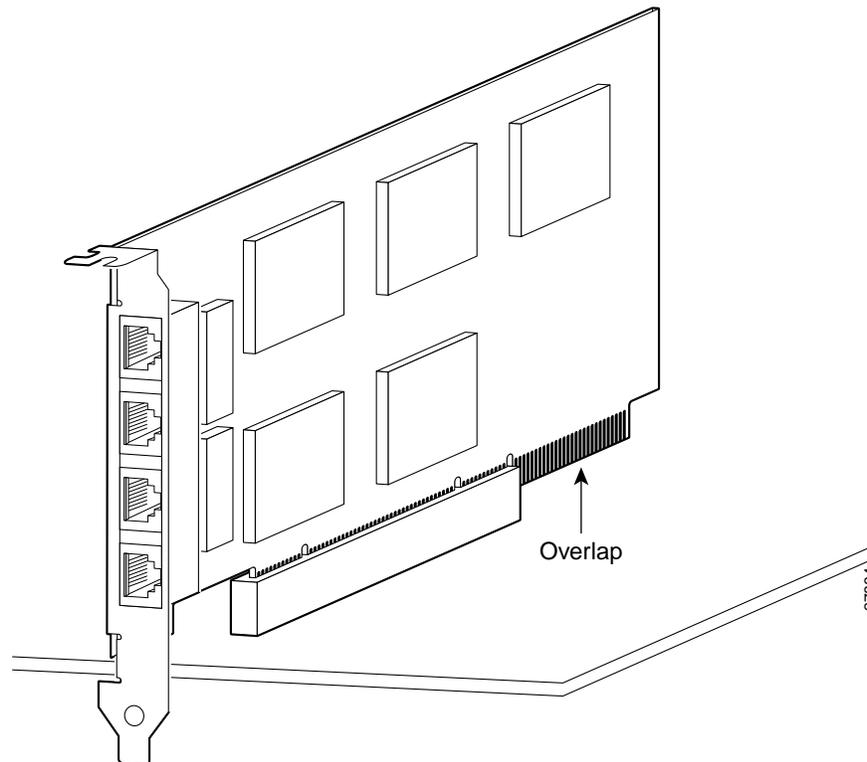
- Step 6** Figure 6-16 shows circuit boards in PCI slots on the component tray.

Figure 6-16 Expansion Boards in PCI Slots on the PIX 525 Component Tray



- Step 7** Reinstall the component tray into the PIX 525 chassis.

Figure 6-17 4-Port Circuit Board Overlap



Note If you are installing a 4-port circuit board, note that the circuit board will overlap the slot connector on the motherboard. This does not affect the use or operation of the circuit board. This illustration illustrates how this appears

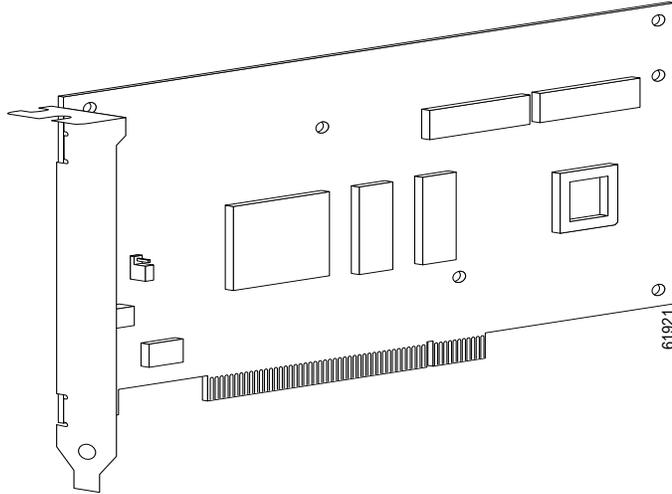
PIX Firewall VPN Accelerator Circuit Board

The VPN Accelerator (PIX-VPN-ACCEL) is an encryption and accelerator circuit board. The VPN Accelerator uses a PCI interface and therefore can only be installed in PIX Firewall platforms with PCI slots. The VPN Accelerator begins to function immediately after installation without the need of special installation configurations.



Note The new VPN Accelerator cannot be used with the former PIX Firewall IPsec accelerator in the same chassis. The PIX Firewall IPsec accelerator was also known as the Private Link card.

An illustration of the VPN Accelerator is shown in Figure 6-18.

Figure 6-18 PIX Firewall VPN Accelerator Circuit Board

Gigabit Ethernet Circuit Board

PIX Firewall supports 1000 Mbps (Gigabit) Ethernet. The Gigabit Ethernet circuit board uses the **gb-ethernet** device name and only has one hardware speed and the following duplex options:

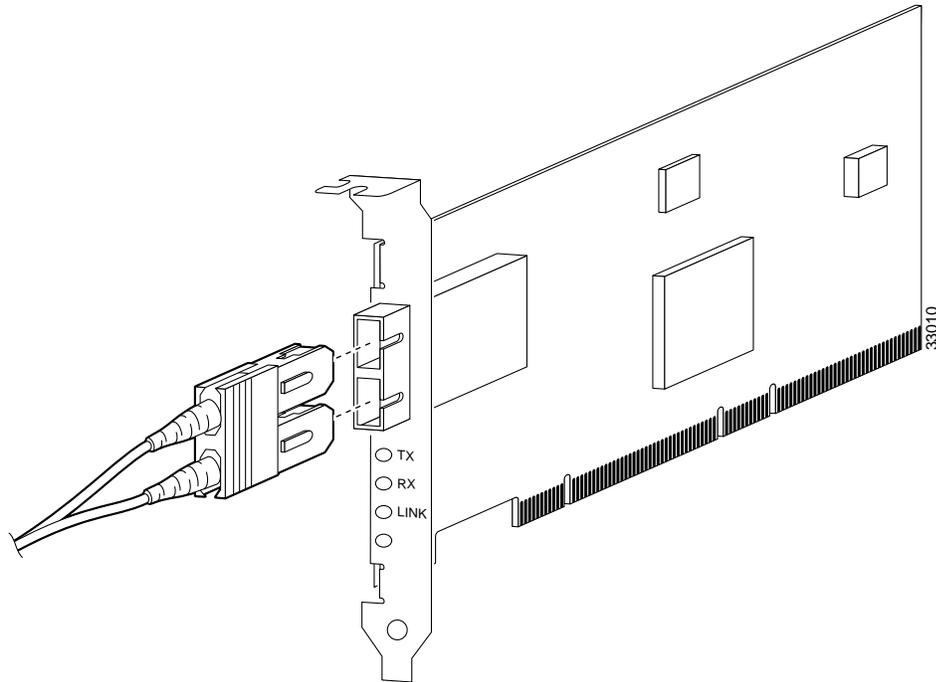
- 1000SXfull—Forces full-duplex operation
- 1000BaseSX—Forces half-duplex operation
- 1000auto—Auto negotiates full or half duplex

**Note**

We highly recommend that you use a GE failover link when connecting the PIX 525 with GE interfaces.

The Gigabit Ethernet circuit board and the fiber optic cable connection are shown in Figure 6-19.

Figure 6-19 Gigabit Ethernet Circuit Board



The Gigabit Ethernet circuit board has three LEDs:

- TX—Transmitting data
- RX—Receiving data
- LINK—The Gigabit Ethernet circuit board has established a network connection

Installing a DC Power Supply



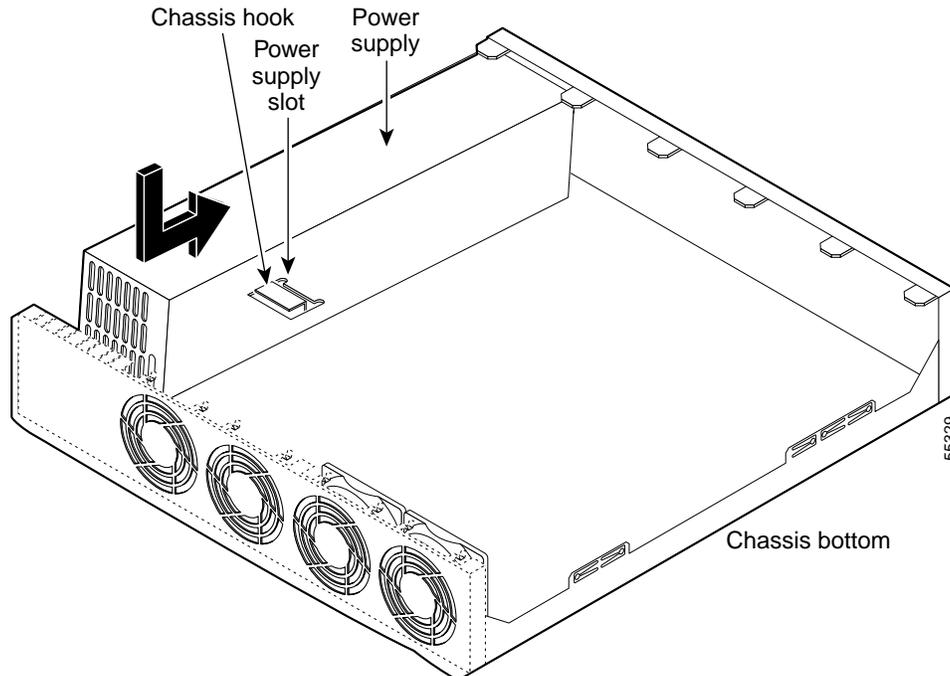
Warning

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.

Complete these steps to install the DC power supply:

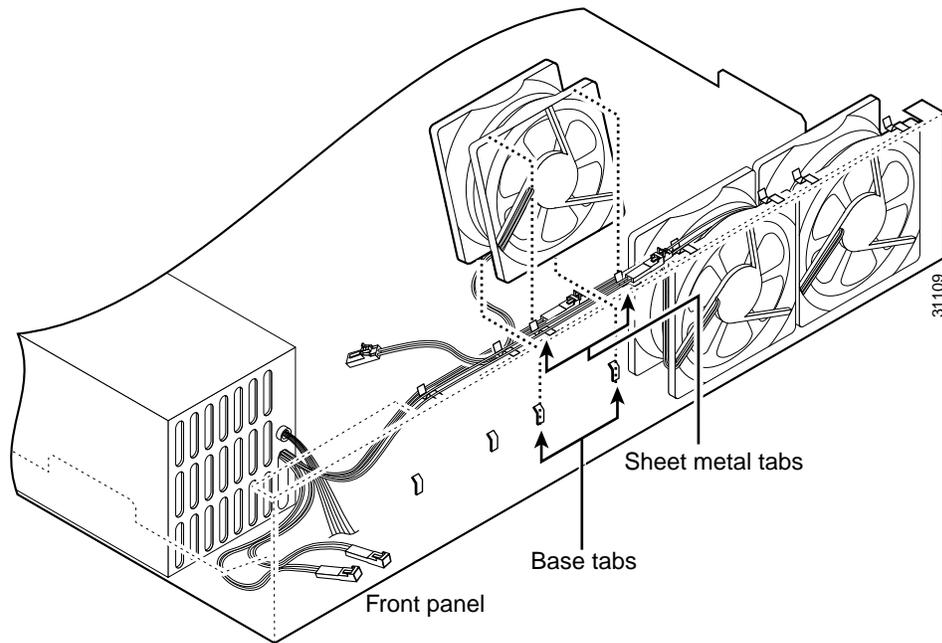
- Step 1** Place the power supply as shown in Figure 6-20, and then slide it toward the rear panel. You will be able to feel the chassis hook engage with the slot on the bottom of the power supply.
- Step 2** Reinstall the three screws that secure the power supply on the back panel of the chassis.

Figure 6-20 Inserting the Power Supply in the Chassis



- Step 3** Connect the six-pin connector to the motherboard.
- Step 4** Route the fan cables on top of fans exactly as shown in Figure 6-21. 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.
- Step 5** Reconnect the power connector.

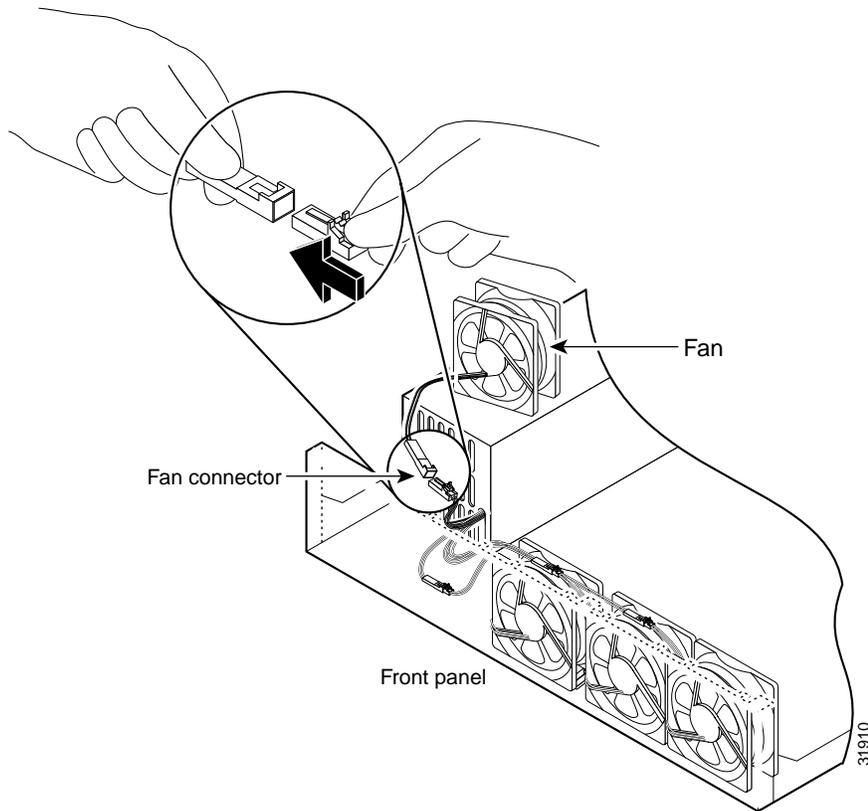
Figure 6-21 Routing the Fan Cables



- Step 6** Insert the second fan as shown in Figure 6-21, making sure that the fan cable feeds to your left. Position the cables to the two installed fans so that they will fit over the first and second fans. Press the fan into place between the four sheet metal tabs.

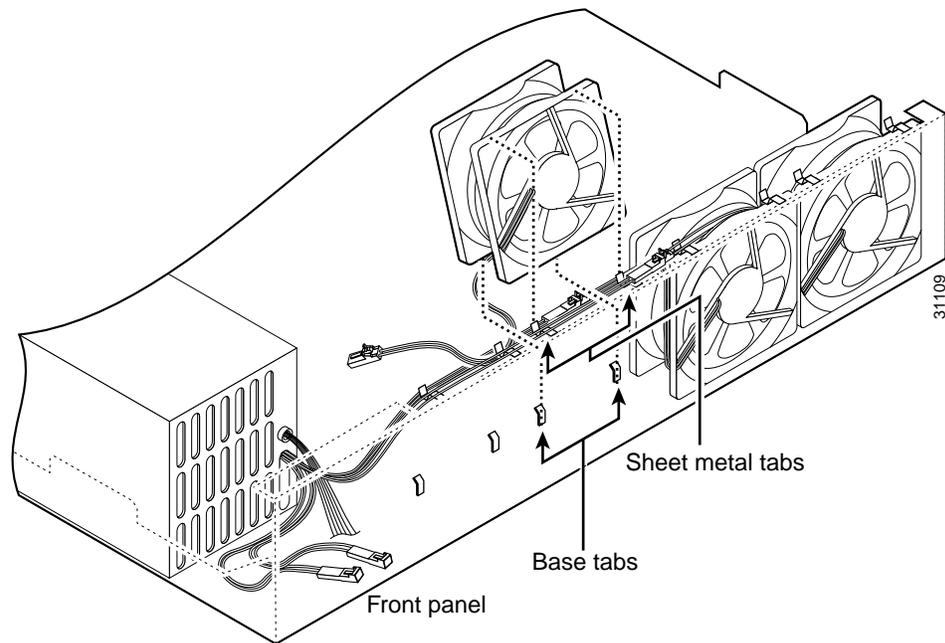
Step 7 Reconnect the two-pin fan cables to the remaining fan, as shown in Figure 6-22.

Figure 6-22 Reconnecting the Fan Cables



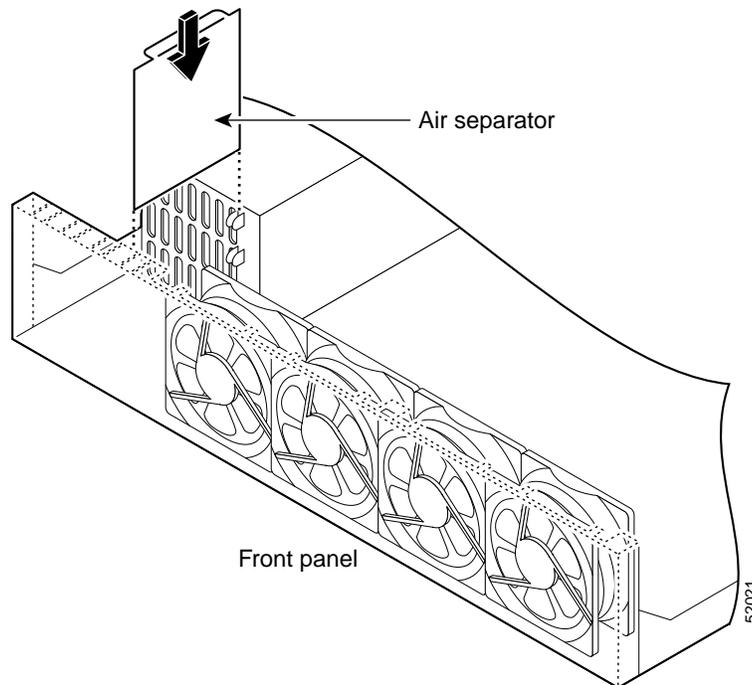
- Step 8** Reinstall the remaining fan. Make sure you orient the fan so that the cables feed to the right (toward the second fan). Route the cable over the fan before you reconnect it. When correctly assembled, the cables appear as shown in Figure 6-23.
- Step 9** Starting with the fan farthest away from the power supply, bend the cable clamps over wires and into the gap between chassis and fan housing.

Figure 6-23 Correct Fan Cable Routing



- Step 10** Replace the air separator as shown in Figure 6-24, holding all cables to the right of the separator as you slip it into the chassis.

Figure 6-24 Replacing the Air Separator



- Step 11** Replace the chassis cover as described in “Replacing the Chassis Cover.”

Rerouting the Fan Wiring

If the fan wiring in your router is not routed on top of the fans, you need to reroute the fan wiring. This will make future power supply replacement easier.

Complete these steps to reroute the fan wiring:

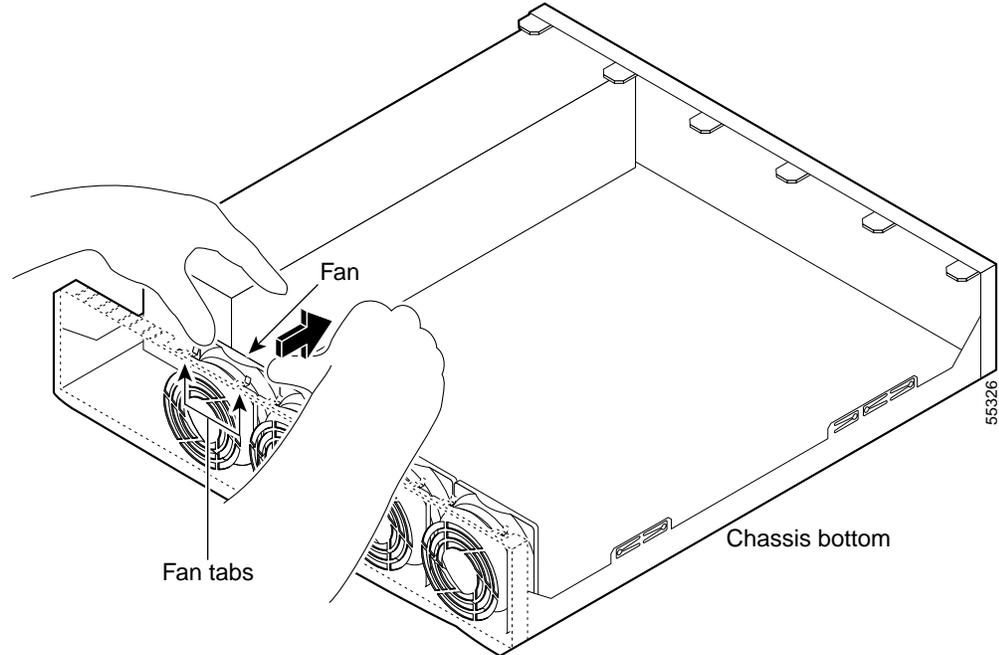
- Step 1** Pull the fan closest to the power supply away from the sheet metal tabs. (See Figure 6-25.)



Note

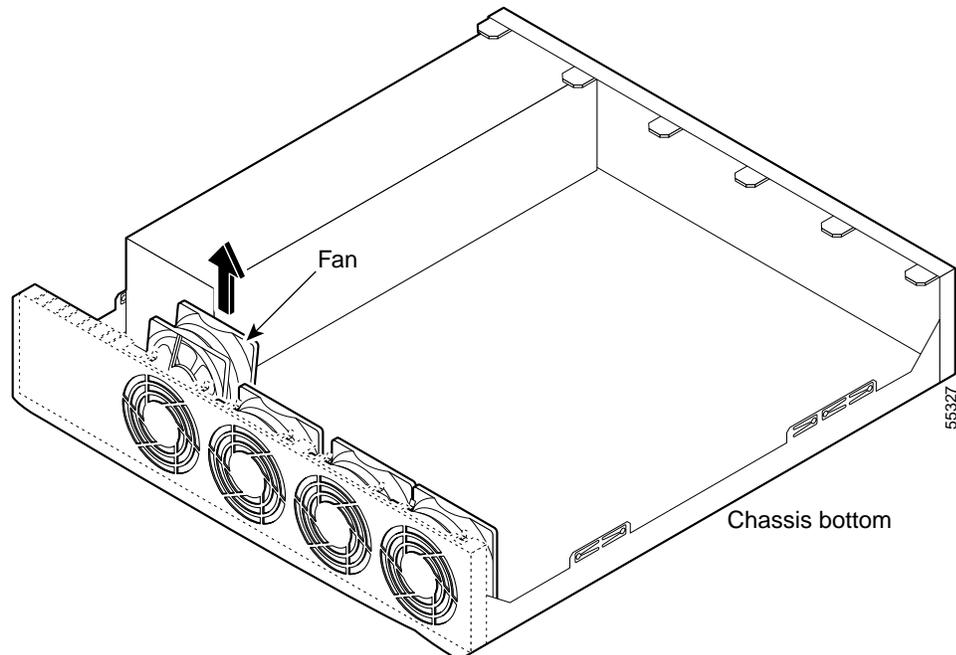
To help with reconnecting the cables, write down which colored cable connects to which fan. See Table 6-4 for a list of the wire colors. There are three different lengths of two-wire ± 12 VDC power cables. The two shortest cables go to the two fans that you will remove in Step 9. The two longer cables go to the two remaining fans you will remove in Step 10 and Step 11. The remaining cable goes to the power connector on the backplane. These cables are color-coded.

Figure 6-25 Pulling the Fan Away from the Tabs



Step 2 Lift the fan out of the chassis as shown in Figure 6-26.

Figure 6-26 Removing the Fan



Step 3 Depress the tab as shown in Figure 6-27.

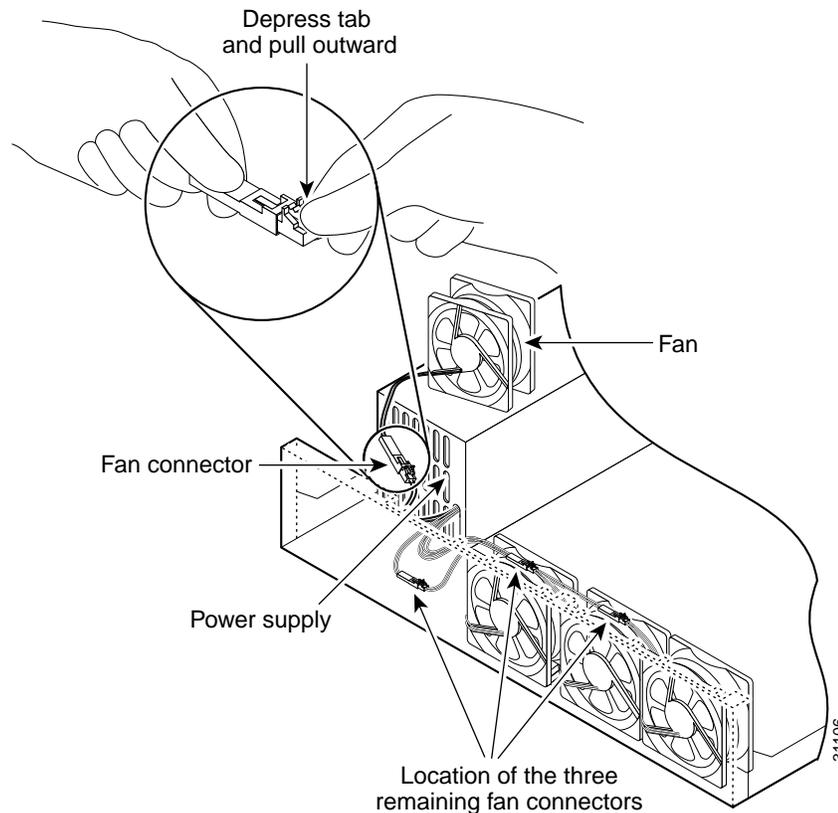


Caution

Do not attempt to remove the fan cables without first depressing the tab as shown in Figure 6-27. You can damage the fan cables by applying stress if the connector is not removed properly.

- Step 4** Disconnect the fan cable as shown in Figure 6-27, and set the fan aside.

Figure 6-27 *Disconnecting the Fan Cable*



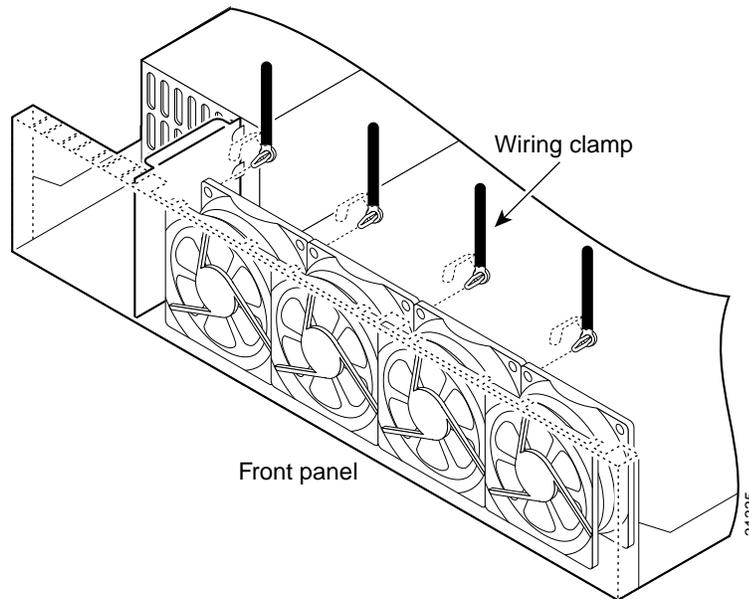
- Step 5** Remove the next fan and disconnect its cable.
- Step 6** Remove the cables for the two remaining fans. Remove the last two fans.
- Step 7** Replace the fans, starting with the fan farthest away from the power supply. If the bezel is removed, make sure the fan farthest away from the power supply does not cover the bezel holes.



Note Make sure that the label on the fan faces the chassis wall to ensure proper airflow direction.

- Step 8** Install cable clamps onto the fans by aligning cable clamp holes over fan mounting holes and pressing rivets through both. (See Figure 6-28.)

Figure 6-28 Inserting Cable Clamp to the Fan



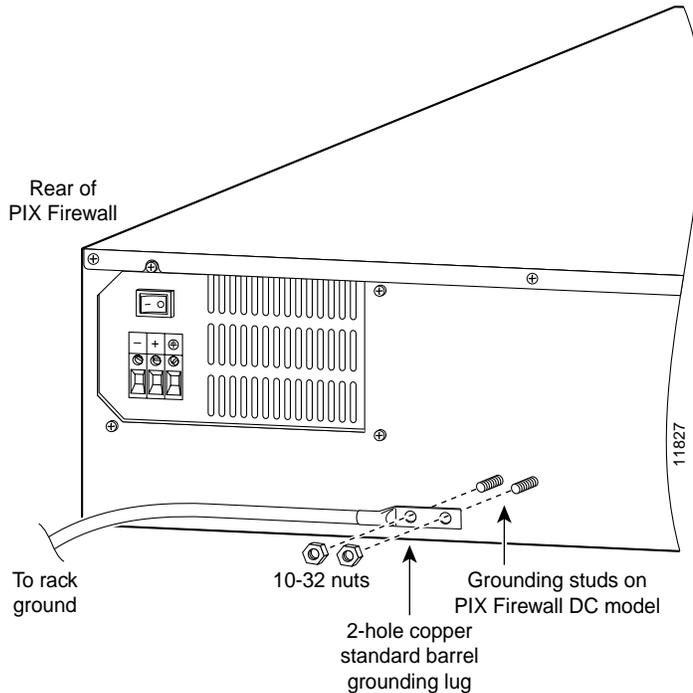
- Step 9** Reconnect the two-pin fan cables to the remaining fan, as shown in Figure 6-28. Fan wiring colors are listed in Table 6-4.
- Step 10** Route the fan wire on the top surface of the fans. Place the fan wires straight, and do not twist the wires together. Locate the connectors in the gap between fans. (See Figure 6-23.)
- Step 11** Starting with the fan farthest away from the power supply, bend the cable clamps over the wires and into the gap between chassis and fan housing.

Table 6-4 Fan Wiring Colors

Fan Number	Wire colors
1 (closest to power supply)	Purple and black
2	Green and black
3	Blue and black
4 (farthest away from power supply)	Brown and black

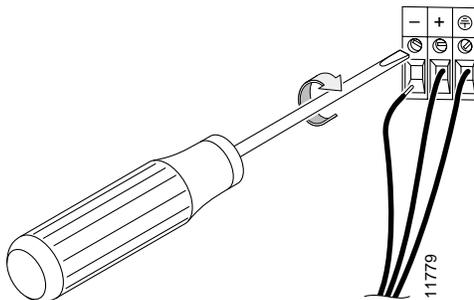
- Step 12** Terminate the DC input wiring on a DC source capable of supplying at least 15 amps. A 15-amp circuit breaker is required at the 48 VDC facility power source. An easily accessible disconnect device should be incorporated into the facility wiring.
- Step 13** Be sure the PIX 525 power is off by checking the power switch at the rear of the unit.
- Step 14** As shown in Figure 6-29, the PIX 525 is equipped with two grounding studs at the back of the unit, which you can use to connect a two-hole grounding lug to the PIX 525. Use the 10-32 nuts provided with the PIX 525 to connect a copper standard barrel grounding lug to the studs. The PIX 525 requires a lug where the distance between the center of each hole is 0.56 inches. A lug is not supplied with the PIX 525.

Figure 6-29 Attaching a Grounding Lug to the PIX Firewall



- Step 15** 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.
- Step 16** Strip the ends of the wires for insertion into the power connect lugs on the PIX 525.
- Step 17** Refer to Figure 6-30 and insert the ground wire into the connector for the earth ground and tighten the screw on the connector. Using the same method as for the ground wire, connect the negative wire and then the positive wire.

Figure 6-30 Attaching DC Power Cables



- Step 18** Reconnect power to the PIX 525. 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.
- Step 19** Insert the PIX 525 system diskette in the drive at the front of the unit.
- Step 20** Power on the unit from the switch at the rear of the unit.
-

If you need to power cycle the DC PIX Firewall, wait at least 5 seconds between powering off the unit and powering it back on.



PIX 535

This chapter describes the installation of the PIX 535, and includes the following sections:

- PIX 535 Product Overview, page 7-1
- Installing the PIX 535, page 7-5
- PIX 535 Feature Licenses, page 7-6
- Installing Failover, page 7-7
- Installing LAN-Based Failover, page 7-9
- Replacing a Lithium Battery, page 7-10
- Installing a Memory Upgrade, page 7-10
- Installing a Circuit Board in the PIX 535, page 7-13
- Installing the PIX 535 DC Model, page 7-20

PIX 535 Product Overview



Note

The PIX 535 top panel should not be removed. The user-serviceable components are accessed by a removable tray at the back panel of each model. If you need to remove the PIX 535 top chassis cover for any reason, use the related information in “Removing and Replacing the PIX 515/515E Chassis Cover” as a guideline.

Figure 7-1 shows the front view of the PIX 535.

Figure 7-1 PIX 535 Front Panel

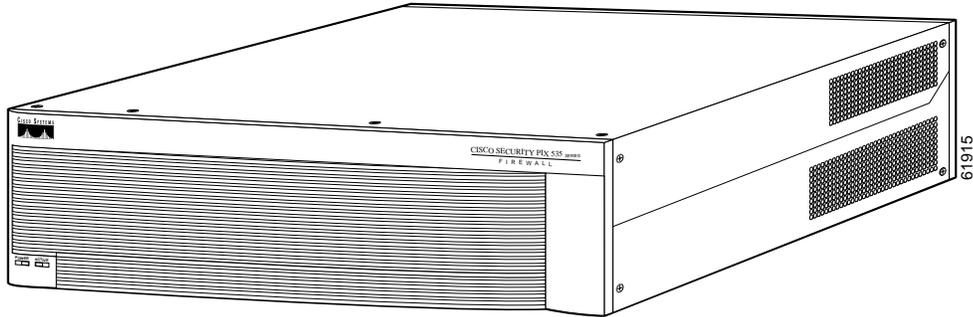
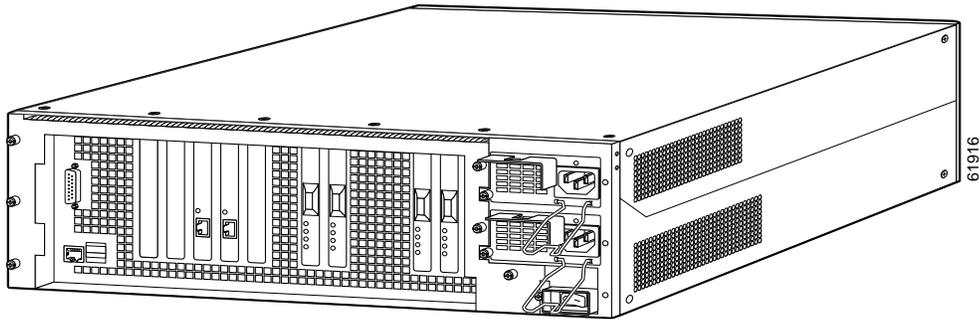


Figure 7-2 shows the rear view of the PIX 535.

Figure 7-2 PIX 535 Rear Panel



The PIX 535 has a fixed RJ-45 Console connector and a DB-15 Failover cable connector the USB port is not used at the present time.

Figure 7-3 shows the PIX 535 front panel LEDs.

Figure 7-3 PIX 535 Front Panel LEDs

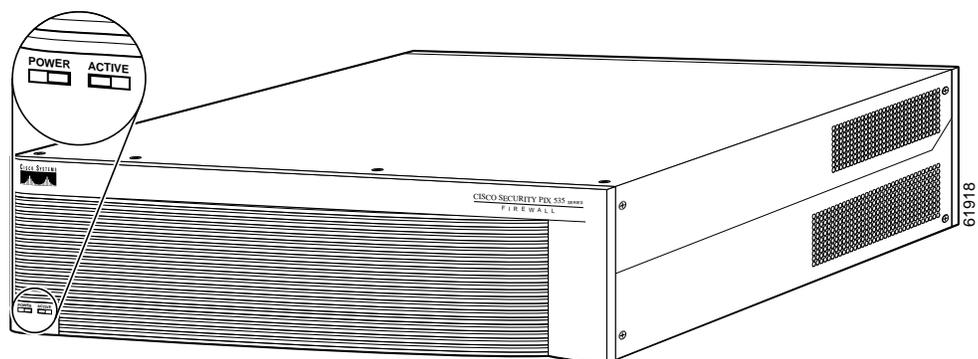


Table 7-1 lists the state of the PIX 535 front panel LEDs.

Table 7-1 PIX 535 Front Panel LEDs

LEDs	Status	Description
POWER	On	Unit has power.
ACT	On	On when the unit is the active failover unit. If failover is present the light is on when the unit is the active unit.
	Off	Off when the unit is in standby mode.

Figure 7-4 shows the PIX 535 rear panel LEDs.

Figure 7-4 PIX 535 Rear Panel LEDs

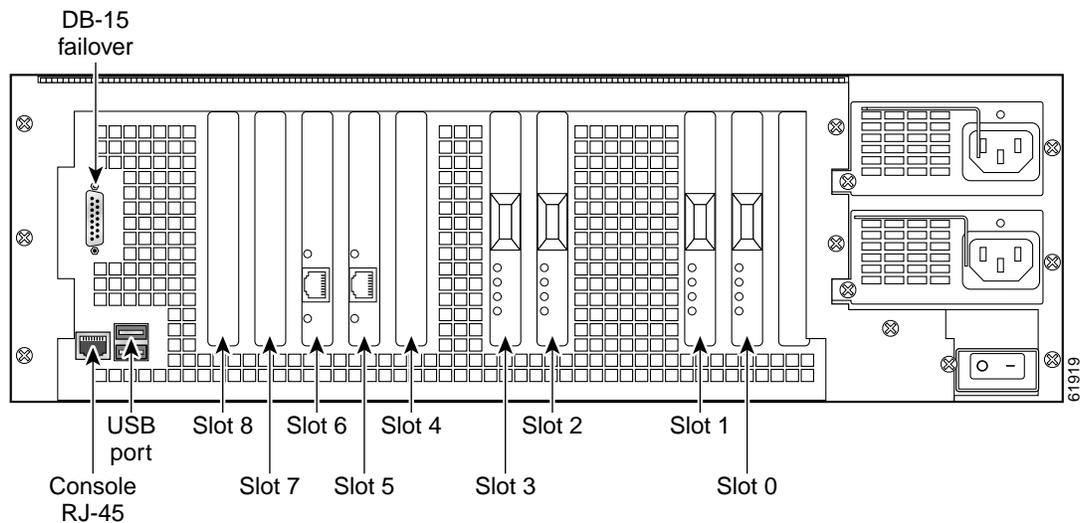


Table 7-2 lists the state of the PIX 535 LEDs.

Table 7-2 PIX 535 Rear Panel LEDs

LEDs	Status	Description
100 Mbps	On	100 megabits per second 100BaseTX communication.
	Off	If the light is off during network activity, that port is using 10 megabits per second data exchange.
ACT	On	Shows network activity.
LINK		Shows that data is passing through that interface.
FDX	On	Shows that the connection uses full-duplex data exchange where data can be transmitted and received simultaneously.
	Off	If this light is off, half duplex is in effect.

PIX 535 Network Interface Description

There are three separate buses for the nine interface slots in the PIX 535. The interfaces are counted from right to left on the PIX 535.

The slots and buses are configured as follows:

- Slots 0 and 1—64-bit/66 MHz Bus 0
- Slots 2 and 3—64-bit/66 MHz Bus 1
- Slots 4 to 8—32-bit/33 MHz Bus 2

For optimum performance and throughput for the interface circuit boards, use the following guidelines:

- A total of eight interfaces are configurable on the PIX 535 with the restricted license, and a total of ten are configurable with the unrestricted license.
- For best performance, the PIX-1GE-66 (66 MHz) circuit boards should be installed in a 64-bit/66 MHz card slot, before they are installed in a 32-bit/33 MHz card slot. You can install up to nine PIX-1GE-66 circuit boards in the PIX 535.
- If Stateful Failover is enabled for PIX-1GE-66 traffic, the failover link must be PIX-1GE-66. The amount of Stateful Failover information is proportional to the amount of traffic flowing through the PIX Firewall and if not configured properly, loss of state information or 256 byte block depletion can occur.
- The PIX-1FE circuit board (33 MHz) can be installed in any bus or slot (32-bit/33 MHz or 64-bit/66 MHz). Up to nine PIX-1FE circuit boards, or up to two PIX-4FE, circuit boards can be installed. The PIX-1FE circuit boards should be installed in the 32-bit/33 MHz card slots first.
- The PIX-4FE card can only be installed in a 32-bit/33 MHz card slot and must never be installed in a 64-bit/66 MHz card slot. Installation of this circuit board in a 64-bit/66 MHz card slot can cause the system to hang at boot time.



Note On the PIX 4FE card, port 0 is on the top and port 3 is on the bottom.

- Do not mix the PIX-1FE circuit boards with the PIX-1GE-66 circuit boards on the same 64-bit/66 MHz bus (Bus 0 or Bus 1). The overall speed of the bus is reduced by the lower speed circuit board.
- The PIX-1GE circuit board is not recommended for use in the PIX 535, as it can severely degrade performance. It is only capable of half the throughput of the PIX-1GE-66 circuit board. If this circuit board is detected in the PIX 535, a warning about degraded performance will be issued.
- The VPN Accelerator (PIX-VPN-ACCEL) should only be installed in a 32-bit/33 MHz card slot.
- The VPN Accelerator Card+ (PIX-VACPLUS) should be installed in a 64-bit/66 MHz card slot. Performance will be degraded if this recommendation is not followed.

Table 7-3 lists the relative throughput of the Gigabit Ethernet combinations.

Table 7-3 *Relative Throughput of Gigabit Ethernet Combinations*

Gigabit Ethernet Card	Bus Type	Shared with 33 MHz Device	Speed
PIX-1GE-66	64/66	No	100%
PIX-1GE-66	64/66	Yes	50%
PIX-1GE-66	32/33	No	25%

Table 7-3 *Relative Throughput of Gigabit Ethernet Combinations (continued)*

Gigabit Ethernet Card	Bus Type	Shared with 33 MHz Device	Speed
PIX-1GE	64/66	No	50%
PIX-1GE	32/33	No	25%

Installing the PIX 535

This section includes the following topics:

- Before Installing the PIX 535, page 7-5
- Mounting the PIX 535, page 7-5
- PIX 535 Network Interface Installation, page 7-5

Before Installing the PIX 535

Observe the following before installing the PIX Firewall:

- Review the safety precautions outlined in the *Regulatory Compliance and Safety Information for the Cisco PIX Firewall* document.
- Place the PIX Firewall on a stable work surface.

Mounting the PIX 535

Complete these steps to mount the PIX 535 on a rack:

-
- Step 1** Attach the mounting brackets to the unit using the supplied screws.
- Step 2** Attach the brackets to the holes near the front on both sides of the unit.
- Step 3** Attach the unit to the equipment rack.
-

PIX 535 Network Interface Installation



Note

If your PIX Firewall model supports a failover configuration, complete the steps that follow only on the active (primary) unit.

Complete these steps to connect interfaces to the PIX 535:

-
- Step 1** Connect the cable so that you have either a DB-9 or DB-25 connector on one end as required by the serial port for your computer, and the other end is the RJ-45 connector.



Note Use the Console port to connect to a computer to enter configuration commands. Locate the serial cable from the accessory kit. The serial cable assembly consists of a null modem cable with RJ-45 connectors, and one DB-9 connector and a DB-25 connector.

Step 2 Connect the cable to the PIX 535 RJ-45 Console connector port and connect the other end of the cable to the serial port connector on your computer.

Step 3 Connect the inside, outside, or perimeter network cables to the interface ports. Starting from the right and moving left, the connectors are Ethernet 0, Ethernet 1, Ethernet 2, and so forth. The maximum number of allowed interfaces is 8. The inside or outside network connections can be made to any available interface port on the PIX 535.



Note If you have a second PIX Firewall to use as a failover unit, install the failover feature and cable as described in “Installing Failover”.



Caution Do not power on the failover units until the active unit is configured.

Step 4 When you are ready to start the PIX 535, power on the unit from the switch at the rear of the unit.

PIX 535 Feature Licenses

If you have the PIX-535-UR unrestricted feature license, the following options are available:

- If you have a second PIX 535 to use as a failover unit, install the failover feature and cable as described in “Installing Failover”.
- If needed, install the PIX Firewall Syslog Server as described in the **logging** command page in the *Cisco PIX Firewall Command Reference*.
- If you need to install an optional circuit board, refer to “Installing a Circuit Board in the PIX 535”.
- If you need to install additional memory, refer to “Installing a Memory Upgrade”.



Note If, for any reason, you choose to downgrade to any software version, note that you need to use the **clear flashfs** command before doing so. A new section was added to Flash memory that must be cleared before downgrading.

For information on upgrading feature licenses or downloading the latest software versions, go to the following website:

http://www.cisco.com/univercd/cc/td/doc/product/iaabu/pix/pix_sw/v_63/config/upgrade.htm

This section includes the following topics:

PIX Firewall VPN Accelerator Card, page 7-7

PIX Firewall VPN Accelerator Card+, page 7-7

PIX Firewall VPN Accelerator Card

The VPN Accelerator Card (VAC) for the Cisco PIX Firewall series is a card that provides high-performance, tunneling and encryption services suitable for site-to-site and remote access applications. The VAC is integrated with PIX 535 unrestricted (UR) and failover (FO) bundles. You can also purchase the VAC as a spare for use with PIX 535 units that have a restricted (R) license.



Note

Installing a VAC and an 82557 based FE card on the PIX 535 could result in a system hang.

PIX Firewall VPN Accelerator Card+

PIX Firewall Version 6.3 adds support for the VPN Accelerator Card+ (VAC+) . The VAC+ is a 64-bit/66 MHz PCI card, that provides faster tunneling and encryption services for Virtual Private Network (VPN) remote access, site-to-site intranet and extranet applications than the VAC. Each VAC+ card occupies a single PCI slot in the system. The VAC+ is supported on any chassis that runs Version 6.3 software, has an appropriate license to run VPN software, and at least one PCI slot available. While the VAC continues to be supported in Version 6.3, if both types of cards, the VAC and the VAC+, are installed in a system running Version 6.3, the VAC card is ignored. The VAC+ is a 64-bit/66 MHz PCI card, that runs at both 32-bit/33MHz, as well as 64-bit/66 MHz, and does not slow down the bus when other 66 MHz cards are installed. It is strongly recommended that the VAC+ be installed in a 64bit/66 MHz slot. Performance is degraded if this recommendation is not followed.

The 6.3 VAC+ driver supports the following:

- 3DES, DES, AES, SHA1, MD5 for (IPSec) ESP protocol (For AES, only the CBC mode and key sizes of 128, 192, and 256 bits are supported).
- SHA1, MD5 for the (IPSec) AH protocol.
- Load sharing ESP and AH activity between up to three VAC+ cards.
- Diffie Hellman public key and shared secret generation.
- Any other crypto-related activity uses a software implementation.

Installing Failover

Complete these steps to set up a failover connection:

Step 1 Power off both the primary and secondary units.



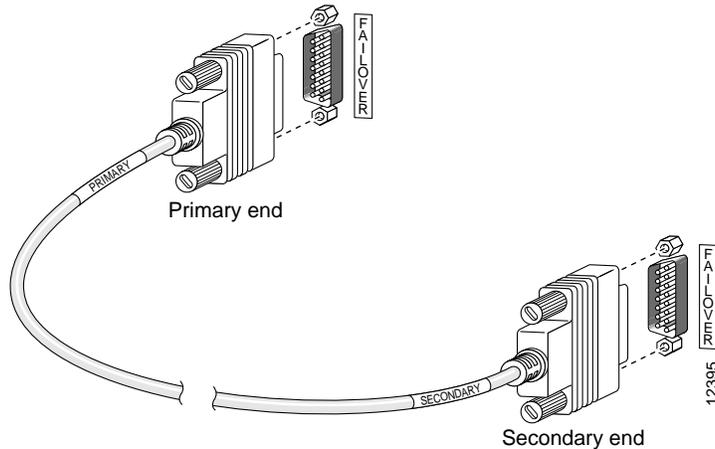
Note

Both PIX Firewall units must be the same model number, have the same amount of RAM, Flash memory, number and type of interfaces, and be running the same software version.

Step 2 Locate the failover cable (shown in Figure 7-5). This cable is shipped separately from the PIX Firewall unit. The cable is labeled Primary on one end and Secondary on the other.

Install the cable for the PIX 535 as shown in Figure 7-5.

Figure 7-5 PIX 535 Failover Cable Connection



- Step 3** Connect the Primary end of the failover cable to the first PIX Firewall unit, that is, the one you have already configured.
- Step 4** Connect the Secondary end of the failover cable to the standby unit.
- Step 5** Connect a power cord to the power connector on the rear panel of each unit, and the other end of each power cord to (preferably separate) power outlets.
- Step 6** If you are using Stateful Failover, use one of the following types of connections, that is appropriate for your system, between the dedicated interfaces on the PIX Firewall units:
- Cat 5 crossover cable directly connecting the primary unit to the secondary unit.
 - 100BaseTX full duplex on a dedicated switch or dedicated VLAN of a switch.
 - 1000BaseTX full duplex on a dedicated switch or dedicated VLAN of a switch.



Note For Stateful Failover on the PIX 535, you must use a Gigabit Ethernet (GE) failover link with GE interfaces.



Caution

Do not turn the power on until the units are connected and the primary unit is configured completely.

- Step 7** Power the primary unit on first, *then* power on the secondary unit. Within a few seconds, the active unit automatically downloads its configuration to the standby unit.
- If the primary unit fails, the secondary unit automatically becomes active.



Note All enabled interfaces must be connected between the active and standby units. Only configure the active unit. On the PIX 535, the active unit is indicated by the ACT LED on the front of the unit.

Installing LAN-Based Failover

LAN-based failover supports failover between two units connected over a dedicated Ethernet interface. LAN-based failover eliminates the need for a special failover cable and overcomes the distance limitations imposed by the failover cable.


Note

Both PIX Firewall units must be the same model number, have the same amount of RAM, Flash memory, number and type of interfaces, and be running the same software version.

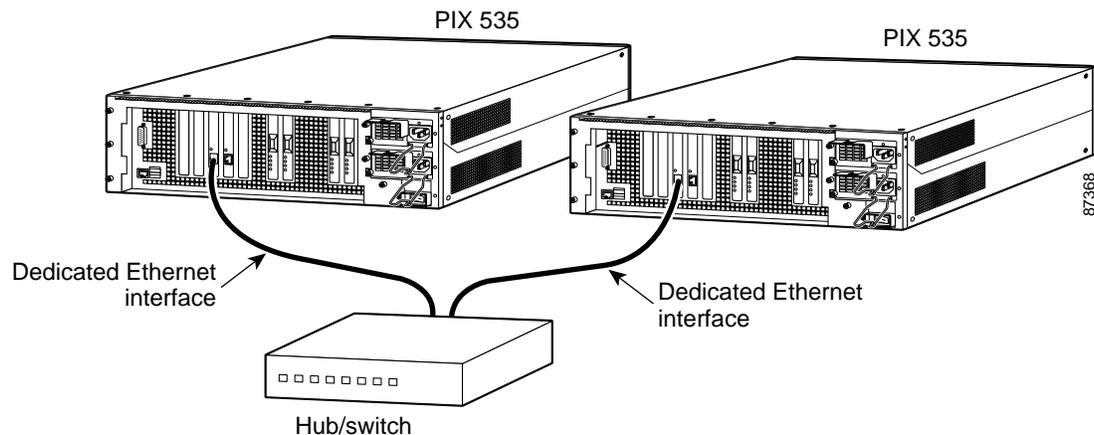
Complete these steps to set up a LAN-based failover connection:

- Step 1** Disconnect both the PIX Firewall units, so that there is no traffic flow between them. If the Failover cable is connected to the PIX Firewall, disconnect it.
- Step 2** Configure the PIX Firewall units. For information on configuring the PIX Firewall, refer to “Configuring the LAN-Based Failover,” section in Chapter 10 “Using PIX Firewall Failover” in the *Cisco PIX Firewall and VPN Configuration Guide*.
- Step 3** Power off both the units.
- Step 4** Connect the LAN failover interfaces to the dedicated switch/hub, as shown in Figure 7-6.


Note

A dedicated LAN interface and a dedicated switch (or VLAN) is required to implement LAN-based failover. You cannot use a crossover Ethernet cable to connect the two PIX Firewall units.

Figure 7-6 LAN-Based Failover Connections



- Step 5** If you are using Stateful Failover, use one of the following types of connections, that is appropriate for your system, between the dedicated interfaces on the PIX Firewall units:
 - Cat 5 crossover cable directly connecting the primary unit to the secondary unit.
 - 100BaseTX full duplex on a dedicated switch or dedicated VLAN of a switch.
 - 1000BaseTX full duplex on a dedicated switch or dedicated VLAN of a switch.



Note For Stateful Failover on the PIX 535, you must use a Gigabit Ethernet (GE) failover link with GE interfaces.



Caution

Do not turn the power on until the units are connected and the primary unit is configured completely.

Step 6

Power the primary unit on first, *then* power on the secondary unit. Within a few seconds, the active unit automatically downloads its configuration to the standby unit.

If the primary unit fails, the secondary unit automatically becomes active.

Replacing a Lithium Battery

The PIX Firewall has a lithium battery on its main circuit board. This battery has an operating life of about 10 years. When the battery loses its charge, the PIX Firewall cannot function. The lithium battery is not a field replaceable unit (FRU). Contact Cisco TAC to replace the battery.



Note

Do not attempt to replace this battery yourself.



Warning

Danger of explosion exists if the lithium battery is incorrectly replaced. Replace only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer's instructions.

Installing a Memory Upgrade

Observe the following warnings, cautions, and notes when installing additional PIX Firewall system memory.

The following statement applies to DC models:



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.

The following statement applies to both AC and DC models:



Warning

Before working on a system that has an On/Off switch, turn OFF the power and unplug the power cord.

**Caution**

If you remove the PIX Firewall chassis top panel, always reinstall the top panel. Running the PIX Firewall without the top panel may cause overheating and damage to electrical components.

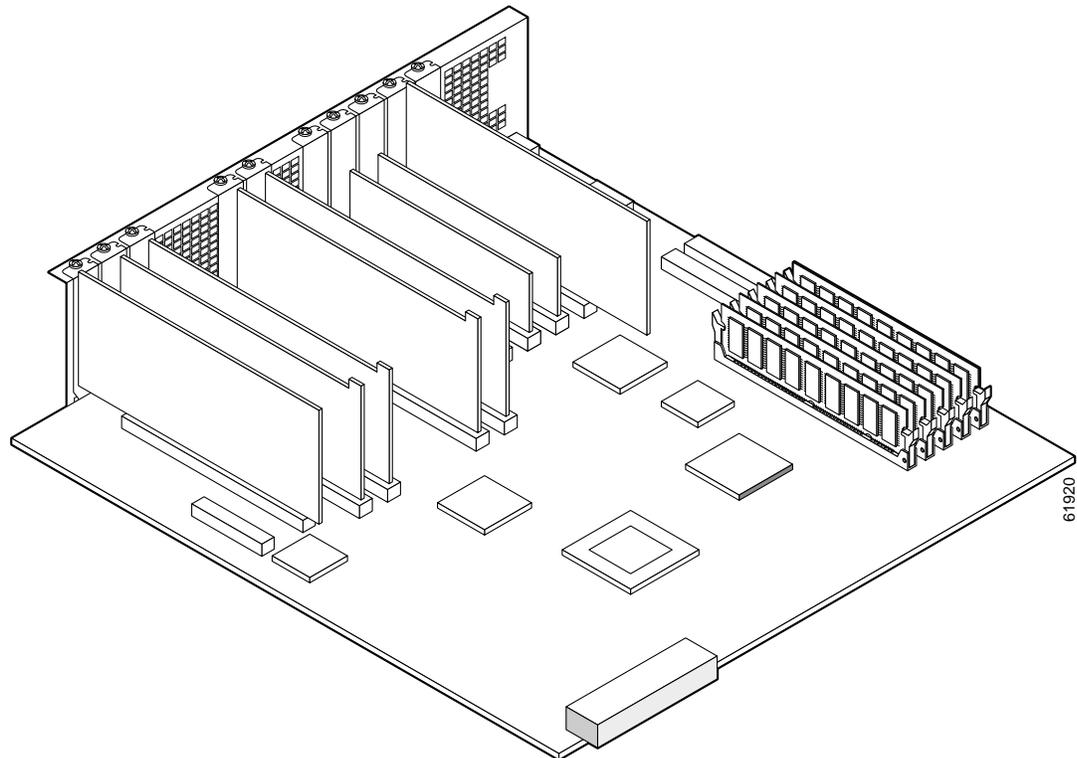
Memory Installation Steps

Complete these steps to install additional system memory:

- Step 1** If the unit is rack-mounted, remove network wires and any cords connecting to the PIX Firewall unit. Ensure that the unit is unplugged from its power source.
- Step 2** Unpack the items in the memory upgrade kit.
- Step 3** Remove the component tray and all the screws holding the assembly in place. Determine the location of your system memory sockets (see Figure 7-7).
- Step 4** Use the markings on the motherboard to determine the socket numbers. Always install the first memory DIMM in J40, and the second one in J43. This constitutes Bank 0. If your PIX Firewall has 512 MB currently installed in it, then both J40 and J43 will be filled. Install the additional 512 MB of RAM in socket J41 and J44.

Make sure that memory from the same vendor is placed together in the same bank (J40 & J43 - Bank 0) or (J41 & J44 - Bank 1).

Figure 7-7 System Memory Location on the PIX 535 Component Tray



- Step 5** Locate the wrist grounding strap in the accessory kit and connect one end to the unit or to the PIX Firewall chassis, and securely attach the other to your wrist so it contacts your bare skin.
- Step 6** With the wrist strap on your wrist, carefully grasp the memory strip from either end. Note that a DIMM strip has notches.
- Step 7** Install the first DIMM in socket J41, and the second DIMM in socket J44 as shown in Figure 7-7 and Figure 7-8, by opening the two plastic wing connectors, inserting the strip, and closing the wing connectors.

Figure 7-8 Inserting a DIMM Memory Strip in the PIX 535

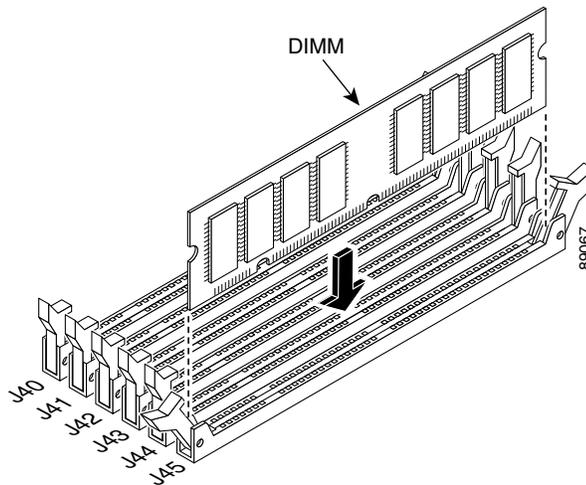
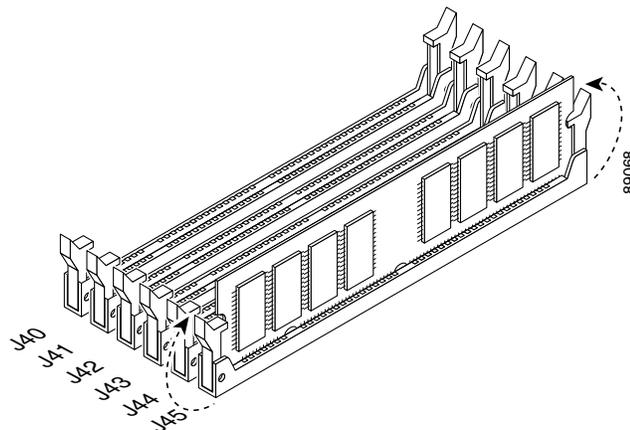


Figure 7-9 Securing a DIMM Memory Strip in the PIX 535



When you finish inserting new RAM memory, reinstall the tray on the PIX 535. Reattach the screws. If desired, rack mount the PIX Firewall and attach all cables and cords as discussed in previous sections. After the PIX Firewall is installed, you can view the amount of RAM memory in the system startup messages or with the **show version** command.

Installing a Circuit Board in the PIX 535

The information in this section refers to all models of the PIX 535.

This section includes the following topics:

- PIX 535 Circuit Board Options, page 7-13
- Circuit Board Slot Description, page 7-15
- Installing a Circuit Board, page 7-16
- PIX Firewall 16 MB Flash Circuit Board, page 7-17
- PIX Firewall VPN Accelerator Circuit Board, page 7-19
- Gigabit Ethernet Circuit Board, page 7-19
- Installing the PIX 535 DC Model, page 7-20

PIX 535 Circuit Board Options

Table 7-4 lists the optional circuit board combinations that are available for the PIX 535. The PIX 535 supports up to ten interfaces. A maximum of eight interfaces are available with a restricted license, and ten interfaces are available with an unrestricted license.



Note

Table 7-4 applies only to PIX Firewall Version 6.1(1) and later. Earlier versions of PIX Firewall support fewer interface options.

Table 7-4 lists the possible choices available for the PIX 535 restricted and unrestricted interface options.

Table 7-4 PIX 535 Interface Options

Restricted Interface Options	Unrestricted Interface Options
8 GE	9 GE
8 GE + 1 VPN Accelerator	8 GE + 1 FE
7 GE + 1 FE	8 GE + 1 VPN Accelerator
7 GE + 1 FE + 1 VPN Accelerator	7 GE + 2 FE
6 GE + 2 FE	7 GE + 1 FE + 1 VPN Accelerator
6 GE + 2 FE + 1 VPN Accelerator	6 GE + 3 FE
5 GE + 3 FE	6 GE + 2 FE + 1 VPN Accelerator
5 GE + 3 FE + 1 VPN Accelerator	5 GE + 4 FE
4 GE + 4 FE	5 GE + 3 FE + 1 VPN Accelerator
4 GE + 4 FE + 1 VPN Accelerator	5 GE + 1 FE + 1 4-port FE
3 GE + 5 FE	5 GE + 1 FE + 1 4-port FE + 1 VPN Accelerator
3 GE + 5 FE + 1 VPN Accelerator	4 GE + 5 FE
2 GE + 6 FE	4 GE + 4 FE + 1 VPN Accelerator
2 GE + 6 FE + 1 VPN Accelerator	4 GE + 2 FE + 1 4-port FE

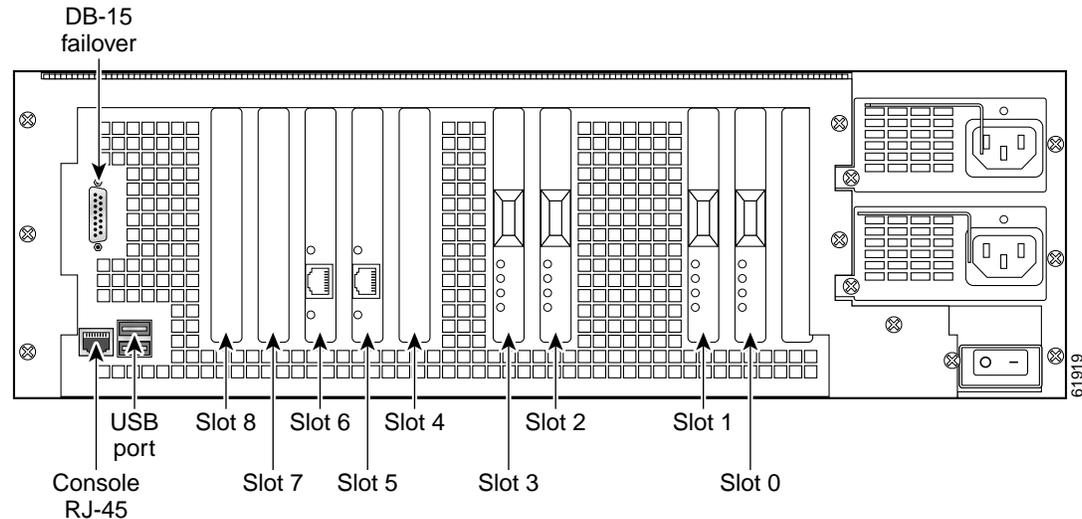
Table 7-4 PIX 535 Interface Options (continued)

Restricted Interface Options	Unrestricted Interface Options
2 GE + 2FE + 1 4-port FE	4 GE + 2 FE + 1 4-port FE + 1 VPN Accelerator
2 GE + 2FE + 1 4-port FE + 1 VPN Accelerator	3 GE + 6 FE
1 GE + 3 FE + 1 4-port FE	3 GE + 5 FE + 1 VPN Accelerator
1 GE + 3 FE + 1 4-port FE + 1 VPN Accelerator	3 GE + 1 4-port FE + 3 FE
8 FE	3 GE + 5 FE + 1 VPN Accelerator
8 FE + 1 VPN Accelerator	3 GE + 3 FE + 1 4-port FE
4 FE + 1 4-port	3 GE + 3 FE+ 1 4-port FE + 1 VPN Accelerator
4 FE + 1 4-port + 1 VPN Accelerator	2 GE + 2 4-port FE
2 4-port + 1 VPN Accelerator	2 GE + 2 4-port FE + 1 VPN Accelerator
-	2 GE + 4 FE +1 4-port FE
-	2 GE + 4 FE + 1 4-port FE + + 1 VPN Accelerator
-	2 GE + 7 FE
-	2 GE + 6 FE + 1 VPN Accelerator
-	9 FE
-	8 FE + 1 VPN Accelerator
-	2 4-port FE + 2 FE
-	2 4-port FE + 2 FE + 1 VPN Accelerator
-	1 4-port FE card + 6 FE
-	1 4-port FE card + 6 FE + 1 VPN Accelerator

Circuit Board Slot Description

There are nine circuit board slots (see Figure 7-10) using three separate buses for the PIX 535.

Figure 7-10 PIX 535 Back Panel Detail



The slots and buses are configured as follows:

- Slots 0 and 1—64-bit/66 MHz Bus 0
- Slots 2 and 3—64-bit/66 MHz Bus 1
- Slots 4 to 8—32-bit/33 MHz Bus 2

For optimum performance and throughput for the interface circuit boards, you must use the following guidelines:

- A total of eight interface circuit boards are configurable with the restricted license and a total of ten are configurable with the unrestricted license.
- PIX-1GE-66 (66 MHz) circuit boards can be installed in any slot, but should be installed in the 64-bit/66 MHz Bus first. Up to eight PIX-1GE-66 circuit boards can be installed.
- The FE circuit board (33 MHz) can be installed in any bus or slot (32-bit/33 MHz or 64-bit/66 MHz). Up to eight single-port FE circuit boards or up to two four-port FE circuit boards can be installed.
 - The four-port FE circuit board should only be installed in the 32-bit/33 MHz Bus.



Note The numbering of the FE circuit boards in monitor mode begins at the 32-bit slots; do not install any FE circuit boards in the 64-bit slots.

- Do not mix the 33 MHz circuit boards with the 66 MHz GE circuit boards on the same 64-bit/66 MHz bus (Bus 0 or Bus 1). The overall speed of the bus will be reduced by the lower speed circuit board.
- The VPN Accelerator circuit board should only be installed in the 32-bit/33 MHz Bus.

Installing a Circuit Board

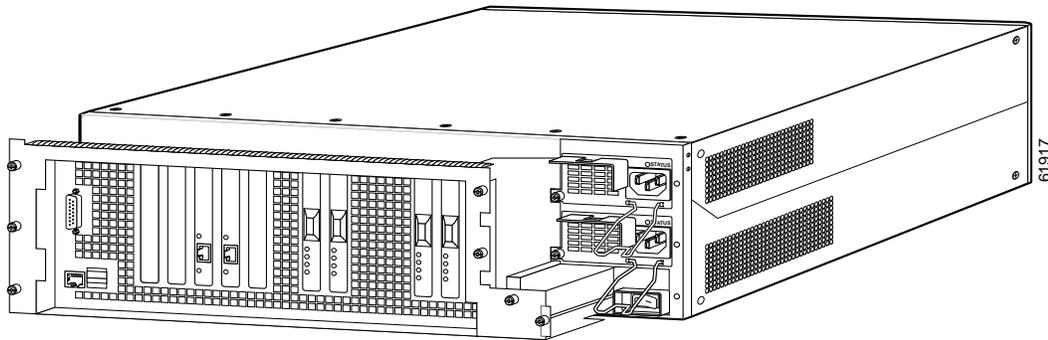
**Note**

It is not necessary to remove the top panel on the PIX 535 to install or replace a circuit board. A component tray, that slides out from the rear panel, contains slots for installing circuit boards and memory boards.

Complete these steps to install a circuit board in the PIX 535:

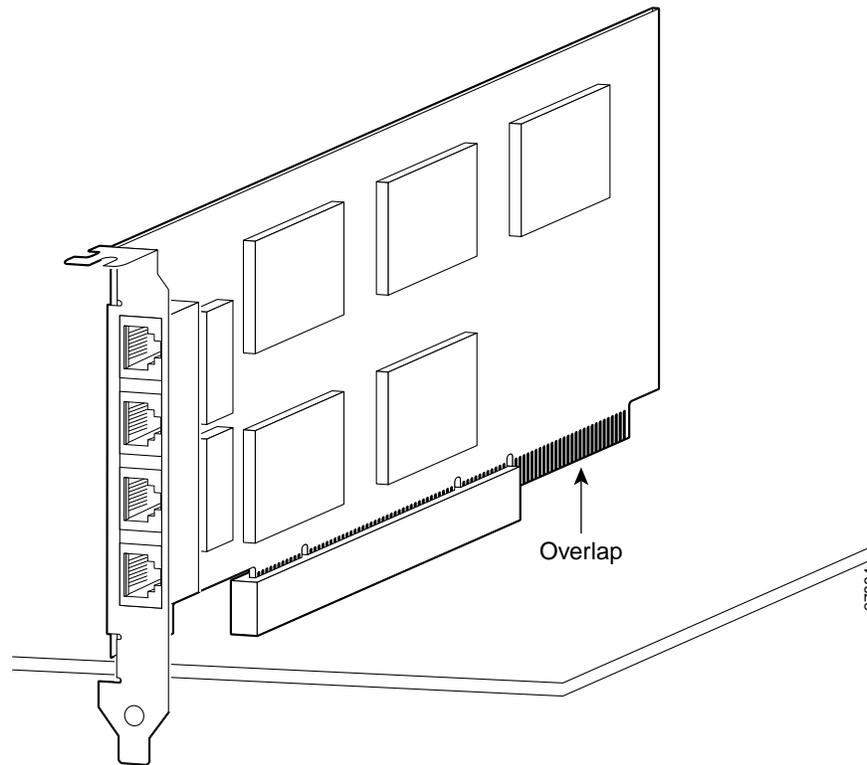
- Step 1** Locate the grounding strap from the accessory kit. Fasten the grounding strap to your wrist so that it contacts your bare skin. Attach the other end to bare metal on the PIX 535 chassis.

Figure 7-11 The Component Tray at the Back of the PIX 535



- Step 2** Loosen the attachment screws from the rear panel of the component tray and slide the tray out.
- Step 3** Select a slot for the circuit board and remove the screw and slot cover plate from the back panel on the component tray.
- Step 4** Install the circuit board into the slot. The front plate on the circuit board should be against the slot opening on the component tray back panel.
- Step 5** Use the screw that was removed in Step 3 to attach the circuit board front plate to the component tray rear panel.
- Step 6** Reinstall the component tray and tighten the attachment screws.

Figure 7-12 4-Port Circuit Board Overlap

**Note**

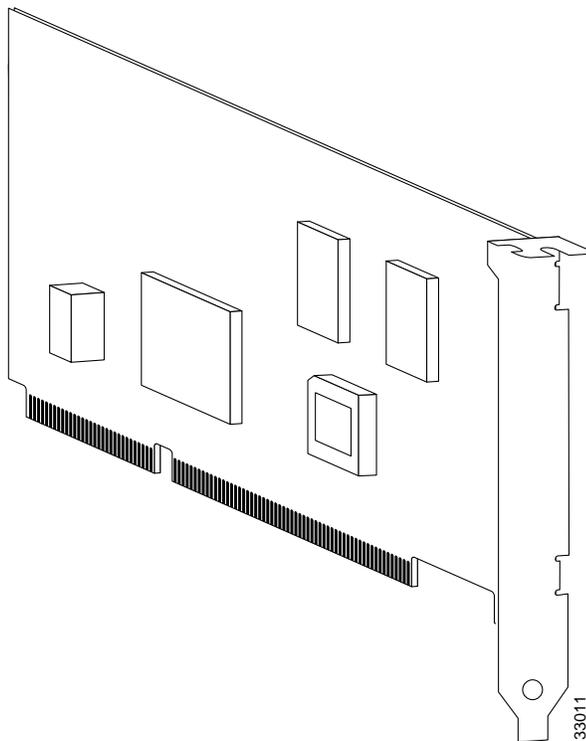
If you are installing a 4-port circuit board, note that the circuit board will overlap the slot connector on the motherboard. This does not affect the use or operation of the circuit board. Figure 7-12 illustrates how this appears.

PIX Firewall 16 MB Flash Circuit Board

Along with upgrading your Flash memory to 16 MB, the PIX Firewall 16 MB Flash circuit board includes pre-installed PIX Firewall software and a UR (unrestricted) 56-bit DES encryption license. The 16 MB Flash circuit board installs into the PIX Firewall ISA slot.

An illustration of the 16 MB Flash circuit board is shown in Figure 7-13.

Figure 7-13 PIX Firewall 16 MB Flash Circuit Board



You must observe the following when installing a 16 MB Flash circuit board:

- The PIX Firewall must have a minimum of 32 MB of RAM memory.
- You must obtain a new activation key if you use 3DES.
- The PIX Firewall should not be downgraded to a software revision lower than 5.0(3) after the new software from the 16 MB circuit board is installed.
- If you downgrade from software Version 5.3 to 5.2 or lower, you will lose private data (keys, certifications, and CRLs) that are stored in Flash memory. You need to use the **clear flashfs** command, **downgrade 5.0 | 5.1 | 5.2** options if your PIX Firewall has 16 MB Flash memory, private data stored in the Flash memory, and you used the **ca save all** command to save these items in Flash memory.

Complete these steps to install the 16 MB Flash circuit board:

-
- Step 1** Record the present PIX Firewall unit serial number.
- Step 2** Record the new serial number from the 16 MB Flash circuit board.
After installation, the serial number of the PIX Firewall is the serial number supplied with the 16 MB Flash circuit board.
- Step 3** Create a backup of your present configuration (to use later to reconfigure your system).
- Step 4** Obtain a new Activation key (if using 3DES).

- Step 5** Remove any previously installed Flash memory circuit boards from the unit.
- Step 6** The jumper on the PIX Firewall 16 MB Flash circuit board must not be removed or repositioned. The PIX Firewall system will not work if this jumper is moved.
- Step 7** Install the 16 MB Flash circuit board into an available ISA slot in the PIX Firewall chassis.

PIX Firewall VPN Accelerator Circuit Board

The VPN Accelerator (PIX-VPN-ACCEL) is an encryption and accelerator circuit board. The VPN Accelerator uses a PCI interface and therefore can only be installed in PIX Firewall platforms with PCI slots. The VPN Accelerator begins to function immediately after installation without the need of special installation configurations.

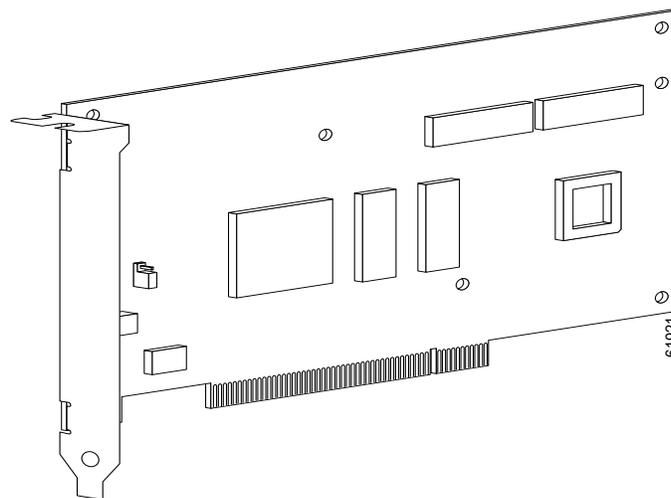


Note

The new VPN Accelerator cannot be used with the former PIX Firewall IPsec accelerator in the same chassis. The PIX Firewall IPsec accelerator was also known as the Private Link card.

An illustration of the VPN Accelerator is shown in Figure 7-14.

Figure 7-14 PIX Firewall VPN Accelerator Circuit Board



Gigabit Ethernet Circuit Board

PIX Firewall supports 1000 Mbps (Gigabit) Ethernet. The Gigabit Ethernet circuit board uses the **gb-ethernet** device name and only has one hardware speed and the following duplex options:

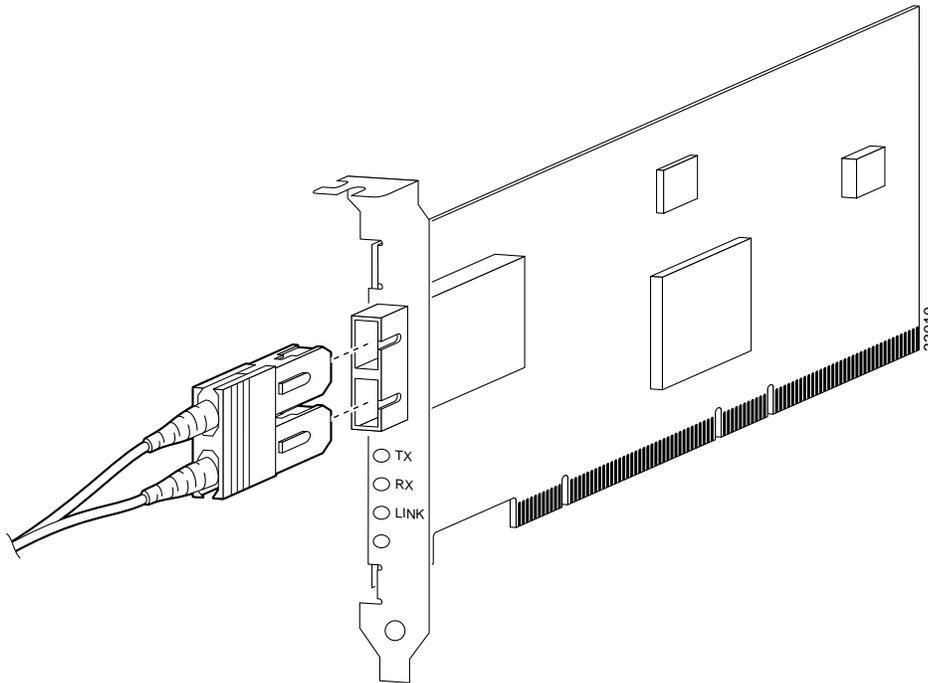
- 1000SXfull—Forces full-duplex operation
- 1000BaseSX—Forces half-duplex operation
- 1000auto—Auto negotiates full or half duplex

**Note**

You must use a GE failover link when connecting the PIX 535 with GE interfaces.

The Gigabit Ethernet circuit board and the fiber optic cable connection are shown in Figure 7-15.

Figure 7-15 Gigabit Ethernet Circuit Board



The Gigabit Ethernet circuit board has three LEDs:

- TX—Transmitting data
- RX—Receiving data
- LINK—The Gigabit Ethernet circuit board has established a network connection

Installing the PIX 535 DC Model

**Warning**

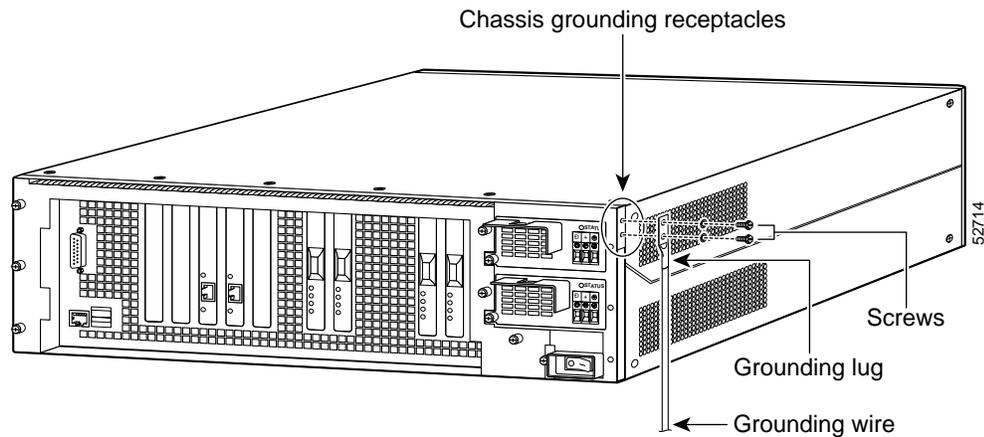
Before performing any of the following procedures, ensure that power is removed from the DC circuit. To ensure that all power is OFF, locate the circuit breaker on the panel board that services the DC circuit, switch the circuit breaker to the OFF position, and tape the switch handle of the circuit breaker in the OFF position.

Complete these steps to install the PIX 535 DC power model:

- Step 1** Remove the blank cover plate, if a blank cover plate is installed on the PIX 535 unit.
- Step 2** Read the *Regulatory Compliance and Safety Information for the Cisco PIX Firewall* document for your respective software version.

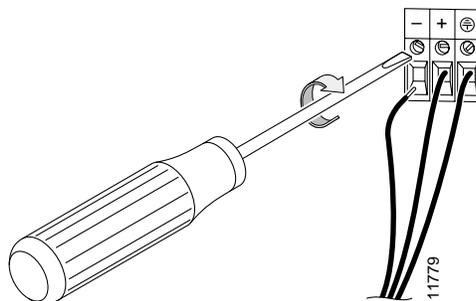
- Step 3** Terminate the DC input wiring on a DC source capable of supplying at least 15 amps. A 15-amp circuit breaker is required at the -48 VDC facility power source. An easily accessible disconnect device should be incorporated into the facility wiring.
- Step 4** Be sure the PIX 535 power is off by checking the power switch at the rear of the unit.
- Step 5** As shown in Figure 7-16, the PIX 535 is equipped with two grounding holes at the back of the unit, which you can use to connect a two-hole grounding lug to the PIX 535. Use M3.5 x 7 mm thread-forming screws to connect a copper standard barrel grounding lug to the holes. The PIX 535 requires a grounding lug where the distance between the center of each hole is 0.56 inches. A grounding lug is not supplied with the PIX 535.

Figure 7-16 Attaching a Grounding Lug to the PIX 535 DC



- Step 6** 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.
- Step 7** Strip the ends of the wires for insertion into the power connect lugs, located to the left of the power switch.
- Step 8** Refer to Figure 7-17 and insert the ground wire into the connector for the earth ground and tighten the screw on the connector. Using the same method as for the ground wire, connect the negative wire and then the positive wire.

Figure 7-17 Attaching DC power cables



- Step 9** Reconnect power to the PIX 535. 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.
- Step 10** If needed, install the interface boards as described in “Installing a Circuit Board in the PIX 535”.
- Step 11** Power on the unit from the switch at the rear of the unit.



Note If you need to power cycle the DC PIX 535, wait at least 5 seconds between powering off the unit and powering it back on.

Your unit is now ready to configure. Refer to the *Cisco PIX Firewall and VPN Configuration Guide* for your respective software version for more information on how to configure the PIX Firewall.



Cable Pinouts

The appendix provides the following pinout information:

- 10BaseT and 100BaseTX Connectors, page A-1
- Console Port (RJ-45), page A-2
- RJ-45 to DB-9 or DB-25 Serial Cable, page A-4
- Failover Cable Pinouts, page A-4

10BaseT and 100BaseTX Connectors

The 10BaseT and 100BaseTX ports use standard RJ-45 connectors. The 10BaseT and 100BaseTX ports have their transmit (TD) and receive (RD) pairs internally crossed.

Figure A-1 shows the 10BaseT and the 100BaseTX connector (RJ-45).

Figure A-1 RJ-45 10BaseT and 100BaseTX Connector

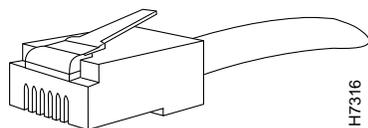


Table A-1 shows the connector pinout.

Table A-1 10BaseT and 100BaseTX Connector (RJ-45) Pinouts

Pin	Description
1	TX+
2	TX-
3	RX+
4	-
5	-
6	RX-
7	-
8	-

Console Port (RJ-45)

Cisco products use the following three types of RJ-45 cables:

- Straight-through
- Crossover
- Rolled

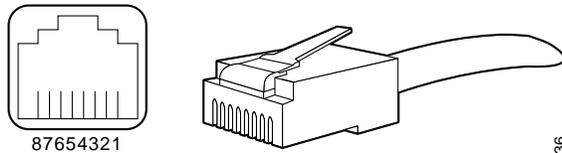


Note

Cisco does not provide these cables; they are widely available from other sources.

Figure A-2 shows the RJ 45 cable.

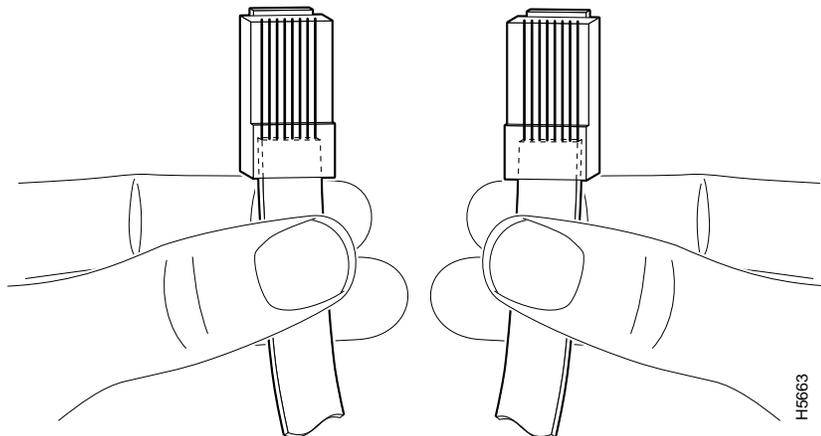
Figure A-2 RJ-45 Cable



RJ-45 connector

To identify the RJ-45 cable type, hold the two ends of the cable next to each other so you can see the colored wires inside the ends, as shown in Figure A-3.

Figure A-3 RJ-45 Cable Identification



Examine the sequence of colored wires to determine the type of RJ-45 cable, as follows:

- Straight-through—The colored wires are in the same sequence at both ends of the cable (see Table A-2).
- Crossover—The first (far left) colored wire at one end of the cable is the third colored wire at the other end of the cable (see Table A-3).
- Rolled—The colored wires at one end of the cable are in the reverse sequence of the colored wires at the other end of the cable (see Table A-4).

Table A-2 RJ-45 Straight-Through (Ethernet) Cable Pinouts

Signal	Pin	Pin	Pin
TX+	1	1	TX+
TX-	2	2	TX-
RX+	3	3	RX+
-	4	4	-
-	5	5	-
RX-	6	6	RX-
-	7	7	-
-	8	8	-

Table A-3 RJ-45 Crossover (Ethernet) Cable Pinouts

Signal	Pin	Pin	Pin
TX+	1	3	RX+
TX-	2	6	RX-
RX+	3	1	TX+
-	4	4	-
-	5	5	-
RX-	6	2	TX-
-	7	7	-
-	8	8	-

Table A-4 RJ-45 Rolled (Console) Cable Pinouts

Signal	Pin	Pin	Pin
-	1	8	-
-	2	7	-
-	3	6	-
-	4	5	-
-	5	4	-
-	6	3	-

Table A-4 RJ-45 Rolled (Console) Cable Pinouts (continued)

Signal	Pin	Pin	Pin
-	7	2	-
-	8	1	-

RJ-45 to DB-9 or DB-25 Serial Cable

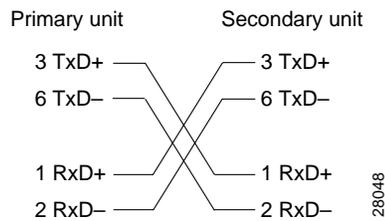
Table A-5 lists the cable pinouts for RJ-45 to DB-9 or DB-25.

Table A-5 Cable Pinouts for RJ-45 to DB-9 or DB-25

Signal	RJ-45 Pin	DB-9 Pin	DB-25 Pin
RTS	8	8	5
DTR	7	6	6
TxD	6	2	3
GND	5	5	7
GND	4	5	7
RxD	3	3	2
DSR	2	4	20
CTS	1	7	4

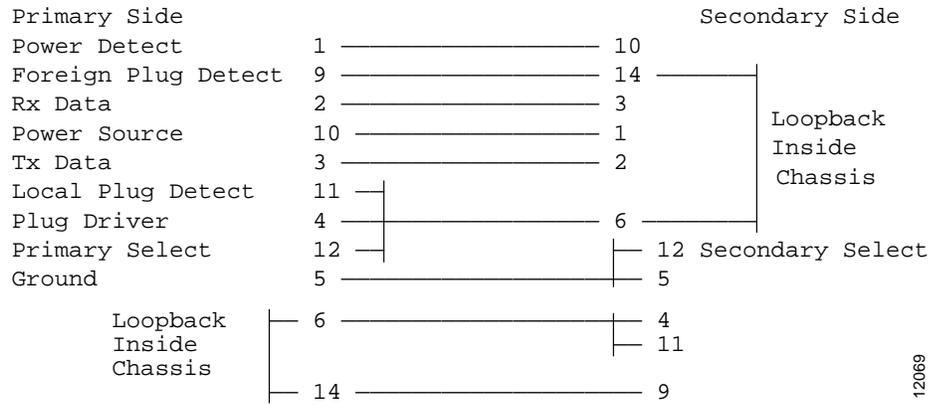
Failover Cable Pinouts

Figure A-4 shows the pinouts of a crossover cable, should you use this with the Stateful Failover dedicated interface.

Figure A-4 Stateful Failover Dedicated Interface Crossover Cable Pinouts

Should you need to test the cable you received, the pinouts are shown in Figure A-5.

Figure A-5 Failover Serial Cable Pinouts



12069



Numerics

100 Mbps LEDs

PIX 506E 3-2

PIX 515 4-3

PIX 525 6-3

PIX 535 7-3

16 MB Flash circuit board

Installing

PIX 520 5-18

PIX 535 7-17

2 pin fan cables 6-22

6 pin connectors 6-20

A

accessory kit 1-1

AC power supplies

connecting

PIX 506E 3-3

PIX 515 4-14

PIX 520 5-5

PIX 525 6-12

AC power supply 7-10

ACT LEDs 3-2, 4-2, 6-2, 7-3

air separator

replacing 6-24

amps

required

PIX 515 4-20

PIX 520 5-21

PIX 525 6-27

PIX 535 7-21

B

back cover plate

see chassis covers

batteries

replacing

PIX 515 4-14

PIX 520 5-12

PIX 525 6-12

PIX 535 7-10

boards

See circuit boards

buses

configurations 7-4

C

cables

clamps

PIX 525 6-23, 6-27

failover A-5

lock

PIX 501 2-4

serial

PIX 506E 3-3

PIX 525 6-4

chassis covers

removing

PIX 515 4-12

PIX 520 5-10

PIX 525 6-9

replacing

PIX 515 4-13

PIX 520 5-11
 PIX 525 6-11

circuit boards

PIX 515 4-17
 PIX 520 5-15
 PIX 525 6-14
 PIX 535 7-13

circuit breaker for DC unit 1-3

Cisco warranty 1-2

clear flashfs command

PIX 520 5-18
 PIX 525 4-7, 6-5
 PIX 535 7-6

connecting a grounding lug 7-21

console port 3-2, 4-3

copper standard barrel grounding lug 6-27

D

DB-15 failover connector 6-3

DB-9 connector and DB-25 connector

PIX 506E 3-3
 PIX 515 4-5
 PIX 525 6-4
 PIX 535 7-6

DC

circuit 6-19, 6-28

see also

power supplies

DC PIX 520 5-21

DC PIX 535 7-20

depress tab 6-25

DIMM 4-16, 5-13

installing

PIX 515 4-16
 PIX 520 5-13
 PIX 525 6-13

DIMM strip 7-12

DIMM strips 6-13

E

electrostatic discharge

see ESD

equipment racks

PIX 520 5-4
 PIX 525 6-3

tips 1-5

ESD

preventing 1-3

ETHERNET 4-3, 6-4

ETHERNET 0

PIX 506E 3-3
 PIX 515 4-3
 PIX 525 6-4

ETHERNET 1

PIX 506E 3-3
 PIX 515 4-3
 PIX 525 6-4

ethernet circuit boards

PIX 515 4-6
 PIX 520 5-2

F

failover

LAN-based

PIX 515 4-11, 5-8, 6-8, 7-9

failover connections

installing 1-1

PIX 520 5-7
 PIX 525 6-6
 PIX 535 7-7

fans

removing

PIX 525 6-25

ventilation 1-5

wiring

PIX 525 6-24

FDX LEDs

PIX 515 4-3

PIX 535 7-3

four-port ethernet circuit board

PIX 515 4-6

PIX 520 5-2

G

gigabit ethernet circuit boards

duplex options

PIX 520 5-20

PIX 525 6-18

PIX 535 7-19

LEDs

PIX 520 5-20

PIX 525 6-19

PIX 535 7-20

grounding lug 7-21

attaching

PIX 515 4-20

PIX 520 5-21

PIX 525 6-27

PIX 535 7-21

grounding strap 7-12

grounding straps

attaching

PIX 515 4-16

PIX 520 5-13

PIX 525 6-13

PIX 515 4-3

PIX 520 5-2

PIX 525 6-4

Installing 2-3

interface cables

installing

PIX 520 5-5

IPSec accelerators

VPN accelerator and (note) 5-19

L

lights

see LEDs

lithium batteries

replacing

PIX 515 4-14

PIX 520 5-12

PIX 525 6-12

PIX 535 7-10

N

Network 7-4

network LEDs

PIX 506E 3-2

PIX 515 4-2

P

panel

removing

PIX 515 4-13

PIX 520 5-10

PIX 525 6-9

pinouts A-1

PIX 501

installing 2-3

in 4-16

indicator lights

see LEDs

inside interfaces

PIX 506E 3-3

- installing cable locks 2-4
 - rear panel (figure) 2-2
 - PIX 506E
 - installing 3-3
 - product overview 3-1
 - PIX 515
 - connectors 3-2
 - feature licenses 4-7
 - inserting boards 4-18
 - installing 4-5
 - installing DIMMs 4-16
 - installing failover connections 4-9
 - LEDs 4-2
 - mounting
 - vertical mounting 4-5
 - product overview 4-1
 - rear panels (figure) 4-3
 - unrestricted license 4-6
 - PIX 520
 - attaching DC-input power supplies 5-22
 - connectors 5-2
 - DC unit installing 5-21
 - installing 5-4
 - installing interface cables 5-5
 - memory location 7-12
 - memory location/installing DIMMs 5-13
 - product overview 5-1
 - PIX 525
 - circuit boards options 6-14
 - feature licenses 6-5
 - installing 6-3
 - installing circuit boards 6-14
 - installing failover connections 6-6
 - memory locations/ installing DIMMs 6-13
 - PIX 535
 - before installing 7-5
 - connecting network interfaces 7-4
 - installing DC-input power supplies 7-20
 - mounting 7-5
 - product overview 7-1
 - power LEDs
 - PIX 515 4-2
 - PIX 520 5-1
 - PIX 525 6-2
 - PIX 535 7-3
 - power supplies
 - connecting
 - PIX 501 2-3
 - PIX 506E 3-3
 - considerations 1-4
 - disconnecting 1-2
 - see also
 - AC-input power supplies
 - DC-input power supplies
 - external power supplies
-
- ## R
- RAM 7-12
 - PIX 515 4-17
 - PIX 520 5-14
 - PIX 525 6-14
 - rerouting fan wiring 6-24
 - RJ-45 connector
 - pinouts 6-3, A-4
 - rubber feet
 - attaching
 - PIX 515 4-4
-
- ## S
- safety 1-2
 - security 2-4
 - serial cables
 - PIX 515 4-5
 - PIX 520 5-5
 - PIX 525 6-4

PIX 535 7-6
show version command 7-12
show version commands
PIX 515 4-17
PIX 520 5-14
PIX 525 6-14
SIMM strip 7-12
site environment 1-4
stateful failover
connecting dedicate interfaces
PIX 515 4-10
PIX 520 5-7
PIX 525 6-7
PIX 535 4-11, 5-9, 6-9, 7-8, 7-9

U

USB ports
PIX 506 3-2
PIX 515 4-3
PIX 525 6-3
PIX 535 7-2

V

VDC power source
requirements 6-27
ventilation fans 1-5
VPN Accelerator
circuit board
PIX 515 4-20
PIX 520 5-19
PIX 525 6-17
PIX 535 7-19
VPN Accelerator Card(VAC)
PIX 535 4-8, 6-6, 7-7

W

warranty 1-2
wiring DC- input power supplies
PIX 520 5-21
PIX 535 7-21
wrist strap 7-12
wrist straps
PIX 515 4-16
PIX 520 5-13
PIX 525 6-13

