



Cisco 6160 PEM FRU Installation and Replacement Notes

Product Number: 6160-1-PEM-DC=

This document provides an overview of and installation and replacement procedures for the Cisco 6160 power entry module (PEM). The PEM is a field-replaceable unit (FRU) in the Cisco 6160 chassis.



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

Contents

This document includes the following sections:

- [Introduction, page 1](#)
- [Part and Tool Requirements, page 4](#)
- [General Safety Precautions and Maintenance Guidelines, page 4](#)
- [Removing and Installing the Cisco 6160 PEM, page 10](#)
- [Standards and Certifications, page 13](#)
- [Related Documentation, page 14](#)
- [Obtaining Documentation, page 14](#)
- [Obtaining Technical Assistance, page 15](#)

Introduction

The Cisco 6160 chassis is equipped with one or two –48VDC PEMs, which distribute direct current (DC) power within the chassis. The Cisco 6160 needs only one active PEM to operate; if two PEMs are installed, a secondary PEM serves as a hot backup to the first PEM.

Each PEM should be connected to a single DC power source. For full power redundancy, two PEMs must be installed and connected to two separate DC power sources.

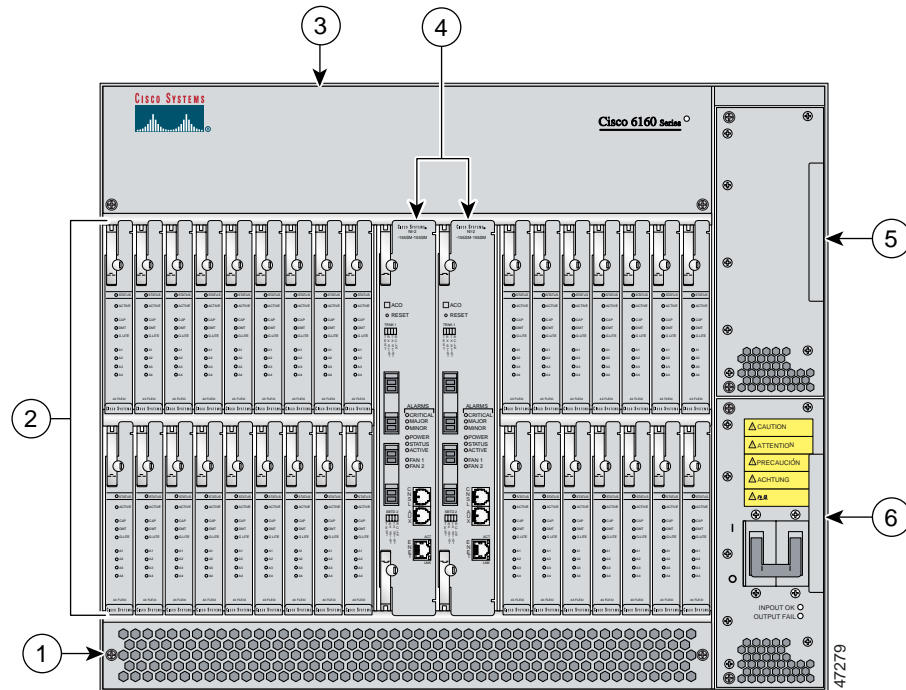


Corporate Headquarters:
Cisco Systems, Inc., 170 West Tasman Drive, San Jose, CA 95134-1706 USA

Copyright © 2002. Cisco Systems, Inc. All rights reserved.

The primary Cisco 6160 PEM is located in the bottom right slot of the Cisco 6160 chassis. If you have a redundant system, a secondary PEM is located in the top right slot of the chassis. [Figure 1](#) shows the location of the PEMs in the Cisco 6160 chassis.

Figure 1 PEM Location in the Cisco 6160 Chassis



1	Air filter	4	NI-2 card (primary and secondary)
2	xTU-C line cards (slots 1 to 9 and 12 through 34)	5	Secondary PEM
3	Blower tray	6	Primary PEM

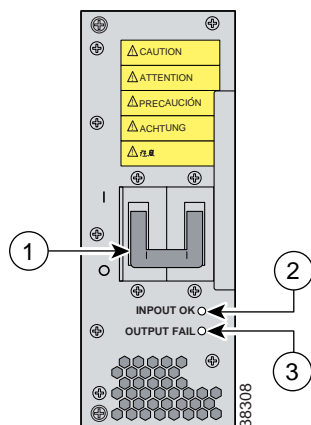
The PEM provides the following features:

- Redundancy, when a secondary PEM is installed. Either the primary or secondary PEM can serve as the active PEM. If the active PEM fails, the standby PEM powers up and becomes active.
- A maximum of 1200 watts of –48VDC power to the Cisco 6160 backplane connector.
- System earth ground bond integrity.
- Circuit breaker control handles, which are accessible from the front panel.
- Circuit breaker auxiliary alarm contacts, which remotely signal the status of the tripped breaker.
- Reverse polarity protection.
- Two internal cooling fans.

Faceplate Features

Figure 2 shows a close-up of the PEM faceplate.

Figure 2 PEM Faceplate



1	Two-position circuit breaker. The positions are Off (0) and On (1).	3	OUT FAIL LED.
2	INPUT OK LED.		



Note

To power down a Cisco 6160 that has two PEMs installed, you must flip the circuit breakers on *both* PEMs to the Off (0) position.

Table 1 describes the LEDs on the PEM.

Table 1 PEM LEDs

LED	State	Function
INPUT OK	Green	-48VDC power is available to the chassis.
	Off	The PEM has a power failure.
OUT FAIL	Red	One or both of the following conditions exists: <ul style="list-style-type: none"> The PEM is not distributing power to the chassis. The PEM is not distributing power to its cooling fans.

Specifications

[Table 2](#) lists the specifications for the PEM.

Table 2 PEM Specifications

Specification	Description
Dimensions	Height: 8.82 in. (22.4 cm) Depth: 9.27 in. (23.55 cm) Width: 2.45 in. (6.223 cm)
Weight	6 lb (2.72 kg)
Power consumption	60W
Minimum software and network management requirements	Cisco IOS—Release 12.0(5)DA CDM ¹ —Release 3.2 (optional)

1. CDM = Cisco DSL Manager

Part and Tool Requirements

[Table 3](#) lists the tools and equipment that you need to install and remove a PEM.

Table 3 Tool and Equipment Requirements Checklist

Check	Tools and Equipment
	PEM.
	Equipment necessary for ESD protection—You need this equipment whenever you handle Cisco chassis, modules, and cards.
	3/8-inch Phillips-head screwdriver.
	Cisco IOS or CDM
	Note See Table 2 for minimum software and network management release requirements.

General Safety Precautions and Maintenance Guidelines

This section describes the following areas:

- [General Safety Precautions, page 5](#)
- [General Maintenance Guidelines, page 9](#)
- [Preventing Electrostatic Discharge Damage, page 9](#)

General Safety Precautions

Before working on the equipment, be aware of standard safety guidelines and the hazards involved in working with electrical circuitry to prevent accidents. Adhere to the following cautions and warnings for safe and hazard-free installation.



Note

To see translations of the warnings that appear in this publication, refer to the *Regulatory Compliance and Safety Information for the Cisco 6160 System* document that accompanied this product.



Caution

Before you start the installation procedures, read the entire document for important information and safety warnings.



Caution

Proper ESD protection is required whenever you handle Cisco equipment. Installation and maintenance personnel should be properly grounded by means of grounding straps to eliminate the risk of ESD damage to the equipment. Equipment is subject to ESD damage whenever it is removed from the chassis.



Caution

If fuses are already installed in the fuse and alarm panel, remove them. You can replace the fuses after the system is installed. Do not power up the system while you install and connect the system.



Caution

It is important that the chassis cooling fans run continuously while the system is powered.



Caution

Any module that is only partially connected to the backplane can disrupt system operation.



Warning

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

Waarschuwing

Dit waarschuwingssymbool betekent gevaar. U verkeert in een situatie die lichamelijk letsel kan veroorzaken. Voordat u aan enige apparatuur gaat werken, dient u zich bewust te zijn van de bij elektrische schakelingen betrokken risico's en dient u op de hoogte te zijn van standaard maatregelen om ongelukken te voorkomen. Voor vertalingen van de waarschuwingen die in deze publicatie verschijnen, kunt u het document *Regulatory Compliance and Safety Information* (Informatie over naleving van veiligheids- en andere voorschriften) raadplegen dat bij dit toestel is ingesloten.

- Varoitus** Tämä varoitusmerkki merkitsee vaaraa. Olet tilanteessa, joka voi johtaa ruumiinvammaan. Ennen kuin työskentelet minkään laitteiston parissa, ota selvää sähkökytkentöihin liittyvistä vaaroista ja tavanomaisista onnettomuuksien ehkäisykeinoista. Tässä julkaisussa esiintyvien varoitusten käännökset löydät laitteen mukana olevasta *Regulatory Compliance and Safety Information* -kirjasesta (määräysten noudattaminen ja tietoa turvallisuudesta).
- Attention** Ce symbole d'avertissement indique un danger. Vous vous trouvez dans une situation pouvant causer des blessures ou des dommages corporels. Avant de travailler sur un équipement, soyez conscient des dangers posés par les circuits électriques et familiarisez-vous avec les procédures couramment utilisées pour éviter les accidents. Pour prendre connaissance des traductions d'avertissements figurant dans cette publication, consultez le document *Regulatory Compliance and Safety Information* (Conformité aux règlements et consignes de sécurité) qui accompagne cet appareil.
- Warnung** Dieses Warnsymbol bedeutet Gefahr. Sie befinden sich in einer Situation, die zu einer Körperverletzung führen könnte. Bevor Sie mit der Arbeit an irgendeinem Gerät beginnen, seien Sie sich der mit elektrischen Stromkreisen verbundenen Gefahren und der Standardpraktiken zur Vermeidung von Unfällen bewußt. Übersetzungen der in dieser Veröffentlichung enthaltenen Warnhinweise finden Sie im Dokument *Regulatory Compliance and Safety Information* (Informationen zu behördlichen Vorschriften und Sicherheit), das zusammen mit diesem Gerät geliefert wurde.
- Avvertenza** Questo simbolo di avvertenza indica un pericolo. La situazione potrebbe causare infortuni alle persone. Prima di lavorare su qualsiasi apparecchiatura, occorre conoscere i pericoli relativi ai circuiti elettrici ed essere al corrente delle pratiche standard per la prevenzione di incidenti. La traduzione delle avvertenze riportate in questa pubblicazione si trova nel documento *Regulatory Compliance and Safety Information* (Conformità alle norme e informazioni sulla sicurezza) che accompagna questo dispositivo.
- Advarsel** Dette varselsymbolet betyr fare. Du befinner deg i en situasjon som kan føre til personskade. Før du utfører arbeid på utstyr, må du 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 *Regulatory Compliance and Safety Information* (Overholdelse av forskrifter og sikkerhetsinformasjon) som ble levert med denne enheten.
- Aviso** Este símbolo de aviso indica perigo. Encontra-se numa situação que lhe poderá causar danos físicos. Antes de começar a trabalhar com qualquer equipamento, familiarize-se com os perigos relacionados com circuitos eléctricos, e com quaisquer práticas comuns que possam prevenir possíveis acidentes. Para ver as traduções dos avisos que constam desta publicação, consulte o documento *Regulatory Compliance and Safety Information* (Informação de Segurança e Disposições Reguladoras) que acompanha este dispositivo.

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

Varning! Denna varningssymbol signalerar fara. Du befinner dig i en situation som kan leda till personskada. Innan du utför arbete på någon utrustning måste du vara medveten om farorna med elkretsar och känna till vanligt förfarande för att förebygga skador. Se förklaringar av de varningar som förekommer i denna publikation i dokumentet *Regulatory Compliance and Safety Information* (Efterrättelse av föreskrifter och säkerhetsinformation), vilket medföljer denna anordning.



Warning

Read the installation instructions before you connect the system to its power source.



Warning

Use copper conductors only.



Warning

Never install telephone wiring during an electrical storm.



Warning

Do not reach into a vacant slot or chassis while you install or remove a module or a fan. Exposed circuitry could constitute an energy hazard.



Warning

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



Warning

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



Warning

Use caution when installing or modifying telephone lines.



Warning

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



Warning

This unit is intended for installation in restricted access areas. A restricted access area is where access can only be gained by service personnel through the use of a special tool, lock and key, or other means of security, and is controlled by the authority responsible for the location.



Warning

Connect the unit only to DC power source that complies with the Safety Extra-Low Voltage (SELV) requirements in IEC 60950 based safety standards.



Warning

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



Warning

Never install telephone jacks in wet locations unless the jack is specifically designed for wet locations.



Warning

Avoid using a telephone (other than a cordless type) during an electrical storm. There may be a remote risk of electric shock from lightning.



Warning

Do not use a telephone to report a gas leak in the vicinity of the leak.



Warning

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



Warning

Do not use this product near water; for example, near a bathtub, washbowl, kitchen sink or laundry tub, in a wet basement, or near a swimming pool.



Warning

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

General Maintenance Guidelines

This section covers the following topics:

- [Installation and Replacement Suggestions, page 9](#)
- [Hot Swapping Modules, page 9](#)

Installation and Replacement Suggestions

The following examples list recommended installation and replacement practices for the PEM.



Caution

Any module that is only partially connected to the backplane can disrupt system operation.

- Do not force the module into its slot. This action can damage the pins on the backplane if they are not aligned properly with the module.
- Ensure that the module is straight and not at an angle when you install it in the slot. Installing the module at an angle can damage the module. Use the guide rails to install the module correctly.
- Firmly press on the module to ensure that the connectors mate with the chassis correctly.

Hot Swapping Modules

The PEM is not hot swappable if there is only one PEM installed in the chassis. If you remove the only operating PEM from the chassis, power down the system before you begin. Removing the only operating PEM from the chassis will interrupt service for the entire system until you replace the PEM.

The PEM is hot swappable if there is a secondary PEM installed in the chassis. If the active PEM is removed, the standby PEM becomes the active PEM and the system continues to operate.



Caution

Only a trained technician should install and remove the PEM.

Preventing Electrostatic Discharge Damage

Proper ESD protection is required whenever you handle Cisco equipment. ESD damage, which can occur when electronic cards or components are improperly handled, results in complete or intermittent failures. Use an antistatic strap when you handle any card or component.

Follow these guidelines to prevent ESD damage:

- Always use an ESD ankle or wrist strap and ensure that the wrist strap makes good skin contact.
- Connect the equipment end of the strap to the ESD jack on the front of the chassis.
- When you install a component, use available ejector levers or captive installation screws to properly seat the bus connectors in the backplane or midplane. These devices prevent accidental removal, provide proper grounding for the system, and help ensure that bus connectors are properly seated.
- When you remove a component, use available ejector levers or captive installation screws to release the bus connectors from the backplane or midplane.

- Place a removed component board-side-up on an antistatic surface or in a static-shielding container. If you plan to return the component to the factory, immediately place it in a static-shielding container.
- Avoid contact between the printed circuit boards and clothing. The wrist strap protects components from ESD voltages on the body only; ESD voltages on clothing can still cause damage.



Periodically check the resistance value of the antistatic strap. Ensure that the measurement is between 1 and 10 megohms.

Removing and Installing the Cisco 6160 PEM

The following sections describe how to remove or install a PEM.



Proper ESD protection is required whenever you handle Cisco equipment. Installation and maintenance personnel should be properly grounded by means of grounding straps to eliminate the risk of ESD damage to the equipment. Equipment is subject to ESD damage whenever it is removed from the chassis.



All modules must be fully seated in the chassis. Push on the faceplate of each module to be sure that the card is fully seated.

Removing a PEM

Complete the following steps to remove a PEM from the chassis:



If you remove a PEM from the Cisco 6160 chassis in which a secondary PEM is installed and providing power, the chassis continues to operate. If you remove the only operating PEM from the chassis, power down the system before you begin.

- Step 1 Connect a grounding strap to the ESD grounding jack on the chassis.
 - Step 2 Power down the Cisco 6160, as necessary.
 - a. Type the following command to save the configuration changes to NVRAM:


```
DSLAM# copy running-config startup-config
```
 - b. Set the circuit breaker on the operating PEM to the OFF (0) position.
 - Step 3 Use a Phillips-head screwdriver to loosen the two captive screws on the front of the PEM.
 - Step 4 Grasp the handle on the right side of the PEM and pull the PEM from the slot.
 - Step 5 Place the PEM in an antistatic bag or in a box lined with antistatic material.
- See the [“Installing a PEM” section on page 11](#) for PEM installation procedures.

Installing a PEM

Complete the following steps to install a PEM in the chassis:



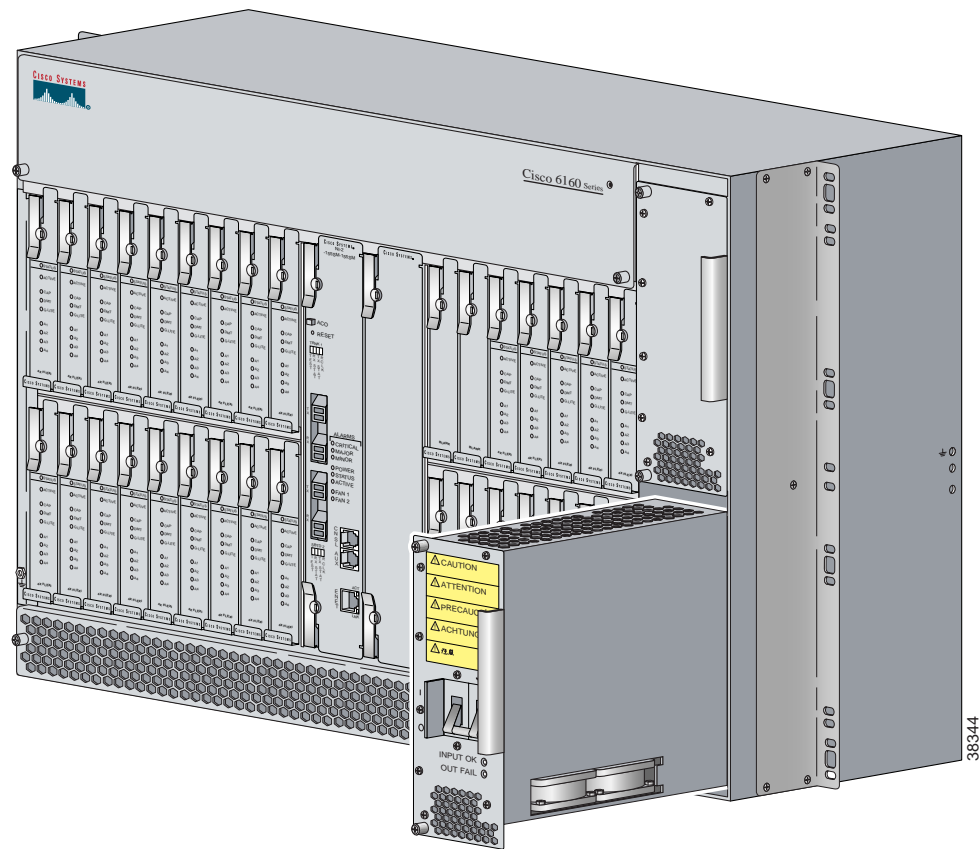
Note

Connect each Cisco 6160 PEM to a separate fuse. Do not power the components in the rack by chaining them together. Refer to the *Cisco 6160 Hardware Installation Guide* for power and ground procedures.

- Step 1** Connect a grounding strap to an ESD grounding jack on the chassis.
- Step 2** Verify that your configuration is saved to NVRAM.
- Step 3** Verify that the circuit breaker on the PEM is turned to the OFF (0) position, as necessary.
- Step 4** Verify that the power and ground wires are connected to the power terminal block located on the backplane, directly behind the PEM that you are installing. Refer to the *Cisco 6160 Hardware Installation Guide* for procedures to connect power and ground to the power terminal block.
- Step 5** Grasp the handle on the right side of the PEM to slide it into the appropriate slot. Verify that the connector on the back of the PEM mates with the backplane connector and guide pins.

Figure 3 shows the installation of the PEM in a Cisco 6160 chassis.

Figure 3 Installation of the PEM



- Step 6** Use a Phillips-head screwdriver to tighten the two captive screws to secure the PEM in place.

Step 7 Power on the PEM by setting the circuit breaker to the ON (1) position, as necessary.



Note The OUT FAIL LED might flash briefly.

Step 8 Verify that the INPUT OK LED is green.



Note If the INPUT OK LED is not green or if other issues arise, refer to the *Cisco 6160 Hardware Installation Guide* for troubleshooting procedures.

Step 9 Confirm that the Cisco IOS software recognizes the new PEM.

a. Type the following command:

```
DSLAM# show hardware chassis
```

b. Scroll through the data and locate the PEM information.

The information displayed on the screen will be similar to the following output:

```
Slot 2 Power Module EEPROM:
Hardware Revision : 1.0
Part Number : 34-1259-01
Deviation Number : 0-0
RMA Test History : 00
RMA Number : 0-0-0-0
RMA History : 00
Chassis Serial Number : 000000PP830
Power Supply Type : DC
CLEI Code : ABCDEFGHIJ
Asset Identifier :
EEPROM format version 4
EEPROM contents (hex):
0x00: 04 FF 41 01 00 82 22 04 EB 01 80 00 00 00 00 03
0x10: 00 81 00 00 00 00 04 00 C2 8B 30 30 30 30 30
0x20: 50 50 38 33 30 0B 01 C6 8A 41 42 43 44 45 46 47
0x30: 48 49 4A CC 20 00 00 00 00 00 00 00 00 00 00
0x40: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
0x50: 00 00 00 00 00 FF FF FF FF FF FF FF FF FF FF
0x60: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
0x70: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
0x80: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
0x90: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
0xA0: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
0xB0: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
0xC0: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
0xD0: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
0xE0: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
0xF0: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
```



Note If the information displays as “Unreadable” or “Unknown”, the PEM was not installed properly or a problem exists with the PEM. Install the PEM again by following the procedures in this section. If the PEM is still not recognized by the system, refer to the *Cisco 6160 Hardware Installation Guide* for troubleshooting procedures.

Step 10 View PEM operating information.

a. Type the following command:

```
DSLAM# show environment all
```

b. Scroll through the data and locate the PEM information.

If the PEM is operating properly, the information displayed on the screen will be similar to the following output:

```

                Slot 1      Slot 2
Power Modules:
Present:        Yes        Yes
Faults:         No         No
Internal Temp:  21C/69 F    22C/71 F
External Temp 1: 20C/68 F    23C/73 F
External Temp 2: 20C/68 F    20C/68 F
Temp Alarms:    No         No

```



Note

If a problem exists with the PEM operating information, refer to the *Cisco 6160 Hardware Installation Guide* for troubleshooting procedures.

Standards and Certifications

The Cisco 6160 PEM has the same standards and certifications as the Cisco 6160 chassis, as listed in [Table 4](#).

Table 4 *Cisco 6160 Regulatory Compliance*

Discipline	Compliance Standard
Product Safety	UL 1950, 3rd Edition EN 60950 2nd Edition, Amendments 1, 2, 3, 4, 11 IEC 2nd Edition, Amendments 1, 2, 3, 4 AS/NZS 3260
Emissions	FCC Part 15 CISPR 22 ICCS-003
NEBS	GR-63-CORE GR-1089-CORE SR-3580 Level 3
Telecom	FCC Part 68 ICCS-003

FCC Class A Compliance

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

**Note**

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

Related Documentation

A complete list of all DSL product related documentation is available on the World Wide Web at http://www.cisco.com/univercd/cc/td/doc/product/dsl_prod/index.htm

Obtaining Documentation

The following sections explain how to obtain documentation from Cisco Systems.

World Wide Web

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

<http://www.cisco.com>

Translated documentation is available at the following URL:

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

Documentation CD-ROM

Cisco documentation and additional literature are available in a Cisco Documentation CD-ROM package, which is shipped with your product. The Documentation CD-ROM is updated monthly and may be more current than printed documentation. The CD-ROM package is available as a single unit or through an annual subscription. Registered Cisco.com users can order the Documentation CD-ROM through the online Subscription Store:

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

Documentation Feedback

If you are reading Cisco product documentation on Cisco.com, you can submit technical comments electronically. Click **Leave Feedback** at the bottom of the Cisco Documentation home page. After you complete the form, print it out and fax it to Cisco at 408 527-0730.

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

To submit your comments by mail, write to the following address:

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

We appreciate your comments.

Obtaining Technical Assistance

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

Cisco.com

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

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

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

You can self-register on Cisco.com to obtain customized information and service. To access Cisco.com, go to the following 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 types of support are available through the Cisco TAC: the Cisco TAC Web Site and the Cisco TAC Escalation Center.

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

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

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

Cisco TAC Web Site

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

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

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

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

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

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

If you have Internet access, it is recommended that you open P3 and P4 cases through the Cisco TAC Web Site.

Cisco TAC Escalation Center

The Cisco TAC Escalation Center addresses issues that are classified as priority level 1 or priority level 2; 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 will automatically open a case.

To obtain a directory of toll-free Cisco TAC telephone numbers for your country, go to the following 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). In addition, please have available your service agreement number and your product serial number.

This document is to be used in conjunction with the documents listed in the [“Related Documentation”](#) section.

CCIP, the Cisco Arrow logo, the Cisco *Powered* Network mark, the Cisco Systems Verified logo, Cisco Unity, Follow Me Browsing, FormShare, Internet Quotient, iQ Breakthrough, iQ Expertise, iQ FastTrack, the iQ Logo, iQ Net Readiness Scorecard, Networking Academy, ScriptShare, SMARTnet, TransPath, and Voice LAN are trademarks of Cisco Systems, Inc.; Changing the Way We Work, Live, Play, and Learn, Discover All That’s Possible, The Fastest Way to Increase Your Internet Quotient, and iQuick Study are service marks of Cisco Systems, Inc.; and Aironet, ASIST, BPX, Catalyst, CCDA, CCDP, CCIE, CCNA, CCNP, Cisco, the Cisco Certified Internetwork Expert logo, Cisco IOS, the Cisco IOS logo, Cisco Press, Cisco Systems, Cisco Systems Capital, the Cisco Systems logo, Empowering the Internet Generation, Enterprise/Solver, EtherChannel, EtherSwitch, Fast Step, GigaStack, IOS, IP/TV, LightStream, MGX, MICA, the Networkers logo, Network Registrar, *Packet*, PIX, Post-Routing, Pre-Routing, RateMUX, Registrar, SlideCast, StrataView Plus, Stratm, SwitchProbe, TeleRouter, and VCO are registered trademarks of Cisco Systems, Inc. and/or its affiliates in the U.S. and certain other countries.

All other trademarks mentioned in this document or Web site are the property of their respective owners. The use of the word partner does not imply a partnership relationship between Cisco and any other company. (0206R)

Copyright © 2002, Cisco Systems, Inc.
All rights reserved.

