AC Power Entry Module for the Cisco uBR10012 Universal Broadband Router

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This document describes the AC power entry module (AC PEM) and how to install it in the Cisco uBR10012 universal broadband router.

Document Revision History

The Document Revision History table below records technical changes to this document. The table shows the document revision number for the change, the date of the change, and a brief summary of the change. Note that not all Cisco documents use a Document Revision History table.

Revision	Date	Change Summary
OL-24536-01	February 22, 2011	Moved document to online only and updated format.
78-13996-01	June 10, 2002	Initial publication.

Contents

Cisco Systems, Inc.
www.cisco.com

Feature Overview

The Cisco uBR10012 router can optionally ship with two AC power entry modules (PEMs) that provide a redundant power supply to the system. One AC PEM can provide sufficient power for a fully configured chassis, so that if one AC PEM fails, the other automatically begins providing power for the entire router, without impacting system operations.

Note You should be using Cisco IOS Release 12.2(4)XF1, Cisco IOS Release 12.2(4)BC1a, or a later release when using the AC PEM. If using an earlier release, the **show environment** command will not correctly identify the AC PEM's error messages.

Caution The Cisco uBR10012 router supports using either the AC PEM or the DC PEM, but it does not support mixing AC and DC PEMs. Both PEMs must be either AC PEMs or DC PEMs.

The AC PEMs use standard 200–240 VAC (50/60 Hz) input power obtained through power receptacles on the front panel of each PEM. The two AC PEMs convert the AC power to provide filtered, redundant, and load shared DC power to the Cisco uBR10012 chassis.

Caution The AC PEMs cannot be used with a 100–120 VAC input power source.

Tips For fully redundant power protection, use either an uninterruptible power supply (UPS) or a separate AC-input power source for each AC PEM.

This document contains the procedures to replace an existing second (redundant) AC PEM and to replace both AC PEMs.

Note You do not need to shut down the Cisco uBR10012 router to replace a redundant AC PEM. If you are replacing both AC PEMs, you can replace one, bring it online, and then replace the other one to avoid shutting down the system.

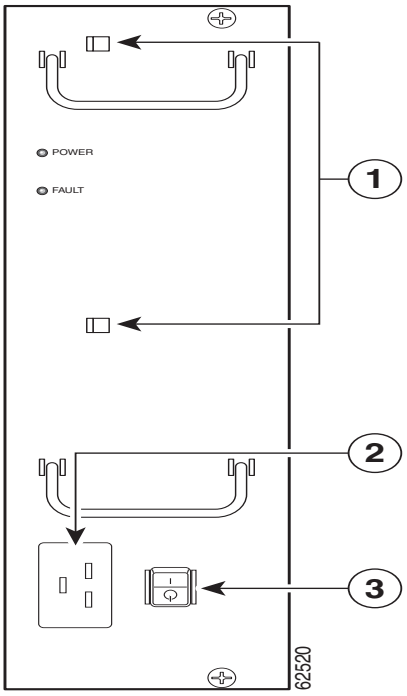
Caution Although one AC PEM can provide sufficient power for a fully configured Cisco uBR10012 chassis, the system should not be run for an extended period of time with only one AC PEM. If an AC PEM fails, order and install a replacement AC PEM as soon as possible. The product order number for a replacement AC PEM is UBR10-PWR-AC=. For proper airflow, cooling, and safety, do not remove the failed unit until the replacement unit is available for installation.

Note The output of the **show inventory** command does not display the serial number for the AC PEM (UBR10-PWR-AC). Visually inspect the serial number label printed on the AC PEM to locate the serial number.

Physical Description

Figure 1 shows the front panel of the AC PEM for the Cisco uBR10012 router.

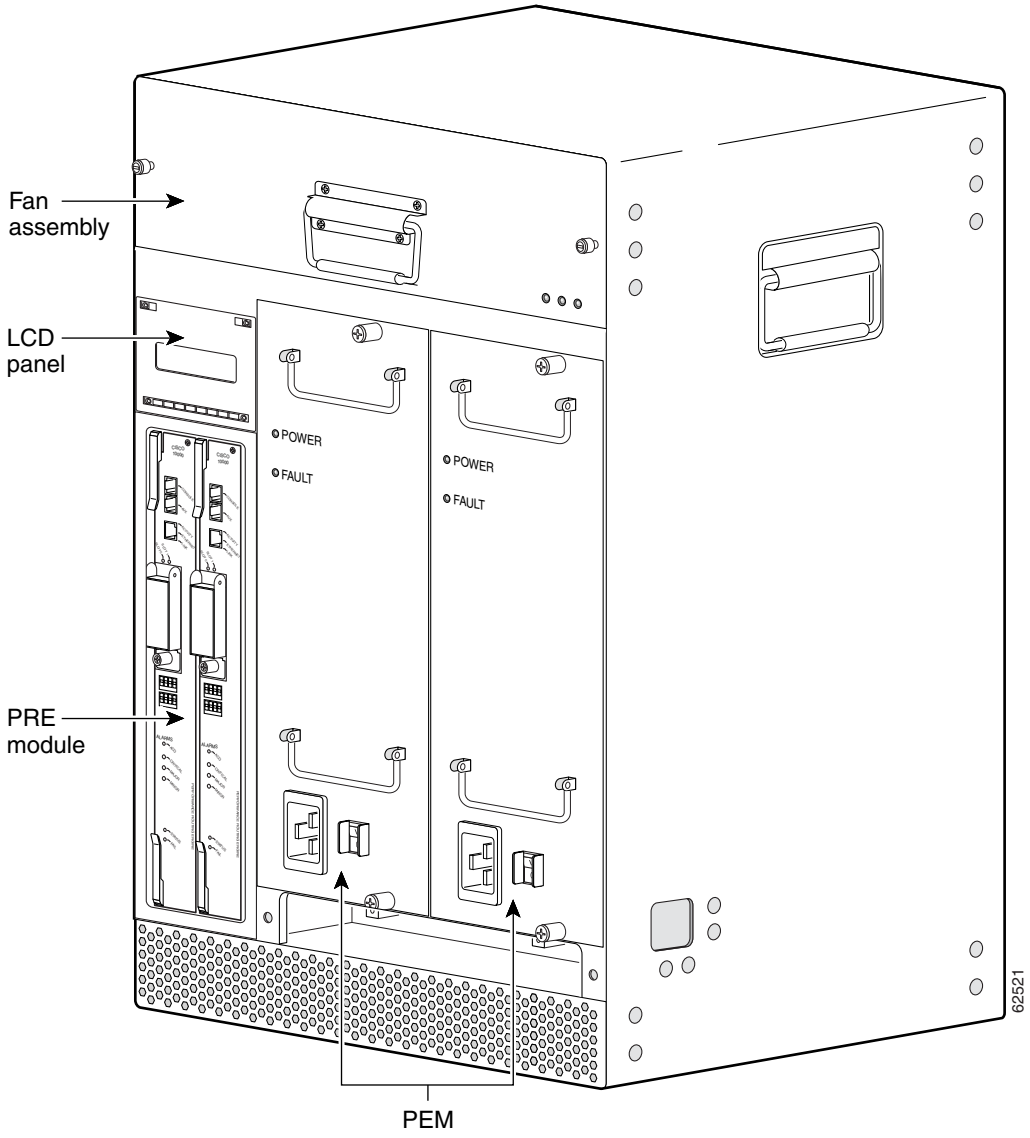
Figure 1 AC PEM Front Panel



1	Power cord clips	**3**	AC power switch
2	AC power receptacle	**4**	—

Figure 2 shows a Cisco uBR10012 router with dual AC PEMs installed.

Figure 2 Cisco uBR10012 Router with AC PEM Modules



Caution Do not attempt to lift the Cisco uBR10012 chassis by using the two handles on the front of the AC PEM. The handles on the AC PEM are for removing and inserting the PEM into the Cisco uBR10012 chassis.

LEDs

Table 1 describes the LEDs on the AC PEM.

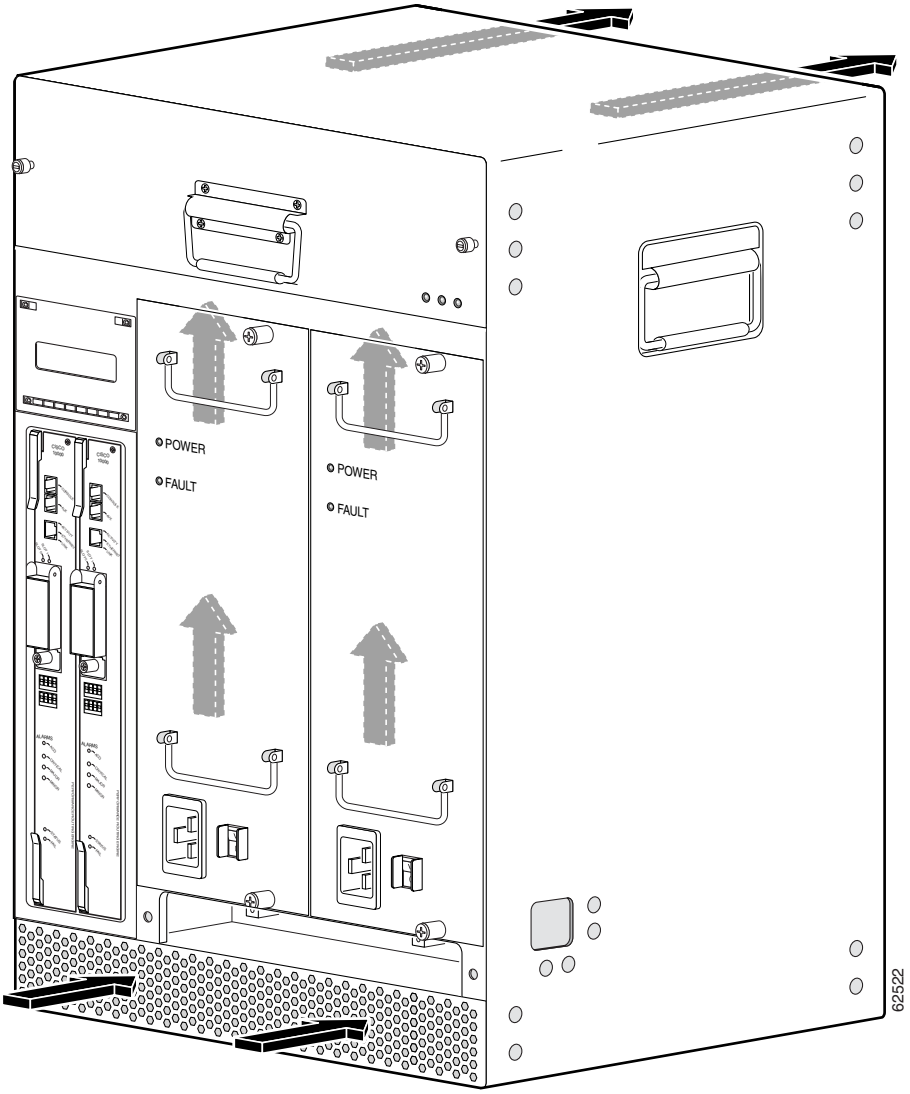
Table 1 AC PEM LEDs and Their Function

LED	Color	Description
Power	Green	The PEM is on, is receiving power from the AC power source, and is providing power to the Cisco uBR10012 chassis (normal operations).
Fault	Yellow	Indicates that AC-input power is being received by the PEM, but that the PEM is not supplying power to the chassis, typically because the PEM's power switch is turned to the standby position. If the power switch is in the ON position, the PEM is not operating correctly.

Air Flow

The AC PEM works together with the fan assembly module to ensure that the Cisco uBR10012 chassis is properly cooled during normal operation. Figure 3 shows the airflow through the Cisco uBR10012 chassis when dual AC PEMs are installed.

Figure 3 Airflow Through the Cisco uBR10012 Chassis with Dual AC PEMs



Note Figure 3 shows the Cisco uBR10012 chassis without the front bezel installed, but the front bezel should be installed during normal operation so that the air filter in the bezel can filter the incoming air before it enters the chassis.

Power Supply Cables

The AC PEM requires different power supply cables, depending on the country of operation. Table 2 lists the product order numbers for the power supply cables that are available for the AC PEM for the Cisco uBR10012 universal broadband router.

Table 2 Power Cables for the AC Power Entry Module for the Cisco uBR10012 Router

Product Order Number	Description
CAB-UBR10-AC-US	North America—Uses a locking NEMA L6-20 connector at the end that plugs into the AC power source.
CAB-UBR10-AC-AR	Argentina
CAB-UBR10-AC-AU	Australia/New Zealand
CAB-UBR10-AC-CH	China
CAB-UBR10-AC-EU	Europe
CAB-UBR10-AC-IT	Italy
CAB-UBR10-AC-JP	Japan
CAB-UBR10-AC-UK	United Kingdom

Safety Information and Warnings

Following are safety guidelines that you should follow when working with any equipment that connects to electrical power:

Warning **IMPORTANT SAFETY INSTRUCTIONS**

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

Note: SAVE THESE INSTRUCTIONS

Note: This documentation is to be used in conjunction with the specific product installation guide that shipped with the product. Please refer to the Installation Guide, Configuration Guide, or other enclosed additional documentation for further details.

Waarschuwing **BELANGRIJKE VEILIGHEIDSINSTRUCTIES**

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

Opmerking BEWAAR DEZE INSTRUCTIES.

Opmerking Deze documentatie dient gebruikt te worden in combinatie met de installatiehandleiding voor het specifieke product die bij het product wordt geleverd. Raadpleeg de installatiehandleiding, configuratiehandleiding of andere verdere ingesloten documentatie voor meer informatie.

Varoitus **TÄRKEITÄ TURVALLISUUTEEN LIITTYVIÄ OHJEITA**

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

Huomautus SÄILYTÄ NÄMÄ OHJEET

Huomautus Tämä asiakirja on tarkoitettu käytettäväksi yhdessä tuotteen mukana tulleen asennusoppaan kanssa. Katso lisätietoja asennusoppaasta, kokoonpano-oppaasta ja muista mukana toimitetuista asiakirjoista.

Attention **IMPORTANTES INFORMATIONS DE SÉCURITÉ**

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

Remarque CONSERVEZ CES INFORMATIONS

Remarque Cette documentation doit être utilisée avec le guide spécifique d'installation du produit qui accompagne ce dernier. Veuillez vous reporter au Guide d'installation, au Guide de configuration, ou à toute autre documentation jointe pour de plus amples renseignements.

Warnung **WICHTIGE SICHERHEITSANWEISUNGEN**

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

Hinweis BEWAHREN SIE DIESE SICHERHEITSANWEISUNGEN AUF

Hinweis Dieses Handbuch ist zum Gebrauch in Verbindung mit dem Installationshandbuch für Ihr Gerät bestimmt, das dem Gerät beiliegt. Entnehmen Sie bitte alle weiteren Informationen dem Handbuch (Installations- oder Konfigurationshandbuch o. Ä.) für Ihr spezifisches Gerät.

Figyelem! **FONTOS BIZTONSÁGI ELÕÍRÁSOK**

Ez a figyelmezetõ jel veszélyre utal. Sérülésveszélyt rejtõ helyzetben van. Mielõtt bármely berendezésen munkát végezte, legyen figyelemmel az elektromos áramkörök okozta kockázatokra, és ismerkedjen meg a szokásos balesetvédelmi eljárásokkal. A kiadványban szereplõ figyelmeztetések fordítása a készülékhez mellékelt biztonsági figyelmeztetések között található.

Megjegyzés ÕRIZZE MEG EZEKET AZ UTASÍTÁSOKAT!

Megjegyzés Ezt a dokumentációt a készülékhez mellékelt üzembe helyezési útmutatóval együtt kell használni. További tudnivalók a mellékelt Üzembe helyezési útmutatóban (Installation Guide), Konfigurációs útmutatóban (Configuration Guide) vagy más dokumentumban találhatók.

Avvertenza **IMPORTANTI ISTRUZIONI SULLA SICUREZZA**

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

Nota CONSERVARE QUESTE ISTRUZIONI

Nota La presente documentazione va usata congiuntamente alla guida di installazione specifica spedita con il prodotto. Per maggiori informazioni, consultare la Guida all'installazione, la Guida alla configurazione o altra documentazione acclusa.

Advarsel VIKTIGE SIKKERHETSINSTRUKSJONER

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

Merk TA VARE PÅ DISSE INSTRUKSJONENE

Merk Denne dokumentasjonen skal brukes i forbindelse med den spesifikke installasjonsveiledningen som fulgte med produktet. Vennligst se installasjonsveiledningen, konfigureringsveiledningen eller annen vedlagt tilleggsdokumentasjon for detaljer.

Aviso INSTRUÇÕES IMPORTANTES DE SEGURANÇA

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

Nota GUARDE ESTAS INSTRUÇÕES

Nota Esta documentação destina-se a ser utilizada em conjunto com o manual de instalação incluído com o produto específico. Consulte o manual de instalação, o manual de configuração ou outra documentação adicional inclusa, para obter mais informações.

¡Advertencia! INSTRUCCIONES IMPORTANTES DE SEGURIDAD

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

Nota GUARDE ESTAS INSTRUCCIONES

Nota Esta documentación está pensada para ser utilizada con la guía de instalación del producto que lo acompaña. Si necesita más detalles, consulte la Guía de instalación, la Guía de configuración o cualquier documentación adicional adjunta.

Varning! VIKTIGA SÄKERHETSANVISNINGAR

Denna varningssignal signalerar fara. Du befinner dig i en situation som kan leda till personskada. Innan du utför arbete på någon utrustning måste du vara medveten om farorna med elkretsar och känna till vanliga förfaranden för att förebygga olyckor. Se översättningarna av de varningsmeddelanden som finns i denna publikation, och se de översatta säkerhetsvarningarna som medföljer denna anordning.

OBS! SPARA DESSA ANVISNINGAR

OBS! Denna dokumentation ska användas i samband med den specifika produktinstallationshandbok som medföljde produkten. Se installationshandboken, konfigurationshandboken eller annan bifogad ytterligare dokumentation för närmare detaljer.

Предупреждение ВАЖНЫЕ СВЕДЕНИЯ ПО БЕЗОПАСНОСТИ

Этот символ предупреждает о наличии опасности. При неправильных действиях возможно получение травм. Перед началом работы с любым оборудованием необходимо ознакомиться с ситуациями, в которых возможно поражение электротоком, и со стандартными действиями для предотвращения несчастных случаев. Переведенный текст предупреждений содержится в соответствующем документе, поставляемом вместе с устройством.

Примечание СОХРАНЯЙТЕ ЭТУ ИНСТРУКЦИЮ
Примечание Эта инструкция должна использоваться вместе с руководством по установке конкретного изделия, входящим в комплект поставки. Дополнительные сведения см. в руководстве по установке, руководстве по настройке и другой документации, поставляемой с изделием.

警告 有关安全的重要说明

这个警告符号指有危险。您所处的环境可能使身体受伤。操作设备前必须意识到电流的危险性，务必熟悉操作标准，以防发生事故。如果需要了解本说明中出现的警告符号的译文，请参阅本装置所附之安全警告译文。

注意 保存这些说明
注意 本文件应与本产品附带的具体安装说明一并阅读。如欲了解详情，请参阅《安装说明》、《配置说明》或所附的其他文件。

警告 安全上の重要な注意事項

「危険」の意味です。人身事故を予防するための注意事項が記述されています。装置の取り扱い作業を行うときは、電気回路の危険性に注意し、一般的な事故防止対策に留意してください。このマニュアルに記載されている警告の各国語版は、装置に付属の「Translated Safety Warnings」を参照してください。

注 これらの注意事項を保管しておいてください。
注 この資料は、製品に付属のインストレーション ガイドと併用してください。詳細は、インストレーション ガイド、コンフィギュレーション ガイド、または添付されているその他のマニュアルを参照してください。

Warning **This equipment must be grounded. Never defeat the ground conductor or operate the equipment in the absence of a suitably installed ground conductor. Contact the appropriate electrical inspection authority or an electrician if you are uncertain that suitable grounding is available.**
(To see translations of the warnings that appear in this publication, refer to the appendix "Translated Safety Warnings" in the installation guide that accompanied this device.)

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

while the housing is open.
(To see translations of the warnings that appear in this publication, refer to the appendix "Translated Safety Warnings" in the installation guide that accompanied this device.)

Warning **Take care when connecting units to the supply circuit so that wiring is not overloaded.**
(To see translations of the warnings that appear in this publication, refer to the appendix "Translated Safety Warnings" in the installation guide that accompanied this device.)

Electrical Equipment Guidelines

Follow these basic guidelines when working with any electrical equipment:

- Before beginning any procedures requiring access to the chassis interior, locate the emergency power-off switch for the room in which you are working.
- Disconnect all power and external cables before moving a chassis.
- Do not work alone when potentially hazardous conditions exist.
- Never assume that power has been disconnected from a circuit; always check.
- Do not perform any action that creates a potential hazard to people or makes the equipment unsafe.
- Carefully examine your work area for possible hazards such as moist floors, ungrounded power extension cables, and missing safety grounds.

Preventing Electrostatic Discharge Damage

Electrostatic discharge (ESD) damage, which occurs when electronic cards or components are improperly handled, can result in complete or intermittent failures. The AC PEMs contain a printed circuit card that is fixed in a metal carrier. Electromagnetic interference (EMI) shielding and connectors are integral components of the carrier. Although the metal carrier helps to protect the cards from ESD, use an antistatic strap each time you handle the modules.

Following are guidelines for preventing ESD damage:

- Always use an ESD-preventive wrist or ankle strap and ensure that it makes good skin contact. Before removing a card from the chassis, connect the equipment end of the strap to a bare metal, unpainted surface on the chassis or rack-mount.
- Handle components by the carrier edges only; avoid touching the card components or any connector pins.
- When removing a module, place it on an antistatic surface or in a static-shielding bag. If the module will be returned to the factory, immediately place it in a static-shielding bag.
- Avoid contact between the modules and clothing. The wrist strap protects the card from ESD voltages on the body only; ESD voltages on clothing can still cause damage.

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

Removing and Replacing an AC PEM

This section contains information on removing and replacing AC PEM modules in the Cisco uBR10012 chassis.

Tip The AC PEM is operating correctly when its Power LED is on (green). When the Fault LED is on (yellow), the AC PEM is receiving AC-input power but is not providing power to the system. Verify that the AC PEM is fully inserted into the power bay and that its captive screws have been tightened. Then flip the power switch on the AC PEM to the standby position, wait several seconds, and then back to the ON position. If the Fault LED does not go off and the Power LED does not come on, replace the AC PEM.

Tools and Parts Required

To remove and replace an individual power module, you need the following tools and parts:

- Replacement AC PEM (UBR10-PWR-AC=)
- ESD-preventive wrist strap
- Flat-head screwdriver

Unpacking and Preparing the AC PEM

To unpack the AC PEM, complete the following steps:

Step 1 Open the shipping carton by cutting the packing tape along the flaps on the top of the box.

Step 2 Remove the PEM from the packaging and place it on an anti-static surface.

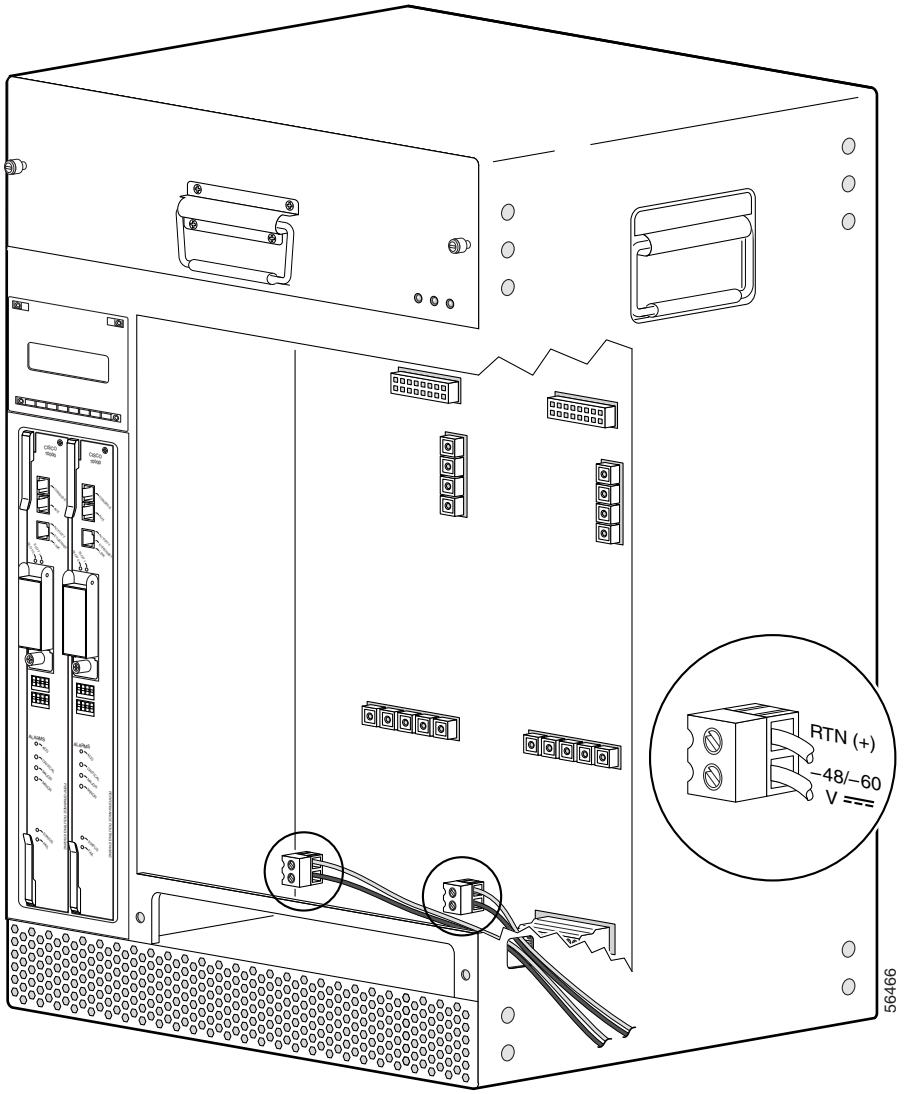
Step 3 Keep the packaging and the carton so that you can use them to return the old unit being replaced to the factory. See the "Obtaining Documentation and Submitting a Service Request" section on page 26 for more information.

Verifying That the DC Power Connectors Are Not Connected

Each of two power bays in the Cisco uBR10012 chassis is above a DC terminal block that is used to provide power only when you are using the DC PEM modules. Do not use these DC terminal blocks when you are using the AC PEMs.

If you have previously used this Cisco uBR10012 router with DC PEMs, first verify that these DC terminal blocks are not currently connected before proceeding with the installation or replacement of the AC PEMs. Figure 4 shows the location of the two DC terminal blocks and how to recognize the wires that might be connected to the blocks.

Figure 4 Location of DC Power Connectors and DC Power Cables



Note For more information on these DC terminal blocks, see either the *Cisco uBR10012 Universal Broadband Router Hardware Installation Guide* or the *DC Power Entry Module for the Cisco uBR10012 Universal Broadband Router* document, which are available on Cisco.com or the Customer Documentation CD-ROM.

Replacing a Redundant AC PEM

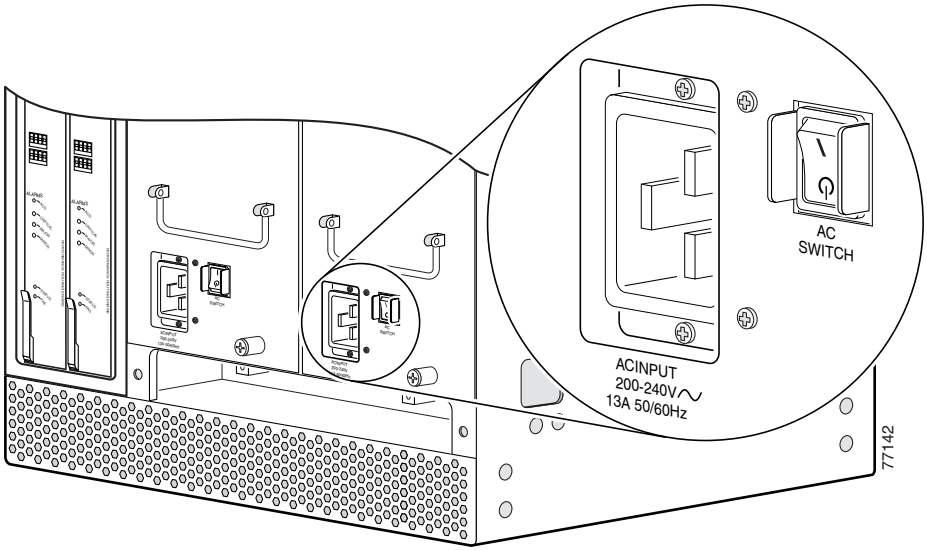
Follow this procedure to replace a redundant AC PEM, which is typically needed when the Fault LED is on and the troubleshooting steps in the "Troubleshooting the PEM" section on page 25 do not correct the problem.

Tip If you want to replace both AC PEMs without shutting down the router, repeat this procedure for each AC PEM, one at a time. Do not use this procedure if both AC PEMs have failed; instead, use the procedure in the "Replacing Both AC PEMs" section on page 19.

Step 1 Remove the front cover by lifting it up slightly and then pulling it toward you.

Step 2 Turn off the AC PEM you are replacing by pushing down the power switch to the standby position (Figure 5).

Figure 5 Turning an AC PEM Off



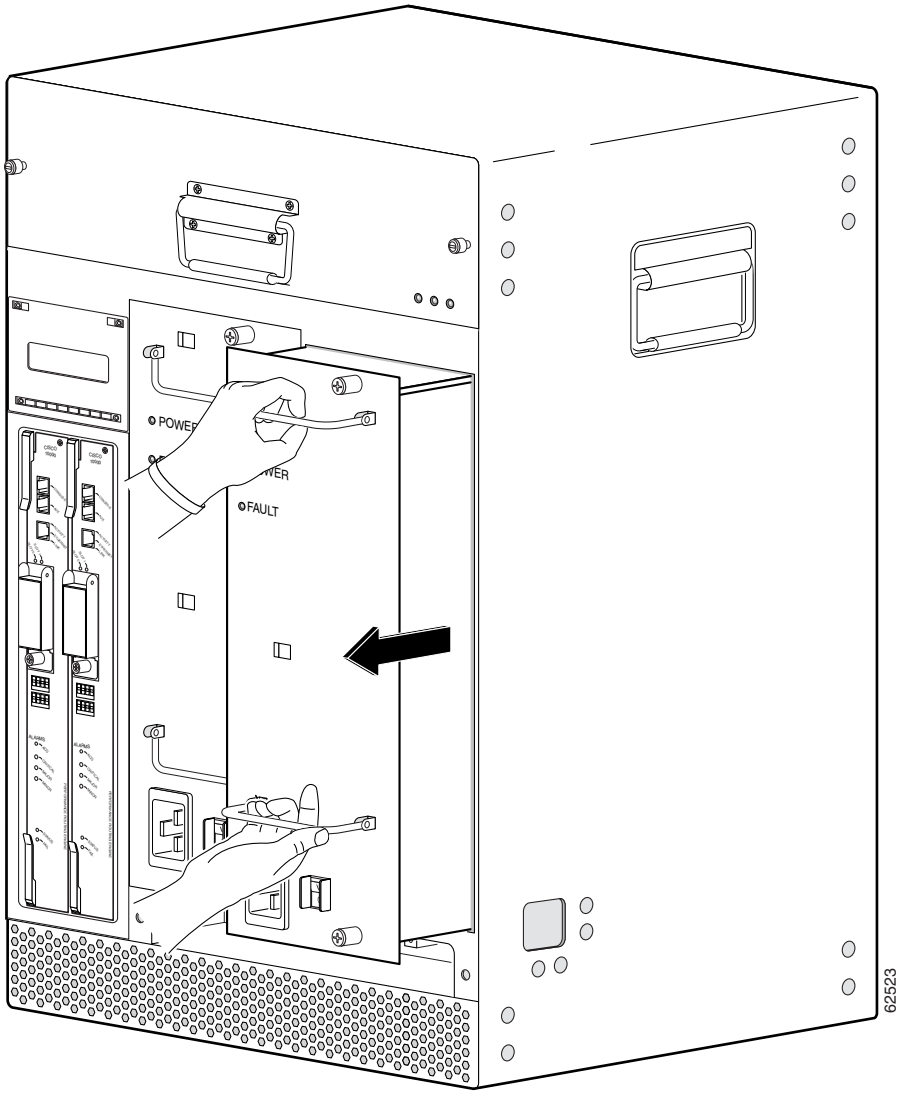
Caution Do not power off both AC PEMs, or the system shuts down and all data traffic stops. Power off only the AC PEM you are replacing.

Step 3 Unplug the AC-input power cable from the power plug on the front panel of the AC PEM. For safety, also unplug the other end of the power cable from the AC-input power source.

Tips For true redundant power protection, ensure that you are using a separate AC-input power source for each AC PEM.

Step 4 Use the screwdriver to loosen the captive screws on the AC PEM you are removing. Then pull the PEM from the chassis by using the handle on the faceplate (Figure 6 on page 16). Set the AC PEM aside.

Figure 6 Removing the AC PEM

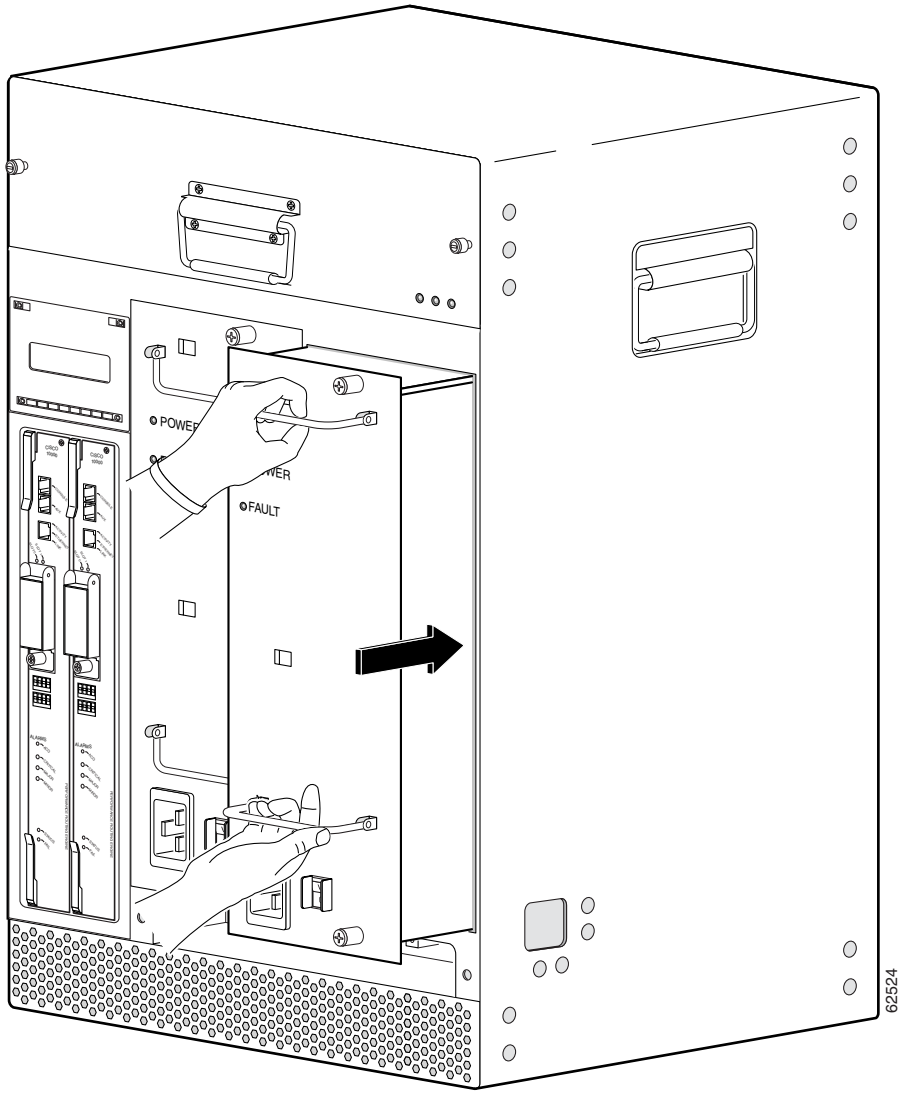


Step 5 Verify that the power switch on the replacement AC PEM is in the standby position (Figure 5 on page 15).

Step 6 Position the replacement AC PEM in the power bay and push it forward, verifying that it goes all the way in and makes a secure connection with the backplane.

Step 7 Use the screwdriver to tighten the captive screws to secure the unit to the chassis (Figure 7 on page 17).

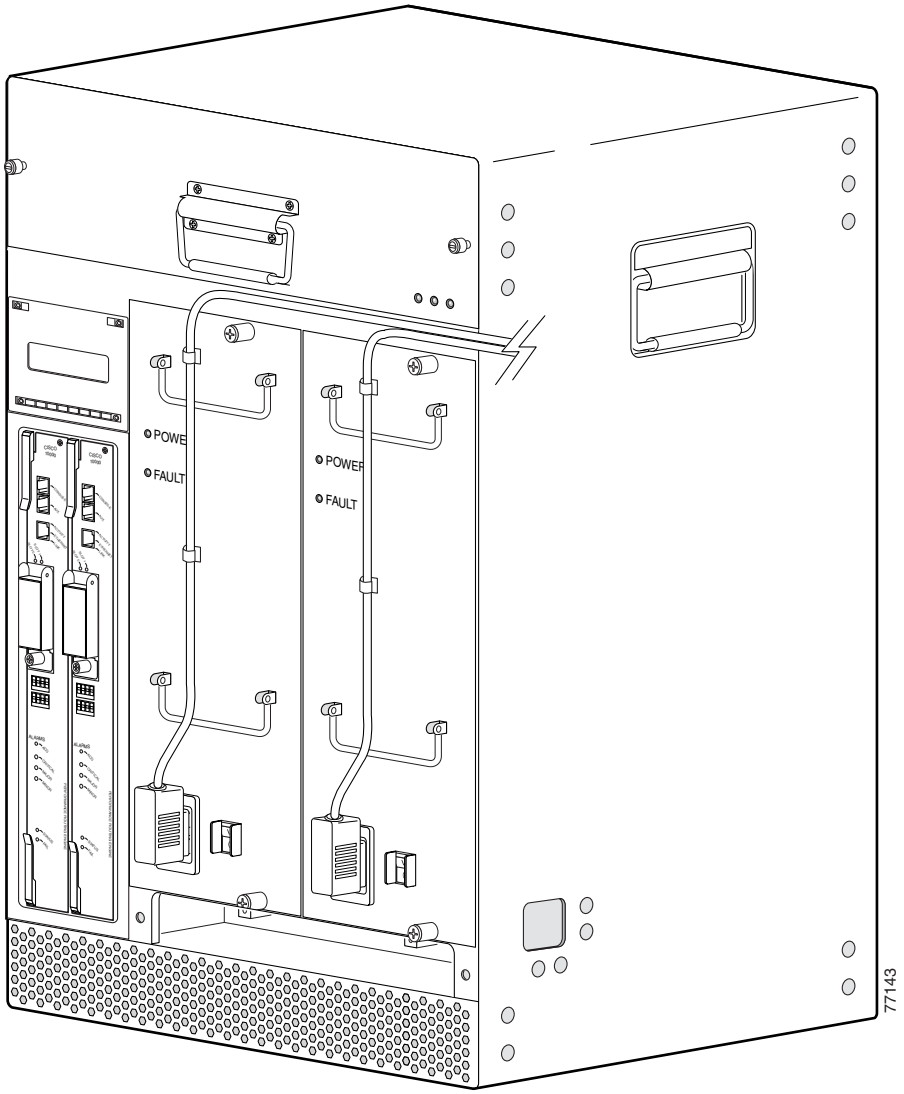
Figure 7 Installing the AC PEM



Step 8 Plug the AC-input power cable into the power receptacle on the front panel of the AC PEM.

Step 9 Route the power cable up the front of the AC PEM and clip it into the two plastic retaining clips attached to the surface of the PEM. Route the power cable out through the right side, so that it will fit through the notch on the right side of the front bezel cover. (Figure 8)

Figure 8 Routing the AC Power Cables

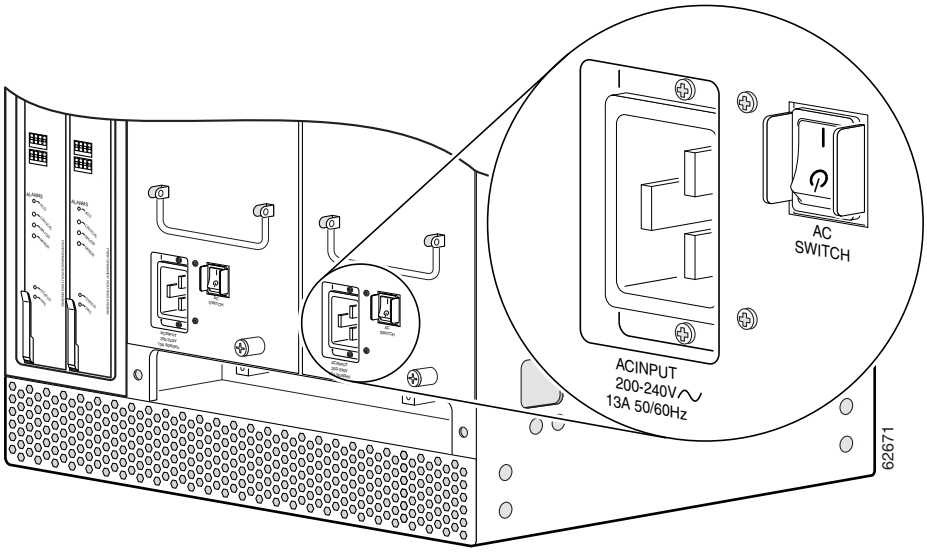


Step 10 Plug the other end of the AC-input power cable into a 200–240 VAC power outlet. For fully redundant operation, each AC PEM should use separate power sources, or you should be using an uninterruptible power supply (UPS).

The Fault LED on the AC PEM should be yellow to indicate that the AC PEM is receiving power from the power source but is not yet supplying power to the Cisco uBR10012 chassis.

Step 11 Push up the power switch on the replacement AC PEM to the ON (|) position (Figure 9 on page 19).

Figure 9 Setting AC Power Switch to the ON Position



Step 12 When you turn on the power switch on the AC PEM, the Fault LED should go off and the Power LED should come on (green).

Step 13 Slide the front bezel cover onto the four corner posts of the chassis and then push down, so that the posts are seated in the grooves above the cover holes. The AC power cables should be routed through the notch on the right side of the cover.

Replacing Both AC PEMs

Use the following procedure to replace or reinstall both AC PEMs. This procedure is typically needed only when you need to move the chassis or reinstall it in another location.

Tip This procedure is rarely needed for normal operations because it requires that you shut down the Cisco uBR10012 router and remove all power to the system. To avoid this, Cisco recommends replacing each AC PEM, one at a time, by following the instructions in the "Replacing a Redundant AC PEM" section on page 14.

Step 1 Remove the front cover.

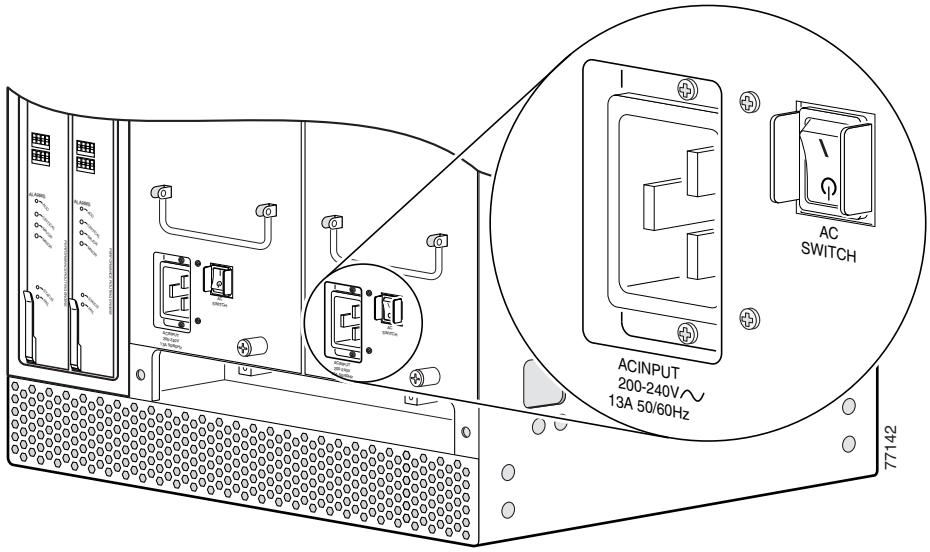
Step 2 Shut down the system using the following procedure:

a. Notify appropriate personnel that you plan to shut down the system and that the shutdown will result in total loss of service. *Appropriate personnel* includes the regional alarm or network monitoring center, central office personnel, and key customers.

b. Before you shut down the router, use the **copy** command to save any configuration changes to NVRAM and, if you wish, to a PCMCIA Flash memory card. See the *Cisco uBR10012 Universal Broadband Router Software Configuration Guide* for instructions about using the **copy** command.

c. Turn the power switch on each AC PEM to the standby position (Figure 10).

Figure 10 Turning the AC PEM Off

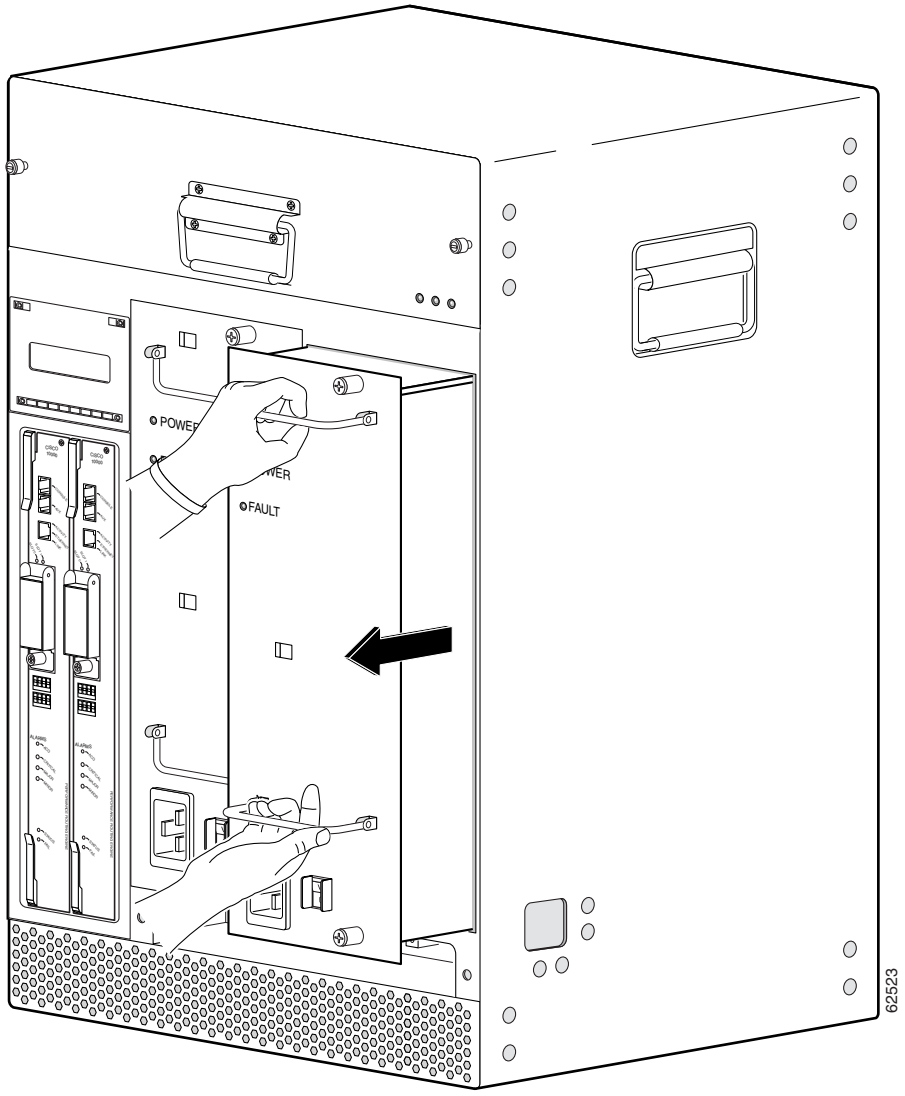


Step 3 Unplug the AC-input power cable from the power plug on the front panel of each AC PEM. For safety, also unplug the other end of the power cable from each AC-input power source.

Tips For true redundant power protection, ensure that you are using a separate AC-input power source for each AC PEM.

Step 4 Use the screwdriver to loosen the captive screws on each AC PEM. Then pull each AC PEM from the chassis by using the handle on the faceplate (Figure 11 on page 21). Set the two AC PEMs aside.

Figure 11 Removing the AC PEM

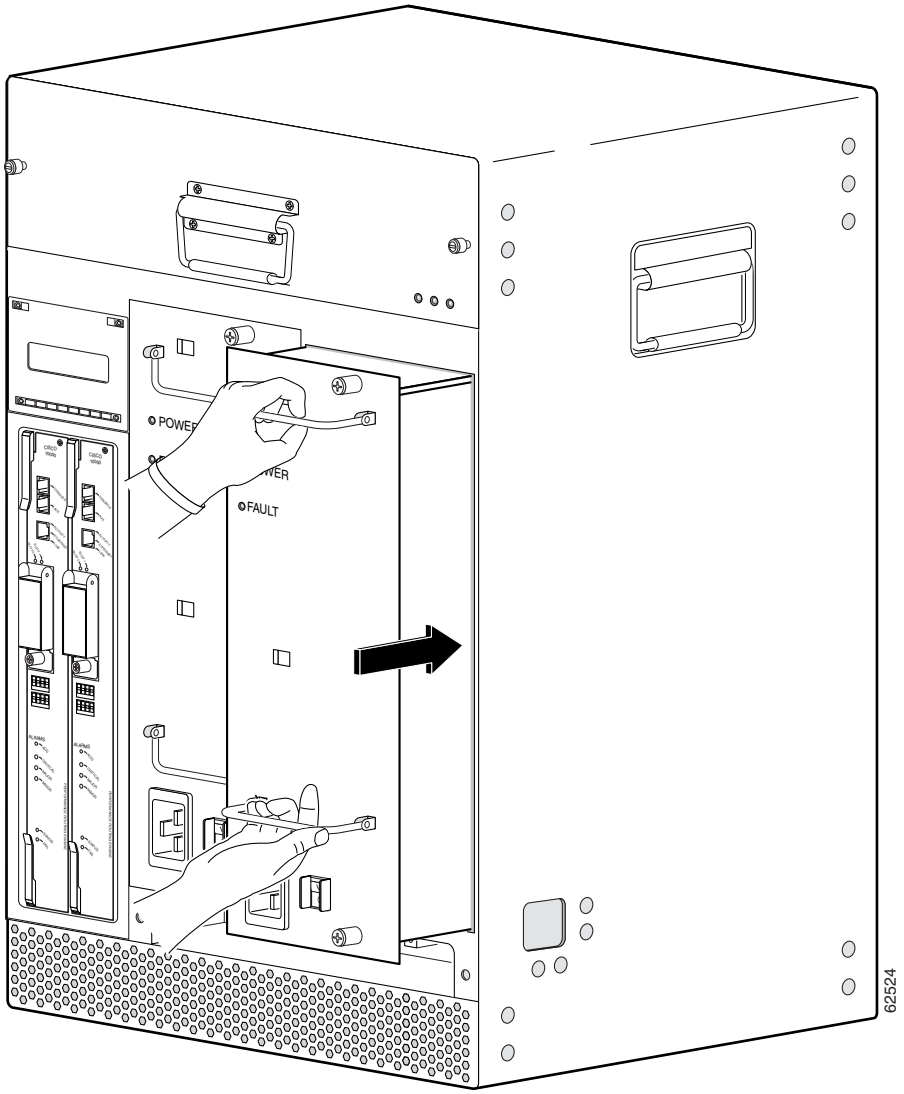


Step 5 Verify that the power switch on each replacement AC PEM is in the standby position (Figure 10 on page 20).

Step 6 Position the first replacement AC PEM in the power bay and push it forward. Verify that it goes all the way in and makes a secure connection with the backplane.

Step 7 Use the screwdriver to tighten the captive screws to secure the unit to the chassis (Figure 12 on page 22).

Figure 12 Installing the AC PEM



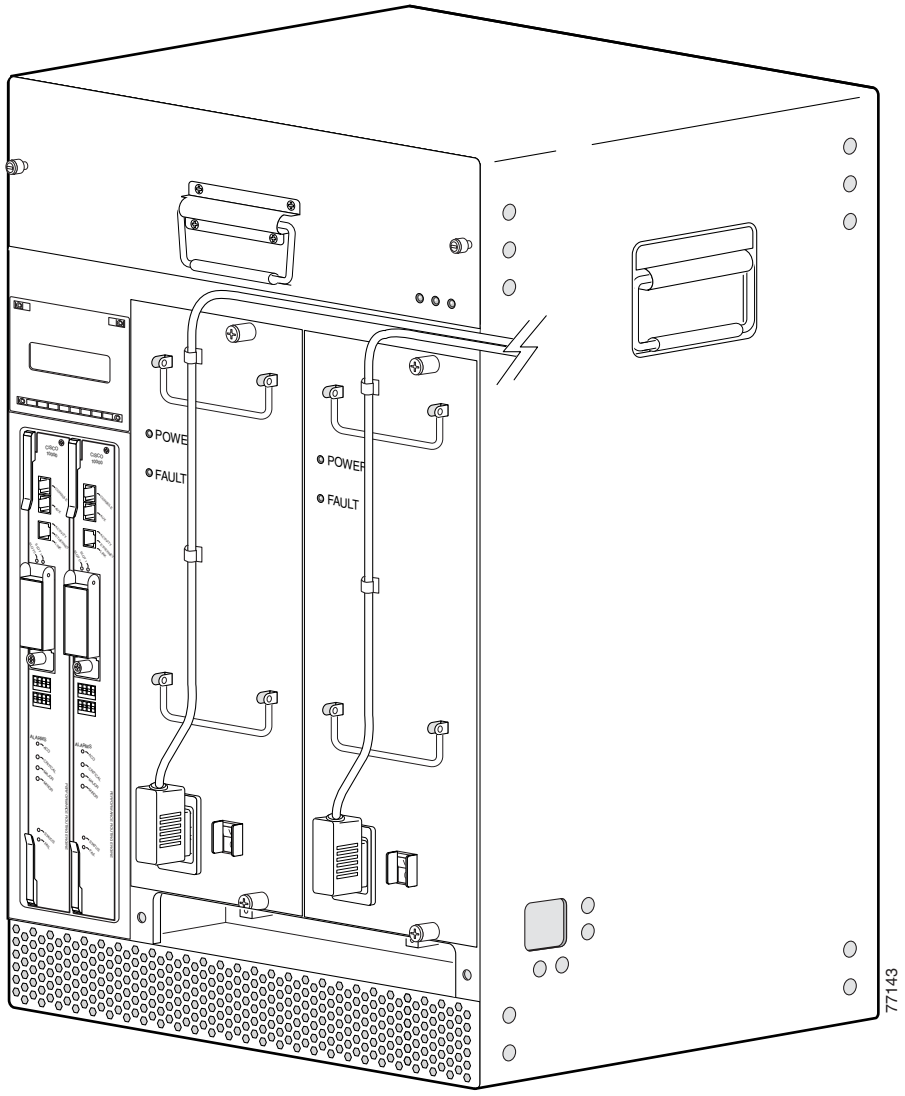
Step 8 Position the second replacement AC PEM in the power bay and push it forward. Verify that it goes all the way in and makes a secure connection with the backplane. Tighten the captive screws to secure the unit to the chassis (Figure 12).

Caution Although one AC PEM can supply sufficient power for a fully configured chassis, run the Cisco uBR10012 router with two AC PEMs installed, because this provides redundant power support.

Step 9 Plug the AC-input power cable into the power receptacle on the front panel of each AC PEM.

Step 10 Route the power cable up the front of the AC PEM and clip it into the two plastic retaining clips attached to the surface of the PEM. Route the power cable out through the right side, so that it fits through the notch on the right side of the front bezel cover. (Figure 13)

Figure 13 Routing the AC Power Cables

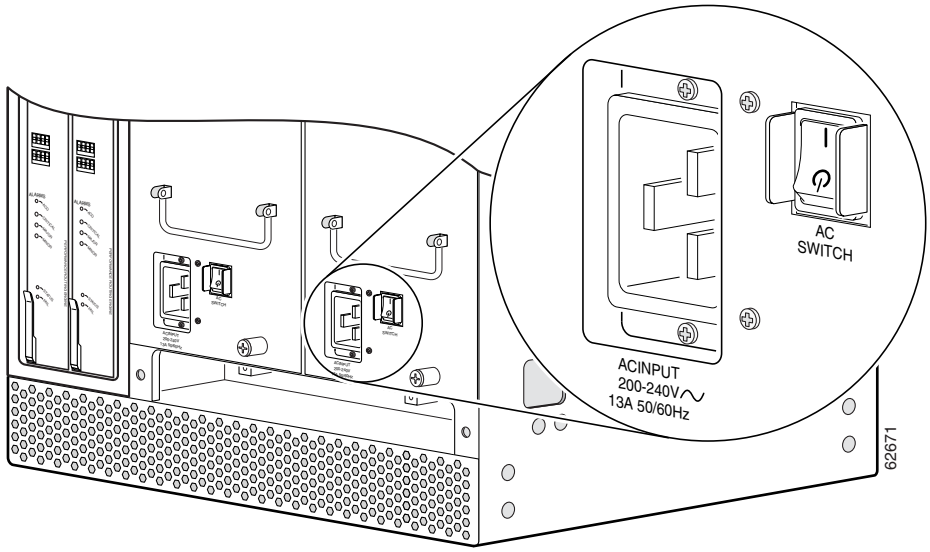


Step 11 Plug the other end of the AC-input power cable into a 200–240 VAC power outlet. For fully redundant operation, each AC PEM should use separate power sources, or you should be using an uninterruptible power supply (UPS).

The Fault LED on each replacement AC PEM should be yellow to indicate that the AC PEM is receiving power from the power source but is not yet supplying power to the Cisco uBR10012 chassis.

Step 12 Push up the power switch on the replacement AC PEM to the ON (|) position (Figure 14).

Figure 14 Setting AC Power Switch to the ON Position



Step 13 When you turn on the power switch on each AC PEM, its Fault LED should go off and the Power LED should come on (green).

Step 14 Slide the front bezel cover onto the four corner posts of the chassis and then push down, so that the posts are seated in the grooves above the cover holes. The AC power cables should be routed through the notch on the right side of the cover.

Troubleshooting the PEM

Check the following to help isolate a problem with the power subsystem:

- Is the Power LED on each AC PEM on (green)?
  - If yes, the PEM is connected to an active 240 VAC AC power source and is supplying power to the chassis.
  - If the Power LED is not on, and if no other LEDs are on, verify that the AC power source is providing valid power. If necessary, try connecting the AC PEM to another wall outlet or power supply.
- Is the Fault LED on (yellow)?
  - If yes, it indicates that the PEM is connected to an active 240 VAC power source but is not providing power to the chassis. Check that the AC PEM is properly inserted into the chassis and that its power switch is on.
- Check the status of the AC PEM using the **show environment** command.

Note The **show environment** command provides accurate information on the AC PEM only when using Cisco IOS Release 12.2(4)XF1, 12.2(4)BC1a, or a later release. If using an earlier release, the **show environment** command will not correctly identify the AC PEM's error messages.

- If none of the above suggestions correct the problem, the AC PEM could be faulty. Contact a service representative for further instructions.

Technical Specifications

Table 3 lists the specifications for the AC PEM.

Table 3 Cisco uBR10000 AC Power Entry Module Specifications

Description	Specifications
Product order number	• UBR10-PWR-AC (Primary) • UBR10-PWR-AC\R (Redundant) • UBR10-PWR-AC= (Spare)
Dimensions	• Height: 19.25 in. (48.894 cm) • Width: 6 in. (15.24 cm) • Depth: 5 in. (12.4 cm)
Weight	14.7 lbs (6.65 kg)
AC input voltage rating	200–240 VAC @ 50/60Hz **Note** 100—120 VAC operation is not supported.
AC operating voltage rating	180–255 VAC @ 50/60Hz **Note** 100—120 VAC operation is not supported.
AC input current rating	13 A
DC output voltage	–54 VDC maximum
DC output current	45.3 A maximum
Power consumption	2650W maximum
Heat dissipation	Heat dissipation: 8200 Btu[1]/hr.
Temperature range	• Operating: 23 to 122°F (–5 to 50°C) • Storage: –13 to 158°F (–25 to 70°C)
Relative humidity	• Operating: 10 to 90%, non-condensing • Storage: 10 to 95%, non-condensing
Operating altitude	–197 to 9,843 feet (–60 to 3000 m)

1. Btu = British thermal units

Obtaining Documentation and Submitting a Service Request

For information on obtaining documentation, using the Cisco Bug Search Tool (BST), submitting a service request, and gathering additional information, see *What's New in Cisco Product Documentation* at: http://www.cisco.com/en/US/docs/general/whatsnew/whatsnew.html.

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