DC Power Entry Module for the Cisco uBR10012 Universal Broadband Router

This document describes the Cisco uBR10012 DC Power Entry Module (DC PEM) and how to install it for use with the Cisco uBR10012 universal broadband router.

Note Cisco uBR10012 DC PEM with part number UBR10-PWR-DC-M (and UBR10-PWR-DC-M=) has reached end-of-life (EOL). However, the contents of this document still apply to the UBR10-PWR-DC-M power module.

This document provides the following information:

Feature Overview

The Cisco uBR10012 router is shipped with two DC power entry modules (PEMs) that provide a redundant power supply to the system. One DC PEM can provide sufficient power for a fully configured chassis, so that if one DC PEM fails, the other automatically begins providing power for the entire system. The two DC PEMs provide filtered, redundant, and load shared DC power to the Cisco uBR10012 chassis.

The DC PEMs receive a –48/–60 VDC power through two separate terminal blocks underneath each PEM. The power supplies can operate with an input from –40.5 to –72 VDC with no harm; however, the input should be restricted to the nominal ranges defined in Table 2 to maintain safety extra-low voltage (SELV) compliance, and to deliver the rated power (2400W or 3000W) at the allowed current levels. The

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34- part number is different for the 2400W and 3000W DC PEMs. The 34- part number is listed on the compliance label of the DC PEM. For more details, see Table 2.

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

The DC PEM is operating correctly when its Power LED is on (green). Replace a DC PEM if either of the PEM failure LEDs turn yellow:

- Miswire—This LED indicates that the wires connecting the PEM to DC power source were wired incorrectly. Remove the DC PEM so that the wiring can be corrected. After the wiring has been corrected, the same DC PEM can be reinserted.

- Fault—This LED indicates that the DC power source is supplying power, but that the DC PEM is not providing power to the system. Flip the power switch on the DC PEM off and then on. If this does not turn the Fault LED off and turn on the Power LED, verify that the DC PEM is fully inserted into the power bay and that its captive screws have been tightened. If these steps do not correct the problem, then replace the DC PEM.

Caution Although one DC PEM can provide sufficient power for a fully configured Cisco uBR10012 chassis, the system should not be run for an extended period time with only one DC PEM. If a DC PEM fails, order and install a replacement DC PEM as soon as possible. The product order number for a replacement DC PEM is UBR10-PWR-DC=.
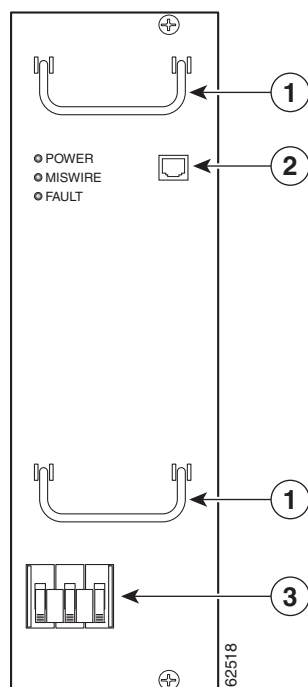
Note The output of the **show inventory** command does not display the serial number for the DC PEM (UBR10-PWR-DC). Visually inspect the serial number label printed on the DC PEM to locate the serial number.

Physical Description

Figure 1 shows the front panel of the original DC PEM (UBR10-PWR-DC) for the Cisco uBR10012 router:

Figure 1   DC PEM Front Panel (UBR10-PWR-DC)

Note   The power supply monitoring cable (product order number UBR10-PWR-MON-CAB=, part number 72-3505-01) for the Cisco uBR10012 router DC PEMs is not the same cable that is used for the similar connection on the Cisco AS5850 Universal Gateway (part number 72-2673-01). The correct cable for the Cisco uBR10012 router is automatically included when you order the AC shelf and DC PEM bundle (UBR10-PWR-AC-EXT).

When using the external AC-input power shelf and Cisco IOS Release 12.2(4)XF1 or later release, the **show environment** command provides information on whether a power module in the power shelf is missing, is reporting a fault, is experiencing an over-temperature condition, or is not receiving AC-input power.

Note   For information on the optional 2400-watt AC-input power shelf and on connecting it to the DC PEM, see the 2400W AC-Input Power Shelf for the Cisco uBR10012 Universal Broadband Router document, available on Cisco.com and the Documentation CD-ROM.

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

Table 1 describes the LEDs on the DC PEM.

Table 1   DC PEM LEDs and their Function

LED	Description
Power (green)	The PEM is on, is receiving power from the external DC power source, and is providing power to the Cisco uBR10012 chassis (normal operations).
Fault (yellow)	Indicates that external DC 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 off. If the power switch is in the on position, the PEM is not operating correctly. (Refer to the *Cisco uBR10012 Universal Broadband Router Troubleshooting Guide*).
Miswire (yellow)	–48/–60 VDC and RTN (+) wires are reversed.

Safety Information and Warnings

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

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

Safety Warnings

⚠
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 kanveroorzaken. 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 Info*rmation -kirjasesta (määräysten noudattaminen ja tietoa turvallisuudesta).**

Attention   Ce symbole d'avertissement indique un danger. Vous vous trouvez dans une situation pouvant causer des blessures ou des dommages corporels. Avant de travailler sur un équipement, soyez conscient des dangers posés par les circuits électriques et familiarisez-vous avec les procédures couramment utilisées pour éviter les accidents. Pour prendre connaissance des traductions d'avertissements figurant dans cette publication, consultez le document *Regulatory Compliance and Safety Information* (Conformité aux règlements et consignes de sécurité) qui accompagne cet appareil.

Warnung   Dieses Warnsymbol bedeutet Gefahr. Sie befinden sich in einer Situation, die zu einer Körperverletzung führen könnte. Bevor Sie mit der Arbeit an irgendeinem Gerät beginnen, seien Sie sich der mit elektrischen Stromkreisen verbundenen Gefahren und der Standardpraktiken zur Vermeidung von Unfällen bewußt. Übersetzungen der in dieser Veröffentlichung enthaltenen Warnhinweise finden Sie im Dokument *Regulatory Compliance and Safety Information* (Informationen zu behördlichen Vorschriften und Sicherheit), das zusammen mit diesem Gerät geliefert wurde.

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

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

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

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

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

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-input power shelf and its AC power modules 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 a DC PEM

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

Tools and Parts Required

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

- Replacement PEM (the product order number is UBR10-PWR-DC=).

- ESD-preventive wrist strap.

Unpacking and Preparing the PEM

To unpack the 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 to return the unit to the factory. See Obtaining Documentation and Submitting a Service Request, page 21 for more information.

Replacing a Redundant DC PEM

Follow this procedure to replace a redundant DC PEM in the following situations:

- To replace a defective DC PEM (the Fault LED is on and the above troubleshooting steps do not correct the problem).

- When the Miswire LED is on, remove the DC PEM so you can then reverse the wires going into the terminal block; you can then reinsert the same DC PEM.

- Remove the second DC PEM when you want to connect the alarm indicator cables. See Chapter 3, *Installing the Cisco uBR10012 Universal Broadband Router*, in the *Cisco uBR10012 Universal Broadband Router Hardware Installation Guide*, which is available on Cisco.com at: http://www.cisco.com/en/US/docs/cable/cmts/ubr10012/installation/guide/hig.html

Do not use this procedure if both DC PEMs have failed; instead, use the next procedure, "Replacing Both DC PEMs" section on page 12.

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Warning   **Before performing any of the following procedures, ensure that power is removed from the DC circuit the PEM is plugged into. 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 1   Remove the front bezel cover by lifting it up slightly and then pulling it toward you.

Step 2   Turn off the DC PEM you are replacing by pushing down the three-levered power switch to the off (0) position (Figure 2 on page 8).

*Figure 2*   *Turning a DC PEM Off*

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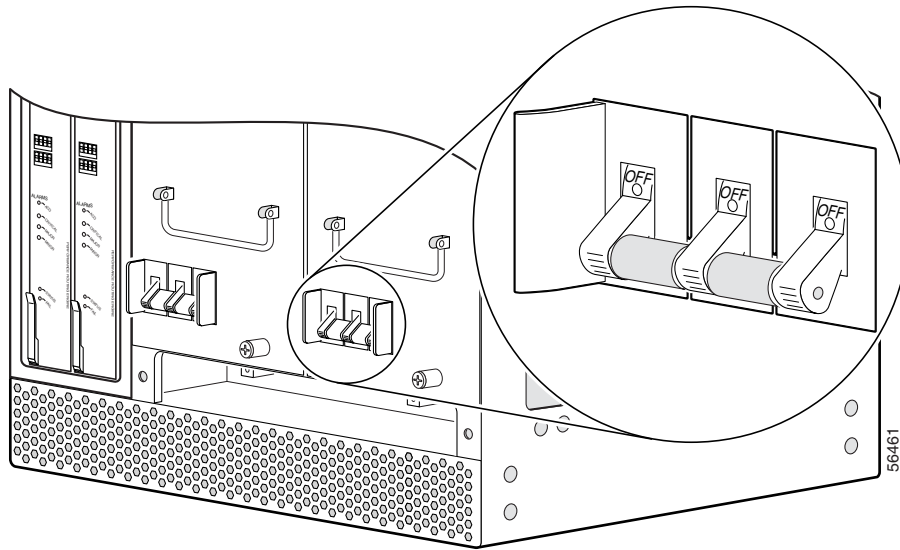
Caution   Do not power off both DC PEMs, or the system shuts down and all data traffic stops. Power off only the DC PEM you are replacing.

Step 3   If this DC PEM has an alarm connector that is connected to the optional 2400-watt AC-input power shelf, disconnect that cable from the RJ-45 connector on the DC PEM's front panel (Figure 3).

*Figure 3*   *Removing the Alarm Connector from the DC PEM*
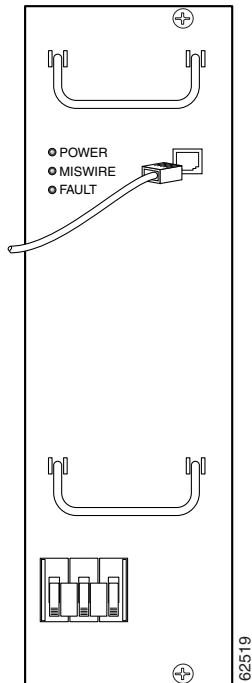
Step 4 (Optional) Turn off the DC power source that is providing power for this DC PEM. All LEDs on the DC PEM should turn off. This step is required only if you need to rewire the terminal block for this PEM as described in Step 6.

Tip For complete redundancy, use a separate DC power source or an uninterruptible power supply (UPS) for each DC PEM. This allows you to turn off the power source for one DC PEM without affecting the power source for the online DC PEM.

Step 5 Loosen the captive screws on the DC PEM you are removing and pull the PEM from the chassis by using the handle on the faceplate (Figure 4 on page 9). Set the DC PEM aside.

Figure 4   *Removing a DC PEM*
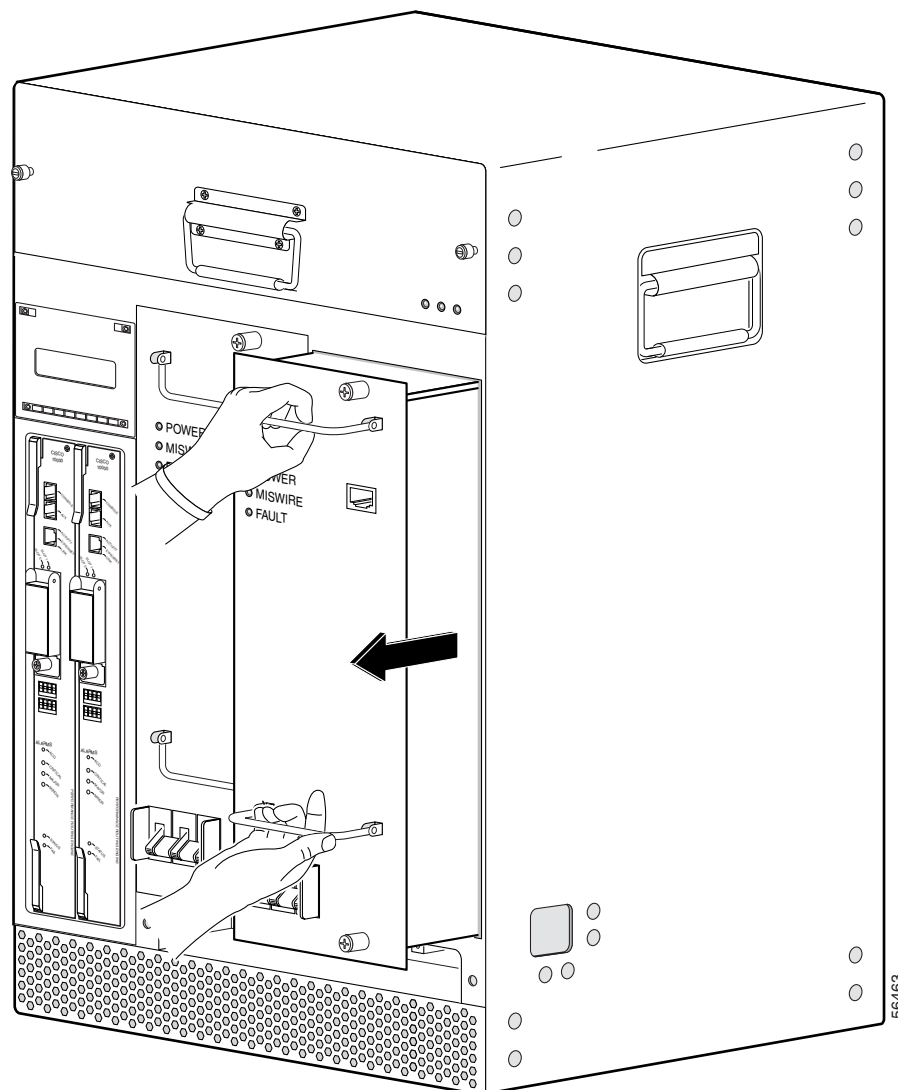
Step 6 If the Miswire LED indicated that the DC power source is miswired, verify that the DC power source has been turned off. Then, verify that the wires leading to the DC power source are connected as follows:

- The cable providing the -48 VDC is connected to the bottom terminal on the DC terminal block. This cable is typically red.

- The cable providing the return path is connected to the top terminal on the DC terminal block. This cable is typically black.

If the Miswire LED is on, then these wires were reversed when connected. Switch them, so that they provide the power signals as listed above.

Figure 5 DC Power Connection
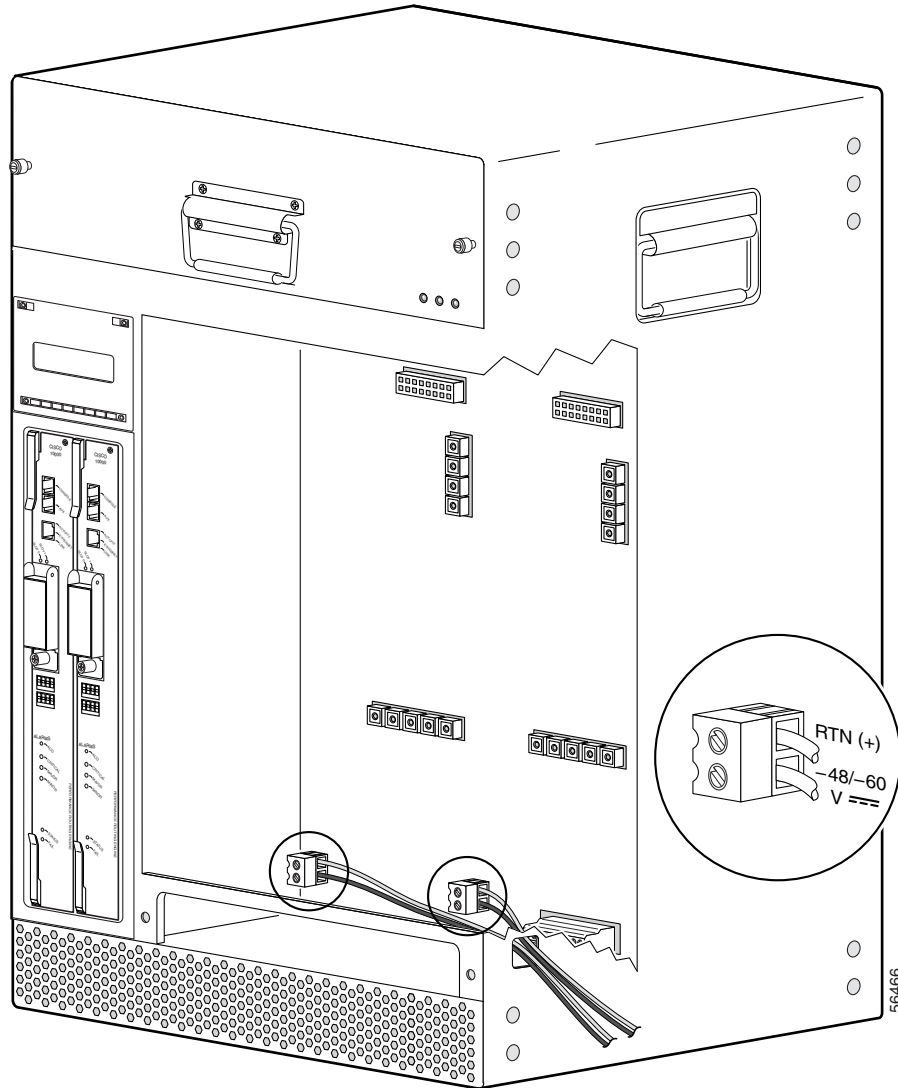
Warning   **Use copper conductors only.**

Step 7   Verify that the power switch on the replacement DC PEM is in the off position (Figure 2 on page 8).

Step 8 Position the replacement DC 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. Tighten the captive screws (Figure 6 on page 11).

Figure 6   Installing a DC PEM
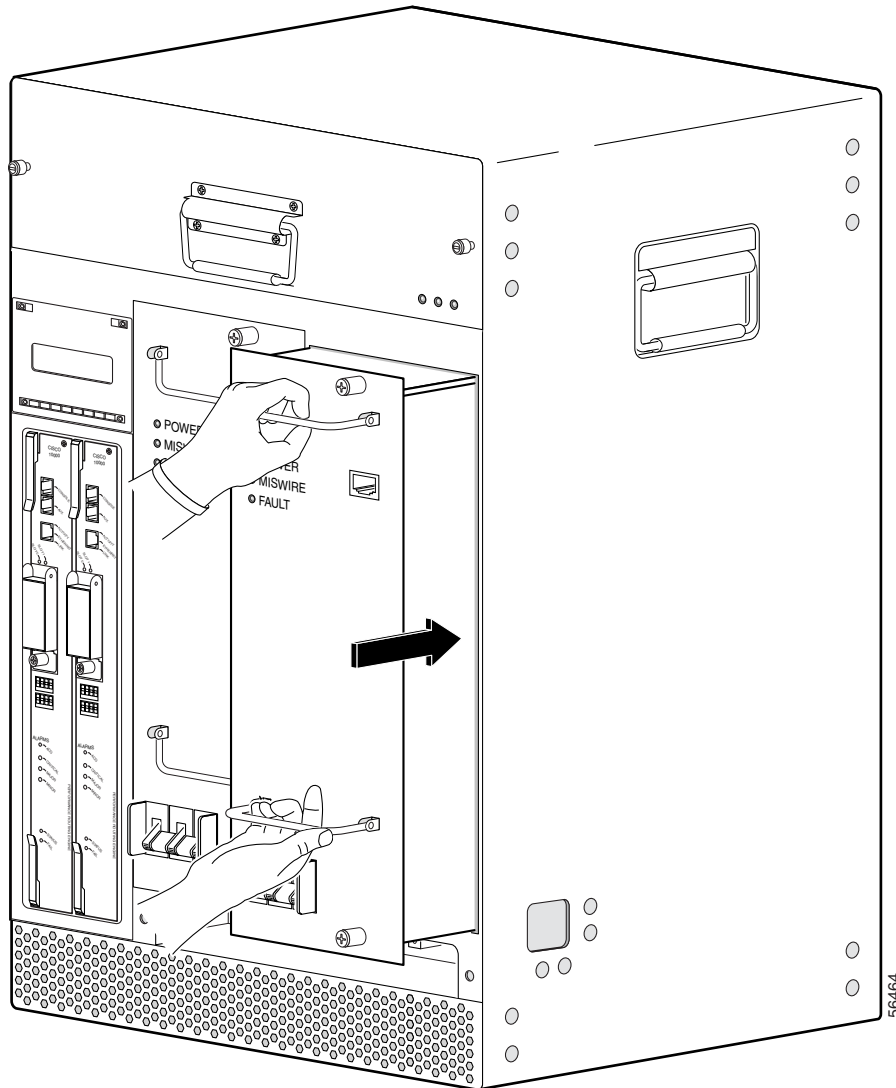
Step 9 If you are using the optional 2400-watt AC-input power shelf, and if this DC PEM has an alarm monitor connector, plug one of the RJ-45 ends of the power supply monitoring cable (UBR10-PWR-MON-CAB) into the RJ-45 connector on the DC PEM's front panel (Figure 3 on page 8). Route the monitor cable off to the right side of the chassis so that it will fit into the notch on the bezel cover, when the cover is reinstalled.

> ✎
> **Note**   The other end of the power supply monitoring cable has a plug connector that connects into connector RJ11 on the AC-input power shelf. See the shelf's documentation for further details.

Step 10 Turn on the DC power source that is providing power for this DC PEM. The Fault LED on the replacement DC PEM should be yellow to indicate that the DC PEM is receiving power from the power source, but is not yet supplying power to the Cisco uBR10012 router chassis.

Step 11 Push up the power switch on the replacement DC PEM to the on (|) position (Figure 7 on page 12).

Figure 7   Setting DC Power Switch to the On Position
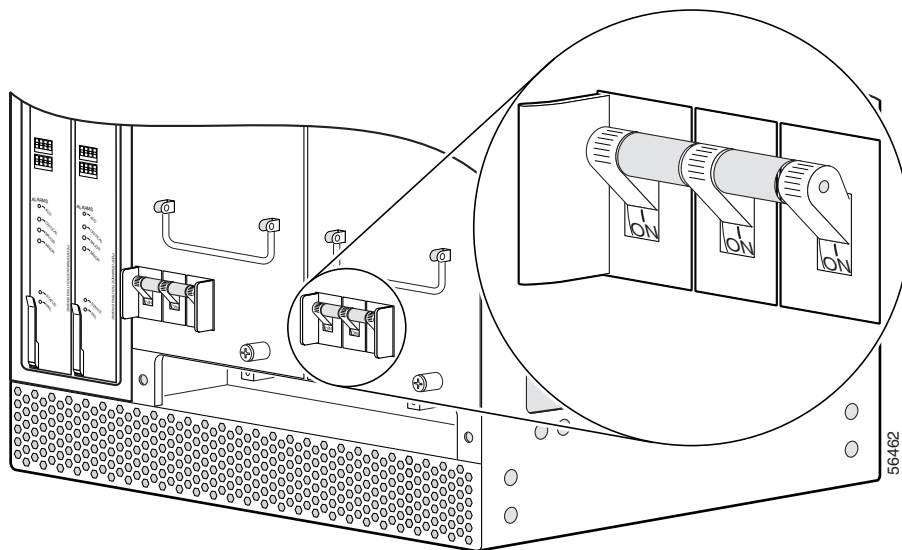
Step 12 When you turn on the power switch on the DC PEM, the Fault LED should turn off and the Power LED should be green.

Step 13 Slide the 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. Route the power supply monitoring cable (if present) through the notch on the right side of the bezel cover—this is the second notch from the top that is aligned with the top of the power supplies.

Replacing Both DC PEMs

Use the following procedure to replace (or reinstall) both DC PEMs. This typically needs to be done only in the following situations:

- The failure LEDs (Miswire or Fault) on both DC PEMs are on, indicating a problem with either the DC power source or the DC PEMs.

- A single DC power source is currently being used for both DC PEMs, and you want to rewire the DC power connections so as to use a separate DC power source for each DC PEM (this is the recommended configuration).

- You want to connect the alarm indicators after the initial installation of the Cisco uBR10012 router. In this case, you will remove all power from the unit from remove only one DC PEM, so as to provide access to the alarm indicator connector. See Chapter 3, *Installing the Cisco uBR10012 Universal Broadband Router*, in the *Cisco uBR10012 Universal Broadband Router Hardware Installation Guide* for more information on connecting the alarm indicators.

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Caution   This procedure requires that you shut down the Cisco uBR10012 router and remove all power to the system. To avoid this, Cisco recommends replacing each DC PEM, one at a time, by following the instructions in Replacing a Redundant DC PEM, page 7.

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

Step 2   Shut down the system with the following procedure:

    a.   Notify appropriate personnel that you plan to shut down the system and that the shutdown results 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 also, if you wish, to a PCMCIA Flash 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 DC PEM to the off (0) position (Figure 8).

Figure 8   ***Turning a DC PEM Off***
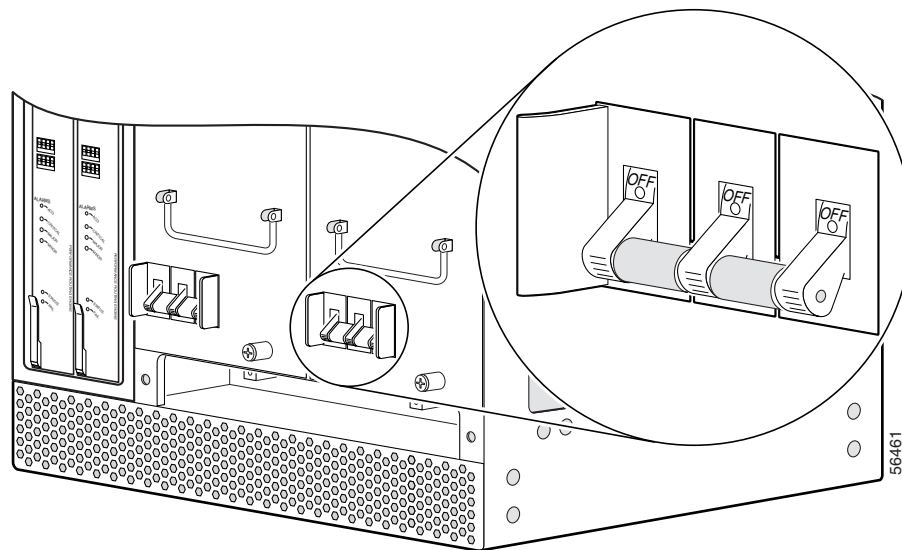
Step 3   Turn off the DC power source that is providing power for each DC PEM. If you are using the optional AC-input power shelf, you can do this by disconnecting the AC power cord from each of the AC-input power modules. All LEDs on the DC PEM should turn off.

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Tip   For complete redundancy, use a separate DC power source or an uninterruptible power supply (UPS) for each DC PEM.

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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.**

Step 4   If the DC PEMs have alarm connectors that are connected to the optional 2400-watt AC-input power shelf, remove the cable from each PEM's RJ-45 connector (Figure 9 on page 14).

Figure 9   *Removing the Alarm Connector from the DC PEM*
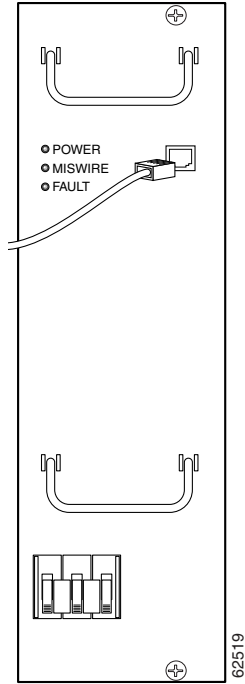
Step 5   Loosen the captive screws on each DC PEM and pull each DC PEM from the chassis by using the handle on the faceplate (Figure 10 on page 15). Set the two DC PEMs aside.

Figure 10   Removing a DC PEM
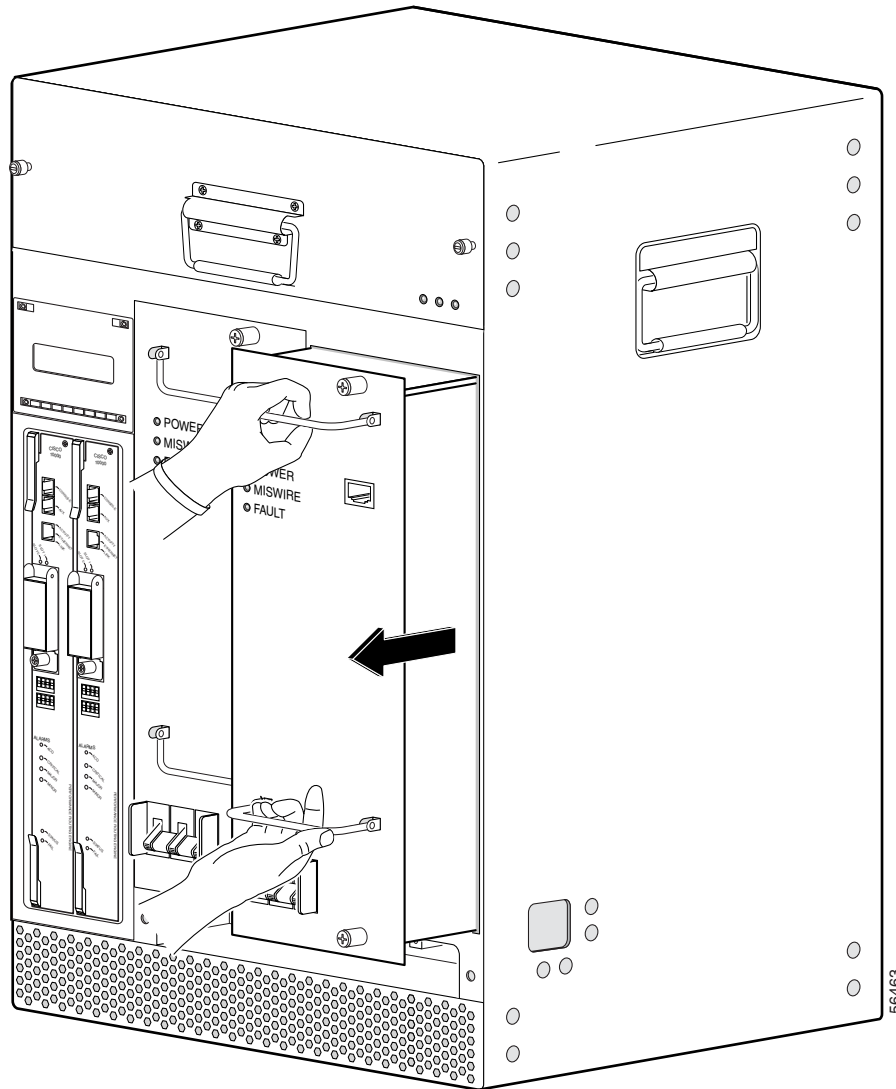
Step 6   If the Miswire LED indicated that the DC power source is miswired, verify that the DC power source is turned off. Then verify that the wires leading to the DC power source are connected as follows:

- The cable providing the -48 VDC is connected to the bottom terminal on the DC terminal block. This cable is typically red.

- The cable providing the return path is connected to the top terminal on the DC terminal block. This cable is typically black.

If the Miswire LED was on either DC PEM, then these wires were reversed when connected. Switch them so that they provide the power signals as listed above.

Figure 11   DC Power Connection
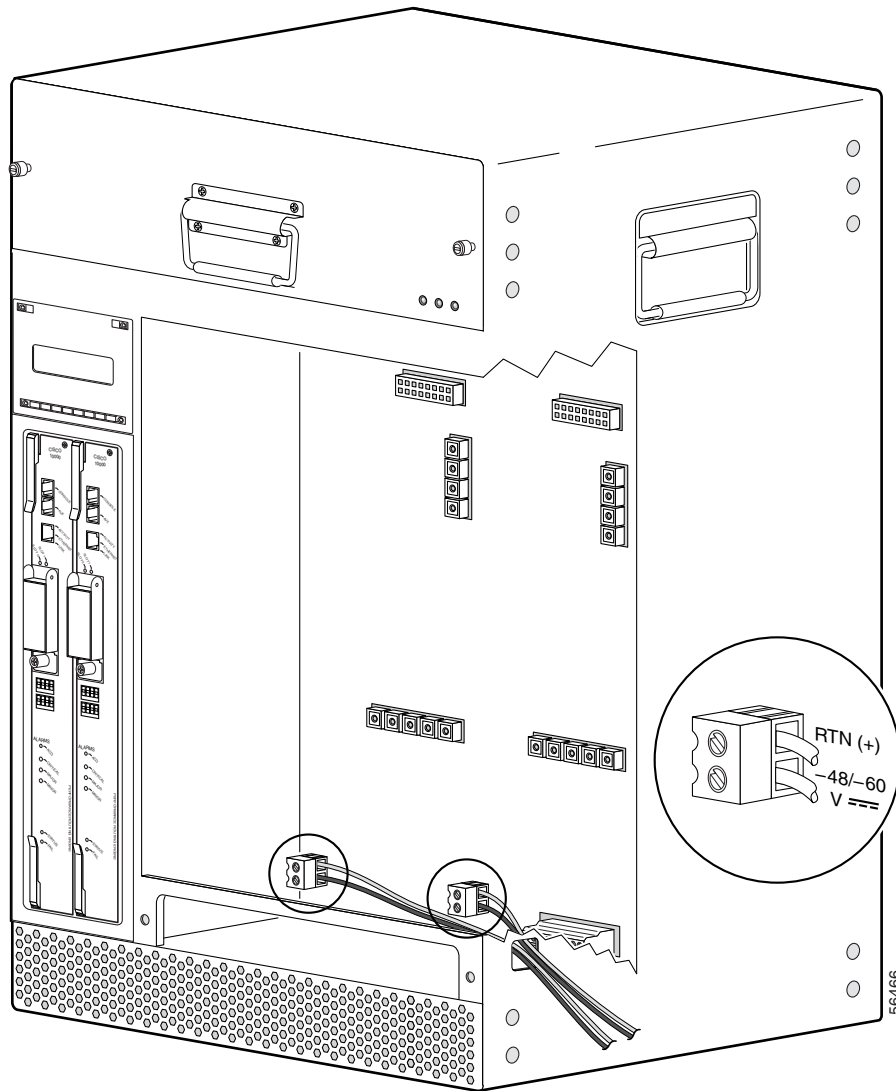
⚠
Warning   Use copper conductors only.

Step 7   Verify that the power switch on each replacement DC PEM is in the off position (Figure 8 on page 13).

Step 8   Position the first replacement DC 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 (Figure 12 on page 17).

Step 9   Position the second replacement DC 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 (Figure 12 on page 17).

Figure 12   Installing a DC PEM
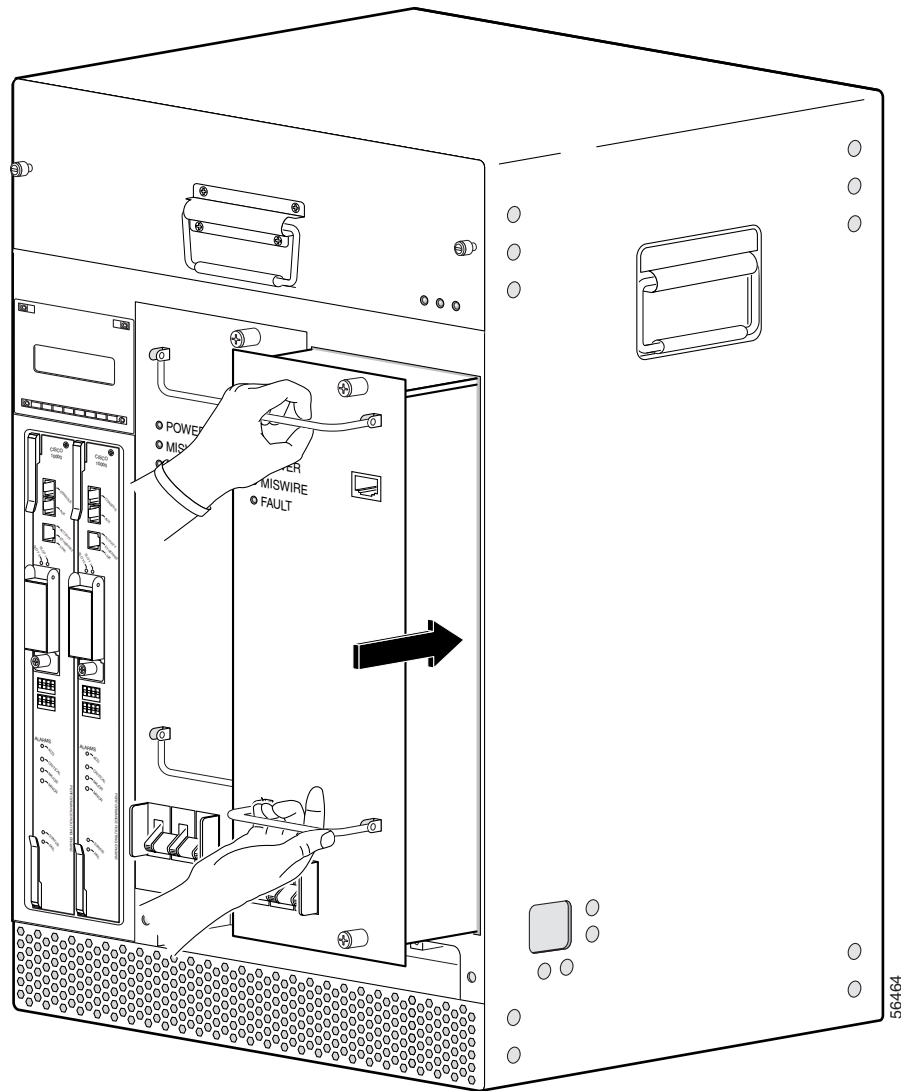
⚠️
Caution   Although one DC PEM can supply sufficient power for a fully configured chassis, run the
Cisco uBR10012 router with two DC PEMs for redundant power support.

Step 10   If you are using the optional 2400-watt AC-input power shelf, and if the DC PEMs have an alarm monitor
connector, plug the RJ-45 ends of the power supply monitoring cable (UBR10-PWR-MON-CAB) into
the RJ-45 connectors on each DC PEM's front panel (Figure 9 on page 14). Route the monitor cable off
to the right side of the chassis so that it will fit into the notch on the bezel cover, when the cover is
reinstalled.

✎
Note   The other end of the power supply monitoring cable has a plug connector that connects into
connector RJ11 on the AC-input power shelf. See the shelf's documentation for further
details.

Step 11 Turn on the DC power sources that are providing power for the DC PEMs. The Fault LED on each replacement DC PEM should be yellow to indicate that the DC PEM is receiving power from the power source, but is not yet supplying power to the Cisco uBR10012 router chassis.

Step 12 Push up the power switch on each replacement DC PEM to the on (|) position (Figure 7 on page 12).

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

Step 14 Slide the 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. Route the power supply monitoring cable (if present) through the notch on the right side of the bezel cover—this is the second notch from the top that is aligned with the top of the power supplies.

Troubleshooting the PEM

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

- Use the **show environment** command to display the general health of the power system:

```
Router# show environment
Temperature normal: chassis inlet measured at 29C/84F
Temperature normal: chassis core measured at 42C/107F
Fan:                                    OK
Power Entry Module 0 type DC status:    OK
Power Entry Module 1 type DC status:    OK
Router#
```

Verify that the temperatures are within the valid operating ranges, and that the fan assembly and both DC PEM modules are present and OK. If this is not the case, check for the following actions:

  - Fan is reported MISSING—Insert the fan assembly or shut down the router immediately to avoid running the router beyond its operating temperature range.

  - DC PEM is not listed—Verify that both DC PEMs are present, and if so, that each PEM is fully inserted into the chassis.

  - An "External AC Supply Fault" message indicates that one of the power modules in the external power supply is reporting either a fault, an over-temperature condition, or is missing. Check the LEDs on the front panels of the power modules on the external power supply to discover which module has the fault.

  - The "Input/Output Voltage Fault" message indicates that the output voltage from one of the DC PEMs is not within the correct range. This can occur when the input DC voltage to the DC PEM is either too low or too high. Measure the input DC voltage, and if it is correct, the DC PEM has failed and should be replaced.

Note The **show environment** command shows status information about the external 2400-watt AC-input power supply only when using the newer model of DC PEM and when the Cisco uBR10012 router is running Cisco IOS Release 12.2(4)XF or later release.

- Is the Power LED on each DC PEM on (green)?

  - If yes, the PEM is connected to an active DC 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 DC power source is turned on. If it is, turn off the DC power source and then verify that the DC power source is correctly wired to the terminal blocks underneath each DC PEM. See *Connecting DC Power to the Cisco uBR10012 Router* in the *Cisco uBR10012 Universal Broadband Router Hardware Installation Guide* for details. If that does not correct the problem, try connecting the DC power source to another wall outlet or power supply. For online documentation, go to URL http://www.cisco.com/en/US/products/hw/cable/ps2209/tsd_products_support_series_home.html.

- Is the Fault LED on (yellow)?

  - If yes, it indicates that the PEM is connected to an active DC power source but is not providing power to the chassis. Check that the DC PEM is properly inserted into the chassis and that its power switch is on.

  - If no, continue with the next step.

- Is the Miswire LED on (yellow)?

  - If yes, it indicates that the wires from the DC power source to this DC PEM are reversed. Turn off the DC power source and reverse the two wires, so that the –48 VDC lead goes to the top terminal, and the RTN lead goes to the bottom terminal in the terminal block. See *Connecting DC Power to the Cisco uBR10012 Router* in the *Cisco uBR10012 Universal Broadband Router Hardware Installation Guide* for details.

  - If no, continue with the next step.

- Is the DC power source supplying the proper power to the DC PEMs? (If you are using the 2400W AC-input power shelf, verify that the AC OK and DC OK LEDs are on for each AC power supply.)

  - If no, and if the DC power source is connected to a valid power outlet, the DC power source could be the source of the problem.

  - If yes, turn off the DC power source, and remove the DC PEM from the chassis. Verify that the DC power source is correctly wired to the terminal blocks underneath each PEM. See *Connecting DC Power to the Cisco uBR10012 Router* in the *Cisco uBR10012 Universal Broadband Router Hardware Installation Guide* for details.

- If none of the above suggestions correct the problem, the DC PEM could be faulty. See the *Cisco uBR10012 Universal Broadband Router Troubleshooting Guide* or contact a service representative for further instructions.

Technical Specifications

Table 2 summarizes the power consumption, DC input voltage, and DC input current values for the 2400W and 3000W DC PEM units. The other technical specifications such as weight, dimensions, and so on are similar for the 2400W and 3000W DC PEMs (see Table 3).

Table 2   Power Consumption, DC Input Voltage, and DC Input Current Values for the DC PEM

Cisco DC PEM (Part Number)[1]	Power Consumption	DC Input Voltage	DC Input Current
34-1651-04	2400W maximum	–48 to –60 VDC nominal	50A
34-1651-05	2400W maximum	–48 to –60 VDC nominal	50A
	3000W maximum	–54 to –60 VDC nominal	56A

1. The 34- part number is listed on the compliance label of the DC PEM.

Table 3   *Cisco uBR10012 Router Power Entry Module Specifications*

Description	Specifications
Product order number	• uBR10-PWR-DC (Primary) • uBR10-PWR-DC= (Spare)
Power Supply Monitoring Cable	• UBR10-PWR-MON-CAB • UBR10-PWR-MON-CAB= (Spare)
Dimensions	• Height: 19.25 in (48.894 cm) • Width: 6 in. (15.24 cm) • Depth: 5 in. (12.4 cm)
Weight	10 lbs. (4.54 kg)
Heat dissipation	Heat dissipation: 360 Btu[1]/hr.
MTBF	190,840 hours
Temperature range	• Operating: 41°F to 104°F (5°C to 40°C) • Storage: –40°F to 158°F (–40°C to 70°C)
Relative humidity	• Operating: 5% to 85% • Storage: 5% to 95%
Operating altitude	–197 ft. to 13,123 ft. (–60 m to 4000 m)

1. Btu = British thermal units

Table 4 shows the pinout of the RJ-45 power supply monitoring connector on the front panel of the new model of DC PEM:

Table 4   *RJ-45 Power Supply Monitoring Connector Pinouts[1]*

RJ-45 Pin	Signal	Description
1	FAULT	This signal is driven to GND if one or more AC power modules in the 2400-watt AC-input power supply reports a fault. To determine which power module has the fault, look at the LEDs on the front panel of the power modules.
2	OVER TEMP	This signal is driven to GND if one of the power modules in the 2400-watt AC-input power supply exceeds its maximum operating temperature.
3	POWER FAIL	This signal is driven to GND if AC power is not being provided to one of the power modules in the 2400-watt AC-input power supply.
4	ALARM RETURN	Return line for pins 1 to 3.
5, 6	–/+AC SUPPLY PRESENT	These pins are shorted together when the external 2400-watt AC-input power supply is being used. If the external power supply is not being used, the pins remain open.
7,8	–/+MODULE MISSING	These pins are shorted together to indicate that all three power modules in the external 2400-watt AC-input power supply are present. If a module is removed, the two pins remain open.

1. In Cisco IOS Release 12.2(4)XF or later release, the **show environment** command shows "External AC Supply Fault" when a power module reports a fault, an over-temperature condition, or is missing. This command shows "Input/Output Voltage Fault" when one of the power modules reports a power failure.

Note   The power supply monitoring cable (product order number UBR10-PWR-MON-CAB=, part number 72-3505-01) for the Cisco uBR10012 router DC PEMs is not the same cable that is used for the similar connection on the Cisco AS5850 Universal Gateway (part number 72-2673-01).

Tip   The other end of the power supply monitoring cable has a plug connector that connects into connector RJ11 on the AC-input power shelf. See the shelf's documentation for further details.

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/c/en/us/td/docs/general/whatsnew/whatsnew.html.

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This document is to be used in conjunction with *Cisco uBR10012 Universal Broadband Router Hardware Installation Guide*.