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# Cisco MWR 1900 Mobile Wireless Edge Router Hardware Installation Guide

# CONTENTS

# About This Guide

This preface discusses the objectives, audience, organization, and conventions of this hardware *installation guide*.

## Objectives

This guide explains how to install, maintain, and troubleshoot your router hardware.

Although this guide provides minimum software configuration information, it is not comprehensive. For detailed software configuration information, see the Cisco IOS configuration guide and command reference publications. (See "Obtaining Documentation" for more information.)

This guide describes several router models that are similar in functionality, but differ in the number of interfaces supported. Some information provided may not apply to your particular router model.

Warranty, service, and support information is in the *Cisco Information Packet* that shipped with the router.

## Audience

This guide is designed for the person installing, configuring, and maintaining the router, who should be familiar with electronic circuitry and wiring practices and has experience as an electronic or electromechanical technician. It identifies certain procedures that should be performed only by trained and qualified personnel.

## Organization

The major sections of this hardware installation guide are:

| Chapter | Title | Description |
|---------|-------|-------------|
| Chapter 1 | Overview of the Cisco MWR 1900 Router | Discusses the hardware features and specifications of the routers. |
| Chapter 2 | Preparing to Install the Router | Describes safety recommendations, site requirements, network connection considerations, required tools and equipment, and includes the installation checklist. |

| Chapter | Title | Description |
|---------|-------|-------------|
| Chapter 3 | Installing the Router | Includes router installation information, and shows how to connect to the router console, auxiliary, and network ports. |
| Appendix A | Troubleshooting | Describes how to isolate problems, read LEDs, interpret error and status messages, recover an enable password, and recover software images. |

# Conventions

This guide uses the following conventions to convey instructions and information:

*Table 1      Document Conventions*

| Convention | Description |
|------------|-------------|
| **boldface font** | Commands and keywords. |
| *italic font* | Variables for which you supply values. |
| [    ] | Keywords or arguments that appear within square brackets are optional. |
| {x | y | z} | A choice of required keywords appears in braces separated by vertical bars. You must select one. |
| screen font | Examples of information displayed on the screen. |
| **boldface screen font** | Examples of information you must enter. |
| < > | Nonprinting characters, for example passwords, appear in angle brackets. |
| [ ] | Default responses to system prompts appear in square brackets. |

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

**Timesaver** Means *the described action saves time*. You can save time by performing the action described in the paragraph.

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

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

Safety warnings appear throughout this publication in procedures that, if performed incorrectly, may harm you. A warning symbol precedes each warning statement.

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

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

**Varoitus**   **Tämä varoitusmerkki merkitsee vaaraa. Olet tilanteessa, joka voi johtaa ruumiinvammaan. Ennen kuin työskentelet minkään laitteiston parissa, ota selvää sähkökytkentöihin liittyvistä vaaroista ja tavanomaisista onnettomuuksien ehkäisykeinoista. Tässä julkaisussa esiintyvien varoitusten käännökset löydät laitteen mukana olevasta *Regulatory Compliance and Safety Information* -kirjasesta (määräysten noudattaminen ja tietoa turvallisuudesta).**

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

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

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

**Advarsel**   **Dette varselsymbolet betyr fare. Du befinner deg i en situasjon som kan føre til personskade. Før du utfører arbeid på utstyr, må du vare oppmerksom på de faremomentene som elektriske kretser innebærer, samt gjøre deg kjent med vanlig praksis når det gjelder å unngå ulykker. Hvis du vil se oversettelser av deadvarslene 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 varamedveten om farorna med elkretsar och känna till vanligt förfarande för att förebygga skador. Se förklaringar av de varningar som förkommer i denna publikation i dokumentet *Regulatory Compliance and Safety Information* (Efterrättelse av föreskrifter och säkerhetsinformation), vilket medföljer denna anordning.**

# Obtaining Documentation

The following sections provide sources for obtaining documentation from Cisco Systems.

## World Wide Web

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

- http://www.cisco.com
- http://www-china.cisco.com
- http://www-europe.cisco.com

# Ordering Documentation

Cisco documentation is available in the following ways:

- Registered Cisco Direct Customers can order Cisco Product documentation from the Networking Products MarketPlace:
  http://www.cisco.com/cgi-bin/order/order_root.pl

- Registered Cisco.com users can order the Documentation CD-ROM through the online Subscription Store:
  http://www.cisco.com/go/subscription

- Nonregistered Cisco.com users can order documentation through a local account representative by calling Cisco corporate headquarters (California, USA) at 408 526-7208 or, in North America, by calling 800 553-NETS(6387).

# Documentation Feedback

If you are reading Cisco product documentation on the World Wide Web, you can submit technical comments electronically. Click **Feedback** in the toolbar and select **Documentation**. After you complete the form, click **Submit** to send it to Cisco.

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

To submit your comments by mail, use the response card behind the front cover of your document, or write to the following address:

Attn Document Resource Connection
Cisco Systems, Inc.
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. For Cisco.com registered users, additional troubleshooting tools are available from the TAC website.

## Cisco.com

Cisco.com is the foundation of a suite of interactive, networked services that provides immediate, open access to Cisco information and resources at anytime, from anywhere in the world. This highly integrated Internet application is a powerful, easy-to-use tool for doing business with Cisco.

Cisco.com provides a broad range of features and services to help customers and partners streamline business processes and improve productivity. Through Cisco.com, you can find information about Cisco and our networking solutions, services, and programs. In addition, you can resolve technical issues with online technical support, download and test software packages, and order Cisco learning materials and merchandise. Valuable online skill assessment, training, and certification programs are also available.

Customers and partners can self-register on Cisco.com to obtain additional personalized information and services. Registered users can order products, check on the status of an order, access technical support, and view benefits specific to their relationships with Cisco.

To access Cisco.com, go to the following website:

http://www.cisco.com

# Technical Assistance Center

The Cisco TAC website is available to all customers who need technical assistance with a Cisco product or technology that is under warranty or covered by a maintenance contract.

## Contacting TAC by Using the Cisco TAC Website

If you have a priority level 3 (P3) or priority level 4 (P4) problem, contact TAC by going to the TAC website:

http://www.cisco.com/tac

P3 and P4 level problems are defined as follows:

- P3—Your network performance is degraded. Network functionality is noticeably impaired, but most business operations continue.
- P4—You need information or assistance on Cisco product capabilities, product installation, or basic product configuration.

In each of the above cases, use the Cisco TAC website to quickly find answers to your questions.

To register for Cisco.com, go to the following website:

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

If you cannot resolve your technical issue by using the TAC online resources, Cisco.com registered users can open a case online by using the TAC Case Open tool at the following website:

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

## Contacting TAC by Telephone

If you have a priority level 1(P1) or priority level 2 (P2) problem, contact TAC by telephone and immediately open a case. To obtain a directory of toll-free numbers for your country, go to the following website:

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

P1 and P2 level problems are defined as follows:

- P1—Your production network is down, causing a critical impact to business operations if service is not restored quickly. No workaround is available.
- P2—Your production network is severely degraded, affecting significant aspects of your business operations. No workaround is available.

# Overview of the Cisco MWR 1900 Router

The MWR 1900 Mobile Wireless Edge Router is a networking platform optimized for use in mobile wireless networks. It extends IP connectivity to the cell site and Base Transceiver Station (BTS), and through a Fast Ethernet interface to the BTS, provides bandwidth-efficient IP transport of voice and data bearer traffic, as well as maintenance, control, and signalling traffic, over the leased line backhaul network between the BTS and leased line termination and aggregation node via compression (cRTP/cUDP) and packet multiplexing (PPPmux and MLPPP). It supports a limited set of interfaces and protocols, but offers high performance at a low cost while meeting the critical requirements for deployment in cell sites, including small size, extended operating temperature range, high availability, and DC input power flexibility.

This chapter includes the following sections:

- Primary Use of the MWR 1900, page 1-1
- Hardware Features, page 1-2
- Fast Ethernet Interfaces, page 1-4
- Voice/WAN Interface Cards, page 1-4
- Compact Flash, page 1-5
- Compact Flash, page 1-5
- Environmental Monitoring Temperature Sensor, page 1-6
- System Specifications, page 1-6
- Regulatory Compliance, page 1-6

## Primary Use of the MWR 1900

The MWR 1900 router is designed to be used at a cell site as part of an IP-RAN solution. Figure 1-1 shows the placement of and connections for the MWR 1900 router for this application.

*Figure 1-1    MWR 1900 in an IP-RAN Solution*
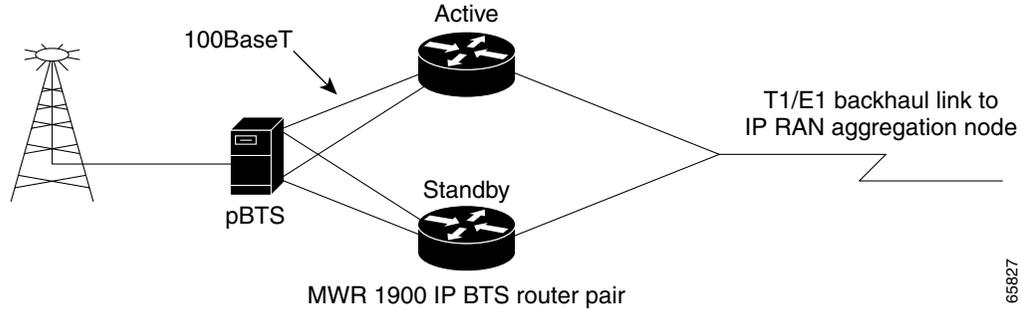


In the IP-RAN solution, the BTS site consists of a pair of MWR 1900 routers. The pair of MWR 1900 routers provides for an active and standby router for redundancy. A failure of the active MWR 1900 router causes the standby router to take over as the active router for the BTS site.

Each pair of MWR 1900 routers at the BTS site is identical in hardware configuration. They connect to each other through the BTS via the Fast Ethernet interfaces. The individual backhaul links to an MWR 1900 router are cabled from a single T1/E1 termination block in the BTS, connecting to both the active and standby routers utilizing a "Y" cable. The redundancy design to control the active/standby transitions of the router pair leverages HSRP to control the relays on the VWIC-2MFT-T1-DIR (or VWIC-2MFT-E1-DIR) in each router to ensure that the relays on the active router are closed and the relays on the standby router are open to avoid double termination of the T1 (or E1).

# Hardware Features

Figure 1-2 shows the front of the router. Figure 1-3 shows the back of the router.

*Figure 1-2    Front Panel of the Cisco MWR 1900 Router*
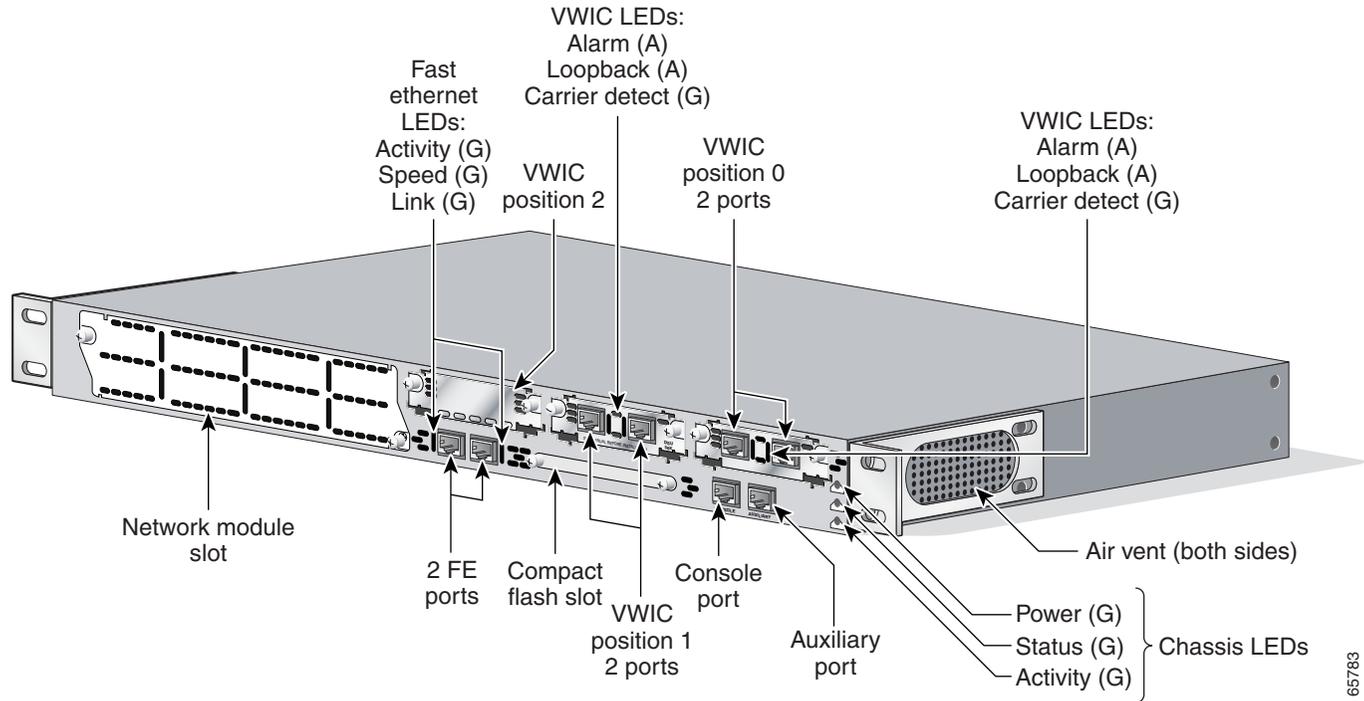


*Figure 1-3    Back Panel of the Cisco MWR 1900 Router*
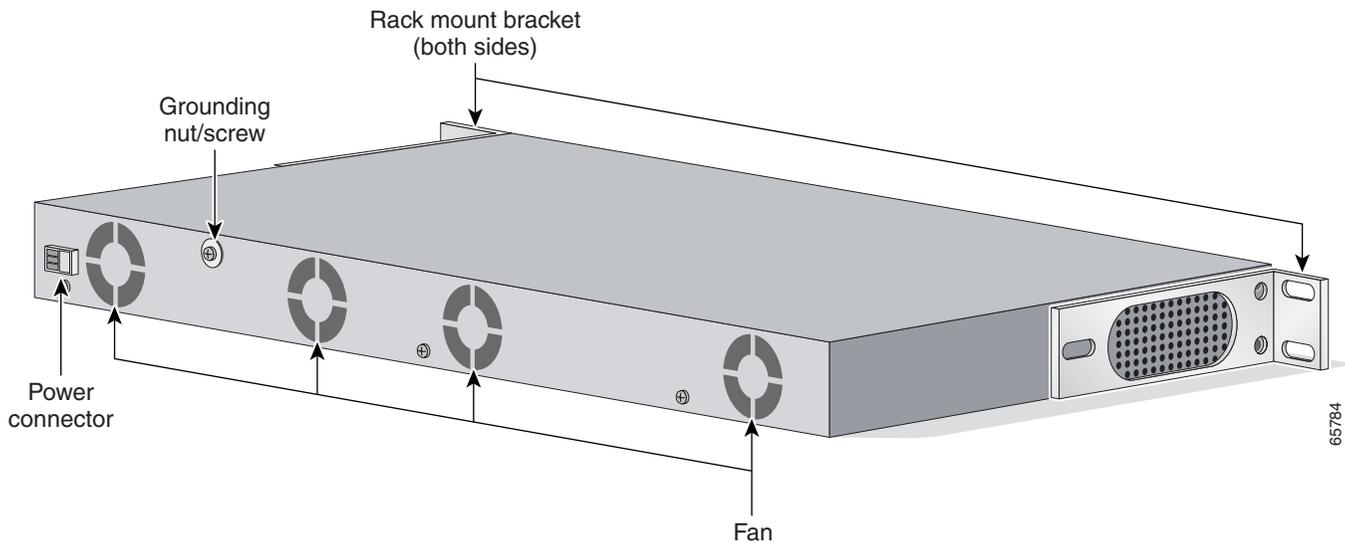


The Cisco MWR 1900 router includes the following features:

- Two DIMM-168 SDRAM (4 banks) sockets
- SysAD bus speed and SDRAM local bus speed is 80Mhz
- External Compact Flash (CF)
- Two fixed LAN 10/100 Base-T Ethernet Ports
- Three modular WIC/VIC expansion slots (1 for future use)

- Redundancy support via a two T1/E1 WIC capable of port switching ON/OFF via relays

- Console RS-232 port

- Auxiliary Serial Port with hardware flow control

- Extended operational temperature range from -10ºC to + 55ºC with over-temperature sensor

- Front (connector side) to rear airflow using four 40mm, 10 CFM exhaust fans

- Custom +27V DC input power

- Three green chassis LEDs for Power (PS is operational), System Ready (software is up and running), and Activity (interrupts/packet transfers running)

- One Network Module slot (for future use)

# Fast Ethernet Interfaces

The MWR 1900 router has two fixed LAN ports offering 10/100 Base-T Ethernet attachment. The ports are fully compliant with the IEEE 802.3 and 802.3U standards and integrate the media access control (MAC) functions and a dual-speed MII interface. Both ports can operate in half- or full-duplex mode and can run independently of one another. For each FE interface, there are two green LEDs, one for Link Integrity and one for Link Activity.

# Voice/WAN Interface Cards

The Cisco VWIC-2MFT-T1-DIR and VWIC-2MFT-E1-DIR Voice/WAN Interface Cards support data applications on the Cisco MWR 1900 Mobile Wireless Edge Router for T1/E1 networks. These cards are dual-port, T1/Fractional T1 or E1/Fractional E1, Drop and Insert Multiplexers with integrated T1 CSU/DSUs or E1 DSUs. The T1 version supports framed and unframed traffic, and the E1 version supports framed traffic and unframed traffic that conforms to the ITU-T G.703 standard for full 2.048 Mbps bandwidth.

The Drop and Insert multiplexer diverts (drops) streams of an aggregate Time Division Multiplexed (TDM) traffic stream, and introduces (inserts) different streams for transmission in the time slots that were previously occupied by the dropped streams. Each VWIC supports a limited channelized capability where the T1 or E1 can be flexibly split into two fractional channel groups, one on each port or two on one port. The switching operation can be maintained through router restarts and reloads of Cisco IOS software.

Each card also features protection switch solid state relays on the line interfaces, which together with redundancy logic and relay control added to the base Cisco IOS feature set on the MWR 1900, provides T1/E1 Protection Switching between redundant routers.

The MWR 1900 router provides two WAN interface slots, which allows support for 4 T1/E1s. A third WAN interface slot is reserved for future use.

Additional information is contained in separate publications that accompanied your router package.

- For information on Voice/WAN interface cards (VWICs), see the publication *VWIC-2MFT-T1DIR, VWIC-2MFT-E1DIR Installation Instructions*.

- For software configuration information, see the publication *Cisco MWR 1900 Software Configuration Guide*.

These manuals are on Cisco.com. See "Obtaining Documentation" for more information.

# Compact Flash

One external Compact Flash (CF) device is used on the MWR 1900 router. The CF memory size can vary with a minimum size of 32Mbyte and a maximum size of 128Mbytes. This device is configured in memory mapped mode (PCMCIA) to allow for hot insertion. This device is required for the MWR 1900 router to function because the IOS image and troubleshooting logs reside on this device. For information about replacing or upgrading the CF, see the "Replacing or Upgrading the CF" section on page 3-10.

# Overview of Cisco MWR 1900 Power Supplies

The MWR 1900 router is equipped with a +27 VDC power supply. The +27 VDC is typically used for cell base stations.

Table 1-1 lists DC power supply specifications of the Cisco MWR 1900 router.

*Table 1-1      Cisco MWR 1900 Power Supply Specifications*

| Specification | +27 VDC |
|---|---|
| Input voltage, DC power supply Maximum input current | + 20 to 32 VDC 2.2A |
| Wire gauge for DC-input power connections[2] | 18 AWG |
| Power Dissipation | 44 W (typical) |
| Power Output | 35 W (typical) |

[2] Only solid copper conductors shall be used for the DC input power connection.

The Cisco MWR 1900 router uses a small, three-wire connector for the power supply. The connector on the Cisco MWR 1900 router is Phoenix Contact part number 1754452 and should mated with Phoenix Contact part number 1754465, which is attached to the power cable.

Table 1-2 lists the pinout configuration for the connector for both power supplies.

*Table 1-2      Power Supply Connectors Pinout*

| PIN | +27 VDC Power Supply |
|---|---|
| 1 | + 27 VDC |
| 2 | Ground |
| 3 | RTN |

# Environmental Monitoring Temperature Sensor

The MWR 1900 router has a temperature sensor to detect over-temperature conditions inside the chassis. The over-temperature detection trips at 75°C +/- 5%. This condition is reported to the processor as an interrupt and software then takes action on this interrupt to generate the appropriate alarming. If the router reaches a temperature of 90°C, the power supply will cycle to prevent the box from exceeding that temperature in a powered up state.

# System Specifications

Table 1-3 lists the Cisco MWR 1900 router system specifications.

*Table 1-3    Cisco MWR 1900 Router System Specifications*

| Description | Specification |
|---|---|
| Dimensions (H x W x D) | 1.72 x 17.5 x 12.5 in. (4.368 x 44.45 x 31.75 cm) 1RU/19.00 Rack Mount |
| Weight | 12 lb (5.443 kg) |
| Console and Auxiliary ports | RJ-45 connector |
| Operating Temperature | 14 to 131°F (-10 to + 55°C) |
| Non-Operational Temperature | -40 to 158°F (-40 to 70°C) |
| Operating Humidity | 5 to 90% RH (non-condensing |
| Operating Altitude | 3000m @ 104°F (40°C) |
| Operating Vibration | 0.41 Grms, 3 to 500 Hz/2 hours per axis |
| Non-Operational Vibration | 1.12 Grms, 3 to 500 Hz/30 minutes per axis |
| Operating Acoustics | < 60 dBa |

# Regulatory Compliance

For regulatory compliance and safety information, see the *Regulatory Compliance and Safety Information for the Cisco MWR 1900 Mobile Wireless Edge Router* document.

# Preparing to Install the Router

This chapter describes site requirements and equipment needed to install your Cisco MWR 1900 router. It includes the following sections:

- Safety Recommendations, page 2-1
- General Site Requirements, page 2-3
- Installation Checklist, page 2-5
- Console and Auxiliary Port Considerations, page 2-6
- Inspecting the Router, page 2-4
- Required Tools and Equipment for Installation and Maintenance, page 2-3
- Console and Auxiliary Port Considerations, page 2-6

# Safety Recommendations

Follow these guidelines to ensure general safety:

- Keep the chassis area clear and dust-free during and after installation.
- Keep tools away from walk areas where you or others could fall over them.
- Do not wear loose clothing that may get caught in the chassis. Fasten your tie or scarf and roll up your sleeves.
- Wear safety glasses when working under conditions that may be hazardous to your eyes.
- Do not perform any action that creates a potential hazard to people or makes the equipment unsafe.

⚠

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

# Safety with Electricity

**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.**

**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**    **The Ethernet 10/100BaseT, Token Ring, serial, console, and auxiliary ports contain safety extra-low voltage (SELV) circuits. BRI circuits are treated like telephone-network voltage (TNV) circuits. Avoid connecting SELV circuits to TNV circuits.**

**Warning**    **Before working on equipment that is connected to power lines, remove jewelry (including rings, necklaces, and watches). Metal objects will heat up when connected to power and ground and can cause serious burns or weld the metal object to the terminals.**

**Warning**    **Before working on a chassis or working near power supplies, unplug the power cord on AC units; disconnect the power at the circuit breaker on DC units.**

Follow these guidelines when working on equipment powered by electricity:

- Locate the room's emergency power-OFF switch. Then, if an electrical accident occurs, you can quickly shut the power OFF.
- Before working on the system, turn the DC main circuit breaker off and disconnect the power cord/terminal block cable.
- Disconnect all power before doing the following:
    - Working on or near power supplies
    - Installing or removing a router chassis or network processor module
    - Performing most hardware upgrades
- Do not work alone if potentially hazardous conditions exist.
- Look carefully for possible hazards in your work area, such as moist floors, ungrounded power extension cables, and missing safety grounds.
- Never assume that power is disconnected from a circuit. Always check.
- If an electrical accident occurs, proceed as follows:
    - Use caution, and do not become a victim yourself.
    - Turn OFF power to the system.

–   If possible, send another person to get medical aid. Otherwise, determine the condition of the victim and then call for help.

–   Determine if the person needs rescue breathing or external cardiac compressions; then take appropriate action.

# General Site Requirements

You can mount the Cisco MWR 1900 router in a 19-inch rack (with a 17.5- or 17.75-inch opening).

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

*   Allow clearance around the rack for maintenance.

*   Enclosed racks must have adequate ventilation. Ensure that the rack is not congested, because each router generates heat. An enclosed rack should have louvered sides and a fan to provide cooling air. Heat generated by equipment near the bottom of the rack can be drawn upward into the intake ports of the equipment above.

*   When mounting a chassis in an open rack, ensure that the rack frame does not block the intake or exhaust ports. If the chassis is installed on slides, check the position of the chassis when it is seated into the rack.

*   Baffles can help to isolate exhaust air from intake air, which also helps to draw cooling air through the chassis. The best placement of the baffles depends on the airflow patterns in the rack, which can be found by experimenting with different configurations.

*   When equipment installed in a rack (particularly in an enclosed rack) fails, try operating the equipment by itself, if possible. Power OFF other equipment in the rack (and in adjacent racks) to allow the router under test a maximum of cooling air and clean power.

# Required Tools and Equipment for Installation and Maintenance

You need the following tools and equipment to install and upgrade the router and its components:

*   Number 2 Phillips screwdriver

*   Screws to fit your rack

*   Cables for connection to the WAN and LAN ports (dependent on configuration)

*   Ethernet hub or PC with a network interface card for connection to the Ethernet (LAN) port(s).

*   Console terminal (an ASCII terminal or a PC running terminal emulation software) configured for 9600 baud, 8 data bits, no parity, and 2 stop bits.

*   Modem for connection to the auxiliary port for remote administrative access (optional).

*   Console cable for connection to the console port. You can supply this cable yourself or order one from Cisco (PN ACS-1900ASYN=).

*   Terminal block connector (Phoenix part number 1754465).

*   Ratcheting torque screwdriver with a Phillips head that exerts up to 15 pound-force inches (lbf-in) of pressure.

*   Panduit crimping tool with optional controlled cycle mechanism, model CT-700, CT-720, CT-920, CT-930, CT-920CH, or CT-940CH.

*   6-gauge copper ground wire (insulated or noninsulated).

- #6, ring-style ground lug.

- 18-AWG copper wire for the power cord.

- Wire-stripping tool(s) for stripping both 6- and 18-gauge wires.

# Inspecting the Router

Do not unpack the router until you are ready to install it. If the final installation site will not be ready for some time, keep the chassis in its shipping container to prevent accidental damage. When you are ready to install the router, proceed with unpacking it.

The router, cables, publications, and any optional equipment you ordered may be shipped in more than one container. When you unpack the containers, check the packing list to ensure that you received all the following items:

- Router

- Rack-mount brackets

- This publication, the *Regulatory Compliance and Safety Information* document, optional companion publications, or Documentation CD-ROM, as specified in your order

- *Cisco Information Packet* publication

Inspect all items for shipping damage. If anything appears to be damaged, or if you encounter problems installing or configuring your router, contact customer service. Warranty, service, and support information is in the *Cisco Information Packet* that shipped with your router.

# Creating a Site Log

The Site Log provides a record of all actions related to the router. Keep it in an accessible place near the chassis where anyone who performs tasks has access to it. Use the Installation Checklist (a sample is included in the following section) to verify steps in the installation and maintenance of the router. Site Log entries might include the following:

- Installation progress—Make a copy of the Installation Checklist and insert it into the Site Log. Make entries as each procedure is completed.

- Upgrade and maintenance procedures—Use the Site Log as a record of ongoing router maintenance and expansion history. A Site Log might include the following events:

  - Installation of network modules

  - Removal or replacement of network modules and other upgrades

  - Configuration changes

  - Maintenance schedules and requirements

  - Maintenance procedures performed

  - Intermittent problems

  - Comments and notes

# Installation Checklist

The sample Installation Checklist lists items and procedures for installing a new router. Make a copy of this checklist and mark the entries when completed. Include a copy of the checklist for each router in your Site Log (described in the next section, "Console and Auxiliary Port Considerations").

Installation Checklist for site
Router name

| Task | Verified by | Date |
|---|---|---|
| Installation Checklist copied | | |
| Background information placed in Site Log | | |
| Site power voltages verified | | |
| Installation site power check completed | | |
| Required tools available | | |
| Additional equipment available | | |
| Router received | | |
| This publication and the *Regulatory Compliance and Safety Information* document received | | |
| Optional printed documentation or CD-ROM documentation received | | |
| *Cisco Information Packet* publication received | | |
| Chassis components verified | | |
| Initial electrical connections established | | |
| ASCII terminal (for local configuration) or modem (for remote configuration) | | |
| Signal distance limits verified | | |
| Startup sequence steps completed | | |
| Initial operation verified | | |
| Software image verified | | |

# Console and Auxiliary Port Considerations

The router includes an asynchronous serial console port and an auxiliary port. The console and auxiliary ports provide access to the router either locally using a console terminal, or remotely using a modem connected to the auxiliary port. This section discusses important cabling information to consider before connecting a console terminal, which can be either an ASCII terminal or a PC running terminal emulation software, to the console port or modem to the auxiliary port.

The main difference between the console and auxiliary ports is that the auxiliary port supports hardware flow control and the console port does not. Flow control paces the transmission of data between a sending device and a receiving device. Flow control ensures that the receiving device can absorb the data sent to it before the sending device sends more. When the buffers on the receiving device are full, a message is sent to the sending device to suspend transmission until the data in the buffers has been processed. Because the auxiliary port supports flow control, it is ideally suited for use with the high-speed transmissions of a modem. Console terminals transmit at slower speeds than modems; therefore, the console port is ideally suited for use with console terminals.

**Note**     Console and rollover cables are not included with the MWR 1900 router. You can order the console cable from Cisco Systems (PN ACS-1900ASYN=). You must supply your own rollover cable.

# Console Port Connections

The router includes an EIA/TIA-232 asynchronous serial console port (RJ-45). Depending on the cable and the adapter used, this port will appear as a data terminal equipment (DTE) or data communications equipment (DCE) device at the end of the cable.

To connect an ASCII terminal to the console port, use the RJ-45 rollover cable with the female RJ-45-to-DB-25 adapter (labeled TERMINAL). To connect a PC running terminal emulation software to the console port, use the RJ-45 rollover cable with the female RJ-45-to-DB-9 adapter (labeled TERMINAL). The default parameters for the console port are 9600 baud, 8 data bits, no parity, and 2 stop bits. The console port does not support hardware flow control. For detailed information about installing a console terminal, see the "Connecting the Console Terminal and Modem" section on page 3-2.

For cable and port pinouts, see the online document *Cisco Modular Access Router Cable Specifications*. This document is located on the Documentation CD-ROM that accompanied your router, and on Cisco.com.

# Auxiliary Port Connections

The router includes an EIA/TIA-232 asynchronous serial auxiliary port (RJ-45) that supports flow control. Depending on the cable and the adapter used, this port will appear as a DTE or DCE device at the end of the cable.

To connect a modem to the auxiliary port, use the RJ-45 rollover cable with the male RJ-45-to-DB-25 adapter (labeled MODEM). For detailed information about connecting devices to the auxiliary port, see the "Connecting the Console Terminal and Modem" section on page 3-2.

For cable and port pinouts, see the online document *Cisco Modular Access Router Cable Specifications*. This document is located on the Documentation CD-ROM that accompanied your router, and Cisco.com.

# Installing the Router

This chapter describes how to install your Cisco MWR 1900 router and connect it to networks and external devices. It contains the following sections:

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

# Rack Mounting the Chassis

You can mount the Cisco MWR 1900 router in a 19-inch rack with the following rack openings and chassis orientations:

- 17.5-inch opening, front panel forward

- 17.75-inch opening, front panel forward

**Warning**  **To prevent bodily injury when mounting or servicing this unit in a rack, you must take special precautions to ensure that the system remains stable. The following guidelines are provided to ensure your safety:**

**This unit should be mounted at the bottom of the rack if it is the only unit in the rack.**

**When mounting this unit in a partially filled rack, load the rack from the bottom to the top with the heaviest component at the bottom of the rack.**

**If the rack is provided with stabilizing devices, install the stabilizers before mounting or servicing the unit in the rack.**

# Attaching the Brackets

Attach the mounting brackets to the chassis as shown, using the screws provided in the bracket kit. Attach the second bracket to the opposite side of the chassis. Use a number 2 Phillips screwdriver to install the bracket screws.

Four screws are required on each side. Figure 3-1 shows how the bracket is attached.

*Figure 3-1     Attaching the Bracket*



Rack-mount bracket
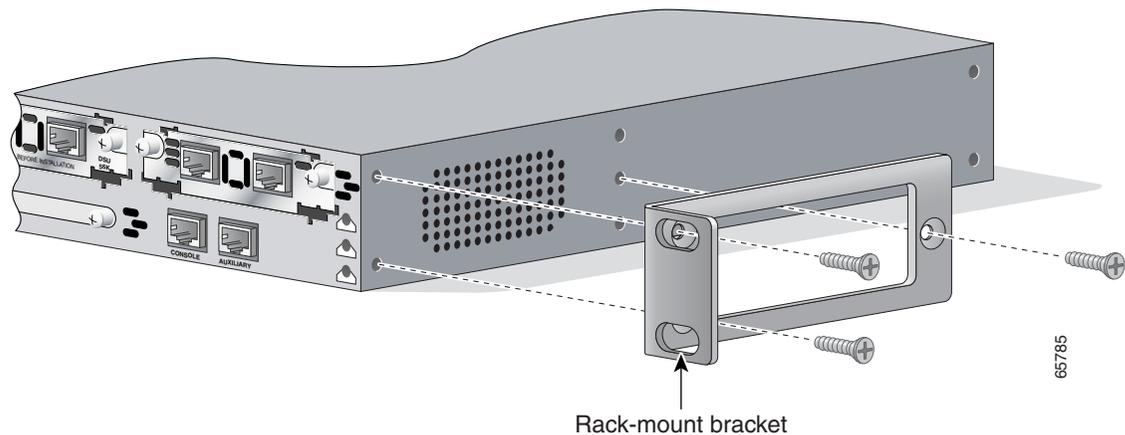
# Installing the Router in the Rack

Install the chassis in the rack. Rack-mounting screws are not provided with the router. Use two screws for each side (supplied with the rack).

# Installing a T1/E1 Multiflex VWIC

If your MWR 1900 router does not have a T1/E1 Multiflex VWIC installed of if you need to install an additional T1/E1 Multiflex VWIC, see the *VWIC-2MFT-T1-DIR, VWIC-2MFT-E1-DIR Installation Instructions*.

⚠

**Caution**    T1/E1 Multiflex VWICs do not support online insertion and removal (hot swapping). Before inserting a card into the network module or router chassis, you must turn off electrical power and disconnect network cables.

# Connecting the Console Terminal and Modem

This section describes how to connect a console terminal and a modem to the router. You can connect only a terminal to the console port. Use the auxiliary port with a terminal or a modem for remote access to the router.

These ports provide administrative access to your router either locally (with a console terminal) or remotely (with a modem).

# Identifying a Rollover Cable

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

*Figure 3-2    Identifying a Rollover Cable*
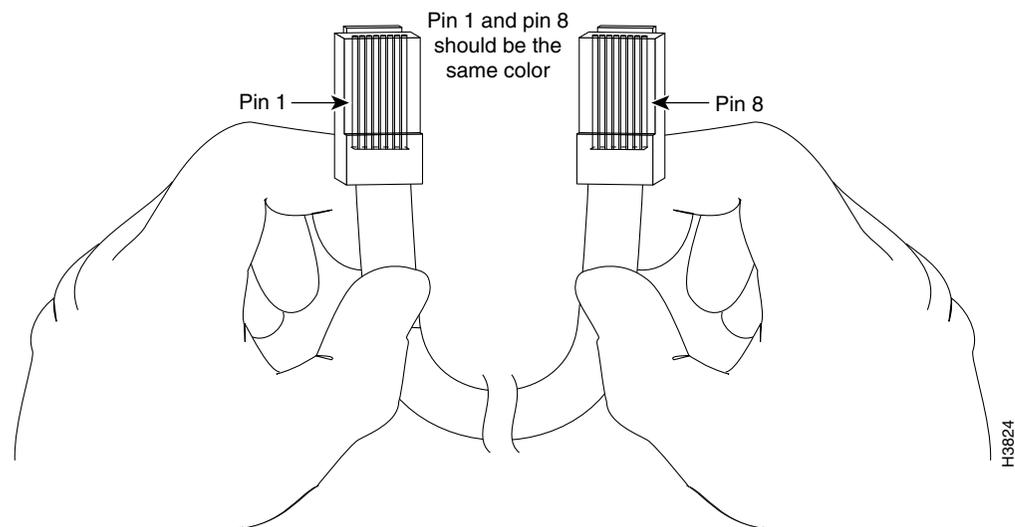


# Console Port

Take the following steps to connect a terminal or a PC running terminal emulation software to the console port on the router:

**Step 1**    Connect the terminal using an RJ-45 rollover cable and an RJ-45-to-DB-25 or RJ-45-to-DB-9 adapter (labeled TERMINAL).

**Note**    The RJ-45-to-DB-25 adapter (Cisco part number 29-0810-01) can be purchased from Cisco.

**Step 2**    Configure your terminal or terminal emulation software for 9600 baud, 8 data bits, no parity, and 2 stop bits.

> ✎
>
> **Note** Because hardware flow control is not possible on the console port, Cisco does not recommend that modems be connected to the console port. Modems should always be connected to the auxiliary port.

## Auxiliary Port

Take the following steps to connect a modem to the auxiliary port on the router:

**Step 1** Connect a modem to the auxiliary port using an RJ-45 rollover cable with an RJ-45-to-DB-25 adapter. The provided adapter is labeled MODEM. For cable pinouts, see the online publication *Cisco Modular Access Router Cable Specifications* available both on the Documentation CD-ROM and CCO.

**Step 2** Make sure that your modem and the router auxiliary port are configured for the same transmission speed (up to 115200 bps is supported) and hardware flow control with Data Carrier Detect (DCD) and Data Terminal Ready (DTR) operations.

# Connecting the Network Cables

The MWR 1900 router supports the following network connections:

- Fast Ethernet
- T1/E1 (through the VWIC)

## Connecting the FE Interface Cables

The RJ-45 port supports standard straight-through and crossover Category 5 unshielded twisted-pair (UTP) cables (refer to Figure 3-15). Cisco Systems does not supply Category 5 UTP cables; these cables are available commercially.

**Step 1** Confirm that the router is turned off.

**Step 2** Connect one end of the cable to the FE port on the router.

**Step 3** Connect the other end to the BTS patch or demarcation panel at your site.

Figure 3-3 shows the RJ-45 port and connector.

*Figure 3-3    RJ-45 Port and Plug*



87654321

RJ-45 connector

H2936
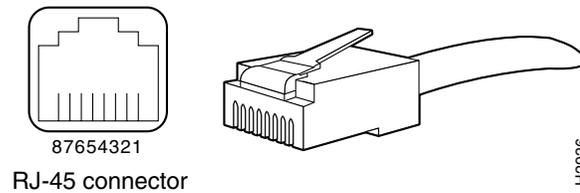
Table 3-1 lists the pinouts and signals for the RJ-45 port.

*Table 3-1    RJ-45 Pinout*

| Pin | Description |
| --- | --- |
| 1 | Receive Data + (RxD+) |
| 2 | RxD- |
| 3 | Transmit Data + (TxD+) |
| 6 | TxD- |

# Connecting the VWIC Interface Cables

How you connect the ports of the T1/E1 Multiflex VWIC depends on whether you are using the MWR 1900 router in a redundant or a non-redundant configuration.

For redundant configurations, use a Y-cable (as described in Y-Cable Specifications, page 3-6).

**Note**    HSRP and the Y-cable mode must be configured for redundancy to allow one router to become active (CD LED on) and the other to become the standby (CD LED on, AL LED on due to no framing). For more information, see the *MWR 1900 Software Configuration Guide*.

**Step 1**    Confirm that both routers are turned off.

**Step 2**    Connect the end of one of the Y-cable stubs to the T1 or E1 port on the card on the first router.

**Step 3**    Connect the end of the other Y-cable stub to the T1 or E1 port (using the same type of port as in Step 2) on the card in the second router.

**Step 4**    Connect the other end of the Y-cable to the BTS patch or demarcation panel at your site.

**Step 5**    Turn on power to the routers.

**Step 6**    Check that the CD LEDs goes on, which means that the cards' internal CSU/DSU is communicating with the CSU/DSU at the T1 or E1 service provider central office.

For non-redundant configurations, use a straight-through, shielded RJ-48C-to-RJ-48C cable.

**Note**   If you choose to use the T1/E1 Multiflex VWIC in a non-redundant configuration, you must close the relays on the card using the **standalone** subcommand. For more information, see the "*Cisco MWR 1900 Software Configuration Guide*."

**Step 1**   Confirm that the router is turned off.

**Step 2**   Connect one end of the cable to the T1 or E1 port on the card.

**Step 3**   Connect the other end to the BTS patch or demarcation panel at your site.

**Step 4**   Turn on power to the router.

**Step 5**   Check that the CD LED goes on, which means that the card's internal CSU/DSU is communicating with the CSU/DSU at the T1 or E1 service provider central office.

The T1/E1 Multiflex VWIC uses an RJ-48C connection, as shown in Figure 3-4.

*Figure 3-4      RJ-48C Connection*



87654321

RJ-48C connector

24939
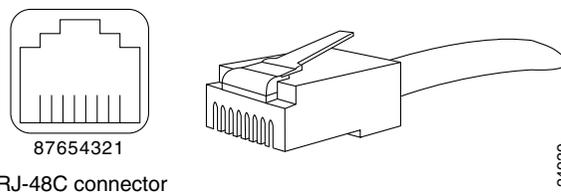
Table 3-2 shows the pinout configuration of the RJ-48C connectors on the T1/E1 Multiflex VWIC.

*Table 3-2      RJ-48C Pinout*

| Pin | Description |
| --- | --- |
| 1 | receive tip |
| 2 | receive ring |
| 3 | receive shield |
| 4 | transmit tip |
| 5 | transmit ring |
| 6 | transmit shield |
| 7 | not used |
| 8 | not used |

## Y-Cable Specifications

Although it can be used in a standalone MWR 1900 router, the T1/E1 Multiflex VWIC is designed to be used in redundant configurations. Such configurations require a special Y-cable for connecting the active and standby routers. The Y-cable provides a dual E1 or T1 PRI connection.

This section describes the specifications of the Y-cable.

- T1/E1 Multiflex VWIC Y-cables should be made with 4 twisted-pair, shielded, 28-gauge cables.

- The cable length of each stub (from the RJ-48C connector to the junction point) should not exceed 3 inches (76 mm).

- The cable length from junction point to the patch panel is determined by the customer.
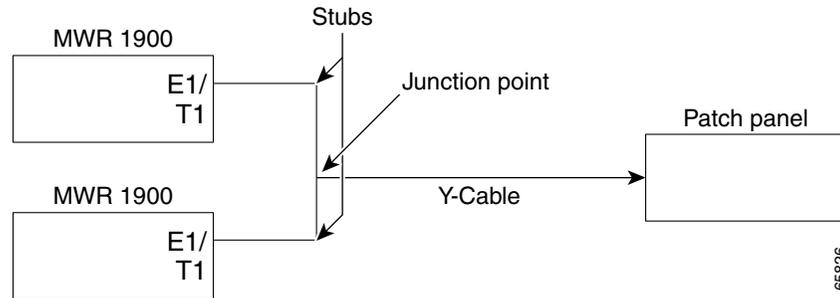


- All signals that propagate in the same direction must share the same twisted pair. For example, RX TIP and RX RING must form a single twisted pair.

- All unused twisted pairs should be cut flush on both ends of the cable. Any unused wire in a twisted pair where one wire is in use should be cut flush at both ends.

# Connecting the MWR 1900 Router to a DC-Input Power Supply

This section contains instructions for:

- Required Tools and Equipment
- Grounding the Router
- Wiring the DC-Input Power Source
- Powering On the Router

**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.**

# Required Tools and Equipment

You need the following tools and equipment:

- Terminal block connector (Phoenix part number 1754465).

- Ratcheting torque screwdriver with a Phillips head that exerts up to 15 pound-force inches (lbf-in) of pressure.

- Panduit crimping tool with optional controlled cycle mechanism, model CT-700, CT-720, CT-920, CT-930, CT-920CH, or CT-940CH.

- 6-gauge copper ground wire (insulated or noninsulated).

- 18-AWG copper wire for the power cord.

- Wire-stripping tool(s) for stripping both 6- and 18-gauge wires.

# Grounding the Router

Follow these steps to ground the router to earth ground. Make sure to follow any grounding requirements at your site.

**Warning**    **This equipment is intended to be grounded. Ensure that the host is connected to earth ground during normal use.**

**Warning**    **When installing the unit, the ground connection must always be made first and disconnected last.**

**Step 1**    Remove the ground-lug screw from the rear panel of the router (shown in Figure 1-3). Use a standard Phillips screwdriver or a ratcheting torque screwdriver with a Phillips head.

**Step 2**    Set the screw aside.

**Step 3**    If your ground wire is insulated, use a wire-stripping tool to strip the 6-gauge ground wire to 0.5 inch ± 0.02 inch (as shown below)

.
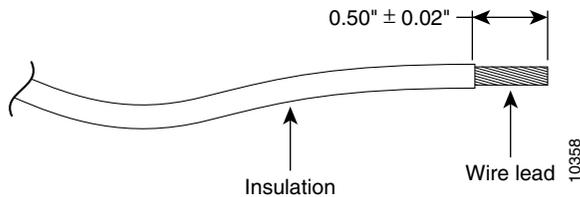


**Step 4**    Slide the open end of your ground lug over the exposed area of the 6-gauge wire.

**Step 5**    Using a Panduit crimping tool, crimp the ground lug to the 6-gauge wire (as shown below).
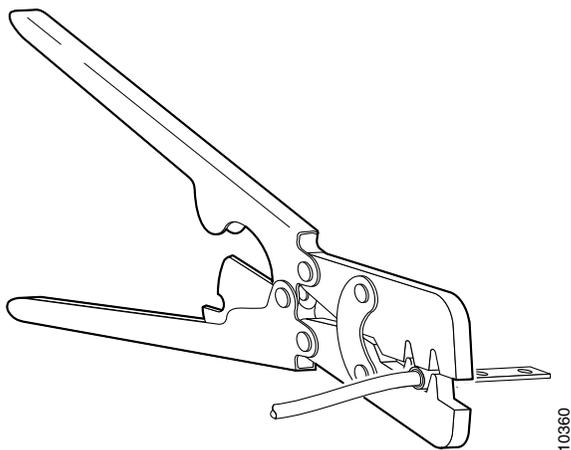
**Step 6**    Use the screw to attach the ground lug and wire assembly to the rear panel of the switch.

**Step 7**    Using a ratcheting torque screwdriver, torque the ground-lug screw to 15 1bf-in (or 240 ounce-force inches [240 ozf-in]).

# Wiring the DC-Input Power Source

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**Warning**    **This product relies on the building's installation or power supply for short circuit (overcurrent) protection. Ensure that a listed and certified fuse or circuit breaker no larger than 60 VDC, 15A U.S. is used on all current-carrying conductors.**

✎

**Note**    The installation must comply with the 1996 National Electric Code (NEC) and other applicable codes.

To connect the DC power supply to the Cisco MWR 1900 router, do the following:

**Step 1**    Turn **OFF** the DC power source at the circuit breaker and tape the circuit breaker in the **OFF** position.

**Step 2**    Connect one end of the customer-supplied power cord (18-AWG copper wire) to the DC power source.

**Step 3**    Attach the terminal block connector (Phoenix part number 1754465) to the other end of the power supply cord. Ensure that the pinouts are configured properly. The pinouts are listed on the label beside the power connector on the back of the MWR 1900 router.

**Step 4**    Plug the connector on the power supply cord into the MWR 1900 power supply connector, which is the green connector on the right-hand side of the back of the MWR 1900 router.

⚠️

**Warning**    **An exposed wire lead from a DC-input power source can conduct harmful levels of electricity. Be sure that no exposed portion of the DC-input power source wire extends from the terminal block plug.**

⚠️

**Warning**    **Secure all power cabling when installing this unit to avoid disturbing field-wiring connections.**

# Powering On the Router

⚠️

**Warning**    **The plug-socket combination must be accessible at all times because it serves as the main disconnecting device.**

Warning    **After wiring the DC power supply, remove the tape from the circuit breaker switch handle and reinstate power by moving the handle of the circuit breaker to the ON position.**

Warning    **Do not touch the power supply when the power cord is connected. For systems with a power switch, line voltages are present within the power supply even when the power switch is off and the power cord is connected. For systems without a power switch, line voltages are present within the power supply when the power cord is connected.**

Warning    **This equipment is intended to be grounded. Ensure that the host is connected to earth ground during normal use.**

To power on the router, do the following:

Step 1    Turn on the power supply at the circuit breaker.

Step 2    The LED labeled PWR on the front panel should go on.

If you encounter problems when you power on the router, see Appendix A, "Troubleshooting.".

# Replacing or Upgrading the CF

This section describes how to remove, install, and format the external Compact Flash (CF).

The MWR 1900 router is shipped with a 32MB CF included. It contains the appropriate IOS software image. However, you may need to replace or upgrade the CF at some point. If you do, follow the steps outlined below. This procedure can also be used to make copies of the CF.

Step 1    Copy the desired IOS image to a remote TFTP server.

Step 2    Power up the MWR 1900 router to the ROMMON prompt.

Step 3    Boot the router with the existing IOS image.

Step 4    Remove the CF cover.

Step 5    Remove the current CF from the CF Slot. See Removing a CF Memory Card from an External Slot, page 3-11 for more information.

Step 6    Place a new CF into the CF Slot.

Step 7    Format the CF using the **format slot0:** command. See Formatting Procedures for CF Memory Cards, page 3-12 for more information.

Step 8    Issue a **copy tftp slot0:** command to copy the customer-ordered IOS image from the remote TFTP server back to the CF.

Note    Ensure that the IOS image is the first file on the CF. Otherwise, the router will not
boot. To avoid naming conflicts, we recommend that you copy the file as
mwr1900-i-mz.boot.

Step 9    Reboot the system to the ROMMON prompt.

Step 10    Boot the customer-ordered IOS image from the new CF.

Step 11    Upon successful booting of the image, replace the CF cover. If the boot process is unsuccessful, repeat
Step 6 through Step 10.

# Removing a CF Memory Card from an External Slot

Complete the following steps to remove a CF memory card from an external slot:

Caution    Do not remove the CF memory card while it is performing a read or write operation,
because the router will shut down and the file system will be damaged.

Step 1    Locate the CF memory card in its slot in the front panel of the chassis. See Figure 1-2 on page 1-3.

Step 2    Move the release button, located next to the slot, to its fully extended position, and press the button to
unseat the card.

Step 3    Carefully pull the card out of the slot.

Step 4    Place the removed CF memory card on an antistatic surface or in a static shielding bag.

# Installing a CF Memory Card in an External Slot

Complete the following steps to install a CF memory card:

Step 1    Locate the CF memory-card slot in the front panel of the chassis.See Figure 1-2 on page 1-3.

Step 2    With the label facing up, insert the connector end of the CF memory card into the slot until the card is
seated in the connector and the release button is pushed out. The card is keyed so that it cannot be
inserted wrong.

Step 3    Pull the release button out and move it to the left, to latch the card in the slot.

Step 4    Refer to the "Formatting Procedures for CF Memory Cards" section for instructions on formatting the
CF memory card.

# Formatting Procedures for CF Memory Cards

For the Cisco MWR 1900 router, Cisco recommends that you format/erase new CF memory cards to initialize them with a Class C Flash file system. This ensures proper formatting and enables the ROM monitor to recognize and boot the Flash.

The Class C Flash file system is similar to the standard DOS file system; however, a CF memory card formatted with the standard DOS file system does not support booting from the ROM monitor.

## Formatting CF Memory as a DOS File System

To format a new external CF memory card, or to remove the files from a previously installed external CF memory card, enter the **format slot0:** command.

The following example shows output for formatting a CF memory card formatted with a Class C Flash file system:

```
Router# format slot0:

Format operation may take a while. Continue? [confirm]
Format operation will destroy all data in "slot0:".  Continue? [confirm]
Enter volume ID (up to 64 chars)[default slot0]:
Current Low End File System flash card in flash will be formatted into DOS
File System flash card!  Continue? [confirm]
Format:Drive communication & 1st Sector Write OK...
Writing Monlib sectors ................................................................
Monlib write complete
..
Format:All system sectors written. OK...

Format:Total sectors in formatted partition:250592
Format:Total bytes in formatted partition:128303104
Format:Operation completed successfully.

Format of flash complete
```

# File and Directory Procedures

The following sections describe file and directory procedures for external CF memory cards formatted with a Class C Flash file system.

## Copy Files

To copy the files to another location, use the **copy slot0:** *source-filename* { **slot0:** | **tfp:** | **lex**: | **null:** | **nvram**: | **pram:** | **rcp:** | **system:** | **tftp:** | **xmodem:** | **ymodem:** | **running-config** | **startup-config**} *destination-filename* command.

The following example shows output for copying a Cisco IOS file from an external CF memory card to a TFTP server:

```
Router# copy slot0:mwr1900-i-mz.tmp tftp:

Destination filename [mwr1900-i-mz.tmp]?
CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC
CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC
CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC
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CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC
6458584 bytes copied in 202.940 secs (31973 bytes/sec)
```

## Display the Contents of a CF Card

To display the contents (directories and files) of a CF memory card formatted with a Class C Flash file system, use the **dir slot0:** command.

The following example shows output for displaying the contents of an external CF memory card with a Class C Flash file system:

```
Router# dir slot0:

Directory of slot0:/

   3  -rw-     6455048   Mar 01 2001 00:04:06  mwr1900-i-mz
1579  -rw-     6458584   Mar 01 2001 00:24:38  mwr1900-i-mz.new

15912960 bytes total (2998272 bytes free)
```

## Display Geometry and Format Information

To display the geometry and format information of a CF memory card formatted with a Class C Flash file system, use the **show slot0:** command.

The following example shows output for displaying the geometry and format information of an external CF memory card formatted with a Class C Flash file system:

```
Router# show slot0:

******** ATA Flash Card Geometry/Format Info ********

ATA CARD GEOMETRY
  Number of Heads:      2
  Number of Cylinders   490
  Sectors per Cylinder  32
  Sector Size           512
Total Sectors         31360

ATA CARD FORMAT
  Number of FAT Sectors  12
  Sectors Per Cluster    8
  Number of Clusters     3885
  Number of Data Sectors 31264
  Base Root Sector       152
  Base FAT Sector        128
  Base Data Sector       184

Please use "dir" command to display the contents of the card.
```

## Delete Files from Flash

To delete a file from a CF memory card, use the **delete slot0:** *filename* command.

The following example shows output for deleting a Cisco IOS file from an external CF card:

```
Router# delete slot0:mwr1900-i-mz.tmp

Delete filename [mwr1900-i-mz.tmp]?
Delete slot0:mwr1900-i-mz.tmp? [confirm]
Router# dir slot0:
Directory of slot0:/

No files in directory

128094208 bytes total (128094208 bytes free)
```

## Rename a File in Flash

To rename a file in a CF memory card, use the **rename slot0:** *original-filename* **slot0:** *new-filename* command.

The following example shows output for renaming a Cisco IOS file in an external CF card:

```
Router# rename slot0:mwr1900-i-mz.tmp slot0:mwr1900-i-mz

Destination filename [mwr1900-i-mz]?
Router# dir slot0:

Directory of slot0:/

 1580  -rw-    6462268   Mar 06 1993 06:14:02  mwr1900-i-mz.1900ata
    3  -rw-    6458388   Mar 01 1993 00:01:24  mwr1900-i-mz

63930368 bytes total (51007488 bytes free)
```

## Display File Content

To display the content of a file in a CF memory card, use the **more slot0:** *filename* command.

The following example shows output from the more command on an external CF card:

```
Router# more slot0:mwr1900-i-mz.tmp

00000000: 7F454C46 01020100 00000000 00000000    .ELF .... .... ....
00000010: 00020061 00000001 80008000 00000034    ...a .... .... ...4
00000020: 00000054 20000001 00340020 00010028    ...T  ... .4.  ...(
00000030: 00050008 00000001 0000011C 80008000    .... .... .... ....
00000040: 80008000 00628A44 00650EEC 00000007    .... .b.D .e.l ....
00000050: 0000011C 0000001B 00000001 00000006    .... .... .... ....
00000060: 80008000 0000011C 00004000 00000000    .... .... ..@. ....
00000070: 00000000 00000008 00000000 00000021    .... .... .... ...!
00000080: 00000001 00000002 8000C000 0000411C    .... .... ..@. ..A.
00000090: 00000700 00000000 00000000 00000004    .... .... .... ....
000000A0: 00000000 00000029 00000001 00000003    .... ...) .... ....
000000B0: 8000C700 0000481C 00000380 00000000    ..G. ..H. .... ....
000000C0: 00000000 00000004 00000000 0000002F    .... .... .... .../
000000D0: 00000001 10000003 8000CA80 00004B9C    .... .... ..J. ..K.
000000E0: 00000020 00000000 00000000 00000008    ...  .... .... ....
000000F0: 00000000 0000002F 00000001 10000003    .... .../ .... ....
00000100: 8000CAA0 00004BBC 00623FA4 00000000    ..J  ..K< .b?$ ....
00000110: 00000000 00000008 00000000 3C1C8001    .... .... .... <...
00000120: 679C4A80 3C018001 AC3DC70C 3C018001    g.J. <... ,=G. <...
00000130: AC3FC710 3C018001 AC24C714 3C018001    ,?G. <... ,$G. <...
00000140: AC25C718 3C018001 AC26C71C 3C018001    ,%G. <... ,&G. <...
00000150: AC27C720 3C018001 AC30C724 3C018001    ,'G  <... ,0G$ <...
00000160: AC31C728 3C018001 AC32C72C 3C018001    ,1G( <... ,2G, <...
--More-- q
```

## Create a New Directory

To create a directory in CF memory, use the **mkdir slot0:** *directory-name* command.

The following example shows output for first displaying the contents of an external CF card, and then creating a directory named config and a subdirectory named test-config:

```
Router# dir slot0:

Directory of slot0:/

  3  -rw-    6458208   Mar 01 1993 00:04:08  mwr1900-i-mz.tmp

128094208 bytes total (121634816 bytes free)
Router# mkdir slot0:/config

Create directory filename [config]?
Created dir slot0:/config
Router# mkdir slot0:/config/test-config

Create directory filename [/config/test-config]?
Created dir slot0:/config/test-config
Router# dir slot0:

Directory of slot0:/

  3  -rw-    6458208   Mar 01 1993 00:04:08  mwr1900-i-mz.tmp
 1580  drw-        0   Mar 01 1993 23:48:36  config

128094208 bytes total (121626624 bytes free)
```

```
Router# cd slot0:/config

Router# dir slot0:

Directory of slot0:/config/

 1581  drw-          0  Mar 01 1993 23:50:08  test-config

128094208 bytes total (121626624 bytes free)
```

## Remove a Directory

To remove a directory from CF memory, use the **rmdir slot0:/***directory-name* command.

Before you can remove a directory, all files and subdirectories must be removed from the directory.

The following example shows output for displaying the contents of an external CF card, then removing the subdirectory named test-config:

```
Router# dir slot0:

Directory of slot0:/config/

  1581  drw-          0  Mar 01 1993 23:50:08  test-config

128094208 bytes total (121626624 bytes free)
Router# rmdir slot0:/config/test-config

Remove directory filename [/config/test-config]?
Delete slot0:/config/test-config? [confirm]
Removed dir slot0:/config/test-config
Router# dir slot0:

Directory of slot0:/config/

No files in directory

128094208 bytes total (121630720 bytes free)
```

## Enter a Directory and Determine the Current Directory

To enter a directory in CF memory, use the **cd slot0:/***directory-name* command. To determine which directory you are in, use the **pwd** command.

The following example shows output for the following actions:

- Entering the home directory of a CF memory card in an external slot (slot0:/)
- Verifying that you are in the slot0:/ directory

```
Router# cd slot0:

Router# pwd

slot0:/
```

# What to Do After Installing the Hardware

When you have installed the router hardware, see the *Cisco MWR 1900 Software Configuration Guide* included in your router package for initial software configuration information.

# Troubleshooting

Your Cisco MWR 1900 router goes through extensive testing before leaving the factory. If you encounter problems, use the information in this appendix to help isolate problems or to eliminate the router as the source of the problem.

This appendix contains the following sections:

- Problem Solving, page A-1
- Reading the LEDs, page A-3

If you cannot locate the source of the problem, contact a customer service representative for information on how to proceed. For technical support information, see the *Cisco Information Packet* publication that shipped with your router. Before you call, have the following information ready:

- Chassis type and serial number
- Maintenance agreement or warranty information
- Type of software and version number
- Date you received the new chassis
- Brief description of the problem
- Brief explanation of the steps you have taken to isolate the problem

## Problem Solving

The key to problem solving is to isolate the problem to a specific subsystem by comparing what the router is doing to what it should be doing.

The LEDs on the front panel of the router enable you to determine router performance and operation. For a description of these LEDs, see Reading the LEDs, page A-3.

When problem solving, consider the following router subsystems:

- Power and cooling systems—External power source, power cable, router power supply and circuit breaker, and router blower and fan. Also consider inadequate ventilation or air circulation.
- Modules—LEDs on the modules help identify a failure.
- Cables—External cables that connect the router to the network.

# Troubleshooting the Power and Cooling Systems

Both the power LED and the fans can help you troubleshoot a power problem. Check the following items to help isolate the problem:

Check the following items to help isolate problems with the power supply installation:

- With the MWR 1900 router connected to the power source, is the power LED on the front panel on?
    - If not, check the DC input, DC source, and the power supply wiring.
    - Check the power supply connection to the motherboard.
    - If the power LED is still off, the problem might be a power supply failure.
- Does the router shut down after being on a short time?
    - Check the fans. If the fans are not working, the router will overheat and shut itself down.
    - If the fans are not working, check the power supply connections to the fans.
    - Ensure that the chassis intake and exhaust vents are clear.

    Check the environmental site requirements in the "System Specifications" section on page 1-6.

- Does the router partially boot, but the LEDs do not go on?
    - Check for a power supply failure by inspecting the power LED on the front panel of the router. If the power LED is on, the power supply is functional.
    - If the power LED is not on, refer to the *Cisco Information Packet* for warranty information or contact customer service.

# Environmental Reporting Features

The MWR 1900 router has a temperature sensor to detect over-temperature conditions inside the chassis. The over-temperature detection trips at 75°C +/- 5%. This condition is reported to the processor as an interrupt and software then takes action on this interrupt to generate the appropriate alarming. If the router reaches a temperature of 90°C, the power supply will cycle to prevent the box from exceeding that temperature in a powered up state.

If the router is operating at an abnormally high temperature, you see the following message on the console screen:

```
%SYS-1-OVERTEMP: System detected OVERTEMPERATURE condition. Please resolve cooling problem
immediately!
```

Some causes of abnormally high router temperature are:

- Fan failure
- Air conditioner failure in the room
- Air blockage to cooling vents

Take steps to correct the problem. For information about environmental operating conditions, see "System Specifications" section on page 1-6.

## Troubleshooting Modules, Cables, and Connections

Network problems can be caused by a module, cables or cable connections, or external devices such as a modem, transceiver, hub, wall jack, WAN interface, or terminal. Check for the following symptoms to help isolate the problem:

- Module is not recognized by the router.

    - Make sure the module is firmly seated in its slot.

    - Check the LEDs on the module. Each module has its own set of LEDs. For information on these LEDs, see Reading the LEDs, page A-3.

    - Make sure you have a version of Cisco IOS software that supports the module.

- Module is recognized, but interface ports do not initialize.

    - Make sure the module is firmly seated in its slot.

    - Check external cable connections.

    - Make sure you have a version of Cisco IOS software that supports the module.

- Router does not boot properly, or constantly or intermittently reboots.

    - Make sure the module is firmly seated in its slot.

    - Check the router chassis or software. Refer to the *Cisco Information Packet* publication that shipped with your router for warranty information, or contact customer service.

- Router boots, but the console screen is frozen.

    - Check the external console connection.

    - Verify that the parameters for your terminal are set as follows:

        (a) The same data rate as configured for the router (9600 bps is the default)

        (b) 8 data bits

        (c) No parity generated or checked

        (d) 2 stop bits

- Router powers on and boots only when a particular module is removed.

    - Check the module. Refer to the *Cisco Information Packet* publication that accompanied your order for warranty information, or contact customer service.

- Router powers on and boots only when a particular cable is disconnected.

    - There may be a problem with the module or cable. Refer to the *Cisco Information Packet* publication for warranty information, or contact customer service.

# Reading the LEDs

The LEDs on the front panel of the router enable you to determine router performance and operation. Figure A-1 shows the locations of the LEDs.

*Figure A-1    Front Panel of the MWR 1900*
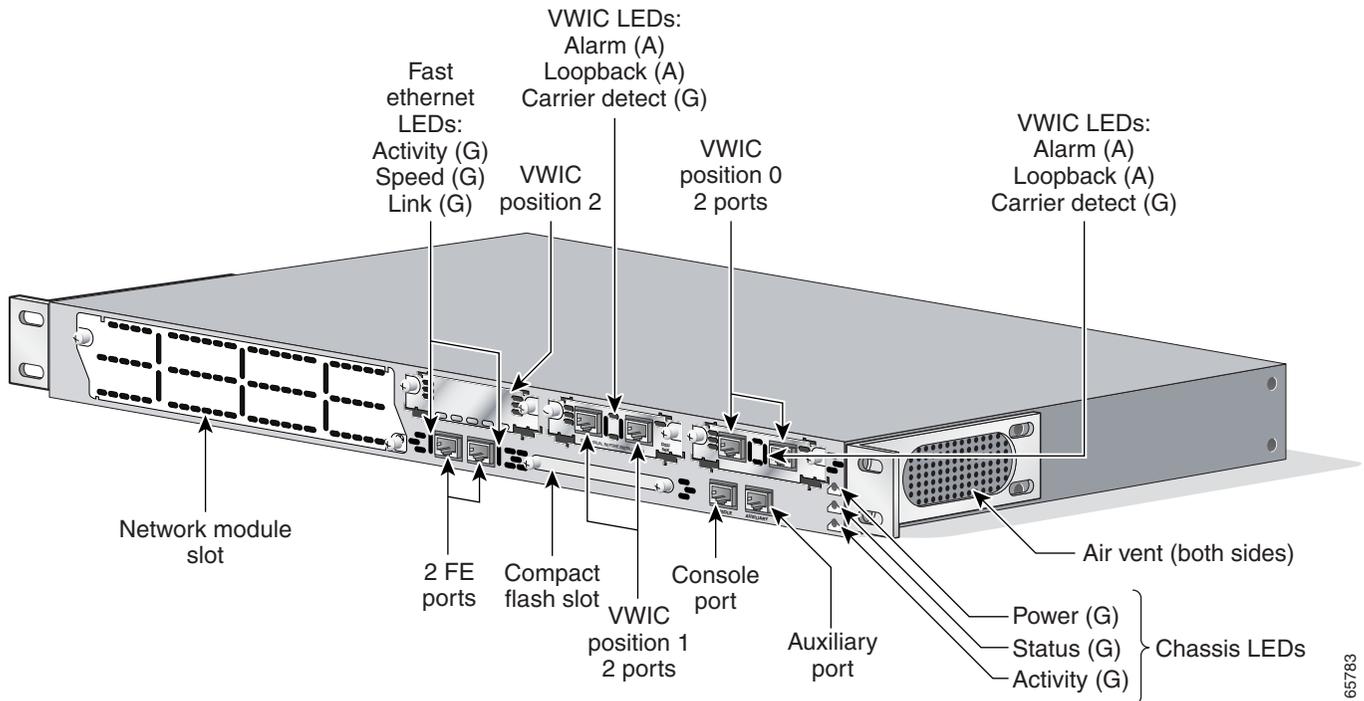


*Table A-1    Chassis LEDs*

| LED | Color | Status |
|---|---|---|
| Power | Green | Operating voltages on the mainboard are within acceptable ranges. |
| | Off | The router is not connected to a power supply or an error condition has been detected in the operating voltages. |
| Status | Green | The router's software has booted up and the system is operational. |
| | Off | The router has not yet booted or an error condition has been detected in the boot process. |
| Activity | Green | Packets or interrupts are being sent or received by the router. |
| | Off | No activity. |

*Table A-2    Fast Ethernet Connector LEDs*

| LED | Color | Status |
|---|---|---|
| Activity | Green | Data is being transmitted on the link. |
| | Off | No data is being transmitted. |
| Speed | Green | 100 Mbps communication speed attained. |
| | Off | 10 Mbps communication speed attained, or no link established. |
| Link | Green | Ethernet link is established. |
| | Off | No established link. |

***Table A-3    VWIC LEDs***

| LED | Color | Description |
|-----|-------|-------------|
| Loopback | Amber | A loopback or line state is detected or is manually set by the user. |
| | Off | Normal operation. |
| Alarm | Amber | A local or remote alarm state. |
| | Off | Normal operation. |
| Carrier Detect | Green | A carrier has been detected and the internal DSU/CSU in the WAN interface card is communicating with another DSU/CSU. This LED is on during normal operation. |
| | Off | No carrier has been detected. |

**Note**    In a redundant configuration, when the relays of the VWIC open, the Carrier Detect LED on the T1 ports will remain lit and the Alarm LED will also come on. Therefore, the inactive router will show both the Carrier Detect light and the Alarm light, while the active router will show only the Carrier Detect light.

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