



Installation Guide

Series 200

Series 400

HP AdvanceStack Routers

Installation Guide

Hewlett-Packard Series 200 Routers
Hewlett-Packard Series 400 Routers

Installation Guide

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Product Numbers

This guide provides operating instructions for the following Hewlett-Packard Company products: 27285A, 27286A, 27287A, 27288A, 27289B, 27290A, J2540B, J2543A

Warranty

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Safety Considerations

The product and related documentation must be reviewed for familiarization with safety markings and instructions before installation and operation. See the “Safety Information” section in the back of this manual.

Informations concernant la sécurité

Ce produit et la documentation s'y rapportant devront être étudiés avant l'installation et l'utilisation, afin de se familiariser avec les symboles et instructions de sécurité. Reportez-vous à la section «Informations concernant la sécurité».

Hinweise zur Sicherheit

Sehen Sie sich das Produkt an und lesen Sie die begleitende Dokumentation, damit Sie vor der Installation und dem Betrieb mit den Sicherheitssmarkierungen und Anleitungen vertraut sind. Bitte lesen Sie das Kapitel mit der Überschrift “Hinweise zur Sicherheit”.

Considerazioni sulla sicurezza

Esaminare il prodotto e la relativa documentazione per familiarizzarsi con gli avvisi e le istruzioni di sicurezza prima dell'installazione e dell'uso. Vedere la sezione di questo documento intitolata “Considerazioni sulla sicurezza”.

Consideraciones sobre seguridad

Antes de instalar y hacer funcionar el producto, se deben estudiar el producto y la documentación relacionada a fin de familiarizarse con las indicaciones de advertencia e instrucciones. Ver la sección del documento titulada “Consideraciones sobre seguridad”.

Regulatory Information

The product described in this document complies with specific international regulations. See the document section entitled “Regulatory Statements” for the applicable regulatory information.

Informations concernant la réglementation

Le produit décrit dans le présent document satisfait à des normes internationales spécifiques. Pour plus de détails sur les réglementations applicables, reportez-vous à la section «Regulatory Statements».

Informationen über Kontrollvorschriften

Das in diesem Dokument beschriebene Produkt erfüllt bestimmte internationale Kontrollvorschriften. Für Informationen über die zutreffenden Kontrollvorschriften lesen Sie bitte das Kapitel mit der Überschrift “Regulatory Statements”.

Informazioni sulla regolamentazione

Il prodotto descritto in questo documento è conforme alle specifiche normative internazionali. Vedere la sezione del documento intitolata “Regulatory Statements” per le informazioni sulle normative competenti.

Informacin reglamentaria

El producto que se describe en este documento cumple con determinados reglamentos internacionales.

En cuanto a la información reglamentaria correspondiente, ver la sección del documento titulada “Regulatory Statements”.

安全のために

本製品の設置、操作を行う前に、必ずマニュアル及び関連文書中の安全表示、使用上の注意をお読みください。“Safety Information”の項をご参照ください。

Preface

This manual is both a task-oriented installation guide and a reference describing the hardware aspects of router features, operation, and troubleshooting. The organization is as follows:

Chapter 1: Installation. Begins with checking the accessory kit and continues with the steps for installation, from preparing the network through mounting the router, connecting the network cables, and initializing and verifying the router.

Chapter 2: Router Description. Covers the general hardware features of all HP “rack and stack” routers, including port identities, status LED indications, resetting/clearing, and initialization sequence.

Chapter 3: Troubleshooting. Provides basic tips, status LED interpretation and indicated actions, verifying LED operation, and various diagnostic tests.

Appendixes: Provide cable and connector descriptions, modem configuration data (for remote console access), specifications, additional FDDI attachment methods, safety, warranty, and regulatory information, and a subject index.

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Installation and Initial Setup

Installation

The installation and initial setup of your HP router involves these tasks:

1. Ensuring that you received a complete set of accessories with your router. (page 1-3).
2. Preparing the network (page 1-4).
3. Preparing the router hardware (page 1-6).
4. Initializing and verifying the router (page 1-26).

Phase 1: Ensure that You Have a Complete Set of Accessories

Accessory kit. You should have one accessory kit containing the following:

- Brackets for mounting the router
- Screws for attaching the brackets to the router and to a rack
- AUI retainers
- Self-adhesive rubber feet
- BNC “T” connector cover(s)

Power cord. Your router is provided with one of the power cords listed below.

Caution

In the event that your installation requires a different power cord, make sure that you use a power cord that bears the mark of the safety agency in your country that defines the regulations for power cords. That is your assurance that the power cord can be used safely with the router.

Australia (8120-1369)

Switzerland (8120-2104)

Denmark (8120-2956)

United Kingdom (8120-1351)

Europe (8120-1689)

United States/Canada (8120-1378)

Japan (8120-4753)

Cables: The cables you receive with your router depend on the options in your router order. For details on cables, refer to appendix A, “Cables and Connectors”.

Documentation: For a listing of the documentation for your router, refer to the release notes you received with your router or latest software update.

Phase 2: Prepare the Network

1. Create or update the network plan. Include power sources, computers, data links, hubs, repeaters, bridges, other routers, and cabling (including types and lengths). Verify the design limits for the cable lengths and the number of repeaters and nodes in your network.
2. Create or update the network map. This map provides a diagram of how the network topology now looks or will look as the router hardware is installed. Generally, this diagram includes:
 - The physical location of each network device and end node
 - The connections between each device and end node
 - The network-layer addresses for identifying network and links

For each LAN link, include the following on the map:

- LAN type (Ethernet/802.3, Token Ring/802.5, or FDDI)
- LAN speed (4, 10, 16, or 100 Mbit/s)
- Physical medium (cable type)

For each WAN link, include the following on the map:

- WAN link type (circuit type) and WAN link speed
- Interface type (X.21, V.35, etc.)
- HDLC address (DCE/DTE) for HP Point-to-Point links
- X.121 address and connection ID (for X.25 links)
- Quality of service (LLC1, LLC2, X.25)
- Other pertinent data, such as:
 - ISDN, switched 56, or other dial type numbers
 - Frame relay DLCI encoding type and length, and management type (ANSI Annex D, Annex D switch, LMI, or LMI switch)
 - SMDS individual address

If you use multiple protocols (routing or bridging services) in your network, you may want to make a separate map for each protocol.

3. If the router will be configured from another router using Quick Remote or from a Bootp server, ensure that the Quick Remote or Bootp operation has been enabled on the remote devices. (For more on remote configuration using Quick Remote or Bootp, refer to the *User's Guide* shipped with your router.)

Installation

Phase 2: Prepare the Network

4. Before you apply power to the router, connect all LAN and WAN links to the router. Verify the LAN cabling and that the WAN link terminating equipment is operational. Your WAN link service provider can verify that the WAN link is operating correctly.

Note

Configuring from Quick Remote or a Bootp server requires that the supporting WAN and/or LAN links be connected before the router boots from the factory default.

5. Use a console as described in this chapter to verify and configure the router. The console must be an ANSI or VT100 terminal or a PC running an ANSI or VT100 terminal emulator. You also need either a cable or a modem and a modem cable for connecting the console. (Refer to appendixes A and B.)

Console Note

Connecting a console to the router's console port is optional if the router will be configured and administered from a remote site. That is, if the router will be automatically configured using Quick Remote or a Bootp server, then a remote operator can verify and administer the router over the network.

Phase 3: Prepare the Router Hardware

The basic hardware installation steps are summarized below and detailed in the following pages.

1. Mount the router (page 1-7).
2. Connect a console (optional, depending on method for configuring and administering).
3. Attach network cables (page 1-11).
4. Plug in and verify the router (page 1-22).

A. Mount the Router

1. Make sure the router's power cord is correct for your country's ac power receptacle. Do *not* attach the power cord until the router is mounted.
2. Mount on a wall, rack, or table as follows:

For Rack or Cabinet Mounting: Using a Phillips or cross-head screwdriver, attach the mounting brackets to the router with 10-mm #M4 screws. Position the router in the rack or cabinet and slide it up or down until the rack holes align with the bracket holes. Then attach the router to the rack with $\frac{5}{8}$ -in. #12-24 screws. These two types of screws are included in the accessories kit with the router. (A cabinet may require $\frac{5}{8}$ -in. #10-32 screws instead, available as p/n 2680-0302. Make sure you have screws that fit your cabinet or rack before mounting the router.)

For Table Mounting: Attach the self-adhesive rubber feet to the bottom of the router. Set the router on a table near the power source.

For Wall Mounting: Using a Phillips or cross-head screwdriver, attach the mounting brackets to the router with 10-mm #M4 screws, included in the accessories kit with the router. Then attach the router to a wood surface (minimum $\frac{1}{2}$ -in. plywood or equivalent) with $\frac{5}{8}$ -in. #12 wood screws or equivalent (not included).

Installation

Phase 3: Prepare the Router Hardware

Single-Height Models

These models are 4.3 cm (1.7inches) in height.

Rack Mounting

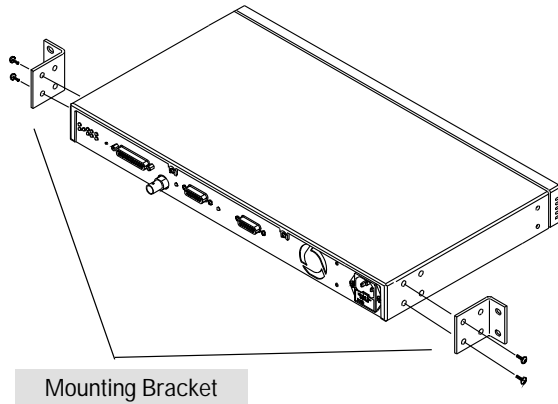


Figure 1-1. Rack Mount - Bracket Position

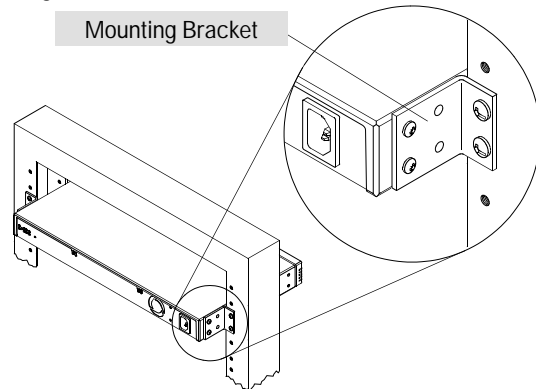


Figure 1-2. Rack Mount - Back Out

Wall Mounting

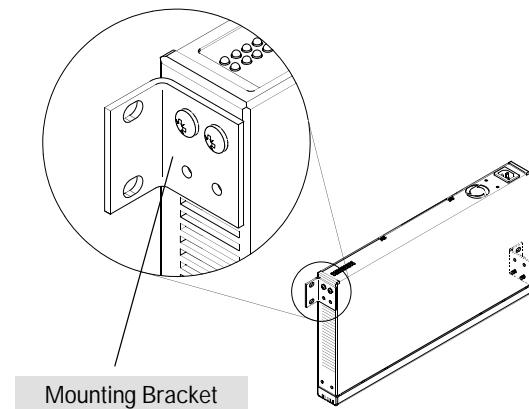


Figure 1-3. Flat On Wall

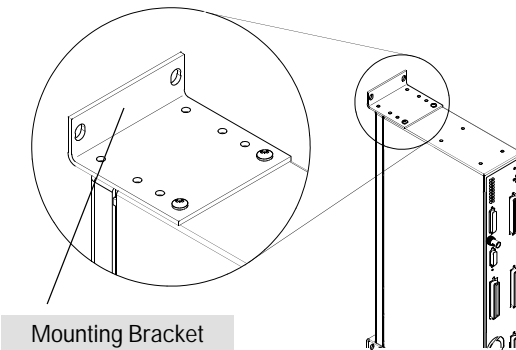


Figure 1-4. Straight Out From Wall

Installation

Phase 3: Prepare the Router Hardware

Double-Height Models

These models are 8.9 cm (3.5 inches) in height.

Rack Mounting

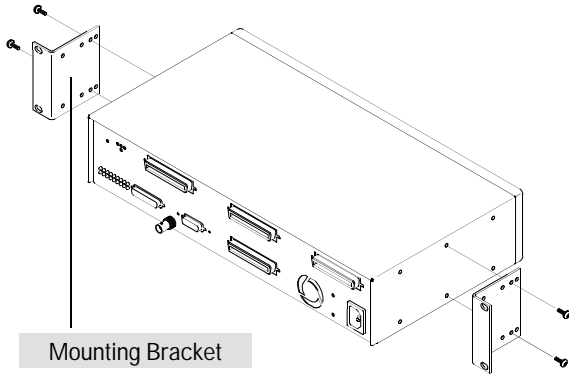


Figure 1-5. Rack Mount - Bracket Position

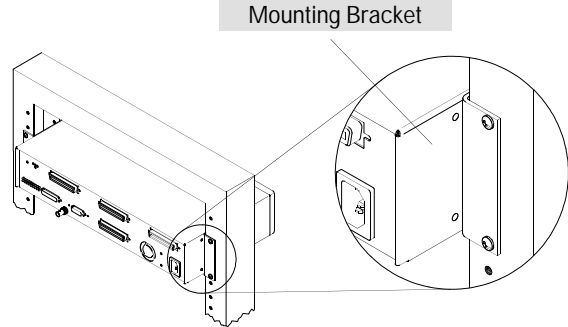


Figure 1-6. Rack Mount - Back Out

Wall Mounting

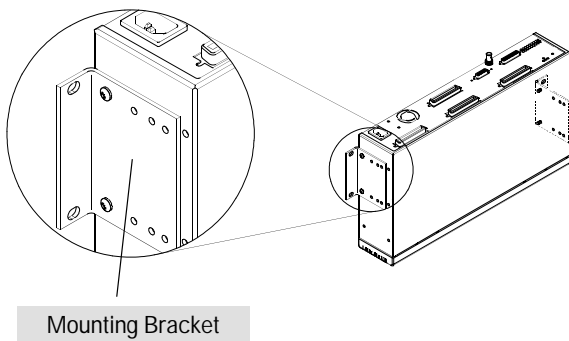


Figure 1-7. Flat On Wall

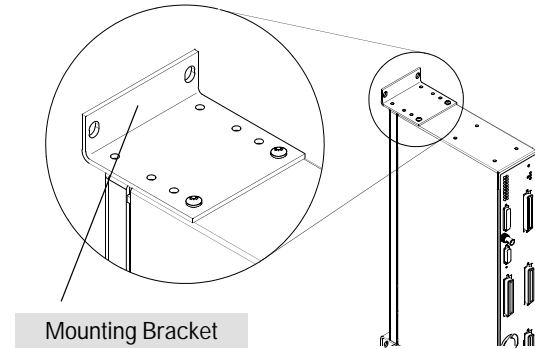


Figure 1-8. Straight Out From Wall

B. Connect a Console (Optional)

When Is a Console Necessary?

Connecting a console is necessary if your management of the router requires direct access through the console port by either a local operator or by a remote operator using a modem. Direct access through the console port is optional if the router is to be configured from a remote site using Smartboot (Quick Remote or a Bootp server) *and* if the router is to be managed from a remote site using Telnet.

To install a console:

1. Do one of the following:
 - Connect the serial port of an ANSI or VT100 terminal (or a PC emulating one of these) to the console port using an RS-232 cable.
 - Connect a full-duplex, asynchronous (character-mode) modem to the console port using an RS-232 cable. At the remote site, connect an ANSI or VT100 terminal (or a PC emulating an ANSI or VT100 terminal) to the remote modem. Then establish the link between the terminal's modem and the router's modem according to the modem instructions.

Note

For recommended console and modem cables, and cable pin-outs, refer to appendix A, "Cables and Connectors". For supported modems and their configuration requirements, refer to appendix B, "Modem Configuration".

2. Switch on the terminal's power (or switch on the PC's power and start the terminal emulation program). Configure for the following:
 - ANSI or VT100
 - 1 stop bit
 - 8 bits/character
 - Xon/Xoff handshaking
 - No parity
 - Baud rate of 57600, 38400, 19200, 9600, 4800, 2400, 1200, or 300
 - Screen size of 24 lines

C. Attach Network Cables

Depending on the model of router and the physical connections in your network, you will use one or more of the following interface options:

- AUI (page 1-12)
- BNC (page 1-14)
- Token Ring (page 1-16)
- FDDI (page 1-17)
- WAN (page 1-21)

Caution

Static discharge may damage equipment. Do not touch the router connector pins or the cable connector pins.

Note

On routers providing an AUI interface and a BNC interface for the same LAN 802.3 port, you can use either interface at any time, but not both at the same time. For information on the operation of the green LEDs indicating AUI or BNC interface selection, refer to “AUI and BNC (green) LEDs” on page 2-10.

Installation

Phase 3: Prepare the Router Hardware

Connecting a LAN to the AUI Interface:

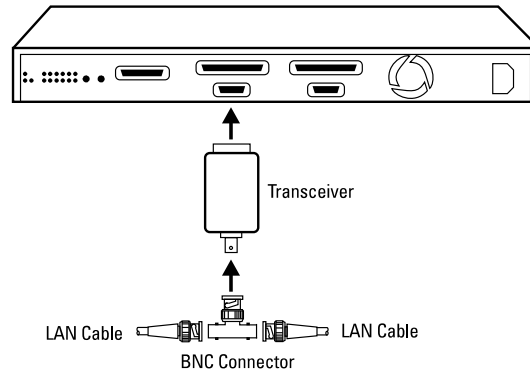


Figure 1-9. LAN AUI Connection

Note

For single-height models, if the bottom of the router rests on a surface (such as a table) and you attach an HP transceiver directly to the AUI port (without an AUI cable), then attach the rubber feet you received in the accessory kit (page 1-3) to the bottom of the router to prevent the transceiver from supporting the weight of the router.

Installation

Phase 3: Prepare the Router Hardware

1. Slide the AUI retainer (included) onto the connector posts on a transceiver (also called a “MAU”) that corresponds to your type of network cabling, or on an AUI cable that is attached to a transceiver (whichever will attach directly to the router).

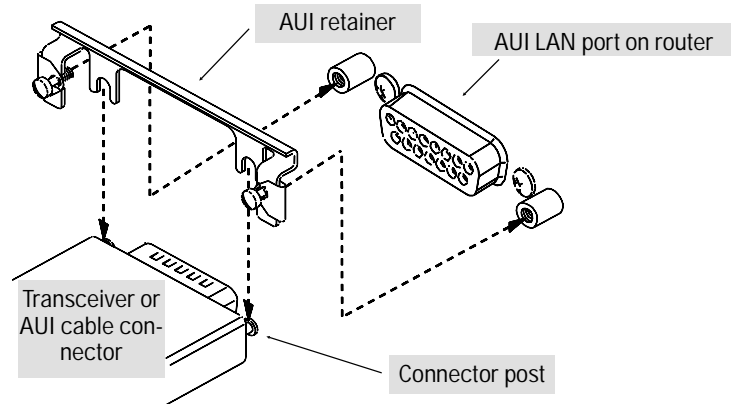


Figure 1-10. Installing the AUI Retainer

2. Plug the transceiver or cable into the Ethernet/802.3 port on the router.
3. Secure the retainer and the transceiver or cable to the router with the retainer's screws.
4. Connect the network cable to the transceiver.

If your router's LAN port(s) have both an AUI interface and a BNC interface, refer to the note on page 1-11

Installation

Phase 3: Prepare the Router Hardware

Connecting a LAN to the BNC Interface:

Warning

To avoid an electrical shock hazard due to an ungrounded or improperly grounded LAN cable, ensure that the LAN cable is properly grounded. (Refer to “Safety Information” in the back of this manual.)

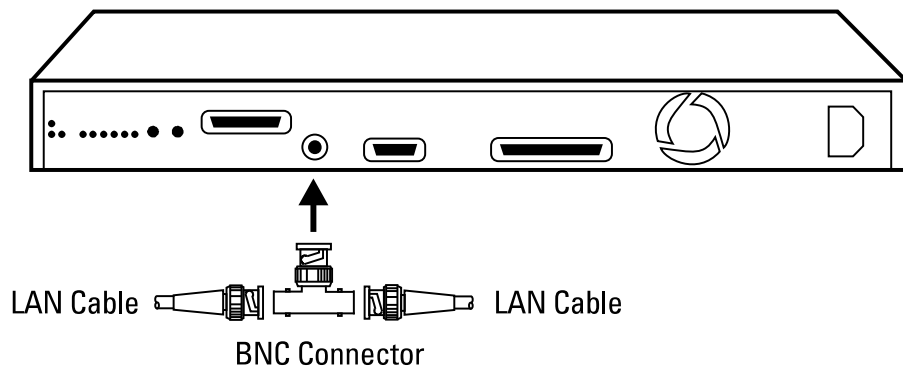


Figure 1-11. LAN BNC Connection

Installation

Phase 3: Prepare the Router Hardware

1. Ensure that the LAN cable is properly grounded. (Refer to “Safety Information” in the back of this manual.)

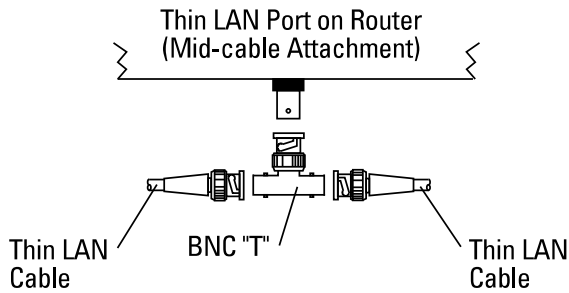


Figure 1-12. BNC Connector -- Mid-Cable

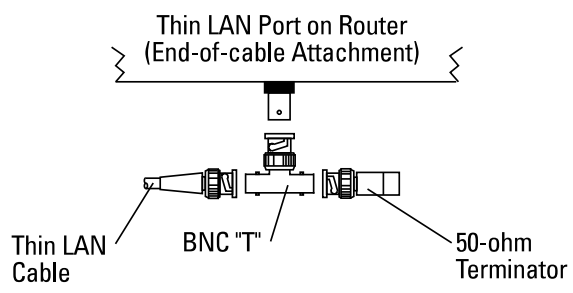


Figure 1-13. BNC Connector -- End-of-Cable

2. Attach a ThinLAN cable section to one side of a BNC “T” connector.
3. Attach another ThinLAN cable section or a 50-ohm terminator to the other side of the “T” connector.

Note

Each coaxial cable segment must be terminated with a 50-ohm terminator at each end. Figure 1-13 shows the ThinLAN port at the end of a cable segment, with the 50-ohm terminator attached to one side of the BNC “T” connector.

4. Attach the “T” connector to the BNC port on the router.
5. Fold the BNC “T” connector cover around the connection and squeeze the surfaces together around the edges.

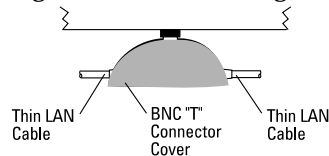


Figure 1-14. The Installed BNC Connector Cover

Installation

Phase 3: Prepare the Router Hardware

Connecting a LAN to the Token Ring Interface

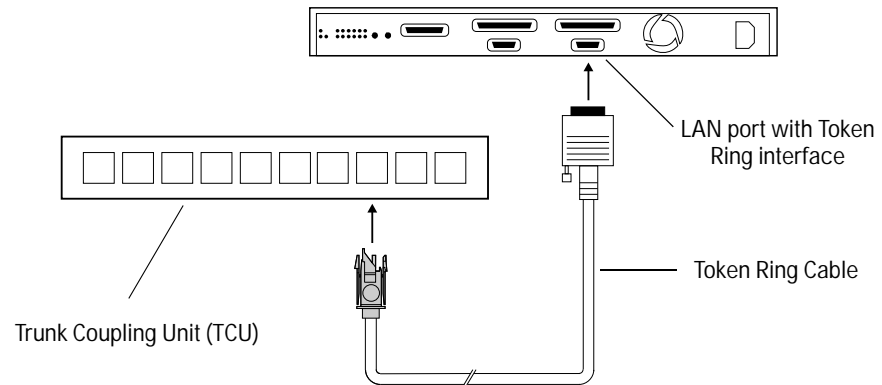


Figure 1-15. LAN 802.5 Token Ring Connection

1. Secure the D-connector on the token ring cable to the token ring port by using the screws on the connector.
2. Connect the MIC connector (illustrated on page A-17) on the token ring cable to the token ring Trunk Coupling Unit (TCU).

Connecting an FDDI Ring to the FDDI Interface

FDDI connections on HP routers use a dual-port FDDI interface with optional node bypassing. Node bypassing is achieved by using an optical bypass switch, also known as an “FDDI dual-switch module”. (For part number, refer to the release notes you received with your router or most recent software upgrade.) Using a bypass switch to connect your FDDI ports to an FDDI network prevents the FDDI network ring from “wrapping”¹ in cases when your router is connected as a dual-attach station (DAS) and powers down. FDDI operation requires HP router software version 5.76 or later.²

This subsection describes basic connections between the router and the FDDI ring. For more information on cable configurations connecting the HP Router BR to dual-attach and single-attach stations (DAS and SAS), refer to appendix D, “FDDI Cable Attachment Configurations”.

¹ For an illustration of “wrapping”, refer to “FDDI Port (Router BR Only)” on page 2-11.

² To determine the current version of software in your router, use the Stamp command in the Network Control Language Interpreter (NCL). For more on NCL commands, refer to the user’s guide you received with your router.

Installation

Phase 3: Prepare the Router Hardware

Connecting an FDDI Ring Directly to the Router: If you are not going to use a bypass switch, simply insert the modular plugs from your FDDI ring into the “MIC A” and “MIC B” FDDI ports on the HP Router BR.

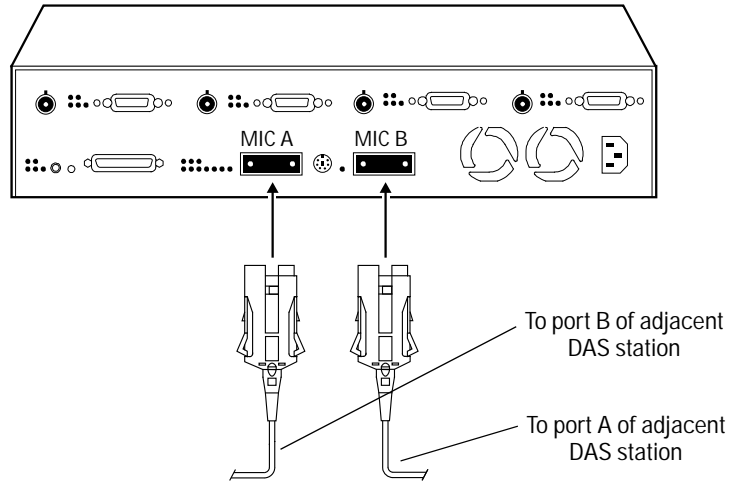


Figure 1-16. Connecting FDDI Without a Bypass Switch

Installation

Phase 3: Prepare the Router Hardware

Using an Optional Bypass Switch to Connect an FDDI Ring :

If your FDDI connection includes an optional bypass switch, use the following steps:

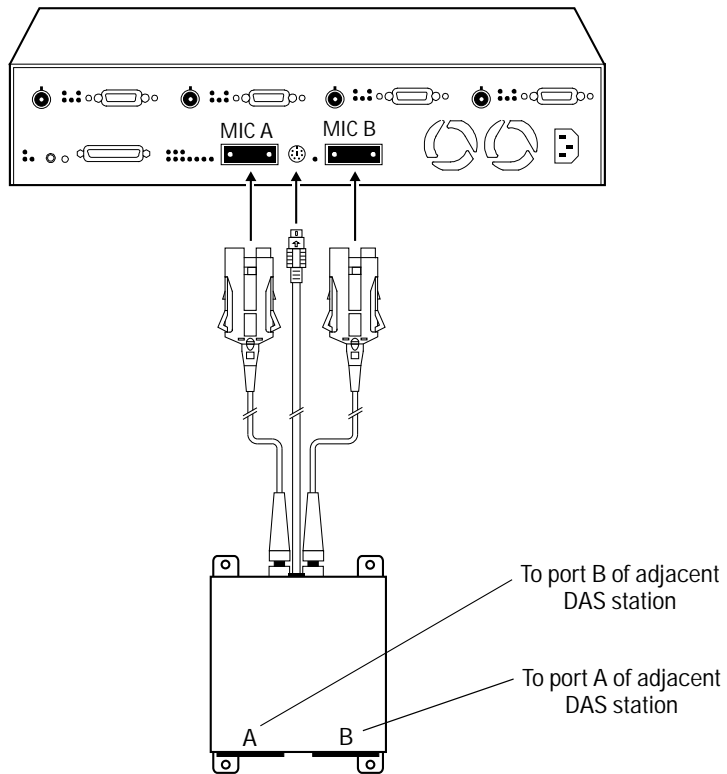


Figure 1-17. Connecting a Bypass Switch

Note

If you are using a bypass switch other than the optical bypass switch offered by Hewlett-Packard, you may want to verify that your switch has the proper pinouts. Refer to "FDDI Optical Bypass DIN Connector Pinouts" on page A-18. (For the part number, refer to the release notes you received with your router or most recent software upgrade.)

Installation

Phase 3: Prepare the Router Hardware

1. Disconnect the router from any directly connected FDDI ring.
2. Connect the bypass switch to the FDDI ring by plugging the MIC A and MIC B connectors from the FDDI ring into the corresponding “A” and “B” ports in the bypass switch. (For details on connecting to the FDDI ring, refer to the instructions for your bypass switch.)
3. Ensure that the bypass cables are keyed properly to allow only the connection of the “A” cable to the router’s “MIC A” port and the “B” cable to the router’s “MIC B” port. (Refer to the instructions for your bypass switch.)
4. Connect the bypass cables to the FDDI ports as shown above.
5. Insert the DIN connector on the bypass unit into the Optical Bypass jack on the HP Router BR.

Note

The router will not detect the presence of a new connection to the FDDI ring until you reboot the router (which is covered later in this chapter).

Installation

Phase 3: Prepare the Router Hardware

Connecting a WAN to the WAN Interface

The RS-232, V.35, X.21, or RS-422/449 cable for the 62-pin connector determines which interface standard is used on this port.

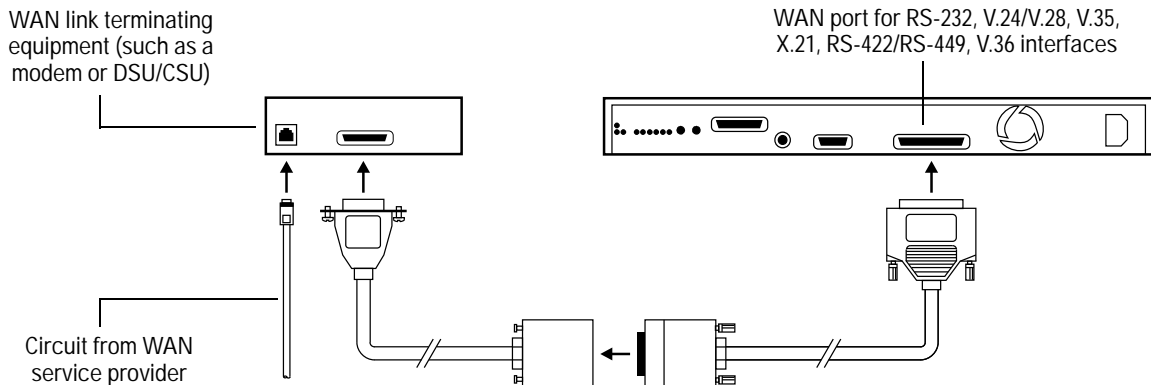


Figure 1-18. Connecting a WAN Interface

1. Attach the male end of the cable to the router's WAN port. Hand-tighten the screws attached to the cable connector.
2. Attach the other end of the cable to the WAN link terminating equipment.

Note

If any port has no network attached, the port's Net Fail LED goes on after the router starts.

D. Plug In and Verify the Router Hardware

When you power up a router that is in the factory default state¹ (or if you clear it by using the Clear/Reset button combination--page 2-17), the router sends Bootp requests over all active ports for one minute.

Depending on the response from the network, the router then does one of the following:

- If the router does not receive a response from either a Quick Remote or Bootp source within approximately one minute of receiving power or being cleared, it configures itself as a bridge and begins bridging operations.
- If the router receives a minimal configuration over a WAN link from a Quick Remote source, it boots itself with this configuration and begins routing and bridging operation accordingly. (For information on Quick Remote set-up and operation, refer to the *User's Guide* shipped with your router.)
- If the router receives a reply from a Bootp server, it configures itself with the intermediate configuration contained in the reply. The router then attempts to download a full configuration from the TFTP server indicated in the Bootp reply message. Following download of the full configuration, the router then reboots itself and begins routing and bridging in accord with the full configuration. (For information on set-up and operation with a Bootp server, refer to the *User's Guide* shipped with your router.)

Note

When powered up in the factory default, the router, by default, begins bridging on all ports if Smartboot does not elicit a configuration from a remote source (described above). Thus, if the router is expected to use Smartboot for configuration, but instead begins operating in the default bridging mode due to some unforeseen problem, there may be unexpected effects on the adjacent networks. For this reason, it is recommended that you attempt to identify potential network responses to (unexpected) default bridging before powering up the router for the first time (or clearing the router to the factory default).

¹The router is shipped from Hewlett-Packard in the "factory default" configuration. Changing the configuration in any way and then rebooting the router replaces the factory default with the new configuration. To return the router to its factory default, clear it by using the Clear/Reset button combination described on page 2-17.

Installation

Phase 3: Prepare the Router Hardware

If the router is not in the factory default state when you apply power, it configures itself according to the configuration that was most recently saved.

Note

The router does not have a power switch. The router is powered on when you plug in the power cord, and automatically adapts to the correct ac voltage range for your power source.

1. Plug the power cord into the router's power socket and into an ac power source.
2. Check these LEDs on the back of the router:
 - Power LED is continuously lit.
 - Self-test LED:
 - lights during the self-test that automatically occurs after you power on or boot the router
 - turns off after a minute or two (when the self-test completes and the router boots)

If either LED operates differently, refer to chapter 3, "Troubleshooting"

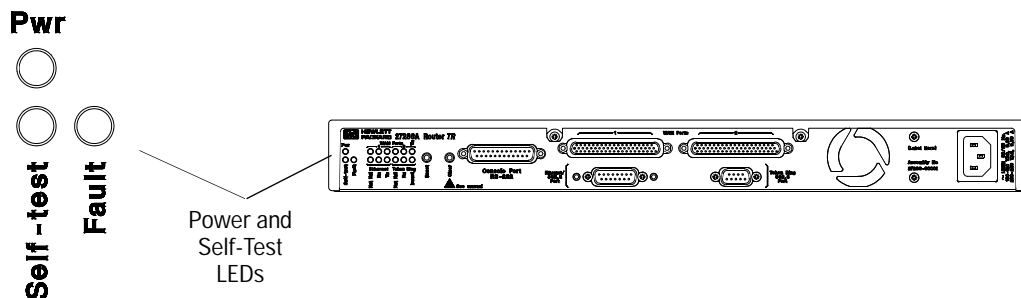


Figure 1-19. Example of Power and Self-Test LED Positions for Single-Height Models

Installation

Phase 3: Prepare the Router Hardware

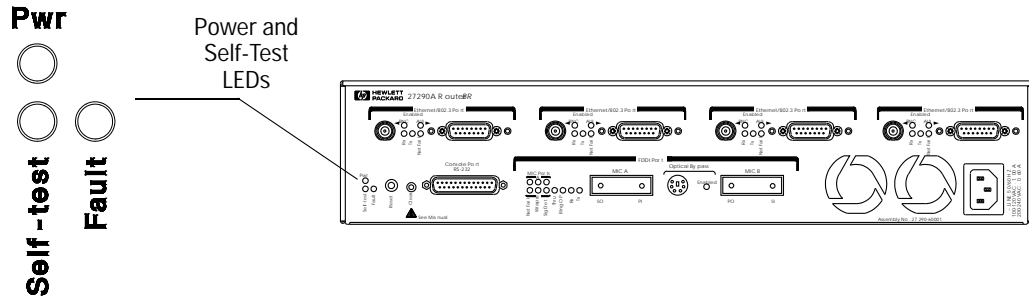


Figure 1-20. Example of Power and Self-Test LED Positions for Double-Height Models

3. After the Self-test LED turns off:

- The port status LEDs for the network interfaces (WAN, 802.3 Ethernet, etc.) will indicate the current operating state of each interface on the router. (If you need to interpret the LEDs at this time, refer to “Meanings of Port Status LEDs” on page 2-9.)
- The console, if installed, will display either the following line of text on your console’s display:

Waiting for speed sense.

or a string of random characters of about the same length as the preceding line.

Note

The remainder of this procedure assumes that a console is connected to the router’s console port, either directly or through a modem.

Installation

Phase 3: Prepare the Router Hardware

4. Press **Return** and wait for either the Main menu or (if a password has been set) the copyright screen, with a prompt for you to type the password.

Note

If your console is set to 9600 baud, you should have to press **Return** only once. If the console is set to another speed, you may have to press **Return** two or three times.

```
DEFAULT_CONFIG
----- SESSION 1 - MGR MODE -----
Main Menu

--> 1. Statistics Screen Menu
    2. Network Control Language Interpreter
    3. Configuration Editor
    4. Event Log
    5. LOGOUT
    6. Quick Configuration
    7. Quick Remote

PRESS: ? for help, Down, Up, <- to exit, <RETURN> to select
```

```
Copyright (C) 1991, 1992 Hewlett-Packard Co. All Rights Reserved.
Copyright (C) 1989, 1990, 1991 The University of Maryland, College Park,
Maryland. All Rights Reserved.
FASTMAC Copyright (C) 1989-91 Madge Networks Ltd. All Rights Reserved.

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as set forth in subdivision (b) (3) (ii) of the Rights in Technical Data and
Computer Software clause at 52.227-7013.

HEWLETT-PACKARD COMPANY, 3000 Hanover St., Palo Alto, CA 94303

Password:
```

Figure 1-21. The Main Menu Screen

Frame 1-22. The Copyright and Password Screen

5. If the copyright screen appears, type the password and press **Return**. The Main menu screen then appears.
6. The system has booted. Go on to “Initialize and Verify the Router” on page 1-28.

Note

If neither the copyright screen nor the Main menu screen appear, press **Return** again, pause, and then repeat if necessary. (Speed sensing may require more than one **Return** for your type of connection.) If pressing **Return** several times does not establish the console connection, refer to chapter 3, “Troubleshooting”.

Phase 4: Initialize and Verify the Router

This phase begins with creating or modifying the configuration in a router. If you are managing a router through the console port or over the network, you will need to perform most or all of these steps. However, you do not need to perform the steps in this phase for a local router if:

1. The system manager sets up Smartboot (the Quick Remote or Bootp server configuration options) to configure the router
2. The router will be managed by an operator at a remote site

However, after the router has been configured successfully by any means and is routing through one or more network interfaces, you may perform any step in this section using either the console port access or Telnet access (provided that the system is configured for Telnet).

Note

This section assumes that, when Smartboot is not used and the router is set to the factory default, you are configuring it by using a console that is connected to the router's console port, either directly using an RS-232 cable or indirectly through a modem.

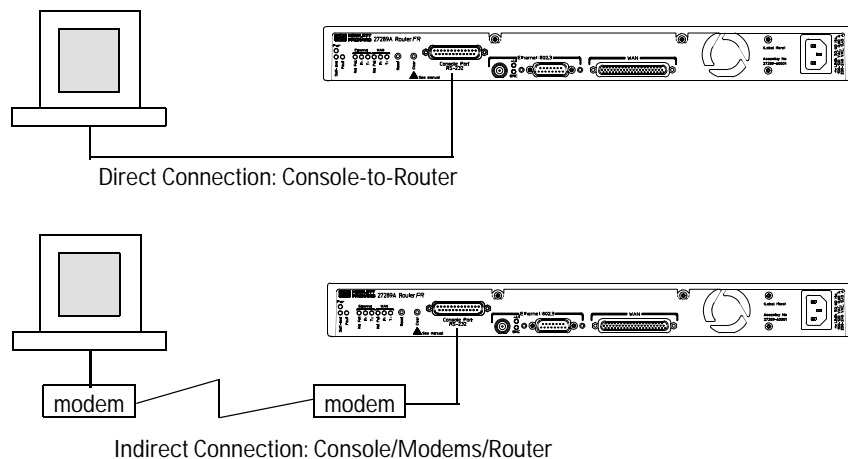


Figure 1-23. Direct and Modem Connections Between Console and Console Port

Installation

Phase 4: Initialize and Verify the Router

This phase involves these steps:

- A. Creating or modifying a configuration (page 1-28)
- B. Booting the router (page 1-30)
- C. Setting the correct time and date (page 1-33)
- D. Setting Manager and User passwords (page 1-34)
- E. Verifying router initialization (page 1-36)

When you power on the router as described in step 4 of the preceding subsection (page 1-22), you will see the Main menu.

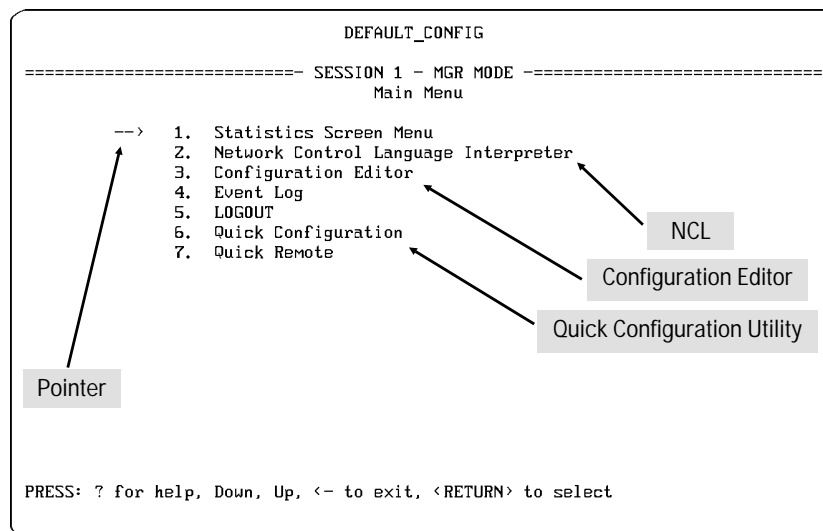


Figure 1-24. The Main Menu

Installation

Phase 4: Initialize and Verify the Router

A. Create or Modify a Router Configuration

The Shortest Path to a Functioning Configuration

Configuring the router assigns values to the parameters that control its networking operation. The router is shipped from the factory with default configuration values. However, even this default state requires you to provide additional values before the router can begin to function in the network. Unless you are using Quick Remote or a Bootp server to configure the router from the factory default, Hewlett-Packard recommends that you use the Quick Configuration utility to enter as many of these additional values as you need. (In some cases, using Quick Configuration may be all that you need to do for minimal operation.) Then you can use the Configuration Editor, if necessary, to enter any other values that may be needed or desirable.

For more information on configuration tools, refer to the following overview.

Note

If any port has no network attached, the port's Net Fail LED goes on after the router starts. Remember to disable that port when you configure the router. (For instructions, refer to "Interpreting LED Error Patterns" on page 3-4).

Any configuration you create or modify will not be activated in the router until you boot the router. The next subsection, "2. Boot the Router" (page 1-30) describes this process.

An Overview of Your Configuration Tools

- **Quick Configuration:** This utility creates a “getting started” configuration from a single screen that accesses the most commonly used router parameters. Some examples of Quick Configuration uses are:

- Setting a “getting started” configuration, either for the first time or after using the reset/clear buttons to set the router to its default state. (Refer to “Resetting the Router, Clearing the Passwords, and Clearing the Router” on page 2-14.)
- Easily checking and/or resetting IP addresses and other “getting started” parameters in existing configurations.

Use Quick Configuration first, to set your initial configuration. Then, if testing shows that you need to configure more parameters, or if your network design calls for such areas as X.25 circuits, spanning tree, static routes, or filtering, you can use the full Configuration Editor.

To learn how to use Quick Configuration, refer to the *User's Guide* shipped with your router.

- **Configuration Editor:** This tool accesses a hierarchy of menus and screens that include any parameters you need for customizing the router beyond the “getting started” level. Using this editor you can customize all parameters needed to integrate the router into your system (including the subset of parameters you can access through Quick Configuration).

For Configuration Editor operating information, refer to the *User's Guide* shipped with your router. For reference information on the parameters accessed by the Configuration Editor, refer to the *Operator's Reference* (also shipped with your router).

To Create a Minimal Configuration Now: Starting from the Main menu (page 27), use the Quick Configuration utility first, and then the NCL boot command to create and implement a minimal configuration. (For step-by-step instructions for these two tasks, refer to the *User's Guide*.)

B. Boot the Router

After you create or change a configuration (pages 1-28 and 1-29), booting the router causes it to replace the former configuration with the newly created one. Thus, in all cases, you must boot (or reboot) the router when you are ready to implement any changes you have made in the configuration.

Note

If you use the Quick Configuration utility to create or change a configuration, you can boot the router as part of the process for exiting from the utility. In this case it is unnecessary to also use the NCL Boot command described in this subsection.

When you use the Configuration Editor to create or change a configuration, use the NCL “boot” command to replace the former configuration with the newly created one.

To boot the router now:

1. In the Main menu (page 1-27), press **[2]** to select the Network Control Language Interpreter (NCL).

You will then see the NCL prompt. This prompt matches the current system name. For example, if the system name is

```
DEFAULT_CONFIG
```

then the NCL prompt appears.

Installation

Phase 4: Initialize and Verify the Router

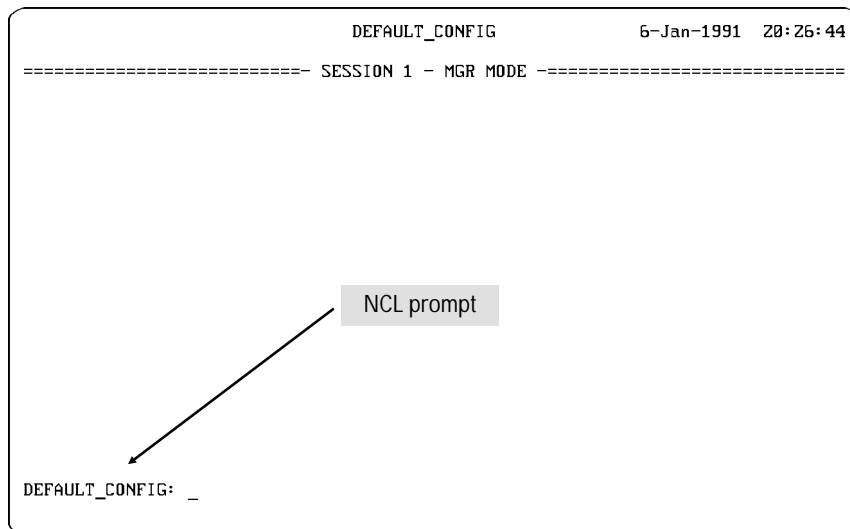


Figure 1-25. The Default NCL Prompt

2. Boot the router (with your new configuration) by typing `boot` at the NCL prompt and pressing `[Return]`.

```
DEFAULT_CONFIG: boot [Return]
```

3. If your router does not have a Manager password, go to step 4. But if the router has a previously set Manager password, you must enter the password before booting can proceed. In this case, the console prompts you to enter the password:

```
Enter current manager password:
```

Type your Manager password and press `[Return]`. (If you've forgotten the password and need to clear it, refer to "To Clear the Manager and User Passwords" on page 2-16.)

4. After you enter the Boot command (and enter a password, if required), the following message prompts you verify that you want to boot the router:

```
Do you want to reboot the system? [y/n]
```

Press `[Y]` to commence the reboot operation.

Installation

Phase 4: Initialize and Verify the Router

5. After the router boots (which takes only a few seconds), you will see the “speed sense” prompt:

Waiting for speed sense.

Press **Return** one or more times, as necessary, to re-synchronize the router with the console and to display the copyright screen.

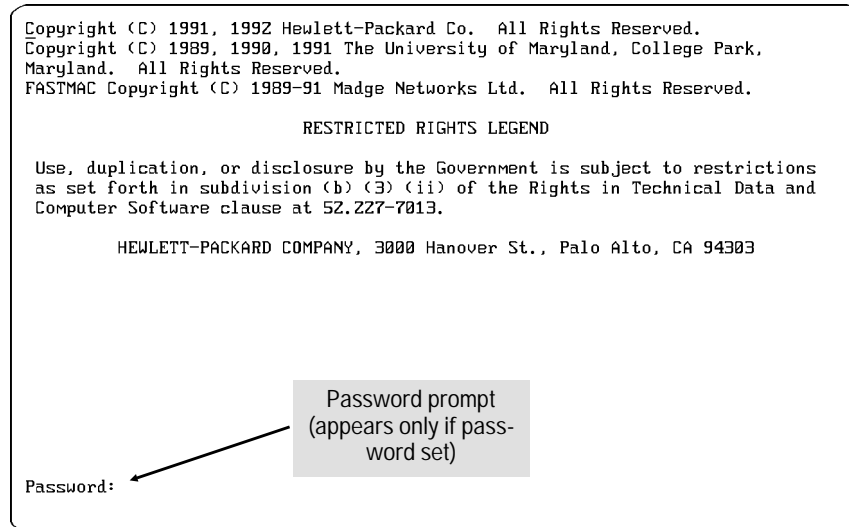


Figure 1-26. The Copyright Screen

6. When the copyright screen appears:
 - If the Password prompt appears, type the password and press **Return** to display the Main menu.
 - If, instead, this message appears:

Press any key to continue

Press **Return** to display the Main menu.

These actions should return you to the Main menu. The router should now be reconfigured to the parameters you specified in the configuration tool.

C. Set the Correct Time and Date (Optional)

Each time you power up the router, it starts with a default time and date. Whether you set the correct time and date or not depends on how you want the time and date to be maintained in your network. When the time and date in one router is used as the source for time and date in another router, the time/date control is termed the “Time Protocol service”. Use the following table to:

1. Identify the Time Protocol usage for your router.
1. Determine whether to set the date and time:

If the router will operate as a:	Set date and time?
Client of Time Protocol service	No
Server of Time Protocol service	Yes
Both Client and Server of Time Protocol service	No*
Neither client nor server of Time Protocol service	Yes

*The router designated as “server only” provides the Time Protocol service. If no router is designated “server only”, then a client/server router should provide the Time Protocol service.

If you need to set the time and date, use the NCL `Time` command:

1. From the Main menu, select the Network Control Language Interpreter.
2. At the NCL prompt at the bottom of the screen (page 1-30), enter the `Time` command with the date and time, as follows:

```
time mm/dd/yy hh:mm:ss
```

where:

```
mm = month      hh = hour
dd = day        mm = minutes
yy = year       ss = seconds
```

Use the `Exit` command to exit from NCL and return to the Main menu.

For more information on the `Time` command, refer to the *Operator's Reference*.

D. Set Manager and User Passwords (Optional)

Passwords are optional. If no password is set, anyone can access the router for viewing, booting, changing the configuration, resetting statistics or variables, and using various commands. User and manager passwords have the following functions:

- User password: controls viewing of statistics, event log, MIB variables, and configuration parameters.
- Manager password: controls access to the following system manager tasks:
 - assigning a user password
 - saving a modified configuration
 - booting the router
 - resetting statistics or MIB variables
 - enabling or disabling services
 - downloading a configuration
 - changing a password
 - changing the date and time
 - using the Fget, Fput, Ping, Atping, and Test commands.

Setting a Password:

1. From the Main menu (page 1-27), select the Network Control Language Interpreter (NCL). The NCL prompt then appears at the bottom of the screen. It will be either

DEFAULT_CONFIG :

as shown below, or another name you have already configured for your system.

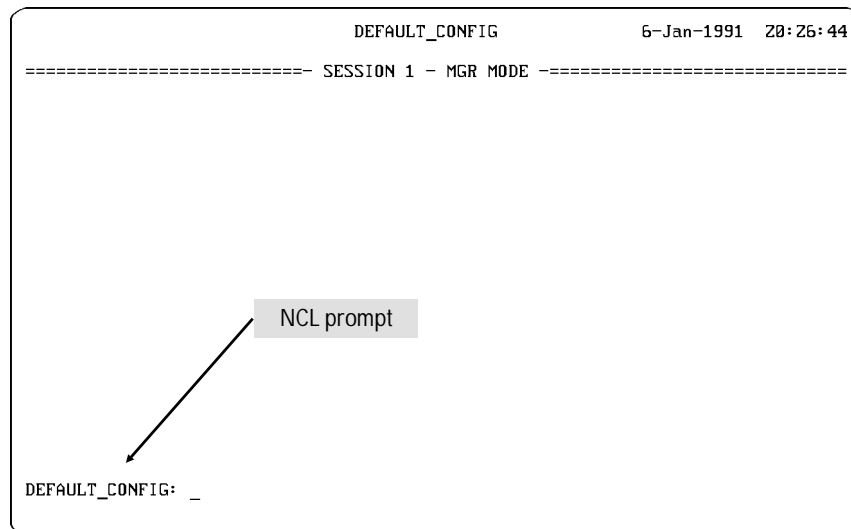


Figure 1-27. The NCL Screen with Default Prompt

2. At the prompt, type

password

and press **Return**.

3. Follow the prompts to set the manager password.
4. To set the user password, repeat this procedure, substituting user for manager in step 3.

E. Verify Router Initialization

Note

The following is an overview of router initialization. For more on verification tests, refer to the *User's Guide* for your router.

Earlier in the startup process it is normal to verify proper router hardware operation. (See “Plug in and verify the router hardware” on page 1-22.) Then, after you configure and boot the router, you should verify that the following two conditions exist:

- The network links are operational
- All networks can be reached by the router

While verifying initialization, you can save steps by operating from the Network Control Language Interpreter (NCL). To begin, select NCL from the Main menu by pressing [2].

```

                                DEFAULT_CONFIG
----- SESSION 1 - MGR MODE -----
                                Main Menu

-->  1. Statistics Screen Menu
      2. Network Control Language Interpreter
      3. Configuration Editor
      4. Event Log
      5. LOGOUT
      6. Quick Configuration
      7. Quick Remote

Access to NCL

PRESS: ? for help, Down, Up, <- to exit, <RETURN> to select
```

Figure 1-28. The NCL Selection in the Main Menu

Examine the Event Log

The event log is a tool you can use to help verify router initialization. Events posted to the event log indicate the success or failure of the configuration and initialization steps. Events are occurrences such as enabling circuits and services, changes in spanning tree states, and error conditions. Each event is labeled with the date, time, severity, and a mnemonic for the software resource that generated the message. (For more information on using the event log and understanding the events listed in it, refer to the operator's guide you received with your router.)

The most recent event appears in the event log line (the second line of the console screen).

```

                                DEFAULT_CONFIG
I 12/21/94 10:02:52 rok[1]: 'System booted'
===== SESSION 1 - MGR MODE =====
                                Main Menu

-->  1.  Statistics Screen Menu
      2.  Network Control Language Interpreter
      3.  Configuration Editor
      4.  Event Log
      5.  LOGOUT
      6.  Quick Configuration
      7.  Quick Remote

PRESS: ? for help, Down, Up, <- to exit, <RETURN> to select
  
```

Figure 1-29. The Event Log Line in the Main Menu

However, checking events is easier if you display and interactively scroll around the entire log. The following steps provide an overview of how to use the event log.

1. Access the event log.

One way to access the interactive log is to select “Event Log” from the Main menu. The other way is to use the NCL Logi command, which is more convenient if you will be working in NCL more frequently than the Main menu.

Installation

Phase 4: Initialize and Verify the Router

Upon entering the event log, you will see the first event for the most recent reboot at the top of the display. To navigate among the events displayed, use the following keys.

<input type="button" value="Return"/>	Advance display by one page
<input type="button" value="P"/>	Roll back display by one page
<input type="button" value="↓"/>	Advance display by one event
<input type="button" value="↑"/>	Roll back display by one event
<input type="button" value="→"/>	Display last page (newest events)
<input type="button" value="C"/>	Display first page of events for most recent reboot
<input type="button" value="H"/>	Display help for event log (including more control keys)
<input type="button" value="←"/>	Exit from event log

Refer to chapter 5, *How To Use the Event Log To Analyze Router Operation* in the User's Guide for more key options and other information about display control keys, a full explanation of the parts of an event line, the severity ratings, and the number and range of events kept in the log. For the meaning of individual event messages, refer to the *Operator's Reference*.

2. In the event log, verify that the circuits and services that you configured are being enabled. The events being listed in the event log should be consistent with information recorded on the network maps.
3. Verify that no warning, major, or fatal events have occurred. (If any such events have occurred, you will probably want to determine what caused them and take remedial steps before continuing.)

Examine the Statistics Screens To Verify That the Network Links are Operational

This step helps to ensure that circuits and the bridging and routing services are transmitting and receiving data with zero or few errors.

1. Access the statistics screens by using the NCL Stats command or by selecting the Statistics Screen Menu from the Main menu. A menu of statistics screens is presented.

```

                                DEFAULT_CONFIG
=====-- SESSION 1 - MGR MODE -----
                                Statistics Screen Menu

-->  1.  Circuit Statistics
      2.  Per Second Statistics
      3.  Bridge Statistics
      4.  DoD IP Router Statistics
      5.  DECnet Router Statistics
      6.  IPX Router Statistics
      7.  Xerox Router Statistics
      8.  AppleTalk Router Statistics
      9.  Buffers Usage Statistics
     10.  Return to Previous Menu

PRESS: ? for help, Down, Up, <- to exit, <RETURN> to select
```

Figure 1-30. Example of the Statistics Screen Menu

2. Select and examine the Circuit Statistics screen. Verify that error-free data is being exchanged over enabled circuits. Match the circuit names with those on the network maps.
3. Select and examine the individual statistics screen for each routing and bridging service configured on the router. Verify that the configured services are exchanging frames or packets as expected. The information listed should match the information on the site survey worksheet and network maps. The statistics should reflect the circuit groups, network interfaces, and traffic patterns expected for the router configuration and the devices attached to the network.

Installation

Phase 4: Initialize and Verify the Router

The following service statistics screens are available:

- **Circuit Statistics:** This screen provides summary data for each individual circuit, including how many bytes and frames were received and transmitted and how many frames contained errors.
- **Per Second Statistics:** This screen provides summary data for traffic volume on a per-second basis for each circuit on the router.
- **Bridge Statistics:** This screen summarizes bridge traffic volume for each circuit group. It shows the number of frames that were received, forwarded, flooded, and dropped. The bridge service must be configured for this screen to be available.
- **DECnet Router Statistics:** This screen summarizes DECnet traffic volume for each circuit group. It shows the number of data packets received, forwarded, and dropped. The statistics do not represent traffic generated by DECnet routing layer control messages, such as Hello and routing messages. The DECnet routing service must be configured for this screen to be available.
- **DoD IP Router Statistics:** This screen provides summary data for each IP network interface. The interfaces are identified by their IP addresses. The screen shows the number of IP datagrams received, forwarded, delivered to upper layer protocols, and dropped. The DoD Internet (IP) routing service must be configured for this screen to be available.
- **IPX Router Statistics:** This screen provides summary data for each IPX network interface. The interfaces are identified by the IPX network numbers of the networks they are connected to. It shows the number of datagrams received, forwarded, delivered to upper layer protocols, and dropped. The IPX routing service must be configured for this screen to be available.
- **XNS Router Statistics:** This screen provides summary data for each XNS network interface. The interfaces are identified by the XNS network numbers of the networks they are connected to. The screen shows the number of XNS datagrams received, forwarded, delivered to an upper layer protocol, and dropped. The XNS routing service must be configured for this screen to be available.
- **AppleTalk Router Statistics:** This screen summarizes AppleTalk traffic volume for each circuit group. It shows the number of packets received, forwarded, and dropped. The AppleTalk routing service must be configured for this screen to be available.

Examine the Bridging and Routing Tables

Use the NCL Rget commands to verify that the bridging and/or routing tables represent the expected network topology. Note that Rget commands are SNMP-based. IP routing or IP host-only service must be enabled to use the Rget commands.

Note

You can use the Quick Configuration utility to activate host-only service. Most HP router models have all of the Rget commands listed here. However, not all commands are available on every router.

(This section provides an overview of the Rget commands. For more information on these commands, refer to the *Operator's Reference*.)

- RGETB: Use the Rgetb command to display the bridge forwarding and filtering table for this node. Verify that the bridging service is learning addresses. Verify proper configuration of source or destination address filters.
- RGETR: Use the Rgetr command to display the IP routing table for this node. Verify that entries exist for all IP subnetworks represented in the network map. Check the next-hop entries to determine the route that IP packets will take to each destination subnet. Verify the number of hops to these subnets; a very large hop count may indicate that the route is invalid (type field I).
- RGETIR: Use the Rgetir command to display the IPX routing table for this node. Verify that entries exist for all IPX networks represented in the network map. Check the next-hop entries to determine the route XNS packets will take to each destination network. Verify the number of hops to these networks; a very large hop count may indicate that the route is invalid (type field I).
- RGETIS: Use the Rgetis command to display the IPX server table for this node. Using your IPX network map, verify that the router has learned about all IPX servers. Note that if IPX SAP filters are being used in the network, your router may be restricted from learning about some servers. Also note that HP devices may be listed in the SAP table (used by HP OpenView network management during autodiscovery).

Installation

Phase 4: Initialize and Verify the Router

- **RGETXR:** Use the Rgetxr command to display the XNS routing table for this node. Verify that entries exist for all of the XNS networks represented in your network map. Check the next hop entries to determine the route the XNS packets will take to each destination network. Verify that the number of hops to these networks is what you expect. A very large hop count metric value may indicate that the route is considered invalid. Check the type field for an “I” (invalid) entry.
- **RGETD:** Use the Rgetd command to display the DECnet router configuration table. Verify that all DECnet circuit groups are available.
- **RGETDN:** Use the Rgetdn command to display the DECnet router level 1 (intra-area) routing table for a local or remote HP router. Verify that the router has learned about all routers and end nodes in its area. Also, trace the paths to the destination nodes to verify that the hop counts and path costs are as expected.
- **RGETDA:** Displays the DECnet router level 2 (inter-area) routing table for a local or remote router. Verify that the router has learned about a path to all areas. Trace the paths to the level 2 router in the destination area to verify that hop counts and path costs are as expected. Note that DECnet routing services on HP routers are always level 1 and level 2 routing services, but this may not be true for DECnet routing services from other vendors.
- **RGETATR:** Displays the AppleTalk routing table. Verify that network range entries exist for all AppleTalk networks. The network ranges should be consistent with those recorded on the network map. Check the next hop entries to determine the route that AppleTalk packets will take to each destination network. Verify that the number of hops to these subnets is what you expect. Check the status field to verify that there are no entries that are marked suspect or bad.

Test Node Accessibility

To verify a newly installed router, perform the Ping command on another router and use the IP address of the router being verified as the destination.

More complete information on Ping is on page 3-18 in this book, and in the *Operator's Reference*.

Note

If the steps in this verification section show that network links are not operating as desired, re-examine the configuration performed in earlier steps. Some links and services may need further customization beyond your initial configuration; you may need to use the Configuration Editor to change more parameters. Refer to the *Operator's Reference* for parameter information. Return to the configuration and booting steps earlier in this chapter, and then repeat the verification steps.

Testing Node Accessibility

The NCL Ping command can be used on a router with IP routing enabled to test whether particular routers and end nodes can be reached. Use the specific IP address of the target. For example, to determine whether a WAN port having the IP address of 10.100.100.1 on a remote router can be reached from your local router, you would execute Ping as follows from the NCL prompt:

```
ping 10.100.100.1
```

When a target is "pinged", the router waits for a response. In the above example, if a response was received within the specified time, the console would display this message:

```
10.100.100.1 is alive
```

To send an AppleTalk Echo Protocol (AEP) request message (available on most HP routers) to a specific AppleTalk node address, use the NCL Atping command.

For more on Ping and Atping, refer to the *Operator's Reference*.

Features and General Hardware Operation

Features

HP routers interconnect local and remote LANs (Ethernet/802.3, token ring/802.5, and FDDI) to create extended LANs. They provide both bridging and routing capabilities and support the Internet Protocol (TCP/IP protocol suite), DECnet Phase IV, Xerox XNS, Novell IPX, and AppleTalk Phase 2 routing services. If a packet arrives with an unsupported protocol, these routers use their bridging capability to send the packet toward its destination. This allows full support for environments where non-routable, uncommon, or unsupported protocols may exist.

On most models there is also one or more synchronous WAN ports supporting RS-232/V.24/V.28, V.35, X.21, or RS-422/RS-449/V.36 interfaces. These provide HP Point-to-Point, PPP, V.25 bis, SMDS, frame relay, and LAPB (X.25) connections to other routers.

Router Ports

The types of ports found on HP routers include one or more of the following:

- **Ethernet/802.3 LAN Port with either an AUI-only or AUI/BNC interface:**
 - AUI interface: For connecting through a transceiver to twisted-pair cable, thick or thin coaxial cable, or fiber-optic cable. All models have at least one AUI interface.
 - BNC interface: For direct ThinLAN connection to a network. BNC interfaces are included on some models, and can be used instead of the corresponding AUI interface on the same port.

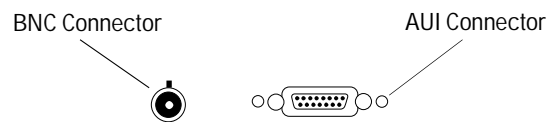


Figure 2-1. Example of AUI and BNC LAN Interfaces

- **Token ring/802.5 LAN Port (either 4 or 16 Mbit/s):** For connecting to a Trunk Coupling Unit (TCU) through shielded, twisted-pair cable.
- **Synchronous WAN Port:** For HP Point-to-Point, PPP, SMDS, frame relay, V.25 bis, and LAPB (X.25) connections to other routers. WAN ports support RS-232/V.24/V.28, V.35, X.21, and RS-422/RS-449/V.36 interfaces.
- **FDDI LAN Port:** For connecting to an FDDI network, either directly or through an optical bypass switch.
- **Console Port:** Present on every HP router; allows access to the router by a terminal or a terminal emulator on a personal computer. Through this interface, you can configure, monitor, and troubleshoot the router. This RS-232 console interface can be accessed either locally or remotely through a modem. The baud rate is automatically detected. Also, router firmware enhancements can be downloaded to the routers through this port.

Router Operation

Features

Additional Features

- Detachable brackets for mounting in a 19-inch rack or on a wall.
- Automatic sensing of the power voltage range with no switches needed.
- The option to automatically recover from power failure while maintaining the current configuration.

Interpreting Front-Panel LEDs

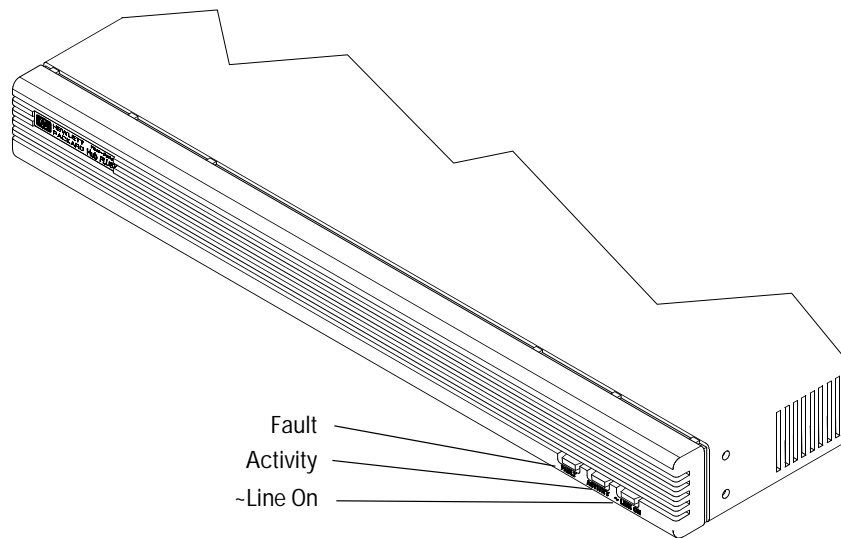


Figure 2-2. Example of Router Front

- ~Line On (green): Continually lit if the router is receiving power.
- Activity (green): Blinks for each packet received or transmitted. The frequency shows the amount of traffic. In heavy traffic, it may appear to be lit all of the time. (In the HP Router TFR, the Activity LED is continually lit while the router is inserted in a ring.)
- Fault (amber): Lights if a failure occurs on the network or router. (See the next section about the back of the router for more specific information.) Fault lights while the Reset button is pressed. (Refer to the next section for more information).

Router Operation
 Interpreting Back-Panel LEDs

Interpreting Back-Panel LEDs

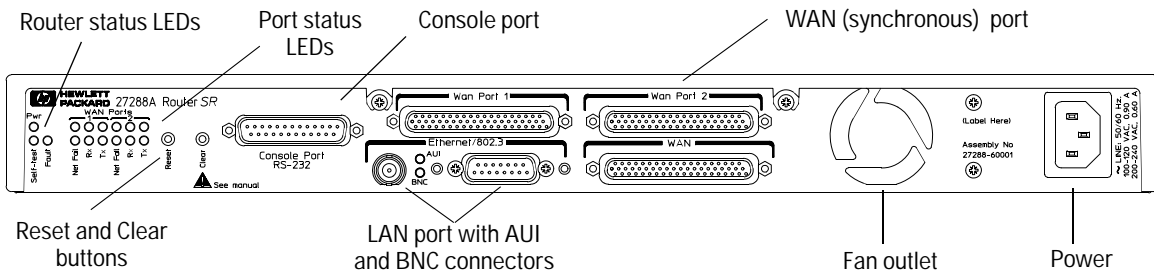


Figure 2-3. Example of the Back Panel of a Single-Height Router

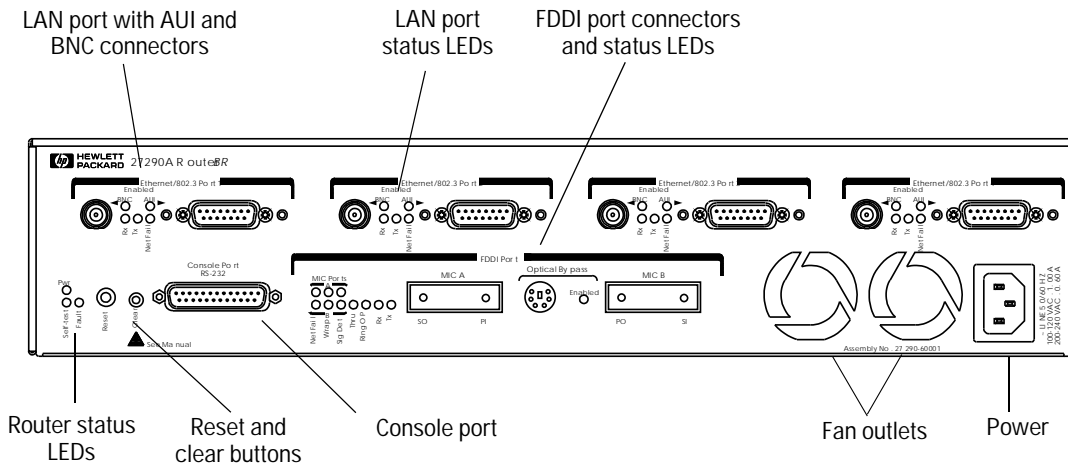


Figure 2-4. Example of the Back Panel of a Double-Height Router

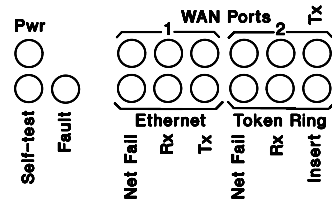


Figure 2-5. Example of Router and Port Status LEDs in a Single-Height Router

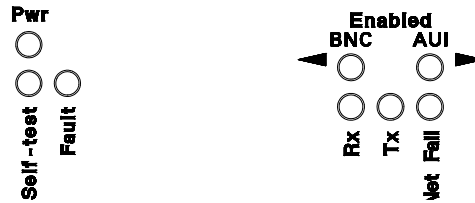


Figure 2-5. Example of Router and Port Status LEDs in a Double-Height Router

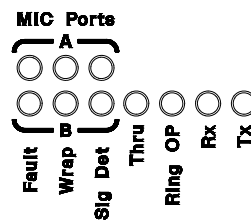


Figure 2-7. Example of Port Status LEDs for an FDDI Port

Meanings of Router Status LEDs

Power (green): Continually lit if the router is receiving power. (This is the same as ~Line On on the front.)

Self-test (green) LED: Lights while the self-test is running (about one minute). This occurs when the router has just been powered on or a reset is in progress. If an error is found during the self-test, this LED remains lit and the Fault LED (and possibly a Net Fail LED) will also light. This LED also remains lit during the configuration clearing procedure (page 2-14).

Fault (amber)LED: Lights if a failure has occurred either during a self-test or during operation. (This LED is duplicated on the front panel.)

- During self-test: If the Fault LED is lit, the router is faulty and must be replaced. Refer to chapter 3, “Troubleshooting”, for details.
- During operation of the router: If the Fault LED is lit, but none of the Net Fail LEDs are lit, there has been a software failure. Press the Reset button to reset the router, or boot the router if it is not configured to reboot automatically. (Refer to table 3-2 in chapter 3, “Troubleshooting”, for details.) If Fault is lit and *any* Net Fail LED is also lit, follow the instructions for the Net Fail LEDs on the page 2-9.
- Fault is always lit while the Reset button is pressed.

Meanings of Port Status LEDs

Note Not all port types appear on all routers.

Net Fail (Amber) LED: The Net Fail LEDs serve two functions:

- If all Net Fail LEDs are *flashing*, the router has failed and must be replaced. Contact your Hewlett-Packard service provider.
- If the Net Fail LED is steadily lit on one or more ports, then the port or the attached network has failed during a self-test or during operation, as described in the following table:

Steady Net Fail LED

Ethernet/802.3 Net Fail	<p>If this LED is lit during a self-test and the Fault LED is also lit, then the router's port is faulty. The router must be replaced. (Refer to chapter 3, "Troubleshooting", for more details.)</p> <p>If Net Fail is lit during router operation while the Fault LED is not lit, this may mean one of the following:</p> <ul style="list-style-type: none">■ An Ethernet/802.3 LAN has not been connected or the signal from the LAN or transceiver has been lost and the router software has disabled the circuit. The broken connection can be detected if transceiver signal polling is enabled in the configuration or if a protocol is running on this port. The circuit will be enabled again when the connection is restored.■ There are excessive collisions or excessive deferrals detected at the port. The Ethernet/802.3 LAN has a problem.
Token Ring/802.5 Net Fail	<p>If this LED is lit during a self-test and the Fault LED is also lit, a ring error has occurred.</p>
WAN Net Fail	<p>If this LED is lit during a self-test while the Fault LED is also lit, the router's port is faulty. The router must be replaced. (Refer to chapter 3, "Troubleshooting", for details). If Net Fail is lit during router operation, but the Fault LED is not lit, then either you have not yet connected a device or the connection to the remote device has been lost. The broken connection can be detected if the Remote signal and sense parameter is enabled in the configuration or if a protocol is running on this port. The circuit will be enabled again when the connection is restored.</p>
FDDI Net Fail	<p>If this LED is lit during a self-test and the Fault LED is also lit, a hardware error has occurred.</p>

Note

All Net Fail LEDs are lit while the Reset button is pressed.

Tx (green) LED: This LED blinks each time a packet is transmitted through the related port. The frequency shows the amount of traffic. During periods of heavy traffic, it may look like it is lit all of the time. On WAN ports, Tx may seem to indicate heavy traffic when using bit-oriented protocols; however, Tx is lit for each packet delimiter (flag) whether packets are sent or not.

Insert (Green) LED: This LED is lit for a token ring port whenever the port is inserted into the ring.

Rx (green) LED: Depending on the type of port, this LED has one of two meanings:

- Ethernet, WAN, and FDDI Ports: The Rx LED blinks each time a packet is received through the port. The frequency shows the amount of traffic. During periods of heavy traffic, it may look like it is lit all of the time. On WAN ports, Rx may seem to indicate heavy traffic when using bit-oriented protocols; however, Rx is lit for each packet delimiter (flag) whether packets are received or not.
- Token Ring Port: The Rx LED is lit continuously if the token ring port is inserted in a ring and is receiving any packets or tokens.

AUI and BNC (green) LEDs: On Ethernet/802.3 ports having both an AUI and a BNC connector, one or the other of these two LEDs is lit to indicate which connector (AUI or BNC) the router is using. At power-on, boot, or reset, the router selects the proper connector by sensing the presence of an attached cable on one or the other of the connectors. If no cable is attached to either connector at power-on, boot, or reset (or if the port has been disabled through Quick Configuration or the Configuration Editor), then either the AUI or BNC LED may be lit.

FDDI Port

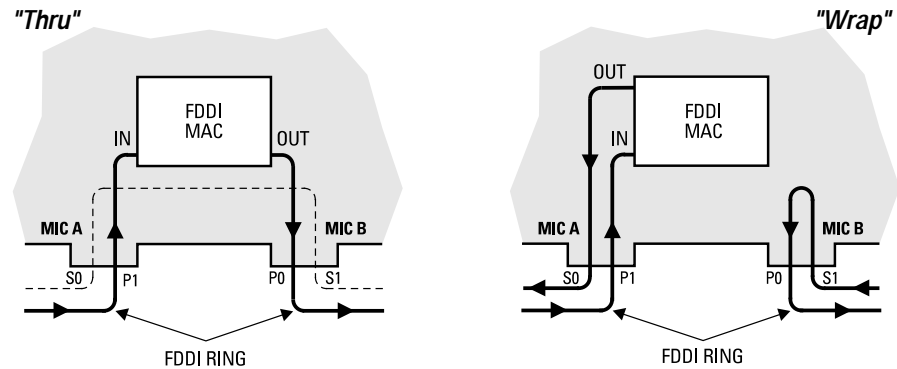


Figure 2-6. FDDI "Thru" and "Wrap A" Operation

Thru (green): When lit, this LED indicates that packets are being received on the primary input line of port A and transmitted on the primary output line of port B.

Wrap A and B (green) LEDs: If either A or B is lit, either a break has occurred in the FDDI ring or the attached neighbor's hardware has failed. In these cases the router is transmitting and receiving on the indicated port only (and not on both ports). In this case, the indicated port is receiving on the input line and transmitting on the output line for that port. This occurs in either of the following cases:

- The unlit port is not communicating.
- A Dual Attach Station (DAS) attached to the unlit port is not functional.

These cases occur, for example, when the cable connection to the unlit port is interrupted or when a DAS connected to the unlit port is down.

Sig Det (green): Signal Detection is lit when the router detects an incoming signal on the FDDI port, and should be lit continuously.

Ring OP (green): The Ring OP LED is continuously lit if the router is inserted and operating in an FDDI ring and is in either Thru or Wrap mode.

Router Operation

Interpreting Back-Panel LEDs

Optical Bypass — Enabled (green):

- If you are using a bypass switch, the Optical Bypass—Enabled LED lights only when the switch is causing the FDDI ring to *bypass* the router. (The router will be bypassed when it is booting and when the FDDI circuit is disabled.) That is, the Optical Bypass LED is not lit when the FDDI circuit is enabled.
- If you are not using a bypass switch, the Optical Bypass—Enabled LED is always lit, regardless of the state of communication between the router and the FDDI ring.

Testing the LEDs

On most HP routers, all LEDs should be lit while you are pressing the Reset button.

On the HP Router ER, TR, and SR, pressing the Reset button should light the following LEDs:

- Power
- Self-test
- Fault (front and rear)
- ~Line On
- Net Fail

Resetting the Router, Clearing the Passwords, and Clearing the Router

Resetting the router: Boots the router, regardless of the current operating mode.

Clearing the password(s): Removes the current password(s), if any, without interrupting the current state of the router. This protects you from being denied console, Telnet, TFTP, or network manager access if you have forgotten the password(s).

Clearing the router: Removes the current password(s), erases the current configuration, and boots the router in its default (factory) configuration. Use this feature only if you are prepared to lose the router's current configuration.

The Reset and Clear buttons are located to the left of the console port:

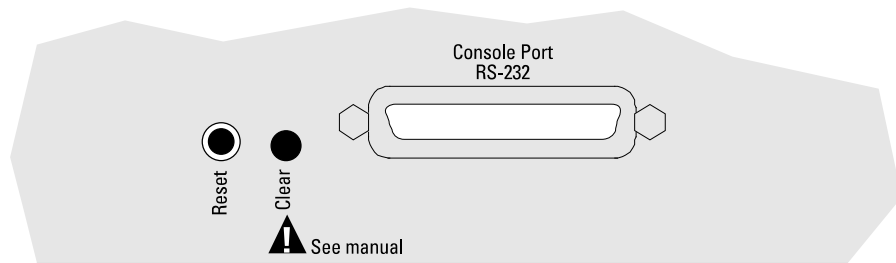


Figure 2-7. Location of the Reset and Clear Buttons

To Reset the Router

Press and release the Reset button on the back of the router. (Turning the power off, then on has the same effect as pressing the Reset button.) Resetting does the following:

- Lights the Fault and Net Fail LEDs while the Reset button is pressed. (On some models, pressing the Reset button lights all LEDs.)
- Clears the event log.
- Runs a self-test that lasts about one minute. (Lights the Self-test LED during this period.)
- Terminates whatever phase of operation the router is in and:
Boots the router, using the most recently saved configuration.

After the self-test, displays the “Waiting for speed sense” message and waits for you to press a key to restart the router.

Uses the most recently saved configuration to initialize the router.

Note

Resetting does not affect any current password(s).

Pressing the Reset button discards any parameter values you may have specified in either the Quick Configuration utility or the Configuration Editor, but have not yet saved. That is, after a reset, the router initializes itself with whatever configuration parameter values were last saved.

If the Self-test LED does not turn off within about one to three minutes of when you press and release the Reset button there may be a malfunction. In this case, check the status of the Fault and Net Fail LEDs for the error, and turn to chapter 3, “Troubleshooting”.

Router Operation

Resetting the Router, Clearing the Passwords, and Clearing the Router

To Clear the Manager and User Passwords

Use a non-conducting, pointed implement such as a wooden pencil or a toothpick to press and release the recessed Clear button. (Refer to figure 2-9 on page 2-14.)



Access to the router will no longer be limited by a password. The Clear button removes all constraints on access by anyone using the console, Telnet, TFTP, or a network manager.

To set a new password, use the Network Control Language (NCL) Password command on the console. For information on setting passwords, refer to “Set Manager and User Passwords” (page 1-34).

To Clear the Router



The combination of the Reset and Clear buttons restores all factory defaults, including configuration defaults; removes the manager and user passwords; initiates transmission of a series of Bootp requests to facilitate (optional) automatic configuration from a remote source. (Refer to “4. Plug In and Verify the Router Hardware” on page 1-22.) Use this procedure, as described below, to clear the configuration if it is so corrupted that you cannot access the router from the console.

Note

In step 3 below, ensure that you release the Clear button within five seconds of releasing the Reset button. That is, holding the buttons in too long—until either the Self-Test LED stops flashing (on newer model routers) or the Fault and Net Fail LEDs begin to flash (on older model routers)—prevents the clearing procedure from working. (In newer models, the router goes into a diagnostic utility; in older models, it goes into a test loop.) If this happens, recover by restarting the clearing procedure.

1. Press and hold the Reset button, then immediately press and hold the Clear button.

The Reset button protrudes slightly; you can press it with your finger. The Clear button is recessed. Press it with a non-conducting pointed implement like a wooden pencil or a toothpick.

2. Release the Reset button.
3. Release the Clear button within five seconds of releasing the Reset button. The router will then reboot in the factory default. If automatic configuration has been enabled via Quick Remote or a Bootp server (and the proper network configuration), then the router will reconfigure itself to the configuration it received from the remote source. Otherwise, the router remains in the factory default.

Router Operation

Resetting the Router, Clearing the Passwords, and Clearing the Router

4. When you see the message “Waiting for speed sense”, press to display the Main menu (figure 1-24 on page 1-27).
(You may need to press more than once to get console access again.)

Caution

The Reset-Clear combination erases the current configuration and replaces it with the default (factory) configuration. In this case, bridging (without spanning tree) is enabled on all ports. However, routing is not enabled unless a Smartboot configuration for this router has previously been enabled on the network. (If Smartboot has been enabled, bridging may or may not be enabled, depending upon the resulting configuration.)

Initialization Sequence

Whenever the router is powered on, or when its Reset button is pressed:

1. The Power LED indicates when power is on.
2. The router automatically goes through a self-test, which takes about one to three minutes. (The Self-test LED is lit during this step.)
3. The router's clock is reset to the time the router was last running. Or, if the Time Protocol is configured to run on this router, the time is set to the time found on a time server.
4. The router operating code is automatically executed.
5. Dynamic variables (such as the counters and events) are reset.
6. The configuration is read from battery-backed RAM into active circuitry. This implements any configuration changes saved since the router was last reset.

If you execute the NCL Boot command on the console, the initialization sequence begins at step 4, above.

Communication is automatically started with the devices that are connected to the router and with the routing applications that are configured. Bridging and routing tables are reset. If the router's factory-default configuration is still in effect, the router will attempt to bridge on all ports. You may see activity reported by the port status LEDs on the router. (Procedures for connecting devices are in chapter 1, "Installation and Initial Setup".)

When you connect a console (a terminal or a PC running a terminal emulator) to the router, the session is restarted. The message `Waiting for speed sense` appears on the console. Since the correct speed for your terminal has not been sensed yet, the 9600 baud message may appear garbled. When you see the new text on your terminal (or simply a few seconds after the Self-test LED turns off) press `[Return]` and pause. Repeat if necessary until the router senses and matches your baud rate. Your console session then begins. (The detailed procedure for connecting a console is in chapter 1, "Installation and Initial Setup".)

Troubleshooting

Introducing Router Troubleshooting Features

On all router models, the LED error patterns described in this chapter indicate specific error conditions that in some cases require either a recovery procedure done by the operator or replacement of the router. Certain later router models also can display error messages indicating FLASH memory problems that require cycling the power, downloading new operating code, or replacing the router.

Basic Troubleshooting Tips

Note

Some of the router's console commands are used for the troubleshooting instructions in this chapter. Refer to "Connect a console" (page 1-10) for details on connecting to the console port. For information on the Configuration Editor and the Network Command Language Interpreter (NCL), refer to the *User's Guide* for your router.

- Make sure that you have a valid network topology. If you have trouble after a recent change to the network, switch back to the previous topology. If you no longer have trouble, the new topology is probably at fault.
- Make sure that the router is plugged in and that cable connections are secure.
- If the console port does not work, refer to "Connect a console" (page 1-10), and then check "Troubleshooting a Terminal or Modem Connection" (page 3-12).
- Check LEDs. For descriptions, see "Interpreting Back-Panel LEDs" (page 2-6). LED patterns that indicate a router or network error are shown in tables 3-1 and 3-2 (pages 3-2 through 3-4).

Note

This chapter describes basic troubleshooting for hardware problems indicated by the Power, Self-test, Fault, and Net Fail LEDs appearing on all routers described in this manual. For the operating diagnosis indicated by other LEDs on a router, refer to "Meanings of Port Status LEDs" (page 2-9).

Interpreting LED Error Patterns

When power to the router is cycled or the Reset button is pushed, LED error patterns have the meanings shown in table 3-1 below.

Table 3-1. LED Error Patterns During Initialization

Initialization Fault LED Patterns				Diagnostic Tips
Power	Self-test	Fault	Net Fail	
Unlit	1	1	1	Check power cord and power source. If they are OK, replace the router.
Lit	Lit	Lit	All Unlit	Router hardware failure detected during self-test. Replace router.
Lit	Lit	Lit	All Lit or Flashing	While Reset button pressed or when power is first applied, this pattern is normal. If Reset is <i>not</i> pressed, router hardware failure detected during self-test. Replace router.
Lit	Lit	Lit	Some, but not all, Lit	Ports whose Net Fail LEDs are Lit are faulty. Replace router. Ports whose Net Fail LEDs are unlit <i>may</i> be usable.
Lit	Flashing	Flashing	Flashing	You have pressed the Reset and Clear buttons for too long to clear the configuration. Release them. Press them again briefly if clearing configuration is desired.
Lit or Flashing	Lit or Flashing	Unlit	Unlit	After (1) Reset and Clear buttons are held down, then (2) Reset button is released, this pattern is normal.

¹ This LED is not important for the diagnosis.

After the self-test has passed successfully, LED error patterns have the meanings shown in table 3-2 on the next page.

Troubleshooting
Interpreting LED Error Patterns

Table 3-2. LED Error Patterns During Operation

Operational fault LED patterns				Diagnostic Tips
Power	Self-test	Fault	Net Fail	
Unlit	*	*	*	Check power cord and power source. If they are OK, replace the router.
Lit	Unlit	Lit	All Unlit	Software failure. Press Reset button or enter NCL Boot command if router is not set to reboot automatically. Check console after you boot for the crash message. (You can re-examine the crash messages any time with NCL's Crash command.)
Lit	*	Lit	All Lit	While Reset button is pressed or when power is applied, this pattern is normal. If Reset is not pressed when you see this pattern, go to the next row.
Lit	Unlit	Lit	Any Ports Lit	Port failure. Cycle power or press Reset button to run self-test. Interpret results using table 3-1.
Lit	Unlit	Unlit	Any WAN Lit	For point-to-point non-X.25 circuits, if Remote Signal & Sense is enabled, then the WAN port is not hearing properly addressed Breath-of-Life packets from the remote device. This may be due to faulty or disconnected network hardware or improper configuration. If nothing is to be connected to this port, set Auto Enable to No for this circuit in the Configuration Editor or delete the configuration for this port.
Lit	Unlit	Unlit	Ethernet (802.3) LAN Lit	The driver is unable to send data. Data is sent by a protocol or when XCVR Signal Polling is enabled on this LAN port. The failure may be due to faulty or disconnected network hardware, excessive collisions, or excessive deferrals. If nothing is to be connected to this port, set Auto Enable to No for this circuit in the Configuration Editor.
Lit	Unlit	Unlit	Token Ring (802.5) LAN Lit	Ring error occurred. Either the cable is not properly attached or the wrong ring interface rate is active. (Options are 4 Mbit/s, 16 Mbit/s, or 16 Mbit/s ETR). Check both end connections of the cable and then use the Quick Configuration utility to verify that you are using the proper rate. (The Ring Interface parameter is listed in the "Port Conf" column of the "Token Ring" row of Quick configuration screens in routers having a token ring port.)

*This LED is not important for the diagnosis.

Interpreting ERROR Messages on the HP AdvanceStack Router 200 Series

Note

This section applies to the following routers:

- HP Router PR
- HP Router FR
- HP Router TFR

General Procedure for Self-Test Failures

If the router has a hardware problem that prevents either normal operation or display of error conditions, then the problem is indicated by the appropriate LED patterns described in table 3-1, “LED Error Patterns During Initialization” on page 3-4. Otherwise, the console displays the appropriate error message along with instructions for further action:

		7, MK5025 Test
Error number	→	ERROR: MK5025 failed interrupt test, errcode = 00000001
Error message	→	SELFTEST FAILURE
		A hardware problem was detected while running selftest. To enter the selftest monitor, press 's'. To attempt to load operating code, press any other key.
Error procedure	→	If no key is pressed after 10 seconds, an attempt will be made to load operating code.

Press `Return` or wait 10 seconds to attempt to load the router's operating code.

Note

If a qualified support person is available to operate the selftest monitor, press `S` to enter the selftest monitor. Otherwise, do as described above to attempt to load the operating code.

In all cases of displayed ERROR *messages*, take additional action as indicated below:

- If the operating code is successfully loaded, you can continue normal router operation. However, you should record the initial failure information and call for service from your HP dealer or service provider. It may be necessary to download new operating code to your router. For more information, refer to “Recoverable Self-Test Failures”, below.
- If the operating code does not successfully load, record the failure information and call for service from your HP dealer or service provider. It may be necessary to replace your router.

Recoverable Self-Test Failures

The following two error messages indicate a problem in the router's FLASH memory that may be corrected by cycling the power. If, after the power is cycled, the problem persists, then it may be corrected by downloading new operating code. In this case, contact your HP dealer or service provider.

```
ERROR: Erasure ERROR, block #
```

```
ERROR: Programming ERROR, block #
```

The following three error messages indicate a problem in the router's FLASH memory that may be corrected by downloading new operating code. For further assistance, contact your Hewlett-Packard representative.

```
ERROR: Incorrect CRC in FLASH
```

```
ERROR: Invalid size field in FLASH
```

```
ERROR: Illegal FLASH ID, byte #, got XXXX,  
expected YYYY
```

Troubleshooting

Interpreting ERROR Messages on the HP AdvanceStack Router 200 Series

Non-Recoverable Self-Test Failures

If the router persists in a non-operating state and/or displays any error message other than the five listed above, then there may be a hardware problem that requires replacement of the router. Contact your HP dealer or service provider.

Verifying LED Operation

If you suspect a non-operating LED, reset the router to verify the LEDs.

Caution

Resetting the router causes bridging and routing tables to be reset.

Verifying LED Operation on the HP Router ER, TR, and SR

1. Press and hold the Reset button while you verify that the ~Line On and Fault LEDs on the front of the router are lit and that the Power, Fault, Self-test, and Net Fail LEDs on the back of the router all are lit while you are pressing the button. (For the Router TR only, the Rx and Insert LEDs for the token ring port will also light when you press the Reset button.)
2. Then release the button—which begins router initialization—and verify that the Self-test LED is lit. After the Self-test LED turns off (in about one minute), if you have running networks connected to the WAN and Ethernet/802.3 ports, then you should see Tx and Rx and Activity LEDs blink for passing traffic on these ports. If all of this happens, the LEDs are verified.

Verifying LED Operation on Other Router Models

Use this method to verify the LEDs on HP routers *other than* the HP Router ER, TR, and SR models.

Press and hold the Reset button. All LEDs should light. If any LED does not light, either the LED or its driver circuit has failed. Normally, after you release the Reset button, only the Power, Self-test, and Ethernet/802.3 (AUI/BNC) connector LEDs will be lit.

Diagnostic Tests

Testing the Router Only

Use one of the initialization procedures listed below. Both include a self-test of the router's internal circuitry. For the other effects of these procedures, refer to "Initialization Sequence" (page 2-19). (Neither tests the router's ports; refer to the next section for port-testing information.)

1. Cycle power on the router by unplugging the power cord and then plugging it in.
2. Press and release the Reset button on the back of the router.

If you see any of the following results for either test, take the indicated action:

- If the Power LED does *not* light, the router is faulty; replace the router.
- If the Self-test LED does *not* light and then turn off after one to three minutes, the router is faulty. If you have tried to change the product operating code or have access to the code on another HP router, try updating it again. If not, then replace the router.
- If the Fault LED lights, look up the pattern of LEDs in table 3-1 on page 3-2, and follow the instructions in that table.

Testing the Router's Ports

The following tests require loopback connectors. The type of loopback connectors depends on which ports are in use and need testing. See illustrations and part numbers under "Loopback Connectors" (page A-20).

To test a WAN port:

1. Detach the router's power cord.
2. Detach the network connection and attach a loopback connector to each WAN port being tested.
3. Reattach the router's power cord.
4. If the Net Fail LEDs for the tested port light, the port is faulty. Replace the router. Any other ports that test OK may be usable in the meantime.

To test a LAN port (802.3/Ethernet or 802.5/token ring):

1. Set the XCVR Signal Polling parameter to "Active" for the circuit on the LAN port to be tested. To access this parameter, use the Configuration Editor from the console, select item 4 ("Circuits"), select the desired LAN port, and specify the Circuit Type parameter. The console then displays the XCVR Signal Polling parameter. (For information on the XCVR Signal Polling parameter, refer to the *Operator's Reference*.)
2. Detach the router's power cord.
3. Detach the network connection and attach an AUI loopback connector to the port being tested.
4. Reattach the router's power cord.
5. If the Net Fail LED for the tested port lights, the port is faulty. Replace the router. Any other ports that test OK may be usable in the meantime.

Troubleshooting
Diagnostic Tests

To test an FDDI port:

1. Detach the network connection and attach a loopback connector to either FDDI port. (Refer to “Loopback Connectors” on page A-20.)
2. Press the Reset button to reset the router.
3. If the Net Fail LEDs for the tested port light, the port is faulty. Replace the router.

To test the router’s console port:

The console port test is included in the next section.

Troubleshooting a Terminal or Modem Connection

If the automatic speed sensing does not connect your console and give you the router’s copyright and Main menu screens, as described under “Connect a console” (page 1-10), then try the following procedures in sequence:

Reset Speed Sensing:

1. Detach the console cable from the router.
2. Reattach the console cable to the router.
3. Look for the line of text on your console that indicates waiting for speed sensing; then press **Return** to display the copyright screen or the Main menu screen. If neither of these screens appears, press **Return** again. If pressing **Return** four or five times does not display either the copyright or Main menu screen, go on to “Adjust Baud Rate” on page 3-13

Troubleshooting
Diagnostic Tests

Note

If pressing **[Return]** after the speed sensing text gets the prompt:
router console>
instead of the copyright screen or Main menu, then the product operating code has been lost. Contact your HPdealer or service provider for further assistance.

Adjust Baud Rate:

1. Temporarily set the baud rate of the terminal or terminal emulator to 9600, if available, or to the slowest setting.
2. Detach the console cable from the router.
3. Reattach the console cable to the router.
4. Look for the line of text on your console that indicates waiting for speed sensing; then press **[Return]** to display the copyright screen or the Main menu screen. If neither of these screens appears, press **[Return]** again. If pressing **[Return]** four or five times does not display either the copyright or Main menu screen, then ensure that you are using the correct console cable. (Refer to “HP Cables” on page A-3.) If the cable is correct, then repeat this procedure for each other baud rate available for your terminal until you find a rate that gives you a successful connection. If you cannot establish a successful connection, go on to “Reset the Terminal”, below.

Reset the Terminal:

1. Switch the terminal or PC’s power off and then on once.
2. Make sure the configuration for your terminal or emulation matches the requirements listed under “Connect a console” (page 1-10).
3. Look for the line of text on your console that indicates waiting for speed sensing; then press **[Return]** to display the copyright screen or the Main menu screen. If neither of these screens appears, press **[Return]** again. If pressing **[Return]** four or five times does not display either the copyright or Main menu screen, then go on to “Test Router’s Console Port”, below.

Troubleshooting
Diagnostic Tests

Test Router's Console Port:

1. Detach the console cable from the router.
2. Attach the console port's loopback connector to the router. (Refer to "Loopback Connectors" on page A-20).
3. Press the Reset button on the back of the router.

Caution

Resetting the router causes bridging and routing tables to be reset.

4. If the Fault LED lights within one to three minutes and while the Self-test LED is still lit, the router is faulty and must be replaced.
5. To resume after testing, remove the loopback connector and reconnect the console cable to the console port. Look for the line of text on your console that indicates waiting for speed sensing; then press **Return** to display the copyright screen or the Main menu screen. If neither of these screens appears, press **Return** again. If pressing **Return** four or five times does not display either the copyright or Main menu screen, then go on to "Check the Configuration", below.

Check the Configuration

If none of the above procedures provides console access, and you suspect that a corrupted configuration rather than the terminal connection is a possible cause, then you may need to clear the configuration. (Refer "To Clear the Router" on page 2-17.)

Testing a Transceiver on an Ethernet/802.3 Port

Note:

This test verifies that data written out is identical to data received and that no collisions are detected. This test can be done with transceivers (sometimes termed *MAUs*) such as the HP 28685B EtherTwist Transceiver, the HP 28641B ThinLAN Transceiver, and the HP 28683A Fiber-Optic Transceiver. (Some transceivers have a loopback test switch that must be set to correspond to these requirements.)

1. Set the XCVR Signal Polling parameter to the default “Active” for the circuit on the LAN port to be tested. To access this parameter, use the Configuration Editor from the console, select item 4 (“Circuits”) select the desired LAN port, and specify the Circuit Type parameter. The console then displays the XCVR Signal Polling parameter. (For information on the XCVR Signal Polling parameter, refer to the *Operator’s Reference*.)
2. Detach the router’s power cord.
3. Attach the transceiver to the LAN port, and attach the required type of loopback connector to the transceiver. If the transceiver has a loopback test switch, enable it for the test.
4. Reattach the router’s power cord.
5. If the Net Fail LED for the tested LAN port remains unlit when self-test completes after about one to three minutes, the transceiver is OK and this procedure is finished. If the Net Fail LED for a tested LAN port lights, then proceed to the next step.
6. Detach the router’s power cord and detach the transceiver from the router. Attach an AUI loopback connector to the LAN port in place of the transceiver. Reattach the router’s power cord. If the Net Fail LED for the tested LAN port remains unlit this time, the transceiver is probably faulty. If the Net Fail LED for the tested port lights, the router’s port is faulty.

Troubleshooting

Diagnostic Tests

2. At the NCL prompt, enter one of the following commands:

- For LAN and WAN circuits:

```
get cct.cct-name.mac_addr 
```

- For FDDI circuits (HP Router BR only):

```
get cct.fddi-name.ieee.addr 
```

where: *cct-name* or *fddi-name* is the configured circuit name for the port. Examples of circuit names are ETHER1, WAN1, TOKEN1, and FDDI1.

3. Note the resulting station address.

4. Use the Exit command to leave NCL and return to the Main menu:

```
exit 
```

Troubleshooting
Diagnostic Tests

Ping

Ping is a network-layer test that sends an Internet Control Message Protocol (ICMP) echo request message to another node that has an IP address and is able to respond to an ICMP echo request message. The router must have IP routing configured in order to use this test.

1. From the Main menu, select the Network Control Language Interpreter (NCL). The NCL prompt then appears at the bottom of the screen. (See figure 3-1 on page 3-16.)

2. At the NCL prompt, enter one of the following commands:

```
ping x.x.x.x
```

```
ping x.x.x.x count
```

```
ping x.x.x.x count wait
```

where:

x.x.x.x is the target node's IP address in dotted decimal notation.

count (optional) is the number of times to repeat the echo request packet. If *count* is not included, the packet is sent once.

wait (optional) is how many seconds to wait for a response. If a second integer is not included, the response must be received in five seconds to be successful.

3. You will see a message, either that the target node is alive—meaning that communications are passing successfully from the router to the remote node on a specific link—or that the remote node did not respond. If you cannot reach any remote node, the problem must be isolated to the router, the links used in the test, or all of the remote nodes.

4. Use the Exit command to leave NCL and return to the Main menu:

```
exit 
```

For more details, refer to “Ping: Sending an ICMP Echo Request Message” in the *Operator's Reference*.

Telnet

Telnet is an upper-layer service that allows you to interact with a remote node's console interface, by establishing a virtual terminal connection. You make a console connection *from* an HP router that has IP routing and a Telnet session configured *to* a router or end node that has Telnet service and is suspected of not routing successfully.

1. From the Main menu, select the Network Control Language Interpreter (NCL). The NCL prompt then appears at the bottom of the screen. (See figure 3-1 on page 3-16.)

2. At the NCL prompt, enter the Telnet command:

```
telnet x.x.x.x
```

where *x.x.x.x* is the IP address of the remote node in dotted decimal notation.

3. Once the connection is established, Telnet passes your keystrokes to the remote system. If the remote system is another HP router:
 - a. You will see the system name of the remote node as the NCL prompt at the bottom of your display. Check the event log or routing tables of the remote node as you do for your own router. Use the Exit command to leave NCL and return to the remote node's Main menu:

```
exit 
```

- b. To disconnect the Telnet session, use the Logout option from the remote node's Main menu. When you are prompted with:

```
Do you want to disconnect? [Y/N:]
```

press for "yes". The remote node is disconnected, the Telnet session ends, and your own system name appears in the the display.

If the remote system is *not* another HP router, then type the appropriate commands to interact with that system and to disconnect Telnet.

4. Use the Exit command to leave NCL and return to the Main menu:

```
exit 
```

A

Cables and Connectors

Cables and Connectors

This appendix lists cables that have been tested and verified for use with this router. It also includes minimum pin-out information, so that if you wish to use an unlisted cable, you can verify that your cables are correctly wired. Note that each pin-out does not necessarily match the pin-out for the corresponding HP cable, but cables manufactured to follow the minimum pin-out will function correctly. Loopback connectors for all router ports are also shown in this appendix.

HP Cables

Cable and Connector on Router	Connector on Attached Device	HP Product or Part Number
RS-232 cable for a modem connecting to console port	For 25-pin female port	13242N, 17355M
	For 25-pin male port	31391A, 31391B, 92215F, 92215T
RS-232 cable for a terminal or PC connecting to console port	For 25-pin female port	13242G ¹ , 40242G ¹
	For 25-pin male port	13242G ¹ plus 92224F female converter
	For 9-pin female port	92221P ¹
	For 9-pin male port	24542G ¹
Transceiver that has an AUI port, directly connecting to AUI LAN port	For LAN cable (These transceivers do not need an AUI cable.)	28685B EtherTwist Transceiver, 28641B ThinLAN Transceiver, 28683A Fiber-Optic Transceiver
AUI stub cable (for other transceivers) connecting to AUI LAN port	For transceiver's 15-pin male port	92264D (1 meter), 92254A through H (6–48 meters), 92254J (5 meters)
RS-422/449/V.36 cable connecting to WAN port	For 37-pin female port	28606-63005 (5 meters)
V.35 cable (balanced X.27) connecting to WAN port	For 34-pin female port	28606-63008 (5 meters)
X.21 cable connecting to WAN port	For 15-pin female port	28606-63001 (5 meters)
RS-232/V.24/V.28 cable connecting to WAN port	For 25-pin female port	28606-63006 (5 meters)
Back-to-Back test cable for WAN port connecting to HP routers having a 62-pin synchronous WAN port or the HP Remote Bridge RB	For 62-pin female WAN port(s) included on most HP routers and the HP Remote Bridge RB	5061-2556 (5 meters)
Back-to-Back test cable for WAN port connecting to HP 27270 Router CR	For 15-pin female COM port on HP 27270B Router CR	5061-2557 (5 meters)
62.5/125 micron multimode fiber-optic cable with fixed-shroud duplex (FSD) media interface connector (MIC) ³ for FDDI port	For connection to an FDDI port on another HP router having an FDDI port	5063-2489 (1-meter)
FDDI optical bypass switch	—	5063-2488

¹ The DTR (pin 20) and RTS (pin 4) signals must be on, or high, on your terminal or in your terminal emulation program.

Cables and Connectors
Other Standard Cables

Other Standard Cables

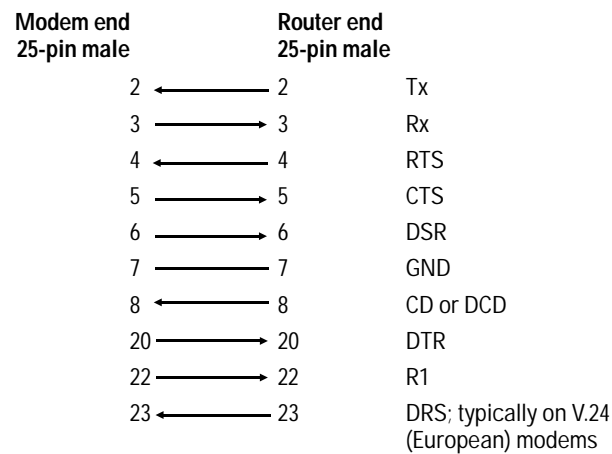
Cable and Connector on Router	Connector on Attached Device	Standard Cable or Cable Solution
Token ring, shielded, twisted-pair cable connecting to the 9-pin female token ring port with a male 9-pin subminiature D-connector	For a medium interface connector (MIC) conforming to IEEE 802.5 specifications for connection to a trunk coupling unit (TCU)	Available from several vendors, such as Black Box and Inmac. Not offered by Hewlett-Packard.
RS-232 modem cable for a modem connecting to console port	For 25-pin female or male port	Use a standard (straight-through) modem cable.
RS-232 cable for a terminal or PC connecting to console port ²	For 25-pin male port	Attach a null modem adapter ¹ (Tandy Null Modem Adapter No. 26-1496 has been tested) to the console port. Then attach a straight-through modem cable to the null modem adapter.
	For 9-pin male port	Use a Black Box PC/AT Serial Printer Cable (EVNBPC has been tested). <i>OR</i> Attach a null modem adapter (Tandy Null Modem Adapter No. 26-1496 has been tested) to the console port. Then attach a modem cable (Black Box Cable EVNBMC and Cablex PC Modem Cable have been tested) to the null modem adapter.
¹ The required minimum pin-out is listed in the next section, "Cable/Connector Pin-Outs". ² Signals DTR (pin 20) and RTS (pin 4) must be on, or high, on your terminal or in your terminal emulation program. ³ Two cables are required for dual attachment to another HP router having an FDDI port or an adjacent DAS.		

Cable and Connector Pin-Outs

Router Console Port Connector Pin-Outs

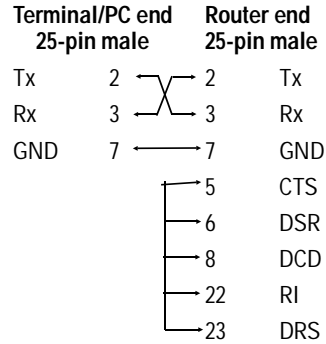
PIN	US	CCITT	DIN
1	CHS GND	101	
2	Tx	103	D1
3	Rx	104	D2
4	RTS	105	S2
5	CTS	106	M2
6	DSR	107	M1
7	GND	102	
8	DCD	109	M5
20	DTR	108	S1
22	RI	125	M3
23	SR	111	

RS-232 Modem Cable—Minimum Pin-Outs

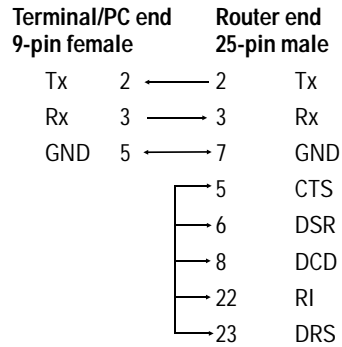


Cables and Connectors
Cable and Connector Pin-Outs

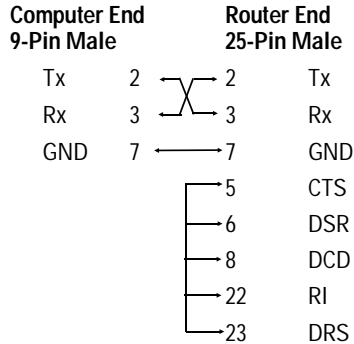
RS-232 “Null Modem” Cable for Terminal/PC with 25-Pin Connector—Minimum Pin-Out



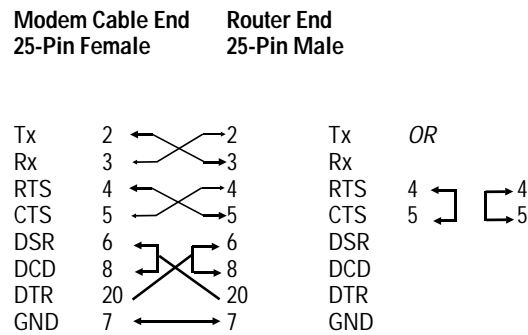
RS-232 “Null Modem” Cable for Terminal/PC with 9-Pin Connector—Minimum Pin-Outs



RS-232 Cable for HP Portable (110) and Portable Plus—Minimum Pin-Outs



Null-Modem Adapter for Use with Modem Cable—Minimum Pin-Outs



Note

Signals DTR (pin 20) and RTS (pin 4) must be on, or high, on your terminal or in your terminal emulation program.

Cables and Connectors
Cable and Connector Pin-Outs

Router AUI LAN Port Definition

The AUI port is compatible with the IEEE 802.3 standard for the Attachment Unit Interface (AUI).

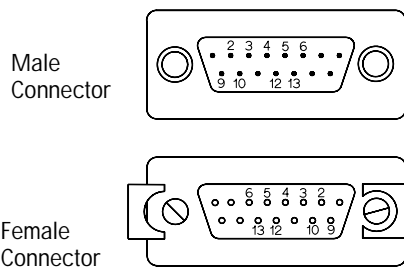
AUI Cable—Minimum Pin-Outs

Transceiver End 15-Pin Female	Router End 15-Pin Male	Signal Name, Circuit
1	1	Chassis Ground
2	2	Control In, A
3	3	Data Out, A
4	4	Data In, Shield (common drain)
5	5	Data In, A
6	6	Voltage Common
9	9	Control In, B
10	10	Data Out, B
11	11	Chassis Ground
12	12	Data In, B
13	13	Voltage Plus
14	14	Chassis Ground

For this connection, you can use:

- HP 92264D (1-meter ThinLAN AUI extension, pin 4 not connected)
- HP 92254A through H (6-meter through 48-meter ThickLAN cables)
- HP 92254J (5-meter ThinLAN AUI cable, pin 4 not connected)

Some longer cables may have all 15 pins wired. See the IEEE 802.3 standards document for definitions of the pins not shown here.



RS-449/422 WAN Cable—Minimum Pin-Outs

WAN link end 37-pin male	Router end 62-pin male	RS-449 Signal Name and Circuit
4 ———	17	SD Send Data, A
5 ———	2	ST Send Timing, A
6 ———	1	RD Receive Data, A
7 ———	15	RS Request to Send, A
8 ———	3	RT Receive Timing, A
9 ———	4	CS Clear to Send, A
10 ———	54	Reserved
11 ———	5	DM Data Mode, A
12 ———	16	TR Terminal Ready, A
13 ———	6	RR Receiver Ready, A
14 ———	53	Reserved
15 ———	48	Reserved
16 ———	55	Reserved
17 ———	14	TT Terminal Timing, A
18 ———	8	Reserved
19 ———	9	SG Signal Ground
	30	
	32	
20 ———	47	Reserved
22 ———	38	SD Send Data, B
23 ———	23	ST Send Timing, B
24 ———	22	RD Receive Data, B
25 ———	36	RS Request to Send, B
26 ———	24	RT Receive Timing, B
27 ———	25	CS Clear to Send, B
28 ———	33	Reserved
29 ———	26	DM Data Mode, B
30 ———	37	TR Terminal Ready, B
31 ———	27	RR Receiver Ready, B
33 ———	29	Reserved
34 ———	34	Reserved
35 ———	35	TT Terminal Timing, B
37 ———	10	SC Send Common

Cables and Connectors
Cable and Connector Pin-Outs

V.35 WAN Cable—Minimum Pin-Outs

WAN link end 34-pin male	Router end 62-pin male	CCITT Signal Name and Circuit
B ——— 9	102	Signal Ground
——— 22		
——— 23		
——— 24		
——— 25		
——— 26		
——— 27		
——— 47		
——— 31		
——— 32		
——— 52		
——— 50		
C ——— 57	105	Ready to Send
D ——— 4	106	Clear to Send
E ——— 46	107	Data Mode
F ——— 6	109	Receiver Ready
H ——— 58	108.2	Terminal Ready
J ——— 48		Reserved
P ——— 21	103	Send Data, A
R ——— 20	104	Receive Data, A
S ——— 42	103	Send Data, B
T ——— 41	104	Receive Data, B
U ——— 61		Transmit Timing, A
V ——— 18	115	Receive Timing, A
W ——— 60		Transmit Timing, B
X ——— 39	115	Receive Timing, B
Y ——— 19	114	Send Timing, A
AA ——— 40	114	Send Timing, B

X.21 WAN Cable—Minimum Pin-Out

WAN link end 15-pin male	Router end 62-pin male	X.21 Signal Name and Circuit	
2 ———	17	T	Send Data, A
3 ———	16	C	Control, A
4 ———	1	R	Receive Data, A
5 ———	4	I	Indicator, A
6 ———	3	S	Send Timing, A
8 ———	9	G	Ground
	32		
	47		
9 ———	38	T	Send Data, B
10 ———	37	C	Control, B
11 ———	22	R	Receive Data, B
12 ———	25	I	Indicator, B
13 ———	24	S	Send Timing, B

Cables and Connectors
Cable and Connector Pin-Outs

RS-232 WAN Cable—Minimum Pin-Outs

WAN link end 25-pin male	Router end 62-pin male	EIA and Signal Name	
2	59	BA	Send Data
3	1	BB	Receive Data
4	57	CA	Request to Send
5	4	CB	Clear to Send
6	46	CC	Data Mode
7	9	AB	Signal Ground
	22-27		
	47		
	30		
	31		
	52		
8	6	CF	Receiver Ready
12	28		Reserved
13	7		Reserved
14	13		Reserved
15	2	DB	Send Timing
16	49		Reserved
17	3	DD	Receive Timing
19	12		Reserved
20	58	CD	Terminal Ready
21	29		Reserved
22	48		Reserved
23	55		Reserved
24	56	DA	Terminal Timing

The maximum cable length is 15 meters (50 feet).

Back-to-Back Test Cables

Two 5-meter, back-to-back, synchronous test cables are available from HP. These cables allow you to connect any HP router having a (62-pin) synchronous WAN port to another HP router (or an HP Remote Bridge) having the same port type, without using a modem eliminator, for up to 60 meters (200 feet). These cables use the RS-422 signal level. Use the test cables for demonstrations, instruction, or testing the router.

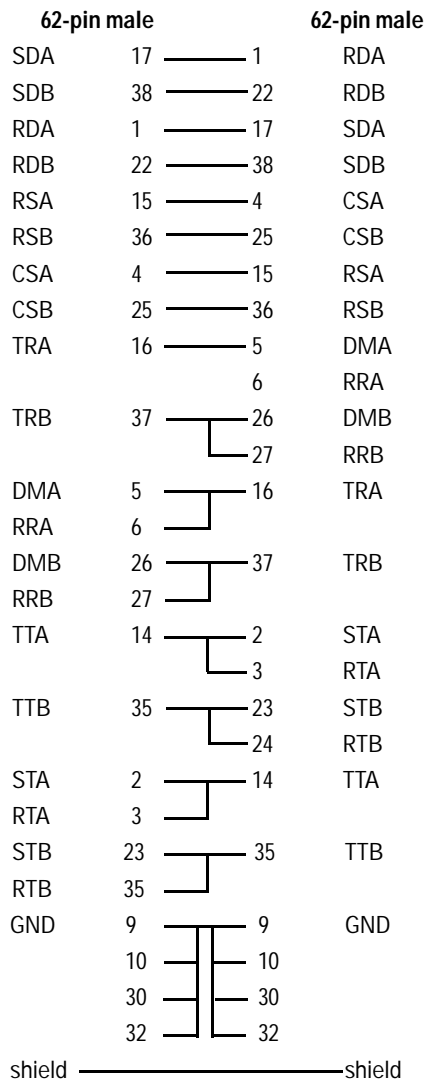
The two test cables available are:

Description	Connector at End For Other Device	Part Number
Back-to-back test cable, 5 meters	62-pin, male (Most HP routers and the HP Remote Bridge RB)	5061-2556
Back-to-back test cable (high-speed balanced), 5 meters	15-pin, male (HP 27270 Router CR)	5061-2557

The minimum pin-outs for the two cables are shown on the following pages.

HP 5061-2556 Back-to-Back Test Cable for 62-Pin Connector—Minimum Pin-Outs

For a description of the use of this test cable, see page A-13 above. The WAN port on one router must have the Point to Point Address configured to DCE and the WAN port on the other router must have it configured to DTE. In addition, one must have the Clock Source parameter configured to External, and the other must have it configured to Internal.



Note: On the HP Router PR, FR, and TFR, Clock Source is automatically configured to the proper setting (Internal or External) when using the HP 5061-2556 test cable. On other models, you must use the Configuration Editor to change the Clock Source setting.

Note

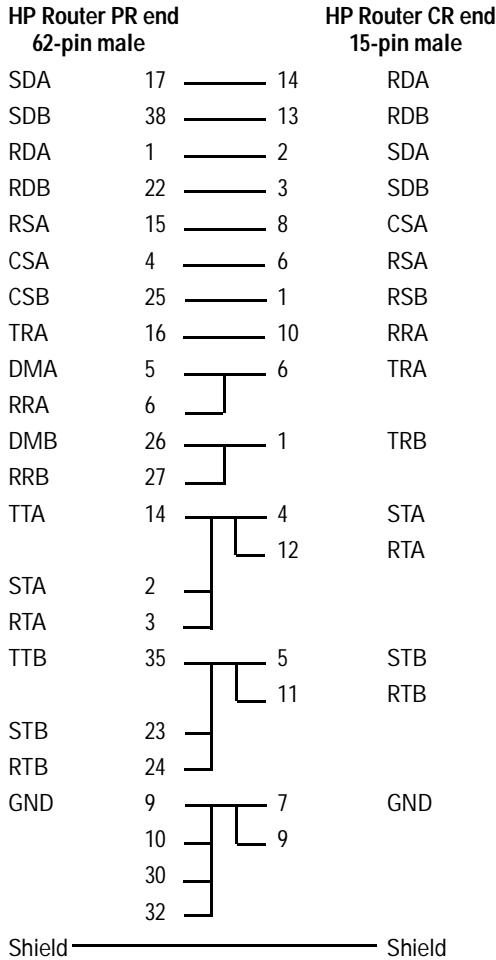
In the cable, each of the differential signal pairs (SDA and SDB, RDA and RDB) and so on, must be twisted pairs of wire.

HP 5061-2557 Back-to-Back Test Cable for 62-Pin Connector—Minimum Pin-Outs

For a description of the use of this test cable, see page A-13 above. The WAN port on one router must have the Point to Point Address configured to DCE and the WAN port on the other router must have it configured to DTE. In addition, this router must have Clock Source configured to Internal, and the HP Router CR must have it configured to External.

For the pinouts of this cable, turn the page.

Cables and Connectors
Cable and Connector Pin-Outs



Note: In the cable, each of the differential signal pairs (SDA and SDB, RDA and RDB, and so on) must be twisted pairs of wire.

Router Token Ring/802.5 LAN Port Definition

This port accepts the standard nine-pin subminiature D-connector for shielded twisted-pair token-ring cable.

Pin Definition of Token Ring Connector

Nine-Pin Connector	Token Ring Signal
1	Data In A
2	Ground
3	5V Out
4	Ground
5	Data Out B
6	Data In A
7	Ground
8	Ground
9	Data Out A

The opposite end of the token-ring cable should be fitted with a medium interface connector (MIC) conforming to the IEEE 802.5 specification.

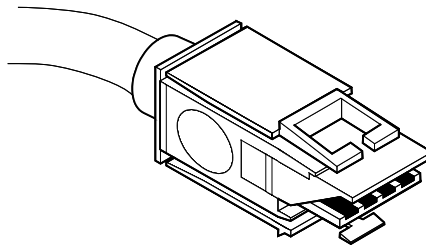


Figure A-1. Router Token Ring (802.5 MIC) Connector

FDDI Optical Bypass DIN Connector Pinouts (HP Part Number 5063-2488)

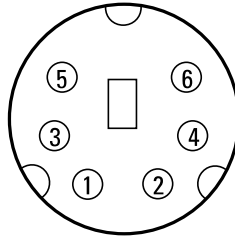


Figure A-2. FDDI Bypass Mini DIN Connector Pinouts

pin 1	
pin 2	switch positive (5V, 400 mA max)
pin 3	
pin 4	switch ground
pin 5	bypass detect
pin 6	ground

When pin 5 is attached to pin 6, the bypass is detected. Pin 5 and pin 6 should be looped together.

FDDI Cable

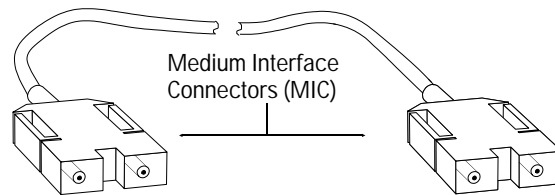


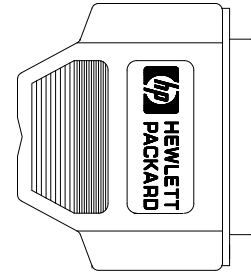
Figure A-3. Example of FDDI Cable

Loopback Connectors

For the Console Port

HP part number 5062-3355; pin connections:

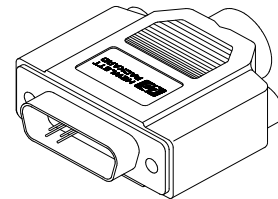
- pin 2 to pin 3
- pin 4 to pin 5 to pin 8
- pin 6 to pin 20 to pin 22
- pin 7 to pin 23



For an AUI LAN Port

HP part number 28663-63001; pin connections:

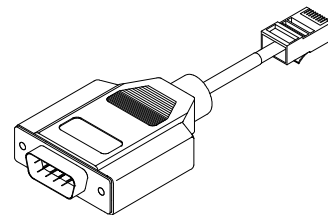
- pin 3 to pin 5
- pin 10 to pin 12



For a Token Ring/802.5 Port

HP part number 5061-2550; pin connections:

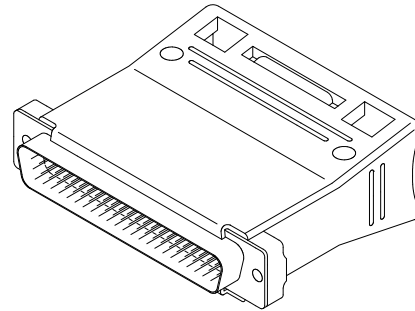
- Modular (RJ-45) to subminiature D-connector:
 - pin 3 to pin 1
 - pin 4 to pin 6
 - pin 5 to pin 9
 - pin 6 to pin 5
- Subminiature D-Connector
 - pin 1 to pin 9
 - pin 5 to pin 6



For a WAN Port

HP part number 28606-63007; pin connections:

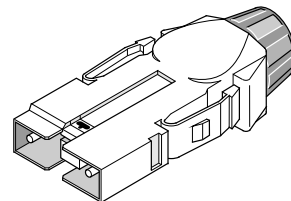
- pin 9 to pin 23
- pin 10 to pin 27
- pin 11 to pin 50
- pin 12 (not used) to pin 7 (not used)
- pin 13 (not used) to pin 49 (not used)
- pin 14 to pin 19
- pin 15 to pin 4
- pin 16 to pin 46
- pin 17 to pin 1
- pin 21 to pin 20
- pins 30, 31, and 32 to pin 27
- pins 33 and 34 (not used) to pin 29 (not used)
- pin 35 to pins 40 and 39
- pin 36 to pin 25
- pin 37 to pin 26
- pin 38 to pin 22
- pin 42 to pin 41
- pin 47 (not used) to pin 24
- pin 51 to pin 2
- pin 53 (not used) to pin 8 (not used)
- pin 54 (not used) to pin 29 (not used)
- pin 55 (not used) to pin 8 (not used)
- pin 56 to pin 3
- pin 57 to pin 28 (not used)
- pin 58 to pin 6
- pin 59 to pin 48 (not used)



For an FDDI Port

HP part number 5063-2490

FDDI-standard loopback connector



B

Modem Configuration

Modem Configuration

HP 35031A Support Link II

At the router end:

Configure SOFT OPTION 6 to 1.

Configure SOFT OPTION 15 to 2.

Configure SOFT OPTION 16 to 2.

Configure SOFT OPTION 20 to 2.

Configure SOFT OPTION 21 to 2.

At the user end:

Configure SOFT OPTION 16 to 2.

HP 37212B Support Link

At the router end:

Set switches 8, 9, 11, and 12 up (set to 1), all others down (set to 0).

AUTO ANS on the front should be pushed in.

At the user end:

Set switches 8, 9, 11, and 12 up (set to 1), all others down (set to 0).

HP 50759A Support Link

At the router end:

For an 8-position switch, set switch 4 down, all others up.

For a 4-position switch, set switch 2 up, all others down.

At the user end:

For an 8-position switch, set switches 3 and 8 down, all others up.

For a 4-position switch, set all switches down.

Hayes 2400 Smartmodem

At the router end:

Configure with a terminal or PC using the following sequence:

```
at&f&c1&d2&s1  
ats0=1
```

Depress the ANS button. The red light should go ON.

At the user end:

Configure with a terminal or PC using the following sequence:

```
at&f&c1&d2&s1
```

Black Box V.32 9600 Async.

At the router end: Load the factory option set #1. Then change the following submenus:

Data Rate Menu: change to 9600 uncoded

Modem Parameters Menu: change to Forced Answer

DTE Parameters Menu:

Set DTR State to Responds to DTR Change

Set DSR State to DSR is Normal

Set CTS State to CTS is Normal

Set DCD State to DCD is Normal

At the user end: Configure as at the router end, except:

Modem Parameters Menu: change to Normal Originate

C

Specifications

Specifications

Physical (without brackets)

Dimensions

Single-Height 42.6 cm by 23.5 cm by 4.3 cm
(16.8 in. by 9.3 in. by 1.7 in.)

Double-Height 42.6 cm by 23.5 cm by 8.9 cm
(16.8 in. by 9.3 in. by 3.5 in.)

Weight

Single-Height 2.7 kg (6 lbs)

Double-Height LR: 4.2 kg (9.3 lbs)
BR: 4.9 kg (10.9 lbs)

Power Consumption

Router Model	Maximum current at 100-120 Vac	Maximum current at 200-240 Vac	Frequency Range
HP Router ER	0.6 amp	0.45 amp	50/60 Hz
HP Router TR	0.9 amp	0.6 amp	
HP Router LR	0.9 amp	0.5 amp	
HP Router SR	0.9 amp	0.6 amp	
HP Router BR	1.0 amp	0.6 amp	
HP Router PR	0.5 amp	0.3 amp	
HP Router FR	0.5 amp	0.3 amp	
HP Router TFR	0.5 amp	0.3 amp	

The routers automatically adjust to voltage in the range of 90-240 V ac.
The routers automatically adjust to cycles in the range of 50-60 Hz.

Environmental

	Operating	Non-Operating
Temperature	0°C to 55°C (32°F to 131°F)	-40°C to 70°C (-40°F to 158°F)
Relative humidity	15% to 95% at 40°C (104°F), non-condensing	90% at 65°C (149°F)
Altitude	4.6 km (15,000 ft)	4.6 km (15,000 ft)

Electromagnetic Emissions

Countries	ER, TR, & SR Models	PR, FR, TFR, LR, & BR Models
U.S.A., Canada, and Latin America	FCC part 15 class A	FCC part 15 class A
Europe and other countries	CISPR-22 class B	CISPR-22 class A
Europe	EN 55022 class B	EN 55022 (1988) class A
Japan	VCCI class 2	VCCI class 1

Acoustical (for Germany)

Geraeuschemission LwA = 53 dB
am fiktiven
Arbeitsplatz
nach DIN 45635 T.19

Safety Approvals

CSA 950
UL 1950
IEC 950/EN60950

Specifications

Data Communications Specifications

Cable Interfaces	Specifications
Console port	EIA RS-232 or CCITT V.24/V.28, asynchronous
Ethernet/802.3 ports	IEEE 802.3 standards, Ethernet 1.0 and 2.0
Token Ring/802.5	IEEE 802.5 standards for shielded twisted pair (TR only)
WAN port (with the appropriate cable)	EIA RS-232 and CCITT V.24/V.28, synchronous, EIA RS-422/449 and CCITT V.36, CCITT X.21, CCITT V.35 ISO 2593 and MIL-C-28747
FDDI port	X3.166-1990/ISO 9314-3:1990 PMD standard for 62.5/125 micron, multimode fiber optic cable with media interface connectors (MIC)

Data Communications: All models covered by this manual are approved under Approval Number NS/G/1234/J/100003 for indirect connection to public telecommunication systems within the United Kingdom.

X.25 Hewlett-Packard has applied to the following agencies for certification for use on X.25 packet-switching networks. Certifications were still in progress at the time of printing. Please contact your local HP representative for latest certification status.

North America Telenet, Tymnet, Infonet, DDN

Europe

Austria	DATEX-P
Belgium	DCS
Finland	DATAPAK
Germany	
Italy	ITAPAK
Luxembourg	LUXPAC
Netherlands	DATANET
Norway	DATAPAK

D

**FDDI Cable Attachment
Configurations**

FDDI Cable Attachment Configurations

If your HP router has an FDDI port, you can attach it to the FDDI network in several different ways. The three examples described below are standard FDDI methods for FDDI dual-attach station (DAS) devices, and are not specific to any HP router.

Dual-Attach Station (DAS)

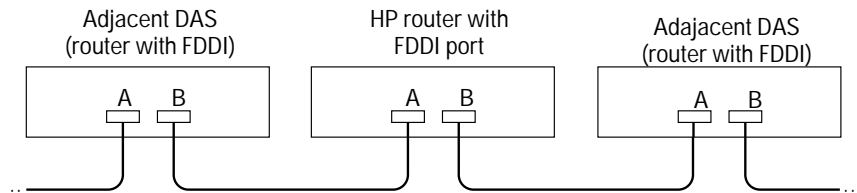


Figure D-1. Example of Dual-Attach Station Connections

This configuration gives you optional use of the optical bypass switch (page 1-19) to prevent ring wrap if an FDDI circuit becomes non-operational.

1. Attach port "A" of the router to port "B" of an adjacent DAS.
2. Attach port "B" of the router to port "A" of another DAS.

Single-Attach Station (SAS)

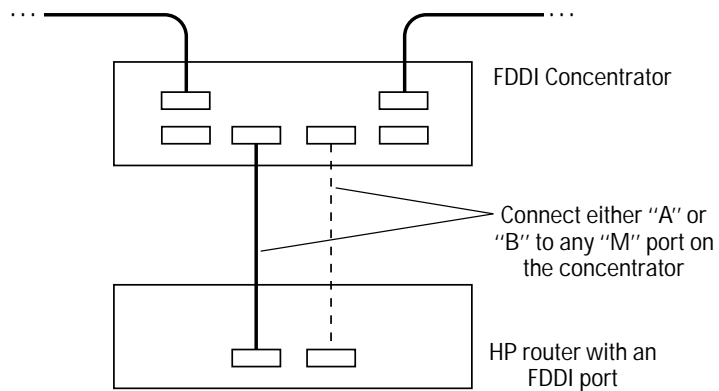


Figure D-2. Example of Single-Attach Station Connections

This configuration avoids the need for an optical bypass switch (page 1-19) because the FDDI concentrator provides the isolation of the router from the dual ring (to prevent ring wrap) if the router's FDDI circuit becomes non-operational.

1. Attach the concentrator to the FDDI ring.
2. Attach either port "A" or port "B" to any "M" port on the FDDI concentrator.

Dual-Homed Connection

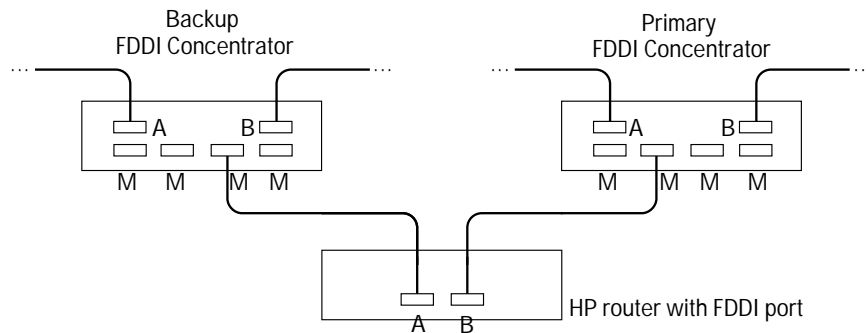


Figure D-3. Example of Dual-Homed Connection

This configuration:

- avoids the need for an optical bypass switch (page 1-19)
- provides redundancy so that failure of one cable or concentrator will not break the router's connection to the dual ring

During normal operation in the above example, traffic is sent and received over port "B" of the router. Port "A" is used only if the cable or concentrator attached to port "B" fails.

1. Attach port "A" of the to an "M" port of a concentrator.
2. Attach port "B" of the router to an "M" port of another router.

Safety Information

Safety Symbols



Documentation reference symbol. If the product is marked with this symbol, refer to the product documentation to get more information about the product.

WARNING

A **WARNING** in the manual denotes a hazard that can cause injury or death.

CAUTION

A **CAUTION** in the manual denotes a hazard that can damage equipment.

Do not proceed beyond a **WARNING** or **CAUTION** notice until you have understood the hazardous conditions and have taken appropriate steps.

Grounding

This is a safety class I product and has a protective earthing terminal. There must be an uninterruptible safety earth ground from the main power source to the product's input wiring terminals, power cord, or supplied power cord set. Whenever it is likely that the protection has been impaired, disconnect the power cord until the ground has been restored.

For LAN cable grounding:

- If your LAN covers an area served by more than one power distribution system, be sure their safety grounds are securely interconnected.
- LAN cables may occasionally be subject to hazardous transient voltages (such as lightning or disturbances in the electrical utilities power grid). Handle exposed metal components of the network with caution.

Servicing

There are no user-serviceable parts inside this product. Any servicing, adjustment, maintenance, or repair must be performed only by service-trained personnel.

This product does not have a power switch; it is powered on when the power cord is plugged in.

Informations concernant la sécurité

Symboles de sécurité



Symbole de référence à la documentation. Si le produit est marqué de ce symbole, reportez-vous à la documentation du produit afin d'obtenir des informations plus détaillées.

AVERTISSEMENT

Dans la documentation, un AVERTISSEMENT indique un danger susceptible d'entraîner des dommages corporels ou la mort.

ATTENTION

Un texte de mise en garde intitulé ATTENTION indique un danger susceptible de causer des dommages à l'équipement.

Ne continuez pas au-delà d'une rubrique AVERTISSEMENT ou ATTENTION avant d'avoir bien compris les conditions présentant un danger et pris les mesures appropriées.

Cet appareil est un produit de classe I et possède une borne de mise à la terre. La source d'alimentation principale doit être munie d'une prise de terre de sécurité installée aux bornes du câblage d'entrée, sur le cordon d'alimentation ou le cordon de raccordement fourni avec le produit. Lorsque cette protection semble avoir été endommagée, débrancher le cordon d'alimentation jusqu'à ce que la mise à la terre ait été réparée.

Mise à la terre du câble de réseau local:

- si votre réseau local s'étend sur une zone desservie par plus d'un système de distribution de puissance, assurez-vous que les prises de terre de sécurité soient convenablement interconnectées.
- Les câbles de réseaux locaux peuvent occasionnellement être soumis à des surtensions transitoires dangereuses (telles que la foudre ou des perturbations dans le réseau d'alimentation public). Manipulez les composants métalliques du réseau avec précautions.

Aucune pièce contenue à l'intérieur de ce produit ne peut être réparée par l'utilisateur. Tout dépannage, réglage, entretien ou réparation devra être confié exclusivement à un personnel qualifié.

Cet appareil ne comporte pas de commutateur principal ; la mise sous tension est effectuée par branchement du cordon d'alimentation.

Hinweise zur Sicherheit

Sicherheitssymbole



Symbol für Dokumentationsverweis. Wenn das Produkt mit diesem Symbol markiert ist, schlagen Sie bitte in der Produktdokumentation nach, um mehr Informationen über das Produkt zu erhalten.

VORSICHT

Eine VORSICHT in der Dokumentation symbolisiert eine Gefahr, die Verletzungen oder sogar Todesfälle verursachen kann.

ACHTUNG

ACHTUNG in der Dokumentation symbolisiert eine Gefahr, die das Gerät beschädigen kann.

Fahren Sie nach dem Hinweis VORSICHT oder ACHTUNG erst fort, nachdem Sie den Gefahrenzustand verstanden und die entsprechenden Maßnahmen ergriffen haben.

Dies ist ein Gerät der Sicherheitsklasse I und verfügt über einen schützenden Erdungsterminal. Der Betrieb des Geräts erfordert eine ununterbrochene Sicherheitserdung von der Hauptstromquelle zu den Geräteingabeterminals, den Netzkabeln oder dem mit Strom belieferten Netzkabelsatz voraus. Sobald Grund zur Annahme besteht, daß der Schutz beeinträchtigt worden ist, das Netzkabel aus der Wandsteckdose herausziehen, bis die Erdung wiederhergestellt ist.

Für LAN-Kabelerdung:

- Wenn Ihr LAN ein Gebiet umfaßt, das von mehr als einem Stromverteilungssystem beliefert wird, müssen Sie sich vergewissern, daß die Sicherheitserdungen fest untereinander verbunden sind.
- LAN-Kabel können gelegentlich gefährlichen Übergangsspannungen ausgesetzt werden (beispielsweise durch Blitz oder Störungen in dem Starkstromnetz des Elektrizitätswerks). Bei der Handhabung exponierter Metallbestandteile des Netzwerkes Vorsicht walten lassen.

Dieses Gerät enthält innen keine durch den Benutzer zu wartenden Teile. Wartungs-, Anpassungs-, Instandhaltungs- oder Reparaturarbeiten dürfen nur von geschultem Bedienungspersonal durchgeführt werden.

Dieses Gerät hat keinen Netzschalter; es wird beim Anschließen des Netzkabels eingeschaltet.

Considerazioni sulla sicurezza

Simboli di sicurezza



Simbolo di riferimento alla documentazione. Se il prodotto è contrassegnato da questo simbolo, fare riferimento alla documentazione sul prodotto per ulteriori informazioni su di esso.

PERICOLO

La dicitura PERICOLO denota un pericolo che può causare lesioni o morte.

ATTENZIONE

La dicitura ATTENZIONE denota un pericolo che può danneggiare le attrezzature.

Non procedere oltre un avviso di PERICOLO o di ATTENZIONE prima di aver compreso le condizioni di rischio e aver provveduto alle misure del caso.

Questo prodotto è omologato nella classe di sicurezza I ed ha un terminale protettivo di collegamento a terra. Dev'essere installato un collegamento a terra di sicurezza, non interrompibile che vada dalla fonte d'alimentazione principale ai terminali d'entrata, al cavo d'alimentazione oppure al set cavo d'alimentazione fornito con il prodotto. Ogniqualvolta vi sia probabilità di danneggiamento della protezione, disinserite il cavo d'alimentazione fino a quando il collegamento a terra non sia stato ripristinato.

Per la messa a terra dei cavi LAN:

- se la vostra LAN copre un'area servita da più di un sistema di distribuzione elettrica, accertatevi che i collegamenti a terra di sicurezza siano ben collegati fra loro;
- i cavi LAN possono occasionalmente andare soggetti a pericolose tensioni transitorie (ad esempio, provocate da lampi o disturbi nella griglia d'alimentazione della società elettrica); siate cauti nel toccare parti esposte in metallo della rete.

Nessun componente di questo prodotto può essere riparato dall'utente. Qualsiasi lavoro di riparazione, messa a punto, manutenzione o assistenza va effettuato esclusivamente da personale specializzato.

Questo apparato non possiede un commutatore principale; si mette sotto tensione all'inserirsi il cavo d'alimentazione.

Consideraciones sobre seguridad

Símbolos de seguridad



Símbolo de referencia a la documentación. Si el producto va marcado con este símbolo, consultar la documentación del producto a fin de obtener mayor información sobre el producto.

ADVERTENCIA Una ADVERTENCIA en la documentación señala un riesgo que podría resultar en lesiones o la muerte.

PRECAUCION Una PRECAUCION en la documentación señala un riesgo que podría resultar en averías al equipo.

No proseguir después de un símbolo de ADVERTENCIA o PRECAUCION hasta no haber entendido las condiciones peligrosas y haber tomado las medidas apropiadas.

Este aparato se enmarca dentro de la clase I de seguridad y se encuentra protegido por una borna de puesta a tierra. Es preciso que exista una puesta a tierra continua desde la toma de alimentación eléctrica hasta las bornas de los cables de entrada del aparato, el cable de alimentación o el juego de cable de alimentación suministrado. Si existe la probabilidad de que la protección a tierra haya sufrido desperfectos, desenchufar el cable de alimentación hasta haberse subsanado el problema.

Puesta a tierra del cable de la red local (LAN):

- Si la LAN abarca un área cuyo suministro eléctrico proviene de más de una red de distribución de electricidad, cerciorarse de que las puestas a tierra estén conectadas entre sí de modo seguro.
- Es posible que los cables de la LAN se vean sometidos de vez en cuando a voltajes momentáneos que entrañen peligro (rayos o alteraciones en la red de energía eléctrica).

Manejar con precaución los componentes de metal de la LAN que estén al descubierto.

Este aparato no contiene pieza alguna susceptible de reparación por parte del usuario. Todas las reparaciones, ajustes o servicio de mantenimiento debe realizarlos solamente el técnico.

Este producto no tiene interruptor de potencia; se activa cuando se enchufa el cable de alimentación.

Safety Information

安全性の考慮

安全記号

マニュアル参照記号。製品にこの記号がついている場合はマニュアルを参照し、注意事項等をご確認ください。

警告 マニュアル中の「警告」は人身事故の原因となる危険を示します。

注意 マニュアル中の「注意」は装置破損の原因となる危険を示します。

「警告」や「注意」の項は飛ばさないで必ずお読みください。危険性に関する記載事項をよく読み、正しい手順に従った上で次の事項に進んでください。

これは安全性クラスIの製品で保護用接地端子を備えています。主電源から製品の入力配線端子、電源コード、または添付の電源コード・セットまでの間、切れ目のない安全接地が存在することが必要です。もしこの保護回路が損なわれたことが推測されるときは、接地が修復されるまで電源コードを外しておいてください。

LAN ケーブルの接地に関して:

- もし貴社のLANが複数の配電システムにより電力を受けている領域をカバーしている場合には、それらのシステムの安全接地が確実に相互に結合されていることを確認してください。
- LAN ケーブルは時として危険な過度電圧(例えば雷や、配電設備の電力網での障害)にさらされることがあります。露出した金属部分の取扱には十分な注意をはらってください。

本製品の内部にはユーザーが修理できる部品はありません。サービス、調整、保守および修理はサービス訓練を受けた専門家におまかせください。

Regulatory Statements and Warranty

FCC Statement (For U.S.A. Only) Federal Communications Commission Radio Frequency Interference Statement

Warning: This equipment generates, uses, and can radiate radio frequency energy. If it is not installed and used in accordance with the instruction manual, it may cause interference to radio communications. It has been tested and found to comply with the limits for a Class A computing device pursuant to Part 15 of FCC Rules, which are designed to provide reasonable protection against such interference when operated in a commercial environment. Operation of this equipment in a residential area is likely to cause interference, in which case the user at his own expense will be required to take whatever measures may be required to correct the interference.

If this equipment causes interference to radio reception (which can be determined by unplugging the power cord from the equipment) try these measures: Re-orient the receiving antenna. Relocate the equipment with respect to the receiver. Plug the equipment and receiver into different branch circuits. Consult your dealer or an experienced technician for additional suggestions.

VCCI Class 2 (Japan Only) For the HP Router ER/TR/SR

この装置は、第二種情報装置（住宅地域又はその隣接した地域において使用されるべき情報装置）で住宅地域での電波障害防止を目的とした情報処理装置等電波障害自主規制協議会（VCCI）基準に適合しております。

しかし、本装置をラジオ、テレビジョン受信機に近接してご使用になると、受信障害の原因となることがあります。

取扱説明書に従って正しい取り扱いをして下さい。

Regulatory Statements and Warranty

VCCI Class 1 (Japan Only) For the HP Router PR/FR/TFR/LR/BR

この装置は、第一種情報装置(商工業地域において使用されるべき情報装置)で商工業地域での電波障害防止を目的とした情報処理装置等電波障害自主規制協議会(VCCI)基準に適合しております。

従って、住宅地域またはその隣接した地域で使用すると、ラジオ、テレビジョン受信機等に受信障害を与えることがあります。

取扱説明書に従って正しい取り扱いをして下さい。

European Community

(Applies to HP Router PR, FR, TFR, LR, and BR)

This equipment complies with ISO/IEC Guide 22 and EN55022 Class A.

Note

The HP router models PR, FR, TFR, LR, and BR are class A products. In a domestic environment, this product may cause radio interference, in which case the user may be required to take adequate measures.

Declarations of Conformity

HP Router ER
HP Router TR
HP Router SR

The following Declarations of Conformity complies with ISO/IEC Guide 22 and EN 45014. It identifies the product, the manufacturer's name and address, and the applicable specifications that are recognized in the European community.

DECLARATION OF CONFORMITY according to ISO/IEC Guide 22 and EN45014	
Manufacturer's Name:	Hewlett-Packard Company
Manufacturer's Address:	8000 Foothills Blvd. Roseville, CA 95747 U.S.A.
declares that the product:	
Product Name:	HP Router ER/TR/SR
Model Number:	HP 27285A/ 27286A/ 27288A
conforms to the following Product Specifications:	
Safety:	IEC 950:1986+A1,A2 / EN60950 (1988)+A1,A2
EMC:	EN 55022 (1988) / CISPR-22 (1985) class B prEN 55024-2 (1990) / IEC 801-2 (1991) 3 kV CD, 8 kV AD prEN 55024-3 (1991) / IEC 801-3 (1984), 3 V/m
Supplementary Information:	
The product herewith complies with the requirements of the Low Voltage Directive 73/23/EEC and the EMC Directive 89/336/EEC.	
Tested with Hewlett-Packard Co. products only.	
Roseville, May 27, 1994	<i>Sandra L. Sheehan</i> Sandra L. Sheehan, Quality Manager
European Contact: Your local Hewlett-Packard Sales and Service Office or Hewlett-Packard GmbH, Department ZQ/Standards Europe, Herrenberger Strasse 130, D-71034 Boblingen (FAX:+49-7031-14-3143)	

Regulatory Statements
and Warranty

Regulatory Statements and Warranty

HP Router PR
HP Router FR
HP Router TFR
HP Router LR
HP Router BR

DECLARATION OF CONFORMITY

according to ISO/IEC Guide 22 and EN45014

Manufacturer's Name: Hewlett-Packard Company

Manufacturer's Address: 8000 Foothills Blvd.
Roseville, CA 95747
U.S.A.

declares that the product:

Product Name: HP Routers

Model Number: HP J2540B (Router PR)
HP 27289B (Router FR)
HP J2543A (Router TFR)
HP 27287A (Router LR)
HP 27290A (Router BR)

conforms to the following Product Specifications:

Safety: IEC 950:1986+A1,A2/EN60950 (1988)+A1,A2

EMC: EN 55022 (1988) / CISPR-22 (1985) class A
prEN 55024-2 (1990) / IEC 801-2 (1991) 4 kV CD, 8 kV AD
prEN 55024-3 (1991) / IEC 801-3 (1984), 3 V/m
prEN 55024-4 (1992) / IEC 801-4 (1988): 1 kV-(power line)
0.5 kV-(signal line)

Supplementary Information:

The product herewith complies with the requirements of the Low Voltage Directive 73/23/EEC and the EMC Directive 89/336/EEC.

Tested with Hewlett-Packard Co. products only.

Roseville, June 7, 1994

Sandra L. Sheehan, Quality Manager

European Contact: Your local Hewlett-Packard Sales and Service Office or Hewlett-Packard GmbH, Department ZQ/Standards Europe, Herrenberger Strasse 130, D-71034 Böblingen (FAX:+49-7031-14-3143)

Three-Year Limited Hardware Warranty

Hewlett-Packard warrants this product against defects in materials and workmanship for a period of three years from receipt by the end user. If HP receives notice of such defects during the warranty period, HP will, at its option, either repair or replace products that prove to be defective.

Should HP be unable to repair or replace the product within a reasonable amount of time, customer's alternative exclusive remedy shall be a refund of the purchase price upon return of the product.

Exclusions The above warranty shall not apply to defects resulting from: improper or inadequate maintenance by customer; customer-supplied software or interfacing; unauthorized modification or misuse; operation outside of the environmental specifications for the product; or improper site preparation and maintenance.

Warranty Limitations HP makes no other warranty, either expressed or implied, with respect to this product. HP specifically disclaims the implied warranties of merchantability and fitness for a particular purpose. Some states or provinces do not allow limitations on the duration of an implied warranty, so the above limitation or exclusion might not apply to you. However, any implied warranty of merchantability or fitness is limited to the three-year duration of this written warranty.

This warranty gives you specific legal rights, and you might also have other rights that vary from state to state, or province to province.

Exclusive Remedies The remedies provided herein are customer's sole and exclusive remedies. In no event shall HP be liable for any direct, indirect, special, incidental, or consequential damages, whether based on contract, tort, or any other legal theory. Some states or provinces do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation or exclusion might not apply to you.

Third-Party Products HP designed the HP routers described in this guide to operate with industry-standard hardware and software products.

HP has conducted limited testing with certain non-HP products to determine compatibility with the HP routers described in this guide. Please contact your HP authorized LAN dealer or HP representative for the current list of tested products.

HP relies in part upon information from the suppliers of non-HP products and makes no warranty, expressed or implied, with respect to the operation of these products or their compliance with worldwide regulatory requirements. HP advises customers to conduct independent examination to determine suitable levels of compatibility for the customer's individual needs.

Gewährleistung HP gewährleistet, daß die Geräte frei von Material- und Fabrikationsfehlern sind. Die Gewährleistungsfrist beträgt drei Jahre ab Lieferung. Etwaige fehlerhafte Geräte werden nach eigenem Ermessen repariert oder ersetzt.

Garantía Esta pieza de hardware está garantizada por HP contra defectos de materiales o manufactura por un período de tres años a partir del momento en que el usuario la recibe. Durante dicho período de garantía, HP o un distribuidor autorizado, reparará o reemplazará, según su criterio, aquellos productos que resulten defectuosos.

Garantie Hewlett-Packard garantit le matériel d'informatique personnelle contre tout défaut de matière ou de fabrication pour une période de trois ans à compter de la réception du matériel par l'utilisateur. Hewlett-Packard ou le distributeur agréé HP choisira de remplacer ou de réparer tout produit défectueux.

Garanzia La Hewlett-Packard garantisce i propri prodotti hardware per computer contro i difetti di materiali e di fabbricazione per un periodo di tre anni dal giorno in cui li riceve l'utente finale. Durante il periodo di garanzia, la Hewlett-Packard o un Rivenditore autorizzato riparerà o sostituirà i prodotti che risultassero difettosi.

Software or Firmware Warranty

Hewlett-Packard warrants that the software or firmware, when properly installed, will not fail to execute their programming instructions for a period of ninety (90) days from the date of purchase from HP or its Authorized Reseller. If HP receives notice of defects within the warranty period, HP will at its option either repair or replace the defective software or firmware or refund the purchase price.

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