# Installation Guide

## HP J2436A
## FDDI Interface
## for the HP Router 650

**Publication Number**
5963-2663
Edition 1, February 1995
Printed in USA

**Product Numbers**
This guide provides installation instructions for the following Hewlett-Packard Company product:
J2436A

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# Introduction

The FDDI Interface provides a 100 megabit-per-second fiber-optic port for connecting an FDDI ring to the HP Router 650. You can either attach a class A dual attachment station (DAS), or attach up to two class B single attachment stations (SAS), or attach the interface as an SAS to a concentrator, or use dual homing. Multimode fiber is required. The wave length used is 1300 nanometers.

# Installation

## Ensure that you have the following items.

- 1 LED label strip (J2436-80012)
- 5 Interface card labels (5182-3315)
- 1 Cable tie (5182-1723)
- 1 Grounding wrist strap (9300-1408)
- 1 *Installation Guide* (this manual, 5962-2663)
- 1 *Caution: Static-Sensitive Devices* (5962-8318)

**Prerequisite: Version A.09.50**

Operating this FDDI Interface requires that the HP Router 650 be running with operating system version A.09.50 or later.

If you need to check which version is running—and your HP Router 650 is currently running (that is, its power is on)—then you can display the version number by using the Stamp command in NCL. This procedure is detailed on page 19 within the section titled “Prepare the router”.

If your HP Router 650 is *not* currently running (that is, its power is *off*)—then you can go ahead and install the card as described on the following pages and delay checking until you get to page 19 within the section titled “Prepare the router”.

You can upgrade your operating system, if needed, using an A.09.50 (or a later version) diskette. See page 19 for instructions.

# Install the interface card.

**Notes**

You can install the interface card without taking the system off line (that is, without switching the router off and taking all networks down); refer to “Installing the Interface Card (System Online)”, page 8. (Installing an interface card without taking the system off line is often called “hot swapping”.)

If you are installing the interface card in a slot that formerly was unused, or if you are installing the interface card in a slot that formerly held a different type of interface card (such as a WAN interface card), you must specify the new card in the configuration. (Refer to “Configure and boot the router” in chapter 1 of the *HP Router 650 Installation Guide*.)

### Installing the Interface Card (System Offline)

If you will be installing the new interface card in a slot where another interface card is *not* currently installed, begin with step 2; otherwise, begin with step 1.

1. Disconnect all cables from the interface card you will be removing, and label them for reconnection when you install that card again.

2. Open the front door of the router by pulling its lock—the round post at the upper right—to the right. See figure 1.

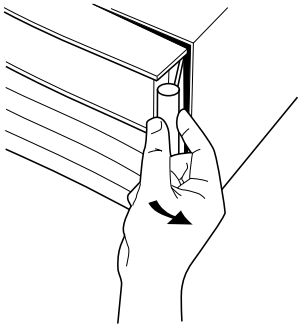


**Figure 1. Opening the Router Door**

3. Switch the power supply off by pressing the bottom of its switch (marked with " ❍ "). If two power supplies are installed, switch both off.

4. Connect a grounding wrist strap (one is provided with the interface card) to your wrist and to the back of the router.

5. Press down slightly on the insides of both locks on the bezel of the old card or blank (see figure 2), then swing them outward until the bezel disengages (see figure 3).

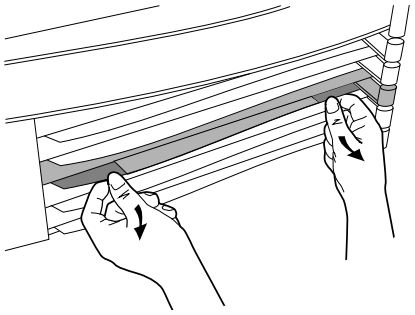


**Figure 2. Unlocking the Card Bezel**

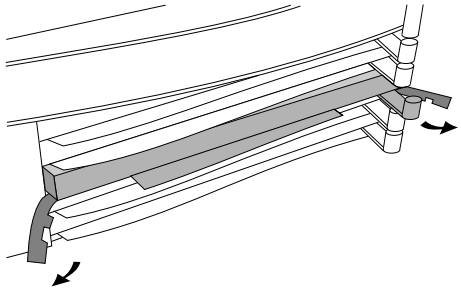


**Figure 3. Disengaging the Card Bezel**

6. Grasping the left and right edges of the bezel, pull out until the tray is about half exposed.

7. Grasping the sides of the tray, remove the card (or blank) from the router.

8. Holding the new interface card by the sides of its tray, slide the back of the tray about half-way into the router.

9. Pull the locks on the bezel outward, then push evenly on both ends until the card engages fully and the locks swing inward to about 45°. See figure 4.

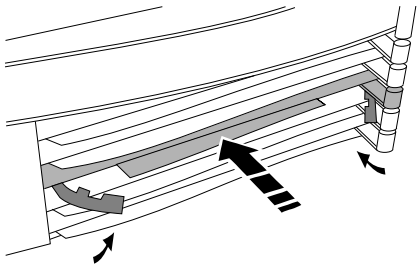


**Figure 4. Installing the Interface Card**

10. Push the two locks evenly to close them, pressing downward slightly to secure them in place.

11. Remove the old card's LED label strip or blank label strip in the router door from the position corresponding to the slot where you have installed the interface card. Then insert the LED label strip provided with the new card as far as it will go.

12. Bend the end of the label strip toward the back of the router, creating a 90° fold.

13. Switch on the router's power supply by pressing the top of the switch (marked with "I"). If two power supplies are installed, switch on both supplies.

14. Close the router door.

15. To replace the label at the left of the slot that identifies the department or site served by the interface, slide the old label out from the right. On one of the new card labels (provided with the card and the router), write on the side that is *not* shiny. Position the new label with its shiny side facing the router, and slide it in from the right.

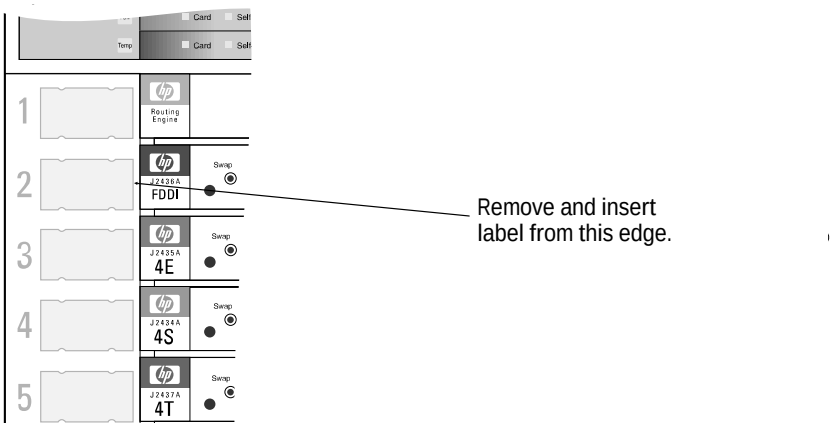



**Figure 5. Interface Card Label Location**

Go to the next installation step, “Connect network cables”, on page 12.

**Install the interface card.**

### Installing the Interface Card (System Online)

If you will be installing the new interface card in a slot where another interface card is *not* currently installed, skip steps 1 and 3.

1. Disconnect all cables from the interface card you will be removing, and label them for reconnection when you install that card again.

2. Connect a grounding wrist strap (one is provided with the interface card) to your wrist and to the back of the router.

3. If the Swap LED on the interface card you will be removing is not lit (see figure 6), press the adjacent Swap button, and hold it until the Swap LED turns on (about 1–5 seconds).

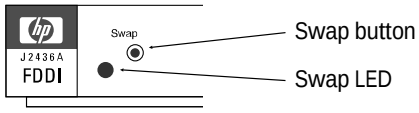



**Figure 6. Swap Button and LED**

4. Press down slightly on the insides of both locks on the old card's bezel (see figure 7), then swing them outward until the bezel disengages (see figure 8).

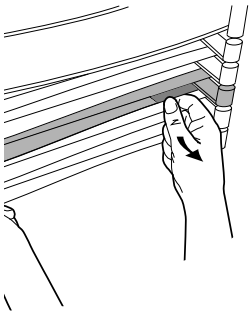


**Figure 7. Unlocking the Card Bezel**

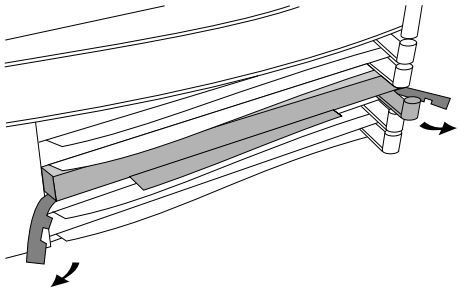


**Figure 8. Disengaging the Card Bezel**

5. Grasping the left and right ends of the bezel, pull out until the tray is about half exposed.

6. Grasping the sides of the tray, remove the card from the router.

7. Holding the new interface card by the sides of its tray, slide the back of the tray about half-way into the router.

8. Pull the locks on the bezel outward, then push evenly on both ends until the card fully engages and the locks swing inward to about 45°. See figure 9.

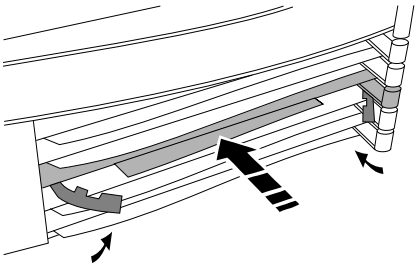


**Figure 9. Installing the Interface Card**

9. Push the two locks evenly to close them, pressing downward slightly to secure them in place. A self-test of the new interface card begins automatically.

10. The self-test requires about 5 seconds. If the new interface card's Card LED (the first LED in the row of LEDs in the router door) has turned green, and the Self-test LED (the second LED in the row) has turned off, then the self-test succeeded, and you can go to step 11. However:
    - If these LEDs continue flashing, the card is not seated properly. Adjust the position of the card by pushing evenly on both ends, and adjust the positions of the locks evenly.
    - If the Card LED remains orange and the Self-test LED remains lit, the card has failed the self-test. This could be due to a hardware failure or a router operating system version older than A.09.50. Do the following steps:
        1) Connect a console to the router and note any error messages in the event log, which can be displayed from the Main menu. (See "Connect a console" in chapter 1 of the *HP Router 650 Installation Guide*.
        2) Switch the router's power off and then on, and then check the LEDs for failures as listed in table 3-1, "LED Error Patterns During Power-On Self-Test" in chapter 3 of the *HP Router 650 Installation Guide*.
        3) If the same LED pattern results (Card LED orange and Self-test LED lit), then check the software version according to "Checking the Software Version" on page 19 in the section titled "Prepare the Router". If the software version is correct, then investigate an "Interface Card/Slot" hardware failure according to the instructions in table 3-1, "LED Error Patterns During Power-On Self-Test" in chapter 3 of the *HP Router 650 Installation Guide*.
    - If the Card LED remains orange but the Self-test LED has turned off, look in the event log (which can be displayed from the Main menu) for the entry "Slot *x* HWID and Line configuration mismatch" (where *x* is the number of the slot). If that entry appears in the event log, specify the new card for that slot in the configuration (refer to "Configure and boot the router" in chapter 1 of the *HP Router 650 Installation Guide*). If that entry does not appear in the event log, call for service from your HP dealer or service provider.

11. Open the front door of the router by pulling its lock—the round post at the upper right—to the right. See figure 10.

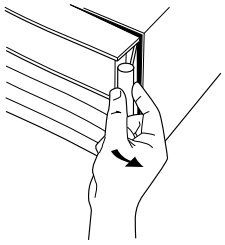


**Figure 10. Opening the Router Door**

12. Remove the old card's LED label strip from the position corresponding to the slot where you have installed the new interface card, then insert the LED label strip provided with the new card as far as it will go.

13. Bend the end of the label strip toward the back of the router, creating a 90° fold.

14. Close the router door.

15. To replace the label at the left of the slot that identifies the department or site served by the interface, slide the old label out from the right. On one of the new card labels (provided with the card and the router), write on the side that is *not* shiny. Position the new label with its shiny side facing the router, and slide it in from the right.

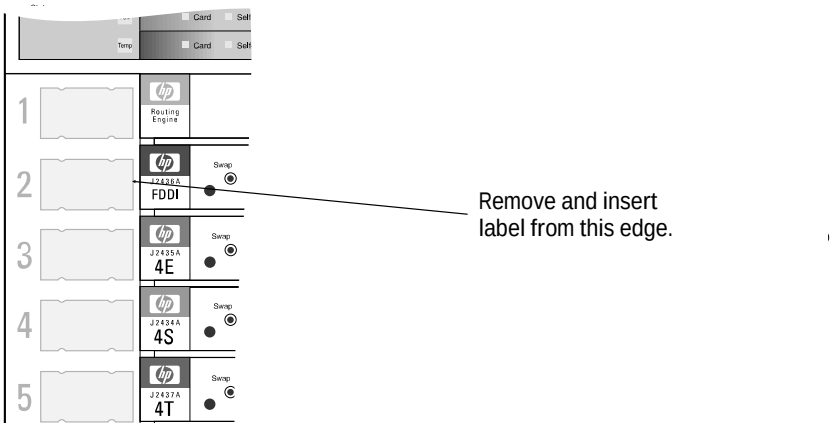



**Figure 11. Interface Card Label Location**

# Connect network cables.

Connect the router into your FDDI ring using one of the configurations described in this section. You should also make sure that all network equipment and links are ready.

The FDDI connection uses a dual-port FDDI interface, with two FSD (fixed shroud duplex) connectors, MIC A and MIC B (media interface connectors for FDDI rings). Either A or B is used to attach a single attachment station (SAS). Both A and B are used to attach the router as a dual attachment station (DAS) or to attach two single attachment stations. The SAS and DAS configurations are described on pages 13 and 14.

On a DAS, the separate optical bypass connector is optionally used, in addition to MIC A and MIC B, to attach an optical bypass switch, also known as an “FDDI dual-switch module”. This configuration is described on page 16. Using a bypass switch prevents the FDDI ring from “wrapping” if the router connected as a dual attachment station (DAS) loses the connection. On a SAS, an FDDI concentrator is used to isolate the router from the dual ring to prevent ring wrapping if the router loses the connection. Wrapping is discussed further in the “Troubleshooting” section starting on page 20.

Another technique for redundancy that avoids the need for a bypass switch is dual homing, so that the failure of one cable or concentrator will not break the router’s connection to the dual ring. This configuration is described on page 15.

### Single Attachment Station (SAS)

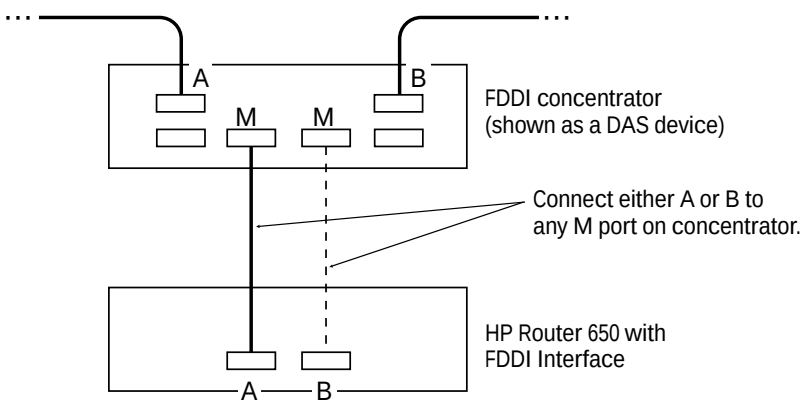



**Figure 12. Example of an SAS Configuration**

To connect the FDDI interface as a SAS, connect either port A or port B of the interface card to an M port on the FDDI concentrator in the FDDI ring. See figure 13. (See the "Cables and Connectors" section on page 23 for information on FDDI cabling available from Hewlett-Packard.)

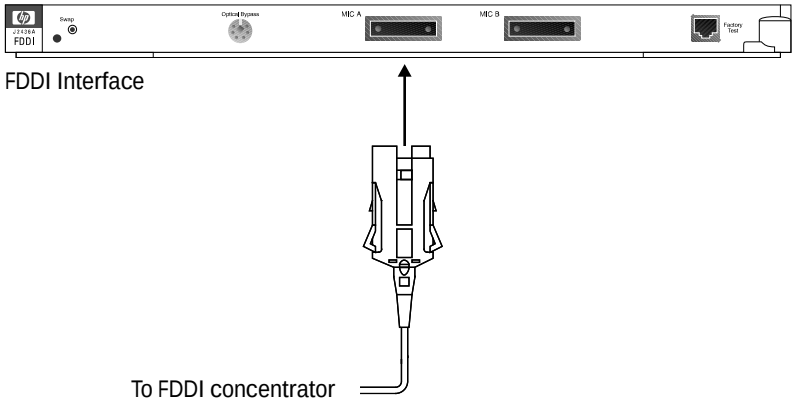



**Figure 13. Connecting an SAS**

**Connect network cables.**

### Dual Attachment Station (DAS)

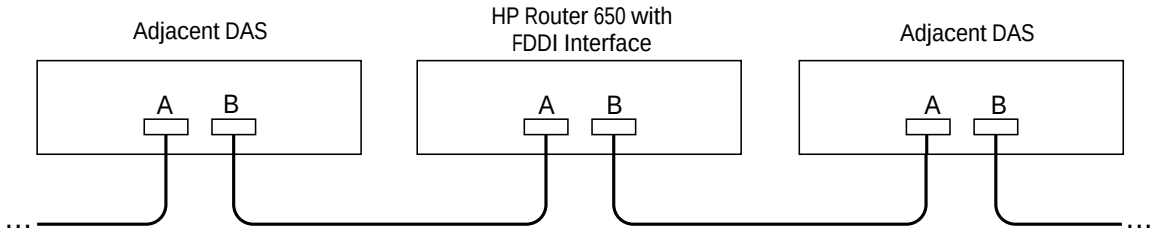



**Figure 14. Example of a DAS Configuration**

To connect the FDDI interface as a DAS, connect port A of the interface card to port B of the adjacent DAS on the ring, and connect port B of this interface card to port A of another (or the same) adjacent DAS on the ring. See figure 15. (See the "Cables and Connectors" section on page 23 for information on FDDI cabling available from Hewlett-Packard.)

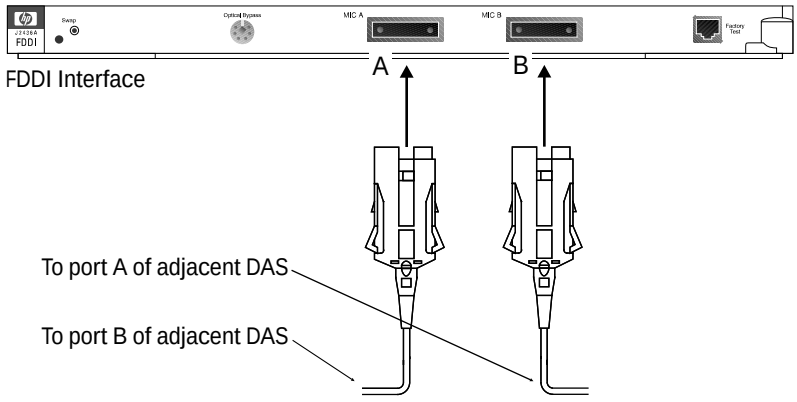



**Figure 15. Connecting a DAS Without a Bypass Switch**

Optionally, you can attach a bypass switch between the adjacent station and the interface card to prevent ring wrapping. See "Optical Bypass Switch Connection" on page 16 for the instructions and an illustration of the required connections.

### Dual-Homed Station

Dual homing is a double or redundant SAS connection providing a backup link to an FDDI concentrator on the ring, either the same concentrator or a different concentrator, so that only one link is active at a time. In the example configuration shown in figure 16, traffic is sent and received over port B of the router during normal operation. Port A is used only if the cable or concentrator attached to port B fails.

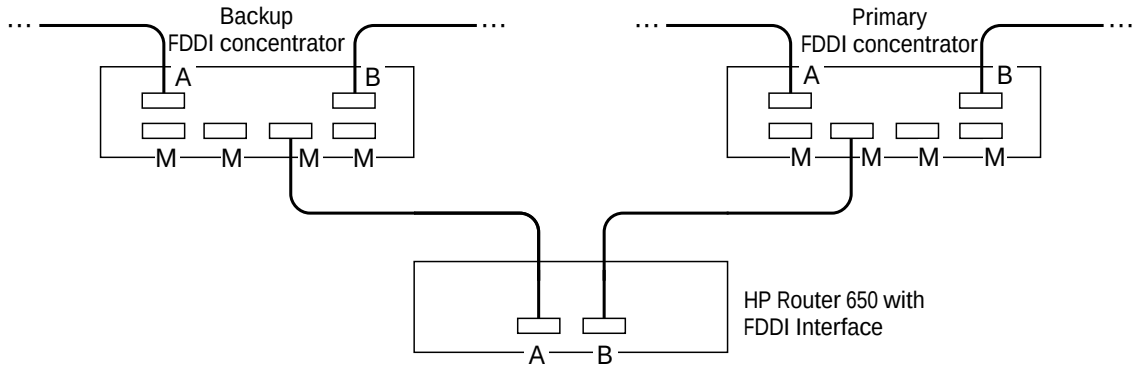



**Figure 16. Example of a Dual-Homed Station Configuration**

To connect the FDDI interface as a dual-homed station to two different FDDI concentrators, connect port A of the interface card to an M port on the secondary (backup) concentrator on the ring, and connect port B of the interface card to an M port on the primary concentrator (for normal operation). See figure 17. Or, you can connect both ports A and B to M ports on *one* (the same) FDDI concentrator.

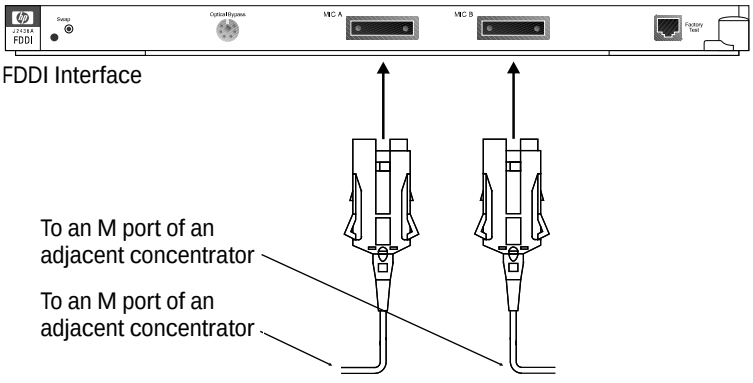



**Figure 17. Connecting the Interface as a Dual-Homed Station**

**Connect network cables.**

### Optical Bypass Switch Connection (Optional)

If your FDDI connection includes an optional bypass switch, use the following steps to connect the FDDI interface as a DAS to a bypass switch on the FDDI ring. (See the "Cables and Connectors" section on page 23 for information on an optical bypass switch available from Hewlett-Packard, or for information on the required pinouts for the optical bypass DIN connector if you use some other bypass switch.)

1. 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 on the bypass switch. (The cable connectors are keyed so that they fit into the correct A and B connectors.) For details on connecting to the ring, refer to the instructions for the bypass switch.

2. Attach the cable with the key labeled "A" from the bypass switch to port A of the FDDI interface card in the HP Router 650. Attach the cable with the key labeled "B" from the switch to port B of the FDDI interface card in the router. (The cable connectors are keyed so that they fit into the correct A and B connectors.) See figure 18.

3. Insert the DIN connector on the cable from the bypass switch into the "Optical Bypass" jack on the FDDI interface card in the HP Router 650. See figure 18.

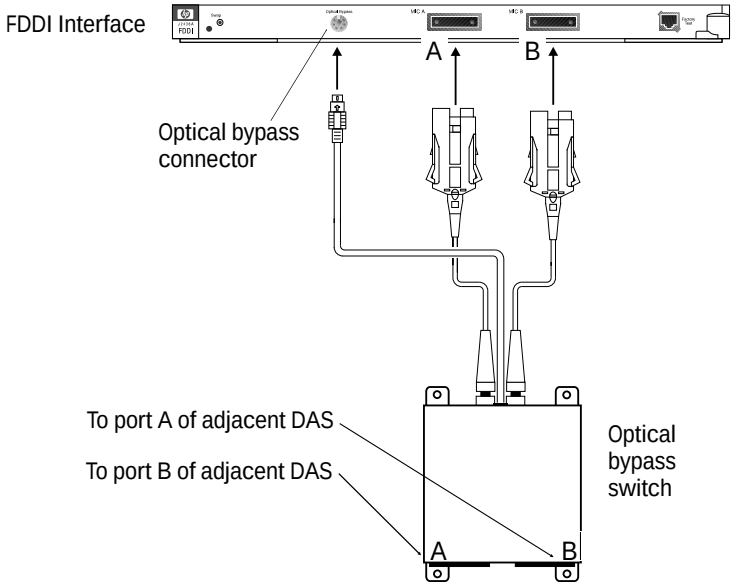



**Figure 18. Connecting a Bypass Switch**

# Arrange the network cables.

To help keep the network cables orderly—and out of the way when interface cards are being removed or installed—arrange the cables over the bars at the right of the router.

The cable-management bars have slots in them that you can use for tie-wrapping the network cables. Included with each interface card is a tie-wrap that you can use to wrap the cables and then attach the bundle to the cable management bar, as shown in figure 19.

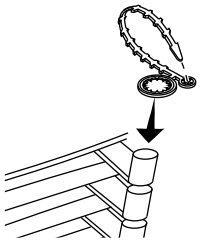


**Figure 19. Cable-Management Bar and Tie-Wrap**

Some bulkier cables may not fit inside the cable management bars. You can use the tie-wraps to bundle the extra cables and hang them on the outside of the bar.

# Prepare the router.

To prepare the router after installing the new interface card, do the following procedures. These procedures are described in chapter 1 of the *HP Router 650 Installation Guide*, except for the third procedure listed with its own reference.

- Connect a console.
- Plug in and verify router hardware.
- Check that the operating software can recognize the card. Refer to the “Checking the Software Version” procedure below.
- Configure and boot the router.
- Verify router initialization and configuration.

## Notes on Configuration

If you are installing the interface card in a slot that formerly was empty, you must specify the new card in the configuration.

If you are installing the interface card in place of a different type of interface card (for example, if the slot in which you are installing the interface card formerly held an Ethernet interface card), you will have a configuration conflict until you change the configuration for this slot. You can use Quick Configuration to replace this configuration easily; refer to the section titled “The HP Router 650” in chapter 3 of the *User’s Guide*.

### Checking the Software Version

**Prerequisite: Version A.09.50**

1. At the Main menu (see figure 1-14 in the *HP Router 650 Installation Guide*), press [2] to select "Network Control Language Interpreter". The NCL prompt—`DEFAULT_CONFIG:` or another system name—then appears at the bottom of the screen (see figure 1-15 in the *HP Router 650 Installation Guide*).

2. At the NCL prompt, enter the Stamp command:
   `stamp` Return

   The following is an example of the first three lines of the response:
   ```
   Image stamp:    /warp/code/f94/build/w3o_f94
                   Feb 1 1995 12:30:51
                   A.09.50
   ```

   - If the version number on the third line is A.09.50 or greater, then the current operating system will support the FDDI interface card without upgrading the operating code. (Disregard the lines of text other than the third line.)
   - If the version number on the third line is lower than A.09.50, then you must upgrade the operating code to version A.09.50 or later, before the FDDI interface card can operate in the router. You can upgrade by loading the diskette for A.09.50 in a PC used as the console for the router. To download the code to the router, follow the instructions on the sheet "HP Router Software Upgrade: Release A.09.50" and/or the `readme.txt` file on the diskette. (Disregard the lines of text other than the third line.)

3. To exit from NCL and return to the Main menu, enter the Exit command at the NCL prompt:
   `exit` Return

# Troubleshooting

For general information about troubleshooting problems using any interface card in the Router 650, refer to chapter 3 of the *HP Router 650 Installation Guide*. The following troubleshooting information is specific to the FDDI interface card.

## Port Status LEDs

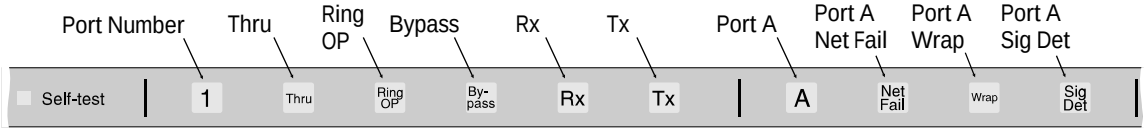



**Figure 20. Port Status LEDs on the FDDI Label Strip**

In the "Port Status LEDs" section of chapter 2 in the *HP Router 650 Installation Guide*, the LEDs illustrated in figure 2-3 are arranged differently on the FDDI interface card's label strip. The FDDI label strip also includes some additional LEDs. Figure 20 illustrates the LEDs for FDDI.

**Port Number 1** indicates the FDDI port. It appears green during the self-test and when the router is operating normally.

**Thru** is green when the router is receiving on the primary input line of port A and transmitting on the primary output line of port B. See figure 21.

**Bypass** is orange when the attached bypass switch is causing the FDDI ring to *bypass* the router, including when the router is booting and when the FDDI circuit is disabled. This LED is not lit when the FDDI circuit is enabled.

**Ring OP** is green if the router is inserted and operating in an FDDI ring and is in either Thru or Wrap mode. (Wrap is described below.)

**Rx** (Receive) flickers green as packets are being received through the FDDI port. The frequency of the flickering indicates the amount of traffic. In heavy traffic, it may appear as if it is lit all of the time.

**Tx** (Transmit) flickers green as packets are transmitted through the FDDI port. The frequency of the flickering indicates the amount of traffic. In heavy traffic, it may appear as if it is lit all of the time.

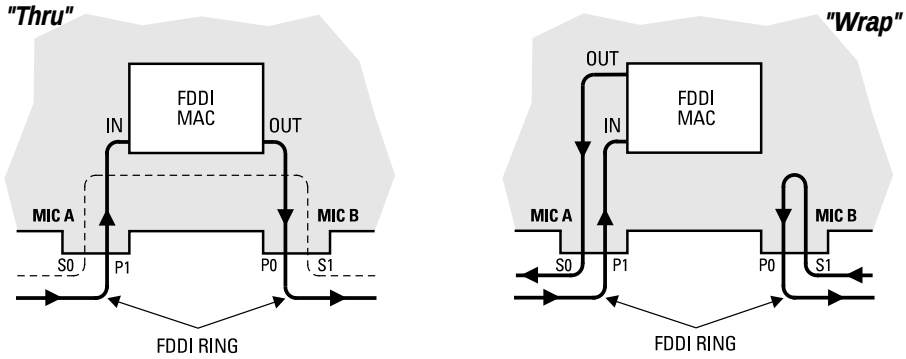



**Figure 21. FDDI "Thru" and "Wrap A" Operation**

**Ports A, B** are always green, indicating to which MIC connection, A or B, the LEDs listed below (Net Fail, Wrap, Sig Det) apply.

**Net Fail** for both ports A and B are orange when the interface fails self-test or is not operating on an active FDDI ring. Possible causes of failure include the router, the interface card, the cabling, the attached station, and the optical bypass.

**Wrap** is green when a break has occurred in the ring. The router is transmitting on the output line and receiving on the input line for either port A or port B (the port for which Wrap is lit), but not on both ports. See figure 21. Wrapping can occur when:

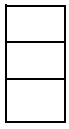
- The port for which Wrap is *not* lit is not communicating, such as when the cable connection to that unlit port is interrupted.
- A dual attachment station (DAS) attached to the port for which Wrap is *not* lit is not functional.

**Sig Det:** (Signal Detection) is green when the router detects an incoming signal on the port for which it is lit. It is lit continuously as long as the port is connected to an active FDDI ring. If it is *not* lit for a port being used, then check the attached cabling and stations.

# Interpreting LED Error Patterns

Use tables 3-1 and 3-2 in chapter 3 in the *HP Router 650 Installation Guide* as your guide to interpreting LED patterns for diagnosis of problems with the router and its interface cards. Because it is possible that the version of operating software on the router may not be a version that supports the FDDI interface card (see page 19), the second error pattern in table 3-1 in that manual should contain the following supplemental diagnostic information.

**Supplemental LED Error Pattern During Power-On Self-Test ***

| Status | Pwr/ Fan/ Temp | Card | Self-test | Port† | Net Fail | Diagnostic Tips |
|---|---|---|---|---|---|---|
|  Status |  | Engine: Card: |   |  |  | **Interface Card/Slot/Software Failure**<br>1. Check that the software version supports the interface card. Use NCL's Stamp command and compare with the version prerequisite listed in the interface card manual. Download new software if necessary.<br>2. If software version is OK, then switch the power off and on to reboot the router. If this error recurs, move the card from this slot to another slot, and move the card from that other slot into this slot.<br>• If this error recurs in the original slot, the router is faulty.<br>• If this error recurs in the new slot, the card is faulty. |

* In this table, a black box indicates an orange LED, a gray box indicates a green LED, and an empty box indicates an unlit LED.

† The Port Number LED, when lit, displays port number 1 on the card.

# Cables and Connectors

| Cable or Connector | HP Part Number |
|---|---|
| 62.5/125 micron multimode fiber-optic cable with fixed-shroud duplex (FSD) media interface connector (MIC) | 5061-2550 |
| FDDI optical bypass switch | 5063-2488 |
| FDDI loopback connector | 5063-2490 |

## FDDI Optical Bypass DIN Connector Pinouts

| HP 5063-2488 | |
|---|---|
| pin 1<br>pin 2 | switch positive (5V, 400 mA max) |
| pin 3<br>pin 4 | switch ground |
| pin 5 | bypass detect |
| pin 6 | ground |
| When pin 5 is attached to pin 6, the bypass is detected. | |

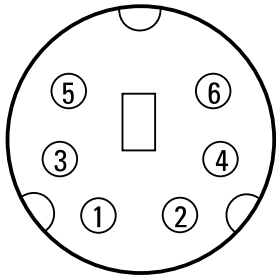



**Figure 22. FDDI Bypass Mini-DIN Connector Pins**

# FDDI Cable

**HP 5063-2550**

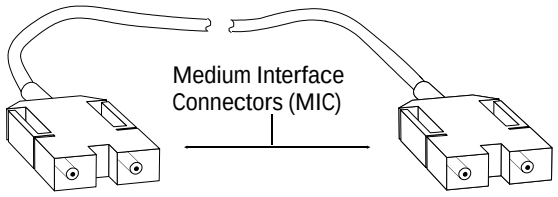



**Figure 23. Example of an FDDI Cable**

# Loopback Connector

**HP 5063-2490**

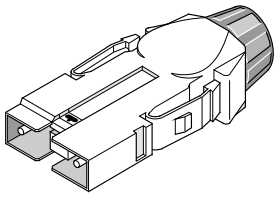


**Figure 24. FDDI Standard Loopback Connector**


Part number: 5963-2663
E0195
Printed in U.S.A.