HEWLETT PACKARD

HP JetDirect Network Interface

Configuration Guide

HP Computer Museum
www.hpmuseum.net

For research and education purposes only.

Configuration Guide

HP JetDirect Network Interface

Publication number
J2371-90001
First Edition, April 1993
Printed in Singapore

Warranty

The information contained in this document is subject to change without notice.

HEWLETT-PACKARD COMPANY MAKES NO WARRANTY OF ANY KIND WITH REGARD TO THIS MATERIAL, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.

Hewlett-Packard shall not be liable for errors contained herein or for incidental or consequential damages in connection with the furnishing, performance, or use of this material.

This product is based in whole or in part on technology developed by Novell, Inc.

Hewlett-Packard assumes no responsibility for the use or reliability of its software on equipment that is not furnished byHewlett-Packard.

MICROSOFT CORPORATION MAKES NO REPRESENTATIONS OR WARRANTIES WITH RESPECT TO THE CONTENTS OR USE OF THIS MANUAL, AND SPECIFICALLY DISCLAIMS ANY EXPRESSED OR IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR PURPOSE. Further, Microsoft Corporation makes no representations or warranties with respect to any Microsoft Corporation Server software, and specifically disclaims any express or implied warranties of merchantability or fitness for any particular purpose. Further, Microsoft Corporation reserves the right to make changes to any and all parts of Microsoft Corporation Server software, at any time, without obligation to notify any person or entity of such changes.

NOVELL, INC. MAKES NO REPRESENTATIONS OR WARRANTIES WITH RESPECT TO THE CONTENTS OR USE OF THIS MANUAL, AND SPECIFICALLY DISCLAIMS ANY EXPRESS OR IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR PURPOSE.

Trademark Credits

Microsoft LAN Manager®, *MS-DOS*®, *Microsoft Windows*®, *Microsoft Windows for Workgroups*®, and *Microsoft Windows NT*® are U.S. registered trademarks of Microsoft Corporation. *NetWare*® and *Novell*® are registered trademarks of Novell Corporation. *IBM*®, *IBM LAN Server*®, *Operating System/2*® are registered trademarks of International Business Machines Corp. *Ethernet* is a registered trademark of Xerox Corporation. *PostScript* is a trademark of Adobe Systems, Incorporated, which may be registered in certain jurisdictions. UNIX® is a registered trademark of UNIX System Laboratories Inc. in the U.S.A. and other countries.

Hewlett-Packard Company
11311 Chinden Boulevard
Boise, Idaho 83714
(208) 323-6000

Conventions

The following conventions are used throughout this guide:

Italic type is used to show the result of a previous action. It is also used for emphasis.

COMPUTER type indicates what you should type on the computer keyboard.

Bold type indicates screen menu selections.

DISPLAY type indicates printer display messages.

Key indicates a key on a computer keyboard.

WORDS IN UPPERCASE LETTERS indicate proper names of utilities or files.

NOTE Notes contain important information that you need to consider.

CAUTION Caution messages indicate procedures which, if not observed, could result in damage to equipment or loss of data.

WARNING **Warning messages indicate that when a specific procedure or practice is not followed correctly, personal injury could occur.**

How To Use This Guide

This guide contains software configuration information for Novell NetWare, Apple EtherTalk, IBM LAN Server or Microsoft LAN Manager on OS/2, Microsoft Windows for Workgroups, Microsoft Windows NT, and Hewlett-Packard HP-UX or SunOS networks. It also contains information for troubleshooting the HP JetDirect network interface.

Before You Begin

If you are not familiar with your network's utilities, spend some time learning how they work before continuing with this guide.

This guide assumes that you:

- Have used your network utilities.
- Are the network administrator for your network with access to the supervisor account, or have access to an account that has supervisor and print server operator privileges.
- Have the proper network software.
- Have a fully operational system.

Table of Contents

1 Introducing the HP JetDirect Network Interface

2 Software Installation and Configuration for Novell NetWare Networks

3 Software Installation and Configuration on EtherTalk Networks

4 Software Installation and Configuration on IBM LAN Server or Microsoft LAN Manager for OS/2 Networks

5 Software Installation and Configuration on Microsoft Windows for Workgroups

6 Software Installation and Configuration on Microsoft Windows NT Networks

7 Software Installation and Configuration on UNIX (HP-UX and SunOS) Networks

8 Troubleshooting

A HP JetDirect Interface in the UNIX Environment

B Customer Support and Warranty Information

1

Introducing the HP JetDirect Network Interface

Overview

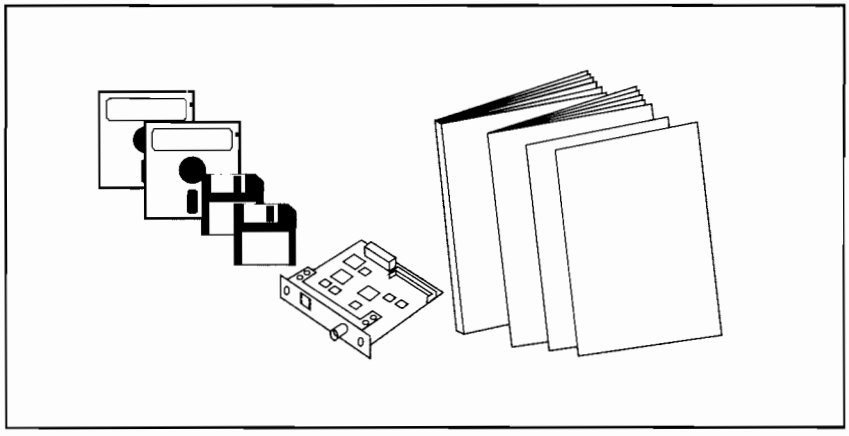
This chapter explains what the HP JetDirect network interface is and how it fits into your local area network (LAN). It provides the following information:

- Product overview.
- Supported links.

Product Overview

The HP JetDirect network interface kit consists of an adapter, this guide, a hardware installation guide, and software disks. (Software for HP-UX and SunOS is sold separately.)

Figure 1-1



The HP JetDirect interface enables you to attach a printer directly to your network at any location while providing increased ease of use, network management, and printer I/O performance.

Increased Ease of Use

The ability to place the printer anywhere on the network eliminates the need to attach the printer directly to a server or workstation, enabling it to be placed closer to your network users. This also eliminates the distance limitations associated with traditional serial and parallel connections.

Improved Network Management

The HP JetDirect interface supports the Simple Network Management Protocol (SNMP) that allows remote management and troubleshooting of the printer. A standard SNMP agent resides on the interface, allowing management using the SNMP/IP or SNMP/IPX protocols. When using the HP JetDirect interface, your printer appears as an intelligent node on the network, and is accessable through various diagnostic utilities. The interface also collects network statistics and error messages to aid in troubleshooting.

Increased I/O Performance

The HP JetDirect interface provides increased printer performance by eliminating the bottleneck associated with serial or parallel connections. With the HP JetDirect interface, network protocols are used to transfer data in large blocks and at high network speeds.

Automatic Protocol Switching

The HP JetDirect network interface supports multiple protocols, or network operating systems. Certain printers, such as the HP LaserJet 4Si printer, can support multiple simultaineously active protocols. The JetDirect interface automatically switches among them. Otherr printers, such as the HP LaserJet 4 printer, can only support one active protocol at a time. Refer to the "Supported Operating Modes" section further in this chapter for more information.

Supported Operating Modes

As illustrated below, the HP JetDirect interface automatically operates in one of two modes *depending on the printer in which the interface is installed.* When installed in a printer that is capable of supporting multiple network protocols concurrently (a "multi-protocol printer"), an HP JetDirect interface operates in Multi-Protocol mode. However, when installed in a printer that can only support a single protocol, (a "single-protocol printer") an HP JetDirect interface can only operate in Single Protocol mode.

Table 1-1

Operating Mode	HP JetDirect Interface Operation	Supported Peripherals
Multi-Protocol	Automatic network switching between network protocols is provided. Print jobs can be accepted from all network operating systems for which the printer is configured.	HP LaserJet 4Si HP LaserJet 4Si MX
Single-Protocol	Automatic network switching between network protocols is *not* provided. Print jobs are accepted from only one network protocol, and other protocols on the interface are automatically disabled. In most cases, you should configure the printer into only one network.	HP LaserJet 4 HP LaserJet 4M HP LaserJet IIISi HP PaintJet XL300 HP DesignJet HP DesignJet 600

* To determine whether your printer supports multi-protocol or single protocol operation, inspect the "NETWORK MODE:" parameter on your printer self-test page or configuration plot while the HP JetDirect interface is installed. For the most recent list of supported printers, contact your HP authorized dealer. Then refer to table 7-5 in the Troubleshooting chapter.

HP JetDirect Interface Operating Modes

For more information on multi-protocol and single-protocol operation, read the sections that follow.

Multi-Protocol Mode

To operate in Multi-Protocol Mode, an HP JetDirect interface must be installed in a multi-protocol printer. During Multi-Protocol mode operation, all supported network protocols on the interface can be active. This allows your printer to service print jobs from different network operating systems that are running on the same physical network. To receive print jobs, the HP JetDirect interface automatically switches between the different network protocols (see table 1-1 for the network operating systems supported by your HP JetDirect interface). If "NETWORK MODE: MULTI-PROTOCOL" appears on the printer's self-test page, the interface and printer are operating in Multi-Protocol mode.

In the interface's default state, all supported network protocols on the interface are enabled. However, you can manually disable one or more protocols (for example, to control the use of the printer or to eliminate broadcast transmissions produced by some protocols). If a protocol is disabled, it will remain disabled when the printer is turned off and then on again. A protocol can be enabled or disabled from the printer's control panel (if it has one) or from an HP supplied Novell NetWare utility. To enable or disable a protocol, refer to your HP JetDirect network interface installation guide.

Single Protocol Mode

In Single Protocol Mode, an HP JetDirect interface can operate with only one of the supported network protocols (table 1-1 lists the supported network operating systems). When installed in a single protocol printer, the interface cannot automatically switch between different network protocols.

In most cases, you should configure the HP JetDirect interface to operate with only one network protocol when it is installed in a single protocol printer. For instructions, refer to the appropriate chapter in this guide.

Single Protocol Selection Process

When installed in a single protocol printer, the HP JetDirect interface will automatically enable a single protocol and disable all others. The protocol that is enabled depends on the network operating system to which the interface was configured. The interface will select the protocol using the following sequence:

1 If the interface has been preconfigured (for example, from the printer's control panel) to operate with a particular protocol, then the preconfigured protocol will be enabled when the printer is turned on.

2 If the interface has not been preconfigured, then all network protocols are initially active when the printer is turned on. The following rules will determine protocol selection:

   a If the interface is able to connect to a Novell server, then the Novell NetWare protocols will be enabled, and all other protocols will be disabled.

   b If the interface is not able to connect to a Novell server, then the protocol that is enabled will be determined by the first print job received. Once a protocol is enabled, the remaining protocols will be disabled.

Identifying the Selected Protocol

To identify the network protocol configured on the interface, refer to the NETWORK MODE: entry on the printer's self-test page. Refer to table 8-5 in the troubleshooting chapter for a list of possible NETWORK MODE: entries.

Before You Begin

Before installing the HP JetDirect interface software, you must have already completed the following tasks:

- The network is up and running.
- Installed and set up the printer according to its instructions.
- Installed all other options (such as a duplexing unit).
- Installed the HP JetDirect network interface (refer to the *HP JetDirect Interface Installation Guide* for information on installing the HP JetDirect interface).

What's Next?

Continue with the appropriate chapter for your network.

- "Software Installation and Configuration on Novell NetWare Networks" provides step-by-step instructions to install and configure the HP JetDirect software on Novell NetWare networks.

- "Software Installation and Configuration on Apple EtherTalk Networks" provides step-by-step instructions to install and configure the HP JetDirect software on EtherTalk networks.

- "Software Installation and Configuration on IBM LAN Server or Microsoft LAN Manager for OS/2 Networks" provides step-by-step instructions to install and configure the HP JetDirect software on LAN Server or LAN Manager networks on OS/2.

- "Software Installation and Configuration on Microsoft Windows for Workgroups provides step-by-step instructions to install and configure the HP JetDirect software on Micosoft Windows for Workgroups.

- "Software Installation and Configuration on Microsoft Windows NT Networks" provides step-by-step instructions to configure the HP JetDirect software on Microsoft Windows NT networks.

- "Software Installation and Configuration on UNIX (HP-UX and SunOS) Networks" provides step-by-step instructions to install and configure the HP JetDirect software on UNIX (HP-UX and SunOS) networks.

- "Troubleshooting" provides troubleshooting procedures should you have problems with the use of this product. In addition, error messages and corrective actions are listed.

2

Software Installation and Configuration for Novell NetWare Networks

Software Requirements

Queue Server mode requires:

- NetWare 386 version 3.1 or greater.
- NetWare 286 version 2.15c or greater.

Remote Printer mode requires:

- NetWare 386 version 3.1 with the NetWare Print Server version 1.2 or greater.

- Advanced NetWare 286 version 2.15 with NetWare Print Server version 1.2 or greater.

- NetWare SFT version 2.15 with NetWare Print Server version 1.2 or greater.

If you do not have one of these Novell products, you will need to obtain one from your authorized Novell reseller before continuing.

Network Modes

The HP JetDirect interface allows you to set up your network printer in either of two modes:

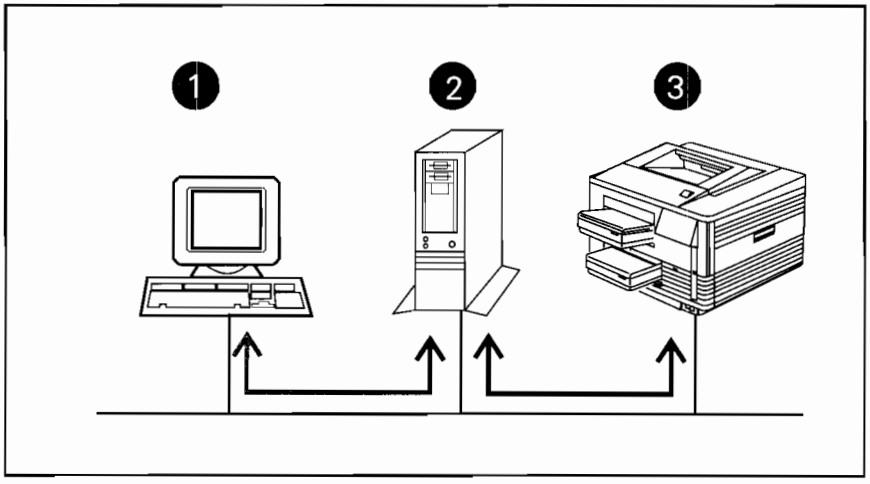
- Queue Server mode.
- Remote Printer mode (using Novell's print server).

Queue Server Mode

While in Queue Server mode, the HP JetDirect interface does not require a separate print server (nor any associated dedicated computer). All of the Queue Server functionality is located on the HP JetDirect interface. The HP JetDirect interface directly accesses the print queues on the file server to copy print jobs to the printer.

When in Queue Server mode, the data follows the path illustrated by figure 2-1. First the user prints the job at a workstation (1). The job travels to the file server (2) where it is stored, or spooled, in a print queue. When the printer is ready to print a job, the Queue Server running on the HP JetDirect interface moves the print job to the printer (3) where it prints.

Figure 2-1



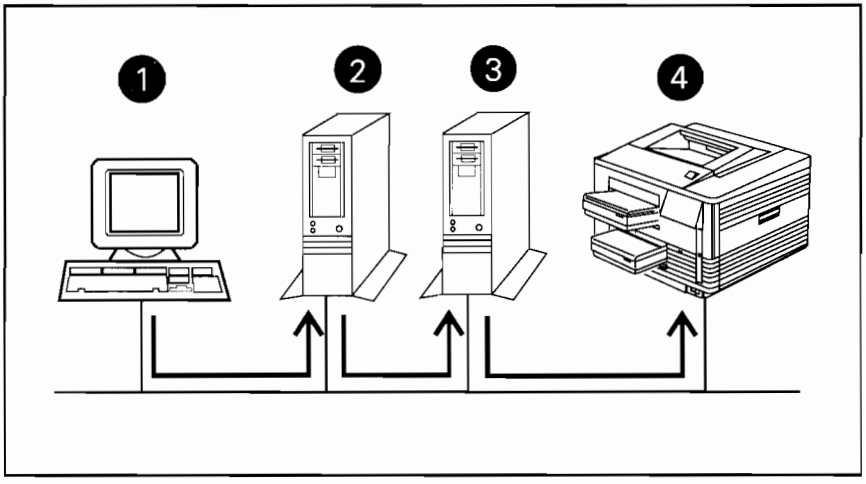
Novell Network Printing in Queue Server Mode

Because the HP JetDirect interface has direct access to the print queues, Queue Server mode provides significantly higher performance than Remote Printer mode.

Remote Printer Mode

When in Remote Printer mode, data follows the path illustrated by figure 2-2. First the user prints the job at a workstation (1). The job travels to the file server (2) where it is stored, or spooled, in a print queue. When the printer is ready to print a job, Novell's print server (3) copies the print job to the printer (4) where it prints.

Figure 2-2



Novell Network Printing in Remote Printer Mode

Figure 2-2 illustrates a Novell network that has a *dedicated* print server. This means that the computer that runs the print server software is dedicated to running *only* the print server software. Dedicated print servers can be set up on both the NetWare 286 and 386 network operating systems, and provide significantly better printing performance than non-dedicated print servers.

Novell networks may also be configured so that the file server and the print server are located on the same physical computer. If the print server is running on a NetWare 386 file server, it is running as a *Network Loadable Module* (NLM). If, however, the print server is running on the NetWare 286 file server, it is running as a *Value Added Process* (VAP). Dedicated print servers are recommended over VAP print servers for NetWare 286.

While in Remote Printer mode, the HP JetDirect interface supports VAP, NLM, and dedicated print servers and all features supported by Novell NetWare Print Services, except for the /TABS option of the CAPTURE and NPRINT commands.

Deciding On a Mode

Table 2-1 compares Remote Printer to Queue Server mode.

Table 2-1

Comparison of Modes		
Criteria	**Queue Server Mode**	**Remote Printer Mode**
Performance	Highest performance (as observed when printing raster graphics and downloading fonts).	Good performance (for best remote performance, use a dedicated print server).
Setup	Easiest to set up, with fewer required steps.	Requires additional steps, but provides best integration with NetWare print utilities (for example, PCONSOLE).
Security	Prevents other printers from accessing data sent to the configured queue(s) without supervisor's intervention. Does not require unencrypted passwords in NetWare 386. Data is password-protected from the file server to the printer.	Does not require unencrypted passwords in NetWare 386. Data is password-protected from the file server to the print server.
Print Server	Does not require a separate print server node and does not rely on print server functions. Does not take up a printer slot in an NLM, VAP, or dedicated print server. Does not require Novell NetWare Print Server.	Requires a print server, but allows implementation of forms and provides best integration with NetWare print utilities (for example, PCONSOLE). Requires Novell NetWare Print Server.
Status	Printer status is available through JETADMIN and JETPRINT and the printer control panel self-test page/configuration plot. Job status is available through job notification. Error notification is configurable through JETADMIN.	Printer status is available through JETADMIN and JETPRINT, the print server screen, PSC, and the printer control panel self-test page/configuration plot. Job status is available through the print server screen, PSC, and job notification.

To Install the Software

Using DOS

1 Log into the server with supervisor privileges.

2 Insert the "Novell NetWare Administration and Printing Utilities" disk into your floppy drive A.

3 Type **A:**.

4 Type INSTALL.

5 Follow the instructions on the screen.

To Configure Queue Server Mode

1 Log onto the network as supervisor at any user workstation.

2 Run JETADMIN.

- **Using DOS:** Type `JETADMIN` at the DOS prompt
  The *Printer I/O Selection* screen appears.

- **Using Windows:** To run JETADMIN for the first time, from Program Manager, type Alt -F, R, `JETADMIN` and press Enter, orfrom File Manager double-click on `JETADMIN.EXE`. This installs the JETADMIN icon in the HP JetDirect group and starts the program.

  To run JETADMIN in the future, double-click or use the arrow keys to select the JETADMIN icon in the HP JetDirect group. The *Printer I/O Selection* screen appears.

3 Select the printer you want to configure from the list box. The printer is listed under its "JetDirect Interface Name" which appears on the self-test page/configuration plot.

4 Select **Configuration....**
The *Printer I/O Configuration* screen appears.

5 Choose **Queue Server**.

6 Enter the print server's name in the *Printer Name* (*Queue Server*) field.

7 Select the **Add Queue** button. The *Available Print Queues* list appears.

8 Select a print queue from the list, or create a new queu, and press **Close**. The *Printer I/O Configuration* screen appears.

9 Type a description of the queue in the description field. The description will be available to users through the JETPRINT utility.

10 Select the **Test Page** button to print a test page.

11 Click **Close** to exit the *Printer I/O Configuration* screen.

12 Select **Exit** to exit JETADMIN.

To Verify the Configuration

1 Double-click on the **JETADMIN** icon in the HP JetDirect group. The *Printer I/O Selection* screen appears.

2 Select the printer.

3 Click on **Configuration....**

4 Click on **User Sheet** at the top of the screen.

5 A sheet with information valuable to users on your network should print. Refer to the Troubleshooting chapter if the User Sheet does not print.

NOTE If you have configured an HP DesignJet plotter, copy an HP-GL/2 file from the server to the printer to verify the new configuration.

To Configure Remote Printer Mode

1 Run PCONSOLE and create or modify your selected print server.

2 Configure a print server slot with `Type Remote, Other Unknown`.

3 Assign a print queue to the printer slot.

4 Restart your print server.

5 Run JETADMIN.

- **Using DOS:** Type `JETADMIN` at the prompt.
  The *Printer I/O Selection* screen appears.

- **Using Windows:** To run JETADMIN for the first time, from Program Manager, type Alt-`F, R, JETADMIN` and press Enter. This installs the JETADMIN icon in the HP JetDirect group. To run JETADMIN in the future, double-click or use the arrow keys to select the **JETADMIN** icon in the HP JetDirect group.
  The *Printer I/O Selection* screen appears.

6 Select the printer you want to configure. The printer is listed under its "`NODE NAME`" which appears on the self-test page/configuration plot.

7 Select **Configuration....**
The *Printer I/O Configuration* screen appears.

8 Choose **Remote Printer**.

9 Enter a name for the printer in the *Printer Name* field.

10 Select the print server's name, or enter a new name in the *Print Server* field.

11 Select the printer number assigned in PCONSOLE.

12 Type a description in the description field. The description will be available to Microsoft Windows users in the JETPRINT utility.

13 Click **OK** to exit the *Printer I/O Configuration* screen.

14 Select **Exit** to exit JETADMIN.

To Verify the Configuration

1 Click the **JETADMIN** icon in the HP JetDirect group. The *Printer I/O Selection* screen appears.

2 Click **User Sheet** at the top of the screen.

3 A sheet with information valuable to users on your network should print. Refer to the Troubleshooting chapter if the User Sheet does not print.

NOTE

If you have configured an HP DesignJet plotter, copy an HP-GL/2 file from the server to the printer to verify the new configuration.

Windows Driver Installation

From the *Printer I/O Configuration* screen you may select the **Drivers...** icon. This allows you to associate one or more Windows printer drivers with the selected queue. Associating the drivers to the queue allows Windows clients, using JETPRINT, to automatically install the driver(s) when selecting a network printer.

Using the JETPRINT Utility

To Connect Window Users to the Printer

1 Run Windows.

2 To run JetPrint for the first time, from Program Manager type Alt -F,R, JETPRINT and press Enter. To run JetPrint in the future, select the JETPRINT icon. The *HP JetPrint Utility* screen appears.

3 Choose the type of connected printers you wish to view from the *Printer Type* field.

4 Choose the appropriate print queue/printer.

5 Click **Set Default**, or double-click the queue to set it as the default print queue/printer.

To Print Using Drag and Drop

1 Minimize **JETPRINT** by clicking the down arrow in the upper right corner of the JETPRINT window.

2 Run **File Manager**.

3 Drag the file(s) to print from File Manager by clicking on the file and holding down the mouse button.

4 Drop the file(s) onto the minimized **JETPRINT** icon at the bottom of the window.

NOTE

You may also issue a print command from a Windows application.

To Set the Default Print Queue

1 Run Windows.

2 Select the **JETPRINT** icon. The *HP JetPrint Utility* screen appears.

3 Choose the type of connected printers you wish to view from the *Printer Type* field.

4 Choose a print queue/printer. For network printers, the printer the queue is connected to, the printer's status, printer description, and current jobs appear. These items are not available for locally attached printers.

5 Click **Set Default**, or double-click the print queue name. The queue you chose is now the default Windows print queue.

You might be prompted to have JETPRINT automatically install a driver if there are no drivers associated with the queue, if your system does not have the driver loaded, or if a new version of the driver is available.

NOTE When exiting JETPRINT, your default printer will remain active.

To View Printer Status

1 Run Windows.

2 Select the **JETPRINT** icon. The *HP JetPrint Utility* screen appears.

3 Highlight a print queue/printer to view the current printer queue status, description, jobs queued, and configuration information.

NOTE The description, printer status, and job status are not available for locally attached printers.

To View Available Print Queues

1 Run Windows.

2 Select the **JETPRINT** icon. The *HP JetPrint Utility* screen appears.

3 Choose the type of connected printers you wish to view from the *Printer Type* field.

4 Click on a print queue. The printer it is connected to and the printer's status appear.

To Delete Jobs from the Network Print Queue

1 Run Windows.

2 Select the **JETPRINT** icon. The *HP JetPrint Utility* screen appears.

3 Choose the type of connected printers you wish to view from the *Printer Type* field. *It must be a networked printer.*

4 Click on the name of the job in *Your Print Jobs* list in the main JETPRINT window.

5 Press **Delete** on the keyboard to delete the print job.

To Select Queue Icons

1 Click **Preferences** on the JETPRINT ToolBar.

2 Click **Queue Icons** under *Advanced Options*. The *Configure Queue Icons* window appears.

3 Choose the type of connected printers you wish to view from the *Printer Type* field.

4 Scroll through the *Icon File Contents* to view the available icons, or click **Browse** to view other icon files on your system.

5 Select the printer or plotter icon to be used.

6 Click **Set Icon**.

NOTE

The *Use Default* button will change the print queue icon back to its default.

7 Click **Close** to exit the *Configure Print Queue Icons* window.

8 Click **OK** to exit the *Preferences* window.

To Attach an Available File Server

1 Run Windows.

2 Select the **JETPRINT** icon. The *HP JetPrint Utility* screen appears.

3 Select **File Servers** from the JETPRINT ToolBar.

4 Choose the file server from which you want to attach under *Available File Servers*.

5 Enter the user's name.

6 Enter the file server's password.

7 Click **Attach**.

8 Click **Close** to exit the *File Servers (Attach / Detach)* window. The main JETPRINT window appears.

To Detach from File Servers

1 Run Windows.

2 Select the **JETPRINT** icon. The *HP JetPrint Utility* screen appears.

3 Select **File Servers** from the JETPRINT toolbar.

4 Choose the file server from which you want to detach under *Attached File Servers*.

5 Click **Detach**.

6 Click **Close** to exit the *File Servers (Attach / Detach)* window. The main JETPRINT window appears.

NOTE

You may not detach from file servers with mapped network drivers. You may not detach from the file server on which your default queue resides.

To Set Window Refresh Rates

1 Run Windows.

2 Select the **JETPRINT** icon. The *HP JetPrint Utility* screen appears.

3 Select **Preferences** from the JETPRINT ToolBar.

4 Choose **Refresh Rates**.

5 Enter the refresh rate, in seconds, for printer status.

6 Enter the refresh rate, in seconds, for the print job list.

7 Click **OK**.

8 Click **OK** to exit the *Preferences* window. The main JETPRINT window appears.

To Display the ToolBar or HelpBar

1 Run Windows.

2 Select the **JETPRINT** icon. The *HP JetPrint Utility* screen appears.

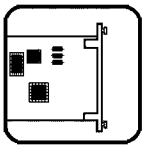
3 Click **Preferences** in the JETPRINT ToolBar.

4 Check the box in front of the **ToolBar**.

5 Check the box in front of **HelpBar**.

6 Click **OK** to exit the *Preferences* window. The main JETPRINT window appears.

NOTE Unchecking the box in front of the ToolBar will delete the ToolBar from the JETPRINT window.



Replacing an HP JetDirect Interface

Replace the HP JetDirect interface following the installation instructions supplied with the interface. Then proceed with the appropriate instructions for your mode.

Queue Server Mode

1 Use PCONSOLE to erase the password for the print server.

2 Use JETADMIN to configure the new interface for Queue Server mode. Refer to "To configure Queue Server Mode" earlier in this chapter.

Remote Printer Mode

Configure the new card in Remote Printer mode using JETADMIN. Refer to "To Configure Remote Printer Mode" earlier in this chapter.

To Verify the New Configuration

Copy the appropriate file from the server to the printer:

- An ASCII file when printing PCL.
- A PostScript file when printing PostScript.
- An HP-GL/2 file when using an HP DesignJet plotter.

Removing Printers from NetWare Networks

The first step in removing a printer from the network is to delete the printer configuration at the server. The printer must not be servicing a job when you do this.

1 Turn off the printer.

2 Disconnect the network cable from the back of the printer.

3 **For Queue Server mode:** Delete the print server name and queue(s) from PCONSOLE.

4 **For Remote Printer mode:** Delete the configuration information for the printer number in PCONSOLE. (This change will not occur until the print server is brought down then brought back up again.)

CAUTION If using Ethernet, do not detach the Ethernet cable from the BNC "T" connector. Detaching the cable from the "T" connector will cause a break in the network.

You have now removed the printer from the network.

3

Software Installation and Configuration on EtherTalk Networks

Overview

This chapter describes procedures for installing the printer driver, specifiying a printer's name and preferred zone, and for using the Macintosh Chooser to select printers. Refer to the manuals supplied with your HP JetDirect interface for information on hardware installation.

To Install the Printing Software

Automatic virus detection programs may interfere with the installation of printer software. Turn off any such programs which are active on your Macintosh before proceeding with the installation process.

NOTE Your printer must have the PostScript language option in order to utilize this printer software.

1 Insert the disk containing your printer driver software. For example, Macintosh "HP LaserJet Printing Tools" disk.

2 If necessary, open the disk's window by double-clicking the disk icon.

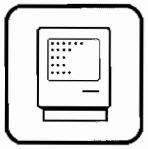
3 Double-click the Installer icon. If more than one installer icon is present, open the icon named for your printer.

4 Click **Install** when the *Easy Install* dialog box appears.

5 Follow the directions presented by the Installer program to complete the installation of the printing software. You may be prompted to remove the current disk and insert other disk(s) as part of the installation process.

6 The Installer notifies you when installation is complete. Follow the instructions presented to exit the Installer program. If you turned off any automatic virus detection utilities prior to this installation, you may now turn them back on.

NOTE For more information about your printer driver, refer to the electronic documentation provided on the driver installation disk(s).



Renaming Your Printer

The factory supplies a default name for your printer. *Hewlett-Packard highly recommends that you rename your printer to avoid having multiple printers with the same name on your network.* You can name your printer anything you like—for example, "Mike's LaserJet 4M" or "Christie's LaserJet IIISi."

NOTE Hewlett-Packard recommends only network administrators use this utility. If this printer is to be serviced by a print spooler, rename the printer before configuring the spooler to capture the printer.

THE HP NAMER utility allows AppleTalk devices (for example, printers) to be renamed. THE HP NAMER has the ability to rename devices located in different zones, as well as the local zone (no zones need be present in order to use THE HP NAMER utility).

Balloon help is available to System 7.x users. Select the **Help** icon in the menu bar, and choose **Show Balloons.**

THE HP NAMER can run directly from your hard drive or as in the following procedure from a floppy disk.

1 Make sure your printer is turned ON and is online, with the ready light illuminated. If your printer has a control panel display, a READY message is displayed.

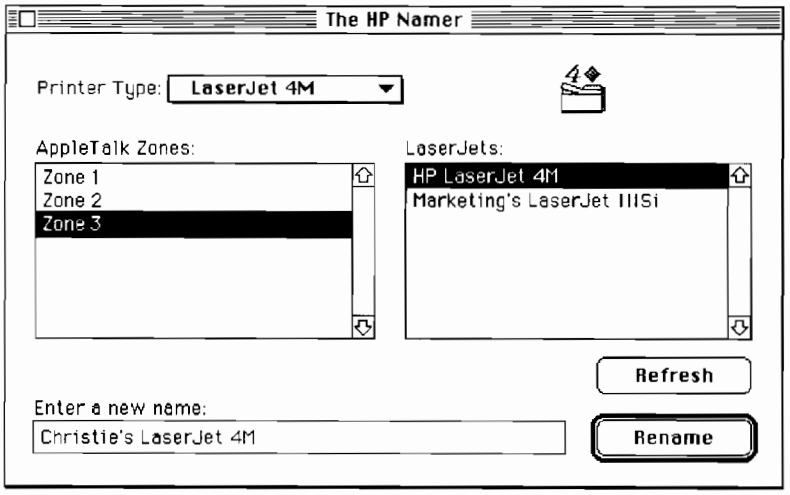
2 Insert the Macintosh "Fonts & Utilities" disk. If necessary, double-click the disk icon to open the disk's window.

3 Double-click **The HP Namer** icon.

The *HP Searching Network* screen appears. This screen will remain until THE HP NAMER has finished searching your local network for all PostScript printer devices. When THE HP NAMER has completed its search, *The HP Namer* window appears.

4 Select the name of your printer's installed driver from the *Printer Type:* menu. *The printer type matches the name of the driver you have installed for the printer.*

Figure 3-1



The HP Namer Window

5 Select the zone, if any, that contains the printer to be renamed from the "AppleTalk Zones:" list.

6 Select the printer to be renamed from the peripheral names list. If the zone has only one printer of the specified type, that printer will automatically be selected.

7 Type (or paste) in the new name. Any illegal characters will be replaced with an underscore character. (The name may be up to 32 characters in length.)

(If you try to name your printer the same name as another printer, an alert dialog box will appear directing you to choose another name.).

8 Click **Rename**.

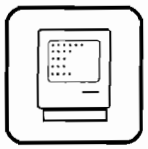
Your new printer name appears in the peripheral names list. It will take a few seconds before the new name will appear on the network. You may click the **Refresh** button to verify that the printer has been renamed.

9 Repeat steps 4 through 8 if you want to change the name of other printers.

10 Select **Quit** from the *File* menu, or click the **Close** box to exit.

11 Remove the disk from your Macintosh by selecting and dragging the disk icon to the Trash.

NOTE Tell everyone on your network the new name of your printer so they can reselect the printer in the Chooser.



Using The HP Zoner

THE HP ZONER utility allows you to choose a preferred zone for your printer on a Phase 2 EtherTalk network. Instead of your printer remaining on the default zone, which is set by the router, this utility lets you select the zone on which your printer will appear.

NOTE

Hewlett-Packard recommends only network administrators use this utility. If this printer is to be serviced by a print spooler, select the printer's zone before configuring th espooler to capture the printer.

THE HP ZONER provides balloon help (for System 7.x users only). Select the **Help** icon in the menu bar, and choose **Show Balloons**.

THE HP ZONER can be run directly from your hard disk, or as in the following procedure from a floppy disk.

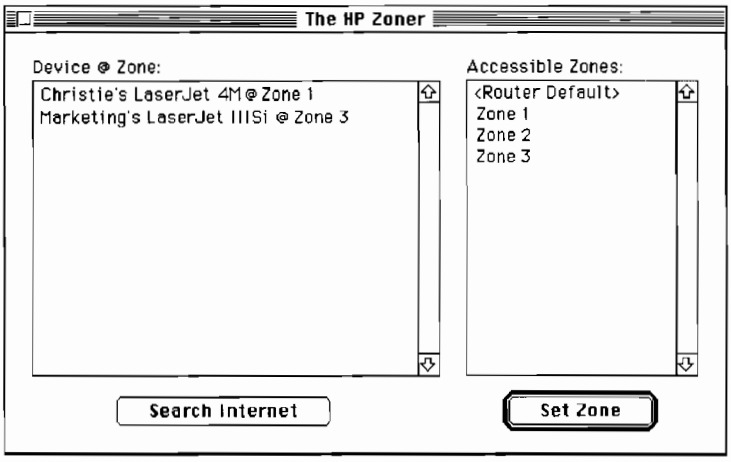
1 Make sure your printer is turned ON and is online, with the ready light illuminated. If your printer has a control panel display, a READY message is displayed.

2 Insert the Macintosh "Fonts & Utilities" disk. If necessary, double-click the disk icon to open the disk's window.

3 Double-click the **The HP Zoner** icon.

The *HP Searching Network* screen appears. This screen will remain until THE HP ZONER is finished searching your local network for all HP EtherTalk devices. When THE HP ZONER has completed its search, *The HP Zoner* window appears.

Figure 3-2



The HP Zoner Window

4 Select your printer name from the *Device @ Zone* list. (You may need to scroll through a long list to find your device.) A list of network zone names appears in the *Accessible Zones* list.

If the device that you want to change does not appear in the *Device @ Zone* list, click **Search Internet**. THE HP ZONER will search all networks for HP EtherTalk devices. If you wish to interrupt the search, use command-period.

5 Select your network zone from the *Accessible Zones* list.

If you select **<Router Default>** in the *Accessible Zones* box, the printer will remain on the default zone specified by the router on the network even if the default zone changes. If you select a zone name, the printer will stay on this zone as long as the zone is available. If the zone becomes unavailable, the printer will be placed on the default zone, and will remain there until the previous zone becomes available again or you choose another zone.

6 Click **Set Zone**.

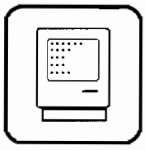
The selected zone appears next to the printer named in the *Device @ Zone* box.

Repeat steps 3-5 for each printer to be zoned.

7 Select **Quit** from the *File* menu or click the **Close** box to quit.

8 Remove the disk from your Macintosh by selecting and dragging the disk icon to the Trash.

NOTE Tell everyone on your network the new zone of your printer so they can reselect the printer in the Chooser.



Selecting Your Printer

1 Activate the **Chooser** from the **Apple** menu.

2 Select the icon which represents your printer driver.

If the appropriate printer icon doesn't appear in the Chooser, the printer resource files are not correctly installed. See the beginning of this chapter for instructions on installing the printer resource files on your Macintosh.

3 If Appletalk isn't active, an alert dialog box appears on your screen. Choose **OK**. The *Active* button will turn ON.

If your network is linked to other networks the *AppleTalk Zones* list box appears in the Chooser. Zones are groups of users, machines, and devices. They can be grouped by physical location (for example, Zone A may contain all the printers on the network in building A), but may also be grouped by logical zones (for example, all printers used in the finance department).

4 If applicable, choose the zone in the *AppleTalk Zones* box where your printer is located. (You may need to scroll through the zones to locate the one you want.)

5 Select the printer name you want to use in the peripheral names list.

If the printer's name does not appear in the peripheral names list make sure that your printer is turned ON, that and that the printer cable connections are secure. A READY message should appear if the printer has a control panel display. See the Troubleshooting chapter for more information.

If your printer is the only name listed in the box, you must still select it. Your printer will remain selected until you choose a different printer with the Chooser.

For System 6.x users, if you would like to display your user name on the network when you are printing documents, enter your user name in **User Name** in Chooser . The user name identifies the Macintosh that sent the print job; however, entering a user name doesn't affect your printer selection.

For System 7.x users, go into the Control Panels on your Macintosh, select **Sharing Setup**, then enter your owner name.

6 Choose **Background Printing ON** or **OFF**.

If background printing is turned OFF when you send a print job to the printer, status messages appear on your screen and you will have to wait until the messages clear before continuing your work. If background printing is turned ON, the messages are redirected to the PrintMonitor and you can continue working while the printer is printing your job.

NOTE

For System 6.x, you can only turn Background Printing **ON** if you are using MultiFinder.

7 Click the **Close** box to exit the Chooser.

To Verify the Configuration

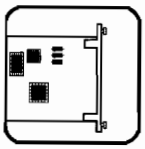
1 Select one of the following from the **File** menu (the selection depends upon your configuration):

- For System 6.x, choose **Print Directory...**.
- For System 7.x, choose **Print Window...**, or if no window is open, choose **Print Desktop...**.

The *Print* dialog box appears.

2 Click **Print**.

If your printer prints the job, you have connected your printer to your network correctly. If your printer doesn't print, go to the Troubleshooting chapter for more information.



Replacing an HP JetDirect Interface

If it is necessary to replace the HP JetDirect interface on the EtherTalk network follow these procedures:

1 Replace the HP JetDirect interface following the installation instructions supplied with the interface.

2 Rename the printer, refer to the "Renaming Your Printer" section earlier in this chapter.

3 Select the prefered zone for the printer, refer to the "Using The HP Zoner" section earlier in this chapter.

4 Use the Chooser to reselect your printer, refer to the "Selecting Your Printer" section earlier in this chapter.

To Verify the New Configuration

1 Select one of the following from the **File** menu (the selection depends upon your configuration):

- For System 6.x, choose **Print Directory...**.
- For System 7.x, choose **Print Window...**, or if no window is open, choose **Print Desktop...**.

The *Print* dialog box appears.

2 Click **Print**.

If your printer prints the job, you have connected the new interface to your network correctly. If your printer doesn't print, go to the Troubleshooting chapter for more information.

Removing Printers from EtherTalk Networks

1 Ensure the printer is not servicing a job.

2 Turn off the printer.

3 Disconnect the network cable from the back of the printer.

CAUTION If using Thin Ethernet, do not detach the cable from the BNC "T" connector. Detaching the cable from the "T" connector will cause a break in the network.

4 Notify the users that a new printer must be selected in the Chooser.

You have now removed the printer from the network.

4

Software Installation and Configuration on IBM LAN Server or Microsoft LAN Manager for OS/2 Networks

Software Requirements

You need OS/2 with one of the following products:

- Microsoft LAN Manager, version 2.0c or later.
- IBM LAN Server, version 1.3 or later.

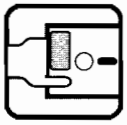
The Remoteboot protocol must be installed and selected in Microsoft LAN Manager 2.0c, prior to installing the HP JetDirect interface software. The IEEE 802.2 protocol must be installed and selected in IBM LAN Server 2.0 LAN Adapter and Protocol Support (LAPS). Refer to your network operating system documentation for installation information.

The default device driver Hewlett-Packard recommends depends on the printer, and in some cases on the application:

For HP LaserJet printers, use the LASERJET.HP driver.

- For the HP PaintJet XL300, for OS/2 2.0 applications, use a PaintJet driver.
- For the HP PaintJet XL300, for applications under other versions of OS/2 use the generic postscript driver that comes with OS/2.
- For the HP DesignJet Plotter, use the HP7586B plotter driver.

Other drivers may be used, but you may not be able to utilize many of the features of the printer. OS/2 clients also need the appropriate device driver loaded.



To Install the Software

1 Log on to the server using administrator privileges.

2 Insert the "IBM LAN Server and Microsoft LAN Manager for OS/2 Install and Setup Utilities" disk into your floppy disk drive A:.

3 Type **A:** at the OS/2 command line.

4 Type INSTALL and press Enter.

5 Select **OK** if the *Welcome* screen appears.
The *Language Selection* screen appears.

6 Select the **OK** button (or press Enter) to keep the default language, or select another language and then select **OK** (or press Enter).
The *Network Printer Installation* screen appears.

7 Select the **Install** button (or press Enter) to keep the designated directory C:\HPNETPRN, or enter another directory name and then select **Install** (or press Enter).
The first *Menu Group Selection* screen appears.

8 Select **Yes** to add the SETUP utility to a menu group in Desktop Manager. If you select **No**, skip to step 10.
The *Menu Group Selection* screen appears.

9 Select an existing group name, or enter another group name of your choice.

10 Select the **OK** button at the bottom of the screen.

11 Select the **OK** button when the *Back-up CONFIG.SYS* screen appears to select CONFIG.BAK as your backup file, or enter a new file name for the backup file. *(INSTALL and SETUP assume that CONFIG.SYS is on the C: drive.)*

12 A question box appears if you already have a CONFIG.BAK file.

13 The program makes a backup copy of the CONFIG.SYS file, adds a command line to the new CONFIG.SYS file, and installs the HP JetDirect interface software.
The Installation Status Bar indicates when the installation program is finished.

14 Select the **OK** button to exit, and then continue with the SETUP utility.

To Configure the Server

1 Make sure your printer is ON and is online with the Ready light illuminated.

2 In the installation directory type `SETUP` and press Enter, or choose **HP Network Printer Setup** from your selected menu group.

3 Select the *Setup* menu.

4 Choose the **Add** button. The *Add Network Printer* screen appears.

NOTE The selected printer being added must be online and ready prior to configuring it on the server.

5 Enter a name for the printer in the *Name* field.
The name can be up to six characters long and may only contain letters and numbers. For example, to name your printer PRINT1, type `PRINT1`. The name *CANNOT* be a printer port, such as LPT1.

6 Enter a comment in the *Description* field if you wish.
You may find it useful to comment on the printer, its location, or its primary users.

7 Select the interface address in the *Interface address* field that corresponds with the 12-digit "`LAN HW ADDRESS`" listed on your printer self-test page/configuration plot.

NOTE If the interface address listed on your printer self-test page/configuration plot does not appear as a choice, the HP JetDirect interface is not communicating with the server. Refer to the Troubleshooting chapter for information on checking your interface. You cannot proceed with the installation until the correct interface address appears as a choice on the screen.

8 Choose an existing queue, or specify a new queue name in the *Queue* field. The queue *CANNOT* be a printer port, such as LPT1.

9 Select the printer driver(s) in the *Printer Driver* field. The default driver depends on your printer (refer to the front of this chapter for more information).

10 Select the **Add** button at the bottom of the screen.
The software will now add the printer configuration to the server. An information box should appear. This will inform you that the printer was successfully added.

11 Select **OK** to continue.
There should now be a new printer icon on the *Network Connected Printer Setup* screen that has the printer's name and the printer's status under it.

12 Choose **Exit** on the *Setup* menu to exit the SETUP utility.

Verifying the Configuration

To verify that you have installed the HP JetDirect interface software correctly, copy an appropriate file from the server to the printer. For PCL use an ASCII file; for PostScript, use a PostScript file; for HP DesignJet plotters, use an HP-GL/2 file).

For example, to send the CONFIG.SYS file to a PCL printer:

1 Type: `NET USE` *devicename* `\\`*servername*`\`*sharename*

- *Devicename* can be LPT1, LPT2, up to LPT9 and must not be in use.
- *Servername* is the name given to your server when the network software was installed.
- *Sharename* is the name given to your shared print queue using the SETUP utility.

2 Type: `PRINT /D:` *devicename* `C:\CONFIG.SYS`

If the file is printed, you have correctly installed and configured your HP JetDirect interface and software.

NOTE

You may want to use Print Manager to change the initial queue configuration on the server. You may also want to make the sharenames permanent (refer to the network operating system documentation). You should also verify that users have access rights to the queue.

Correcting Problems

If the file does not print, check the following:

- Did a "SYS" type error message occur? Re-enter the print command line *without* the colon (:) in the devicename.
- Is the printer on and is it online?
- Was the file received at the shared print queue on the server?
- Is the print queue shared correctly?
  Check the printer and queue definitions using Print Manager.

If you have checked these items and still cannot get the file to print, refer to the Troubleshooting chapter for detailed troubleshooting information.

Assigning Locally Administered Addresses

Locally administered addresses are only supported with HP JetDirect Token Ring interfaces, and are not supported with HP DesignJet plotters or HP PaintJet XL300 printers.

1 Make sure the printer is on and is online.

2 Make sure the printer is not printing a job.

3 Type `SETUP` from the installation directory and press [ENTER], or select **HP Network Printer Setup** from the group that contains the SETUP utility.

4 The *Network Connected Printer Setup* screen appears containing a horizontal list of menus, and the network printers currently configured on your server.

5 Select the printer icon representing the network printer whose interface address you want to modify.

6 Choose the **Setup** menu.

7 Select the **Locally Administered Addressing** button.
The *Locally Administered Address* screen appears.

8 Enter the new locally administered address in the *New Card Address* field.
It is recommended that this address be a 12-digit number in the range of 4000 0000 0000 to 4000 7999 9999.

9 Choose the **Modify** button at the bottom of the screen.
An information box will inform you when the modification is complete.

10 Select **OK** to continue.

11 Choose **Exit** on the *Setup* menu to exit the SETUP utility.

Resetting to the Factory Address

You may change the HP JetDirect interface address back to the factory default address using the following procedure:

To reset the address hold down the On Line key while you turn the printer off and then back on. The On Line key MUST be held down while the printer is turned back on.

NOTE

You may reset the HP JetDirect interface address only if your printer is an HP LaserJet printer. Resetting the printer will reset ALL printer settings to factory defaults. You may need to reconfigure the printer's control panel for the user's needed settings.

To View the Error Log

1 Type SETUP from the installation directory and press Enter, or select **HP Network Printer Setup** from the group that contains the SETUP utility.
The *Welcome* screen might appear, depending upon the server's configuration.

NOTE

If you are already running SETUP, an information box appears. Select **OK** to exit the second version of SETUP and continue.

2 Select **OK** if the *Welcome* screen appears.
The *Network Connected Printer Setup* screen appears. A horizontal list of menus and network printers currently configured for your server are on the screen.
3 Select the **Log** menu.
4 Choose **View** to display the error log on the screen.
Each line in the error log corresponds to a separate error message.
5 Select **OK** at the bottom of the *View Status Log* screen to exit.
6 If you wish, select **Clear** at the bottom of the screen to clear or erase the error log.
7 Select **Save As** on the *Log* menu if you want a copy of the error log. You will be prompted for a file name.
8 Select the **Setup** menu.
9 Choose **Exit** to exit the SETUP utility.

Understanding the Error Log

This section describes the error log screen. The error log is divided into five columns, as illustrated by figure 4-1:

1 The name of the printer the message refers to.
2 The date the error/status occured.
3 The time the error/status occured.
4 The error number. The errors are listed by number in the section "INSTALL and SETUP Error Messages."
5 A brief description of the error/status. (Listed at the end of the description is the secondary error number. This number is used by the Customer Support Center staff to troubleshoot errors.)

Figure 4-1

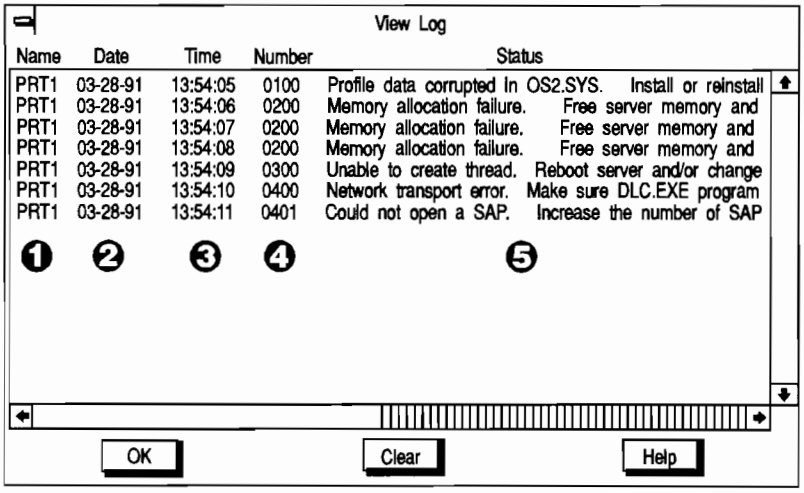


Figure 4-1 Error Log Screen

For a list of error messages shown on the error log refer to table 4-1.

INSTALL and SETUP Error Messages

The INSTALL and SETUP utilities for IBM LAN Server and Microsoft LAN Manager may detect and display the following errors:

Table 4-1

INSTALL and SETUP Error Log Messages	
Error Numbers	Suggested Recovery
0100	Corrupt data was found in the system profile file (OS2.INI). Run the INSTALL utility to reinstall the HP JetDirect interface software.
0200	You do not have enough memory. Reboot the server. If that fails, add memory to the server.
0300	The server is unable to create a thread. You have too many processes running. Reboot the server or edit the CONFIG.SYS file to increase the "THREADS=^value, and reboot the server.
0400	If this is the first time you have tried to add a printer to your network, you do not have DLC loaded. You may need to edit the CONFIG.SYS file to add more threads. If you have successfully added a printer, check the CONFIG.SYS file to ensure that the line containing the HPREDIR.EXE command is after the net drivers command lines. (Hewlett-Packard suggests putting the command line last in your CONFIG.SYS file.) Then reboot the server. If that doesn't work, check to see that the other drivers are loading correctly. If HPREDIR was running, the server's network adapter interface may have reported a problem to HPREDIR.EXE that was not recoverable. Restart HPREDIR. If you still have problems, call for service.
0401	SAP error. The HPREDIR.EXE program could not open a (SAP).
0402	You do not have enough SAPs or Link Stations to run the HP JetDirect interface software. Increase the number of SAPs in your network configuration; refer to your network operating system documentation. HPREDIR uses one SAP and 18 Link Stations. Then reboot the server and retry the INSTALL utility.

Table 4-1 (Cont)

INSTALL and SETUP Error Log Messages - Continued	
Error Numbers	Suggested Recovery
0403	Receive error. Reboot the server.
0404	Transmit error. Reboot the server.
0405	Connect error. Printer is offline, turned off, connected to another server (check the server address on the self-test page/configuration plot), or a network problem exists.
0406	Link station error. The HPREDIR.EXE program could not open the link station. Ensure that there are 18 unused Link Stations available before starting HPREDIR.
0407	Disrupted route error. The server can't find the printer on the network. Make sure the printer is turned on. There may be a cabling, bridge, or for Token Ring interfaces, a jumper block problem.
0408	DLC transport not found error. The DLC is not present on the server. Refer to the Network Operating System documentation for loading the DLC.
0409	Printer connection was lost. A network or printer problem exists. Make sure the printer is on and is online. Check the cables, any bridges, and server.
0500	Maximum configuration exceeded. Delete the printer configuration.
0600	Insufficient handles available. See your network operating system documentation for information on increasing the "MAXOPENS" parameter.

Accessing the Printer Status

When you run the SETUP utility, the main screen, *Network Connected Printer Setup*, contains icons representing the printers you have connected to your server. Under each icon is the name of the printer and its status.

Table 4-2

Printer Status Messages	
Status Message	**Description**
"Not responding"	The printer does not respond to a connection request from the HPREDIR.EXE program.
"Off line"	The printer is offline. Click the [ONLINE] key to put the printer back online.
"Out of paper"	The printer is out of paper. Fill the paper tray(s) according to the instructions in the printer's instruction manual.
"Pending"	The server is waiting for a status request response from the printer. Wait a minute or so to see if the status is updated. If this message does not change refer to the troubleshooting chapter for more information.
"Printing"	The printer is receiving data and is printing that data.
"Ready"	The printer is ready to receive data.
"See error log"	There has been a network error. Check the status listed on the error log, then refer to section "INSTALL and SETUP Error Messages" for more information on the error message.

Immediately Updating the Status

To perform an immediate refresh of the printer's status, select the *Refresh* menu from the *Network Connected Printer Setup* screen, and then the **Now** item.

To Update the Printer Status Interval

The status is updated at a set interval. The default update time is 60 seconds, but you may change this interval using the *Refresh* menu.

1 Type SETUP from the installation directory and press Enter, or select **HP Network Printer Setup** from the group that contains the SETUP utility.
The *Welcome* screen might appear depending upon the server's configuration.

NOTE

If you are already running SETUP, an information box appears. Select **OK** to exit the second version and continue.

2 Select **OK** if the *Welcome* screen appears.
The *Network Connected Printer Setup* screen appears. A horizontal list of menus, and network printers currently configured on your server appear.

3 Select the **Refresh** menu.

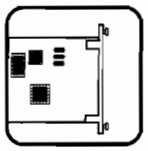
4 Choose **Interval** to refresh the status update interval.
The *Refresh Interval* screen appears. The first line shows the current interval expressed in seconds. The default is 60 seconds, unless it has been changed.

5 Enter a new interval if you prefer.
The interval must be between 1 and 65,535. If you want the 60-seconds default, select **Default** at the bottom of the screen.

6 Choose **OK** at the bottom of the *Refresh Interval* screen to save the new interval and exit the screen. If you do not wish to keep a new interval you may have entered, select **Cancel** to return to the interval listed at the beginning of the procedure.

7 Select the **Setup** menu.

8 Choose **Exit** to exit the SETUP utility.



Replacing an HP JetDirect Interface

Replace the HP JetDirect interface following the installation instructions supplied with the interface.

To Modify the LAN Server or LAN Manager Network Address

Use the SETUP Utility to modify the interface address. You must use Print Manager to modify all other portions of the configuration, such as the queue drivers or queue priority.

1 After you have replaced the HP JetDirect interface, make sure the printer is on and is online.

2 Type `SETUP` from the installation directory and press **Enter**, or select **HP Network Printer Setup** from the group that contains the SETUP Utility.

NOTE

If you are already running SETUP, an information box appears. Select **OK** to exit the second version of SETUP and continue.

3 Select **OK** if the *Welcome* screen appears. The *Network Connected Printer Setup* screen appears containing a horizontal list of menus, and the network printers currently on your server.

4 Select the printer icon representing the network printer with the new HP JetDirect interface. (You must select the icon.)

5 Choose the **Setup** menu.

6 Select the **Modify** button. The *Modify Network Printer* screen appears.

7 Select the address that matches the new "`LAN HW ADDRESS`" on the printer's self-test page/configuration plot.

8 Choose the **Modify** button at the bottom of the screen. A question box appears.

9 Select **Yes** to continue. An information box informs you the modification is complete.

10 Select **OK** to continue.

11 Choose **Exit** on the *Setup* menu to exit the SETUP utility.

To Verify theConfiguration

Copy the appropriate file from the server to the printer:

- An ASCII file when printing PCL.
- A PostScript file while printing PostScript.
- An HP-GL/2 file when using an HP DesignJet plotter.

Removing Printers from LAN Server or LAN Manager Networks

The first step in removing a printer from the network is to delete the printer configuration at the server. *The printer must not be servicing a job when you do this.*

To Delete the Configuration on LAN Server or LAN Manager Networks

1 Type SETUP from the installation directory and press **Enter**, or select **HP Network Printer Setup** from the group that contains the SETUP Utility.

2 Select **OK** if the *Welcome* screen appears.The *Network Connected Printer Setup* screen appears containing a horizontal list of menus, and the network printers currently on your server.

3 Select the printer icon which has the name of the printer to be removed below it. (You must highlight the icon.)

4 Choose the **Setup** menu.

5 Select **Delete**. A question box appears to verify you want the printer configuration removed.

6 Select **Yes** (or press **Enter**) to remove the printer's configuration. A question box might appear if the queue configured for the printer has no more destinations.

NOTE To cancel the removal of the printer's configuration, select **No**.

7 Select **Yes** or **No** (depending upon the queue's configuration) if the question box appears. An information box informs your of the successful removal of the printer's configuration at the server.

8 Select **OK** to return to the *Network Connected Printer Setup* screen. The printer icon which had the removed printer's name below it should no longer appear on the screen.

9 To delete additional printers, repeat steps 3 through 8.

10 When finished select **Exit** on the *Setup* menu.

To Disconnect the Printer

1 Turn off the printer.

2 Disconnect the network cable from the back of the printer.

CAUTION If using Ethernet, do not detach the Ethernet cable from the BNC "T" connector. Detaching the cable from the "T" connector will cause a break in the network.

You have now removed the printer from the network.

5

Software Installation and Configuration on Microsoft Windows for Workgroups

Overview for Installing the Software

The MONITOR software can be installed on any 386 or higher workstation running Windows for Workgroups. However, the software may be used peer-to-peer or client-server.

Peer-to-Peer

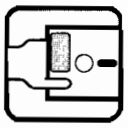
In this situation each user who wants access to the network printer installs the software on their workstation. Each user then adds the network printer to their system, as described later, and uses the printer as if it was their own. This solution is best if there are few users and print jobs tend to be short. You will also get printer status back. This solutions is the easiest, but runs the risk of jobs being rejected (the print spooler times out) if the printer is heavily used.

Client-Server

In this situation, one user installs the software and adds the printer to his/her system. The user then "shares" the printer using the Windows Print Manager. Other users connect to the printer through the first user's system using Print Manager. This solution provides a way of maintaining queue ordering and job priority. Use this solution if large jobs are printed, and several people are trying to use the printer. The disadvantages of this solution are the reliability upon the workstation chosen to be the print server, and there is no printer status returned to the client. For example, if the workstation goes down, no one can print. The workstation must also be capable of handling the print traffic that may move through it.

NOTE

When using the client-server solution, other users may still install the MONITOR software, and add the peripheral so they may receive peripheral status. Also, using the client-server solution does not prevent other users from printing directly to the peripheral.



To Install the Software

1 If Windows is not running type `WIN` at the DOS prompt.

2 Insert the "Windows for Workgroups Setup and Monitor Utiities" disk into your floppy disk drive A:.

3 Bring up Program Manager.

4 Choose **Run** from Program Manager's *File* menu.

5 Type `A:\SETUP`.

6 Click **OK** (or press Enter). The *Welcome* screen appears.

7 Select **Continue** (or press Enter). The *Setup Destination* screen appears.

8 To change the default destination, select **Set Location**.

9 Select **Install**.

10 After all of the files are copied, SETUP will exit and automatically start the Network Control Panel application so you can install the DLC.

NOTE The preceding procedures only need to be performed the first time you install MONITOR, unless you remove the utilities and reinstall them.

To Install the DLC

SETUP automatically starts the Network Control Panel application.

1 Select **Adapters**. The *Network Adapters* window appears.

2 Click **Setup...**. The *Adapters* window appears. Adapters is dependent upon the current adapter being used.

3 Click **Protocols...**. The *Protocol Used on Adapter* window appears.

4 Select **Unlisted or Updated Protocol** from the *Available Protocols* field.

5 Click **Add->**. The *Install Driver* window appears.

6 Insert the "JetDirect Utilities for Windows for Workgroups" disk into the floppy drive.

7 Enter the drive letter, for example **A:**.

8 Click **OK**. The *Unlisted or Updated Protocol* windows appears and the Microsoft DOS DLC (802.2) entry is highlighted.

9 Click **OK** to exit the *Unlisted or Updated Protocol* window.

10 Click **OK** to exit the *Protocol Used on Adapter* window.

11 Click **OK** to exit the *Adapters* window.

12 Click **Close** to exit the *Network Adapters* window.

13 Click **OK** to exit the *Network Settings* window.

14 Click **Restart Computer** so the changes will take effect.

Configuring the Printer

Before you configure the HP JetDirect software, be sure the following items are true:

- The interface has been installed in the printer.
- The printer is connected to the network.
- The printer is turned on and is online.
- You have a copy of the printer self-test page or configuration plot (note the "LAN HW ADDRESS").

To move between the fields and buttons in the MONITOR utility screens, press the **Tab** key, or use the mouse to click on the field or button.

To Add a Port

1 If Windows is not running type WIN at the DOS prompt.

2 Bring up **Control Panel**.

3 Double-click the **HP Network Port** icon.

NOTE If you are already running MONITOR, that version appears at the top of the screen and you run that version.

4 Select the **Port** menu.

5 Choose **Add**. The *Add a Network Peripheral Port* window appears.

6 Enter a name for the printer port. The name can be up to eight characters and may contain letters and numbers only. *The first character must be a letter.* For example, to name your printer PRINT1, type PRINT1. The name cannot be a port, such as LPT1, or an existing DOS device.

7 Select the LAN HARDWARE address in the Card Address field that corresponds with the 12-digit "LAN HW ADDRESS" listed on your printer self-test page or configuration plot.

NOTE If the LAN HW ADDRESS listed on your printer self-test page or configuration plot does not appear as a choice, the HP JetDirect interface is not communicating with the server. Refer to the "Troubleshooting" chapter for information on checking your HP JetDirect interface. You cannot proceed with the installation until the correct address appears as a choice on the window.

8 Enter a comment in the *Description* field if you wish. You may find it useful to comment on the printer, its location, or its primary users.

9 Change the printer icon if you wish by clicking **Change...** in the *Icon* field.

10 Select **OK** at the bottom of the window. The software will now add the printer configuration to the server. There should now be a new printer icon on the *HP Network Peripheral Port Monitor* window that has the printer's name beneath it.

   a A prompt appears asking if you wish to connect a printer to this port. Select **Yes** or **No**. If you select **Yes**, the *Network Control Panel* application appears, which allows you to connect a printer to the port.

   b Continue with step 3 of "Connecting the Printer to a Port in Windows."

11 Choose **Exit** from the *Port* menu to exit the MONITOR utility.

To Connect the Printer to a Port in Windows

1 Double-click the **Control Panel** icon. The *Control Panel* window appears.

2 Double-click the **HP Network Port** icon. The *HP Network Peripheral Port Monitor* window appears.

3 Select the **Port** menu from the *HP Network Peripheral Port Monitor* window.

4 Choose the **Connect Peripheral to Port...** item. The *Network Control Panel* application appears.

5 Choose **Add>>**.

6 Select the type of printer you have from the list shown.

7 Click **Install...**.

8 Click **Connect...**.

9 Select the name of the printer port you added using the MONITOR utility from the *Port* list box.

10 Click **OK** to close the *Connect* window.

11 Select **Close** to exit the *Printers* window.

You have now completed the configuration of your printer on the Windows for Workgroups server.

To Verify the Configuration

Use the Notepad application to print a simple file to the printer.

Changing MONITOR Settings

To Change the Displayed Language

1 Double-click the **Control Panel** icon. The *Control Panel* window appears.

2 Double-click the **HP Network Port** icon. The *HP Network Peripheral Port Monitor* window appears.

3 Select the **Options** menu from the *HP Network Peripheral Port Monitor* window.

4 Choose **Preferences**.

5 Click the button in front of the language you wish MONITOR to display.

6 Click **OK** to exit the *Preferences* window.

7 Choose **Exit** from the *Port* menu to exit the *HP Network Peripheral Port Monitor* window.

To Change the Printer Port Icon

1 Double-click the **Control Panel** icon. The *Control Panel* window appears.

2 Double-click the **HP Network Port** icon. The *HP Network Peripheral Port Monitor* window appears.

3 Select the icon or port window which has the name of the printer port to be modified from the *HP Network Printer Port Monitor* window. (You must highlight the item).

4 Select the **Port** menu.

5 Choose **Modify....** The *Modify a Network Peripheral Port* window appears.

NOTE

You may double-click the *Port* icon, then select **Modify** from the toolbar to change the icon.

6 Click **Change...** from the *Icon* field. The *Change Port Icon* window appears.

7 Scroll through the selection of icons.

8 Highlight the new icon.

9 Click **OK** to select the icon.

10 Click **OK** to exit the *Modify a Network Peripheral Port* window.

11 Choose **Exit** from the *Port* menu to exit the MONITOR utility.

To Hide the Toolbars

1 Double-click the **Control Panel** icon. The *Control Panel* window appears.

2 Double-click the **HP Network Port** icon. The *HP Network Peripheral Port Monitor* window appears.

3 Select the **Options** menu from the *HP Network Peripheral Port Monitor* window.

4 Choose **Preferences**.

5 Uncheck the box in front of *Show the Toolbars.*

6 Click **OK** to exit the *Preferences* window.

7 Choose **Exit** from the *Port* menu to exit the *HP Network Peripheral Port Monitor* window.

To Hide the Status Bar

1 Double-click the **Control Panel** icon. The *Control Panel* window appears.

2 Double-click the **HP Network Port** icon. The *HP Network Peripheral Port Monitor* window appears.

3 Select the **Options** menu from the *HP Network Peripheral Port Monitor* window.

4 Choose **Preferences**.

5 Uncheck the box in front of *Show the Status Bar*.

6 Click **OK** to exit the *Preferences* window.

7 Choose **Exit** from the *Port* menu to exit the *HP Network Peripheral Port Monitor* window.

To Set the Status Interval

1 Double-click the **Control Panel** icon. The *Control Panel* window appears.

2 Double-click the **HP Network Port** icon. The *HP Network Peripheral Port Monitor* window appears.

3 Select the **Status** menu from the *HP Network Peripheral Port Monitor* window.

4 Choose **Interval** to set the time interval for updating the status.

5 Enter the new interval in seconds.

NOTE To set the interval to the factory default of 20 seconds, click **Default**.

6 Click **OK**.

7 Choose **Exit** from the *Port* menu to exit the *HP Network Peripheral Port Monitor* window.

To Update the Status Immediately

1 Double-click the **Control Panel** icon. The *Control Panel* window appears.

2 Double-click the **HP Network Port** icon. The *HP Network Peripheral Port Monitor* window appears.

3 Select the **Status** menu from the *HP Network Peripheral Port Monitor* window.

4 Choose **Now** to immediately update the status.

5 Choose **Exit** from the *Port* menu to exit the *HP Network Peripheral Port Monitor* window.

Using the System or Port Log

You may view, print, save, or clear either the system log which contains information on all the connected ports, or the port log which contains information on the selected printer port.

To Display the System Log

1 Select the **Log** menu.

2 Choose **System Log**. The *System Log* list appears.

3 Choose **Display...**. The *Display System Log* window appears.

4 Scroll through the list of errors.

5 Double-click on the error to receive more information.

6 If you want, click **Clear** to erase the system log.

7 If you want, click **Print...** to print the system log. The *Print System Log* window appears.

8 If you want, click **Save...** to save the system log to a specified file. The *Save System Log* window appears.

To Display the Port Log

1 Select the icon or port window whose error log you wish to view from the *HP Network Peripheral Port Monitor* window. (You must highlight the item.)

2 Select the **Log** menu.

3 Choose **Port Log**. The *Port Log* list appears.

4 Choose **Display...**. The port log is added to the port window.

5 Scroll through the list of errors.

6 Double-click on the error to receive more information.

To Print the System or Port Log

1 Select the **Log** menu.

2 Select **System Log** if you want to print the error log for all the printer ports, or select **Port Log** if you want to print the error log for only the selected port.

NOTE

To print the port log you must have selected the icon or port window whose error log you wish to view from the *HP Network Peripheral Port Monitor* window.

3 Choose **Print...**. The *Print System Log* or *Print Port Log* Window appears.

4 Choose the print quality.

5 Enter the number of copies to be made.

6 If the copies are to be collated, check the box in front of *Collate Copies*.

7 Click **OK** to print the error log.

8 Choose **Exit** from the *Port* menu to exit the *HP Network Peripheral Port Monitor* window.

To Save the System or Port Log

1 Select the **Log** menu.

2 Select **System Log** if you want to save the error log for all of the peripheral ports, or select **Port Log** if you want to save the error log for only the selected port.

NOTE

To save the port log you must have selected the icon or port window whose error log you wish to view from the *HP Network Peripheral Port Monitor* window.

3 Choose **Save...**. The *Save System Log* or *Save Port Log* window appears.

4 Enter the file name.

5 Choose the type of file extension you wish to use from *Save File as Type:*.

6 Specify the drive and directory to which you want the file saved.

7 Click **OK** to save the error log.

8 Choose **Exit** from the *Port* menu to exit the *HP Network Peripheral Port Monitor* window.

To Clear the System Log

1 Select the **Log** menu.

2 Select **System Log**.

3 Choose **Display...**.

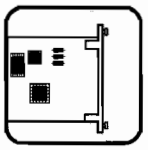
4 Click **Clear**.

5 Choose **Exit** from the *Port* menu to exit the *HP Network Peripheral Port Monitor* window.

To Disable the System Log

1 Select the **Log** menu.

2 Choose the **Disable Logging** item.



Replacing an HP JetDirect Interface

Replace the HP JetDirect interface following the installation instructions supplied with the interface.

To Modify the Windows for Workgroups Network Address

1 After replacing the interface make sure the printer is on and online.

2 If Windows is not running, type `win` at the DOS prompt.

3 Bring up the *Control Panel* main window.

4 Double-click **HP Network Peripheral Port Monitor**.

5 Select the icon or port window which has the name of the printer port to be removed from the *HP Network Peripheral Port Monitor* window.

6 Select the **Port** menu.

7 Choose **Modify...**. The *Modify a Network Printer Port* window appears.

Note You may double-click the Port icon, then select the change icon from the toolbar.

8 Select the interface's `LAN HARDWARE ADDRESS` that matches the new interface's `LAN HARDWARE ADDRESS` on the self-test page or configuration plot.

9 Select OK at the bottom of th window. A prompt appears asking if you wish to connect a printer to this port

10 Select **Yes** or **No**. If you select **Yes**, the *Control Panel-Printers* application appears, which allows you to connect a printer to the port.

11 If you changed the continue with step 3 of "To Connect the Printer to a Port in Windows."

12 Choose **Exit** from the *Port* menu to exit the MONITOR utility.

To Verify the New Configuration

Use the Notepad application to print a small file to the printer.

Removing Printers from Windows for Workgroups Networks

The first step in removing a printer from the network is to delete the printer configuration at the server. The printer must not be servicing a job when you do this.

1 If Windows is not running type `WIN` at the DOS prompt.

2 Bring up the **Control Panel** main window.

3 Double-click the **HP Network Port** icon.

4 Select the icon or port window which has the name of the printer port to be removed from the HP Network Printer Port Monitor window. (You must highlight the icon.)

5 Select the **Port** menu.

6 Select the **Delete...** item. A question box appears to verify that you want the printer configuration removed.

7 Select **OK** (or press Enter) to remove the printer's configuration.

NOTE

To cancel removal of the printer's configuration from the network, select **Cancel**.

An information box will inform you of the successful removal of the printer's configuration from the server. The icon which had the removed printer's name beneath it will no longer appear on the screen.

8 To delete additional printers, return to step 4.

9 Choose **Exit** from the *Port* menu to exit the MONITOR utility.

10 Turn off the printer.

11 Disconnect the network cable from the back of the printer.

CAUTION If using Ethernet, do not detach the Ethernet cable from the BNC "T" connector. Detaching the cable from the "T" connector will cause a break in the network.

You have now removed the printer from the network.

6

Software Installation and Configuration on Microsoft Windows NT Networks

To Install the Software

All software necessary to support the HP JetDirect Network interface is included with the Windows NT operating system. Follow steps below to install the DLC Transport and Driver for the HP JetDirect Network Interface.

NOTE

You must be logged on with administrator privileges to perform the following procedure.

1 Run **Windows NT**.

2 Double-click the **Control Panel** icon.

3 Double-click the **Networks** icon.

4 Click **Advanced>**.

5 Install the DLC Transport and Driver by choosing **Install Software** in the *Advanced Networks* screen.

6 Reboot your system for the installation to take effect.

a To verify the DLC software is installed, ensure that `DLC Sys` appears in the *Network Software* list box of the *Networks* dialog box.

To Configure a Printer

1 Select **Print Manager** from the *Main* group.

2 Choose **Create Printer** from the *Printer* menu at the top of the screen. The *Create Printer* dialog box appears.

3 Enter a name for the printer in the *Printer Name* field.

4 Select the printer's model from the *Driver* pull down menu.

5 Select **Other** from the *Print to* pull down menu. The *Print Destinations* dialog box appears.

6 Choose **Hewlett-Packard Network Port** from the *Available Print Destinations* list. The *Add an HP Network Peripheral Port* dialog box appears.

NOTE

If **Hewlett-Packard Network Port** does not appear as a choice in the dialog box, the DLC Transport and Driver are not installed. Go to the above section, "To Install the Software," for installation instructions.

7 Enter a name for the port in the *Name* field (the name must not be the name of an existing port, such as LPT1, or an existing DOS device).

8 Select the HP JetDirect LAN HARDWARE address from the *Card Address* pull down menu. This address matches the one listed under "LAN HW ADDRESS" on the self-test page or configuration plot.

9 Click **OK** to exit the *Add a Network Peripheral Port* dialog box.

a You may share the printer if you wish. To share the printer, click **Share the Printer on the Network** in the share box. The share name defaults to the printer name, and can be changed if needed.

10 Click **OK** to exit the *Create Printer* dialog box. A dialog box from the selected model's device driver appears.

11 Set any printer-specific options, and click **OK**.

To Verify the New Configuration

Print an appropriate file from the server to the printer:

- An ASCII file when printing PCL.
- A PostScript file when printing PostScript.
- An HP-GL/2 file when using an HP DesignJet plotter.

Replacing an HP JetDirect Interface

Replace the HP JetDirect interface following the installation instructions supplied with the interface.

To Modify the Windows NT Printer Port

1 Run Windows NT.

2 Select **Print Manager** from the *Main* group.

3 Highlight the appropriate printer icon.

4 Choose **Printer Properties** from the *Printer* pull down menu at the top of the screen. The *Printer Properties* dialog box appears.

5 Click **Settings**. The *Configure a Network Printer Port* dialog box appears.

6 If needed, enter a new name for the port in the *Name* field.

7 Select the new HP JetDirect interface address from the *Card Address* pull down menu. This address matches the one listed under "LAN HW ADDRESS" on the self-test page or configuration plot.

8 Click **OK** to exit the *Configure a Network Printer Port* dialog box.

9 Click **OK** to exit the *Printer Properties* dialog box.

10 Continue with the next section, "To Verify the New Configuration."

To Verify the New Configuration

Print an appropriate file from the server to the printer:

- An ASCII file when printing PCL.
- A PostScript file when printing PostScript.
- An HP-GL/2 file when using an HP DesignJet plotter.

Removing Printers from Windows NT Networks

The first step in removing a printer from the network is to delete the printer configuration at the server.

1 Run Windows NT.

2 Select **Print Manager** from the *Main* group.

3 Highlight the appropriate printer icon.

4 Choose **Printer Properties** from the *Printer* pull down menu at the top of the screen, or from the toolbar. The *Printer Properties* dialog box appears.

5 Choose a different destination for this printer from the *Print To* pull down menu.

6 Click **OK** to exit the *Printer Properties* dialog box.

7 Choose **Printer Properties** again from the *Printer* pull down menu at the top of the screen, or from the toolbar. The *Printer Properties* dialog box appears.

8 Click **Details**. The *Printer Details* dialog box appears.

9 Select the port to delete from the *Print to Additional Ports* list.

10 Click **Delete**.

11 Click **Yes** to confirm the deletion of the port.

12 Click **OK** to exit the *Printer Details* dialog box.

13 Click **OK** to exit the *Printer Properties* dialog box.

14 Turn off the printer.

15 Disconnect the network cable from the back of the printer.

CAUTION If using Ethernet, do not detach the Ethernet cable from the BNC "T" connector. Detaching the cable from the "T" connector will cause a break in the network.

You have now removed the printer from the network.

7

Software Installation and Configuration on UNIX (HP-UX and SunOS) Networks

Overview

This chapter contains the steps necessary to configure both the HP JetDirect interface and the HP-UX or SunOS host spoolers.

This chapter is divided into the following sections:

- Installing the software on your host system.
- Running the configuration utility (`hpnpcfg`).
- Verifying the software installation.
- Configuring the host spooler.
- Testing the host spooler.

Before You Begin...

We assume that you have properly connected your printer to the network using the HP JetDirect interface, and that you have interface status information (for example, by printing a self-test page or configuration plot). Refer to your HP JetDirect interface installation guide for instructions.

Be sure that you have the following items:

- System administrator (root) access to your system.
- The LAN hardware address (or station address) of the interface. This address is printed with interface status information (on the self-test page or configuration plot). It will be similar to the following:

  LAN HW ADDRESS: 080009xxxxxx

- For HP-UX systems, an appropriate model script name for your printer. Model scripts are listed in the `/usr/spool/lp/model` directory. Refer to your HP JetDirect interface installation guide for a recommended model script for your printer. (For example, use `dumbplot` for HP DesignJet plotters or `LaserJet IIIsi` for HP LaserJet IIISi printers.)
- Approximately four megabytes of free disk space on the disk containing `/usr/lib`.

Use this worksheet to record your configuration parameters. The recorded data will be helpful later for network administration or troubleshooting.

Installing the Software

This section provides instructions for installing the HP JetDirect Network Interface software. If you are installing the software on an HP 9000 HP-UX host, read On an HP 9000 Host. If you are installing the software on a Sun SPARCsystem SunOS host, read On a Sun Host.

NOTE If you are installing the HP JetDirect software froma CD-ROM drive, refer to the instructions provided with the CD-ROM disc.

On an HP 9000 Host

You must first load the HP JetDirect software onto your system. Then you must run an installation script (`hpnpinstall`) to set up the file structures required for interface and spooler configuration.

Loading the Software

Use the `tar` utility to load the software from your HP JetDirect software media onto your system as described below.

NOTE For HP 9000 Series 800 multiuser systems running HP-UX 9.x or later, the HP JetDirect software was included with your operating system media and may already be loaded on your system. If the *NET-PERIPH* file set is on your system, the HP JetDirect software is already loaded. You can then skip to Running the Install Script.

1 Log onto the HP-UX host computer as **root**.

2 Type `cd /` to go to the root directory.

CAUTION Do not omit step 2. The installation procedures will create a directory system relative to the directory that you are in when you run the installation script. If you are not in the root directory when installation begins, the file references made throughout the rest of this manual will be incorrect.

3 Insert the HP JetDirect software tape into the tape drive.

4 Use `tar` to extract the files from the tape as follows:

```
tar xvf tape-device
```

where *tape-device* is the device name of the drive in step 3.

5 Before running the installation script, copy `/usr/lib/hpnp` and all its subdirectories to another host if you plan to do either of the following:

- Configure additional hosts as master spoolers for this printer.
- Configure a different host as the BOOTP server (that is, the host that will be used to download network configuration data to the HP JetDirect interface).

Running the Installation Script

The installation script, `hpnpinstall`, sets up the JetDirect software file structure and installs the necessary files for interface and spooler configuration. It must be run on the host to be configured.

1 Run the script from the root directory. Enter the following:

```
/usr/lib/hpnp/hpnpinstall
```

2 If you intend to make this host the BOOTP server, answer `y` (for "yes") when asked if you are installing the startup configuration utilities. If you intend for this host to be the master spooler and are asked whether to install the spooler utilities, answer `y`. (Note: spooler utilites may already be installed on some systems.)

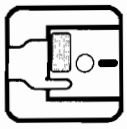
3 To determine which files to install, the installation script will try to identify the HP 9000 host (both the series and operating system version) that you are installing the software on.

If the script is unable to recognize the system, it will prompt you with a series of questions. For each question, answer `y` for yes or `n` for no.

After some processing, the following message will appear:

```
Installation is complete.
```

This signifies that software installation is complete. Skip to the "Running the Configuration Utility" section to continue with the configuration.



On a Sun Host

As described below, use the `extract_unbundled` command to load the HP JetDirect software installation script and files from tape to your Sun host. Subsequently, run the installation script (hpnpinstall) to set up the file structures required for interface and spooler configuration. Proceed as follows:

1 Log onto the Sun host computer as **root**.

2 Enter the following command to unload the tape:

```
/usr/etc/extract_unbundled
```

3 The following prompt appears:

```
Enter media drive location [local | remote]:
```

If the tape drive is directly attached to the host, type `local`. If it is attached to another host, type `remote`.

NOTE

If you are using a remote drive, you will also be prompted for the name of the remote host to which the drive is connected.

4 The following prompt appears:

Enter Device Name (e.g. rst0, rmt0, rfd0c) : /dev/r

Type the remainder of the device name you are using (the prompt supplies the initial r).

5 Insert the cartridge into the tape drive and press your [Return] key on your keyboard.

6 A copyright message is displayed along with a product description. Then the following prompt will appear:

```
Do you want to continue [y/n]?
```

Type `y` to continue. Typing `n` will end the installation without loading the files.

7 The software will begin loading. When the loading is completed, the following prompt will appear:

Do you want to continue with installation [y | n]?

Your answer depends on your intended configuration:

- If you plan to configure additional hosts as master spoolers for this printer, or use a different host as the BOOTP server, type `n` to exit.

  Copy `/usr/lib/hpnp` and all its subdirectories to the host that will be a master spooler or the BOOTP server.

  Run the installation script on each host intended to be a master spooler or the BOOTP server. To start the script, enter the following:

  ```
  cd /
  /usr/lib/hpnp/hpnpinstall
  ```

  Then continue with step 8 below.

- If you plan to use this host as both a master spooler and BOOTP server, answer `y`. This will automatically start the installation script. Then continue with step 8 below.

8 The installation script will ask whether you are installing the startup utilities (which will make this host the BOOTP server), and the spooler utilities (which makes this host a master spooler). If you are installing both on this host, answer `y` (for "yes") to both prompts.

After some processing, the following message will appear:

```
Installation is complete.
```

This signifies that software installation is complete. Now go to the section Running the Configuration Utility.

Running the Configuration Utility

The configuration utility, hpnpcfg, helps the administrator to configure the interface and the spooling system. The configuration utility is run by entering the following:

```
/usr/lib/hpnp/hpnpcfg
```

The utility will display the following menu, and will ask you to enter a selection:

Main Menu of the Configuration Utility

```
HP TCP/IP PERIPHERAL CONFIGURATION TASKS
MAIN MENU

1)  Verify installation of software
2)  Configure a peripheral with BOOTP/TFTP
3)  Verify BOOTP/TFTP configuration
4)  Verify network peripheral connectivity
5)  Verify network peripheral operation
6)  Add a peripheral to spooler
7)  Remove peripheral BOOTP/TFTP configuration
8)  Remove peripheral from spooler

?) Help                q) Quit
```

In most installations, steps 1 through 6 of the main menu should be performed in sequence. Steps 7 and 8 are typically used if you are changing configurations. Be sure to use the *Help* menu by entering `?` at any prompt.

NOTE

Although `hpnpcfg` is recommended, SAM (System Administration Manager) may be used on HP-UX 9.x (or later) systems to configure your network-based printer into your spooling system. To determine SAM support and use, refer to your HP-UX system manuals.

NOTE

For some installations, the HP JetDirect interface may be configured from the printer's control panel instead of through a BOOTP server; in this case, steps 2 and 3 can be skipped. Refer to your HP JetDirect interface installation guide for instructions on configuring the interface from the control panel.

To Verify the Software Installation

1 Run the configuration utility, hpnpcfg.

2 Select item **1** (Verify installation of software) from the main menu.

3 The utility will verify software installation and display the following message:

```
Software verification passed
```

If the verification tests fail, refer to the troubleshooting chapter for more information.

Configuring the HP JetDirect Interface

To operate properly, the HP JetDirect interface must be configured with network configuration data, such as a valid IP (Internet Protocol) address. Depending on your printer, this can be done in one of two ways:

- By downloading the data from a network-based server using BOOTP (Bootstrap Protocol) and TFTP (Trivial File Transfer Protocol) each time the printer is turned on, or
- By manually entering the data using the printer's front control panel keys, if control panel configuration is supported.

  The control panel method allows you to configure only a limited subset of configuration parameters (IP address, subnet mask, default gateway address, and idle timeout). Therefore, control panel configuration is only recommended during troubleshooting or for simple installations.

Note

If BOOTP/TFTP is used to configure the interface, the configuration is downloaded to the interface each time the printer is turned on (the configuration is not saved over power cycles). Note that the BOOTP daemon, bootpd, must be running on the BOOTP server.

If control panel configuration is used, the interface saves the configuration over power cycles.

Using BOOTP/TFTP

(Skip this subsection if you will use the printer's control panel to configure the interface, or the printer can get its IP address from an existing BOOTP server).

For the HP JetDirect interface to obtain its configuration data over the network, the BOOTP server must be set up with the appropriate configuration files. The configuration utility, `hpnpcfg`, automatically creates or edits these files for you.

To automatically set up the configuration files on the BOOTP server, run the configuration utility (`hpnpcfg`) and follow the steps below.

1 Turn off the printer.

NOTE

Be sure to turn off the printer. After the BOOTP server is set up, it will be necessary to turn on the printer for the JetDirect interface to proceed through its boot sequence and receive its network configuration data.

2 Select item 2 (Configure a printer with BOOTP/TFTP) from the main menu of the configuration utility. The utility will interactively prompt you for BOOTP/TFTP configuration parameters listed in tables 7-1 and 7-2, and will automatically make the necessary entries in the appropriate files.

Some parameters are optional and can be skipped simply press your **Return** key without making an entry.

CAUTION

Enter data carefully. If you make an error, you must enter `q` and start over again.

NOTE

The data that you configure determines what entries and files are created. Some data is intended for the `/etc/bootptab` file, while other data is placed in a network printer interface (NPI) configuration file. BOOTP is used by the interface to obtain entries in the `/etc/bootptab` file, while TFTP is used to obtain NPI configuration file entries. If you do not specify any SNMP configuration entries, and default values are used for the host access list and idle timeout, an NPI configuration file will not be created.

If you answer `y` to the prompt:

Do you want to configure SNMP related parameters?

you will be able to interactively configure Simple Network Management Protocol (SNMP) parameters. SNMP configuration parameters are listed in table 7-2, and are optional.

Table 7-1

Standard Configuration Parameters	
LAN Hardware Address:	The link-level, or station, address of the HP JetDirect interface. This is a required enty. This address is printed with the card status information as the LAN HW ADDRESS (see self-test page or configuration plot).
Name:	Name of the printer. This is a required entry. It can be any name, such as `picasso` or `peripherall`. The name must begin with a leter and must end with either a letter or a number. Other characters in the name are limited to letters, numbers, periods, and hyphens. Maximum length is 32 characters. This name is returned whtn the SNMP sysName is requested.
IP Address:	The Internet Protocol address used for communication between network nodes. This is a required entry.
Subnet Mask:	The mask used when a network is subnetted. This is required only if subnetting is being used. If the subnet mask is not provided, the default network mask is used.
Default Gateway:	The IP address of the gateway used when sending packets off the local subnet. Only one default gateway may be configured.
Syslog Server:	The IP address of the host that receives syslog messages from the interface. Only one syslog server may be configured. If a syslog server is not configured, the interface will not send syslog messages.
Syslog Facility:	Describes the part of the system that generates the syslog messages. This is configured only if a syslog server is configured. The interface can be configured to generate syslog messages with the facilities `local 0` through `local 7`. The default facility is `LOG_LPR`.
Idle Timeout:	The number of seconds that an idle print data connection is allowed to remain open. Since the card supports only a single TCP connection, the idle timeout balances the opportunity of a host to recover or complete a print job against the ability of other hosts to access the printer. The acceptable vaues range from 0 to 3600 (1 hour). If "0" is entered, the timeout mechanism is disabled. The default is 90 seconds.
Access List:	Specifies from which hosts or subnets theinterface will accept print data connections. It also determines which hosts can use SNMP SetRequests. Up to 10 entries are allowed. If the host access list is empty, the interface will accept connections from all hosts. The default is an empty list.

Table 7-2

SNMP Configuration Parameters	
SNMP Location:	Identifies the physical location of the printer. Only printable ASCII characters are allowed. Maximum length is 64 characters. The default location is undefined. (Example: `1st floor, south wall`)
SNMP Contact:	The name of the person who administers or services the printer and may include how to contact this person. The default contact is undefined.
SNMP Get Community Name:	A password that allows SNMP access to control functions on the HP JetDirect interface. The community name of an incoming SNMP Set Request must match the interface's "set community name" for the interface to respond. If the interface has no "set community name", it *will not* respond to any SetRequests. SetRequests must come from hosts that are configured in the interface's host access list (see table 7-1). Community name must be ASCII characters. Maximum length is 32 characters.
SNMP Set Community Name:	A password that allows SNMP access to control functions on the HP JetDirect interface. The community name of an incoming SNMP SetRequest must match the interface's "set community name" for the interface to respond. If the interface has no "set community name", it *will not* respond to any SetRequests. SetRequests must come from hosts that are configured in the interface's host access list (see table 7-1). Community names must be ASCII characters. Maximum length is 32 characters.
SNMP Trap Destination List:	The list of IP addresses for systems that the interface sends SNMP traps. If the list is empty, the interface will not send SNMP traps. The list may contain up to four entries. The default SNMP Trap Destination List is empty.
SNMP Trap Community Name:	The community name (password) used by the interface when it sends SNMP traps. The default community name is "`public`". Community names must be ASCII characters. Maximum length is 32 characters.

CAUTION Community names (passwords) for your printer are not secure. If you specify community names for your printer, choose names that are different from those used for other systems on your network.

NOTE For SunOS systems that use NIS services, the NIS services map must be rebuilt with the BOOTP service before performing step 3 below. To rebuild the NIS services map, first go to the correct directory. For example:

```
cd /var/yp
```

Then rebuild the map:

```
make services
```

Verify that the BOOTP service is now present in the map:

```
ypcat services | grep bootp
```

There should be an entry for `bootps` and `bootpd` displayed. Determine the process ID (PID) for `inetd` (internet services daemon):

```
ps -ax | grep inetd
```

Use the PID to signal inetd to re-read its configuration file:

```
kill -1 <inetd-PID>
```

where `1` is the number "one", and `<inetd-PID>` is the PID for `inetd`.

Then return to the `/usr/lib/hpnp` directory and run `hpnpcfg` as previously described.

3 Select item 3 (Verify BOOTP/TFTP configuration) from the main menu of the configuration utility. This selection will run `/etc/bootpquery` which verifies that the system (BOOTP server) will respond to your printer's BOOTP request. The BOOTP request used is actually generated by the system, but is similar to the one that would be sent by your printer.

   In addition, one of the following programs will be run to verify that the NPI configuration file can be retrieved (if such a file was created from step 2):

   On HP-UX systems: `/usr/bin/tftp`

   On SunOS systems: `/usr/ucb/tftp`

4 Turn the printer on. When it receives power, the HP JetDirect interface will send BOOTP requests, and should receive its configuration data from the configured BOOTP server.

Using the Control Panel

(Skip this subsection if you configured the interface using BOOTP/TFTP.)

If configuration of the HP JetDirect interface from your printer's control panel is supported, you can set the four network configuration parameters listed below:

- IP address of the interface
- Subnet mask
- Default gateway address
- Syslog sever address
- Idle timeout period

NOTE If you need to configure other parameters, you should not use the control panel to configure the interface. Instead, you must use BOOTP/TFTP to configure the interface as previously described.

NOTE If the interface is configured to receive its configuration from the front panel, the configuration is saved on the interface over power cycles.

Refer to table 7-1 for information on these parameters. Refer to your HP JetDirect interface installation guide for instructions on how to configure the interface from the printer's control panel (if control panel configuration is supported).

Verifying Interface Configuration

To verify that the network configuration data has been configured on the interface, print the interface status (which is typically located on a plotter's configuration plot or printer's self-test page) and check for the desired interface configuration settings. For instructions on printing a configuration plot or self-test page, refer to the HP JetDirect interface installation guide, or to the printer's reference guide.

NOTE

If the interface status information includes the messages:

TCP STATUS:INITIALIZING
BOOTP IN PROGRESS

the interface is trying to obtain its network configuration data using BOOTP requests. Wait one minute, and obtain the interface's status again. If these messages are still displayed, refer to the troubleshooting chapter of this guide for information.

If the interface status information includes the message:

TCP STATUS: XX

and is accompanied by an additional error message, refer to the Troubleshooting chapter of this guide for information.

Testing the Configuration

The configuration utility `hpnpcfg` provides two tests to verify communications between the host system and the network-based printer. If these tests fail, refer to the troubleshooting chapter for information.

Verify Network Connectivity

To verify that this host can communicate with the network-based printer, run the configuration utility and select item 4 (Verify network printer connectivity) from the utility's main menu. The host will issue `/etc/ping` commands to the printer. The following message indicates that network connectivity exists between the host and the printer:

printer name `has passed the connectivity test.`

Print Test, Spooler Not Used

To send a test file from the host system to the printer without using the host's spooler system, run the configuration utility and select item 5 (Verify network printer operation) from the utility's main menu.

In this test, the utility will first determine if this host is allowed to print on the printer (that is, the interface's *host access list* is checked). If the host can print, the utility will ask you to select one of the following types of test files to send to the printer:

1) text file
2) PostScript file
3) HP-GL/2 file

Enter the number corresponding to the type of file that is compatible with the default language of your printer.

NOTE If this test succeeds, but the printer does not respond when you test the spooler, a spooler fault is indicated.

Configuring the Host Spooler

The spooling system is a set of programs, shell scripts and directories that control your printers and the flow of data going to them. This section explains how to use the configuration utility, hpnpcfg, to configure your network-based printer into the spooling system.

If you have an HP 9000 host, read On an HP 9000 Host below.

If you have a Sun SPARCsystem host, skip to On a Sun Host.

On an HP 9000 Host

To configure a print queue for your network-based printer into a master spooler on an HP 9000 host, follow these steps (enter `?` for online help):

NOTE

Although `hpnpcfg` is recommended, SAM (System Administration Manager) may be used on HP-UX 9.x (or later) systems to configure your network-based printer into your spooling system. To determine SAM support and use, refer to your HP-UX system manuals.

1 Run the configuration utility and select item 6 (Add a peripheral to spooler) from the utility's main menu.

2 The following prompt will appear:

Enter the lp destination name:

The `lp spooler destination name` is the print queue name that would be specified with the `-d` option in the HP-UX `lp` command. You may use the same name that you used for the network printer, but any valid name will be accepted.

3 The following prompt will appear next:

Enter the network printer name:

The network printer name is the name entered in `/etc/hosts`, NIS (Network Information Service), or DNS (Domain Name System) for the printer. It is the printer's node name.

4 The following prompt will appear next:

Enter the model script name: ('*' to see choices)

If you press *, several model scripts that are stored on the system will be displayed. Enter the name of an appropriate model script.

NOTE

Because there are no standard naming conventions for model scripts, your selection from the list of model scripts may not be intuitively obvious. Use the model script name identified in your HP JetDirect interface installation guide.

5 The following prompt will appear next:

Enter the spooler class for the printer to join (optional):

If you want to add this printer to a class of printers, enter the name of the class. Otherwise, simply press your key to continue.

A class is a collection of print queues. A printer class can be used as a print destination instead of a print queue name. The first available queue in the printer class will print the next job queued to that printer class.

6 Before the utility shuts down the spooler to make configuration changes, it will prompt you for confirmation. When you are ready for the spooler to be shut down, press your key.

7 The utility will echo to the screen all the system commands it uses to configure and start the spooler.

At the prompt, press your key to display the utility's main menu. Then type `q` to exit the utility.

8 The printer should now be configured in your HP 9000 HP-UX spooling system. Proceed to the section Testing the Host Spooler.

On a Sun SPARCsystem Host

To configure a print queue for your network-based printer into a master spooler on a Sun SPARCsystem host, follow these steps (enter ? for online help):

1 Run the configuration utility and select item 6 (Add a printer to spooler) from the utility's main menu.

2 The following prompt will appear:

Enter the peripheral type (1/2/3/4):

3 If you are configuring a plotter, type 1 and press .

If you are configuring a queue for the printer, enter 2, 3, or 4 and press . The utility will then prompt you to select the printer language for the queue:

- **Option 1:** The queue will only process PCL files, and the printer has been setup for printing only PCL files. The printer MUST be set up for PCL printing.
- **Option 2:** The queue will only process PostScript files, and the printer has been setup for printing only PostScript files. The printer MUST be set up for PostScript printing.
- **Option 3:** The queue will only process PCL files, even though the printer has been setup to print either PCL or PostScript files. The printer must have language switching capabilities, for example the HP LaserJet 4 or HP LaserJet 4Si printers..
- **Option 4:** The queue will only process PostScript files, even though the printer has been setup to print either PCL or Post-Script files. The printer must have language switching capabilities., for example the HP LaserJet 4 or HP LaserJet 4Si printers.
- **Option 5:** The queue will process either PCL or PostScript files, and the printer has been setup for automatic language switching. The printer must have automatic language switching capabilities, for example the HP LaserJet 4 or HP LaserJet 4Si printers.

For a printer capable of language switching, one alternative would be to run this menu item twice; once to create a PCL language switching entry and once to create a PostScript language switching entry.

NOTE If you do not find a selection for your particular printer, try one that applies to the HP LaserJet IIISi printer. You may need to customize your printcap file entries to meet your specific printing needs.

4 The following prompt will appear next:

```
Enter the lpr peripheral (queue) name:
```

Enter the name of the queue. This name is used with the `-P` parameter of the `lpr` command. You may use the same name as the network-based printer, but any valid name will be accepted.

5 The following prompt appears next:

```
Enter the network printer name:
```

The network printer name is the name entered in `/etc/hosts` (hosts table), NIS (Network Information Service), or DNS (Domain Name System) for the printer. It is the name assigned to the printer as if the printer was a host.

6 The utility obtains the default spool directory name and displays it along with the following prompt:

```
Enter the spool directory name:
```

The spool directory holds the print jobs queued for printing or plotting. Each printcap entry must have a unique spool directory. If you want to use the default spool directory, press your **Return** key. Otherwise, enter the spool directory that you desire.

7 The utility will echo to the screen all the system commands it uses to configure and start the spooler.

At the prompt, press your **Return** key to display the utility's main menu. Then type `q` to exit the utility.

8 The printer should now be configured in your SPARCsystem SunOS spooling system. Proceed to the section Testing the Host Spooler.

Testing the Host Spooler

Test the spooler by sending a file to the printer using the `lp` command (on HP-UX systems) or the `lpr` command (on SunOS systems). To print the same file used in the `hpnpcfg` test (Main Menu item 5) that bypasses the spooler, use the appropriate file below:

/usr/lib/hpnp/testfiles/text	(ASCII text file)
/usr/lib/hpnp/testfiles/ps	(PostScript file)
/usr/lib/hpnp/testfiles/hpgl2	(HP-GL/2 file)

If you are unable to print or plot the file, refer to the troubleshooting chapter.

NOTE

If you are unable to print a file, try running the configuration utility, `hpnpcfg`, again and select item 5 (Verify network printer operation). This test bypasses the spooling system. If this test succeeds, you should suspect a spooler problem. See the troubleshooting chapter for information.

Removing Printers from HP-UX and SunOS Networks

The first step in removing a printer from the network is to delete the printer configuration at the server. The printer must not be servicing a job when you do this.

To Delete the Printer's Configuration

1 Log in as a supervisor.

2 Run `/usr/lib/hpnp/hpnpcfg`.

3 Select the option **8** for removing the queue.

You have now removed the printer form the spooler. Continue only if you want to remove the printer from the BOOTP server.

To Remove the Printer from the BOOTP Server

1 Log in as a supervisor.

2 Run `/usr/lib/hpnp/hpnpcfg`.

3 Select the option **7** for removing the printer, which is represented as a BOOTP entry.

4 Turn off the printer.

5 Disconnect the network cable from the back of the printer.

CAUTION

If using Ethernet, do not detach the Ethernet cable from the BNC "T" connector. Detaching the cable from the "T" connector will cause a break in the network.

You have now removed the printer from the network.

8

Troubleshooting

Overview

This chapter describes how to troubleshoot problems you may have with the HP JetDirect interface. It also includes self-test page/configuration plot messages.

This chapter contains both task and reference information, and is organized as follows:

- Questions designed to help assess the problem.
- A general troubleshooting checklist that applies to all network operating systems. You may want to complete this section to troubleshoot the interface and other hardware such as the printer, client, and server.
- Checklists that are specific to each network operating system. You may want to complete the applicable sections to troubleshoot the HP JetDirect software configuration.
- Self-test/Configuration plot messages. These messages include configuration information and error messages for each network operating system.

The strategy to follow when using this chapter is to reduce the possible causes of the problem. Start by asking yourself some general questions that may lead you to a component of the network. Then use the troubleshooting checklist to check the components common to each network operating system. If the problem proves to be with the network operating sytem, continue with the specific network operating system checklist. This strategy will help you eliminate possible causes, and focus on the probable cause.

Assessing the Problem

For the purpose of troubleshooting, ask yourself these questions:

- Was the HP JetDirect interface installation verified? Did you receive a printout at the end of configuring the interface? Refer to the software installation and configuration chapter for your network operating system.

- Was anything recently changed on the network? Ensure that any changes made were performed correctly.

  - Has any hardware been moved or added to your network? Verify that it was moved, deleted, or installed correctly. Refer to the software installation and configuration chapter for your network operating system to verify the connection.
  - Have any software applications been added to the network? Ensure their compatibility, and that they were installed correctly. Refer to the software installation and configuration chapter for your network operating system to verify the connection.
  - Have any configuration files been modified? Make sure the changes were correct and that the HP JetDirect interface configuration reflects those changes. Refer to the software installation and configuration chapter for your network operating system for configuration information.

- Are other users able to print?

  - Are they using the same network operating system? Check the troubleshooting checklist for your network operating system.
  - Are they using the same port on the back of the printer, but possibly different network operating systems? Check the troubleshooting checklist for your network operating system.
  - Are they using a different port on the back of the printer? Verify the HP JetDirect interface is installed and configured correctly. Refer to the Hardware Installation Guide or the Configuration Guide for more information. Check the troubleshooting checklist for your network operating system.

General Troubleshooting Checklist

The basic checklist is as follows:

Ensure that the printer is functioning properly.

- Is the printer plugged in and turned on?
- Is the printer online? The online light should be lit. If it is not, press the appropriate key to place the printer online.
- Is the form feed light on (where applicable)? If it is, it may indicate that a Form Feed was not sent with the print data, and that data is waiting for a Form Feed to print. Take the printer offline, press the [illegible] key, and put the printer back online.
- Is the printer's control panel display blank (only printers with displays)? Make sure the printer is turned on. Make sure the HP JetDirect interface was installed correctly.
- Are your network cables connected properly? Make sure that the printer is attached to the network using the appropriate HP JetDirect interface port and cable. Check each cable connection to make sure it is secure and in the right place. If the problem continues, you may have a bad cable.
- Is the network terminated correctly? If you are using a ThinLAN (thin Ethernet coaxial cable), your network must form a line, not a loop.
- Does a SWITCHING message appear in the printer's display? It is possible for this type of message to appear briefly after the printer is reset, turned ON, or switching between PCL and PostScript, but it shouldn't continue in the display for more than two minutes. If the printer is unable to successfully register its name and address on the network, then this message may continue until the problem is corrected.
- Does a NOT READY, UPPER MIO, or LOWER MIO type message appear in the printer's display window, or is the Ready light off? Check that the interface is connected to the network. Try to print a printer self-test page or configuration plot. Refer to the printer's reference manual for instructions on how to print a self-test page/configuration plot. Refer to the printer's manual or the HP JetDirect Network Interface Configuration Guide for error message information.

- Does a 40 ERROR appear on the printer's display? An error message indicates that the HP JetDirect interface has detected a break in the data communications. When this error occurs, the printer will go offline.

  A break in communications may result from the physical network connection being disrupted or the server going down. If your printer has "auto continue" and it is set to "OFF", you must press the appropriate key (, for example) on the printer after the communications problem is solved to put the printer back online.

- Does an initializing (INIT) type message appear on the printer's display? This is a normal message. Wait about 3 minutes for the message to clear, or another message to appear. If another message appears, refer to the printer's manual or the self-test page/configuration.

- Does any other type of message (other than a ready type message) appear on the printer's display? Refer to your printer's reference manual for a complete listing of control panel messages and corrective actions.

- Does the printer's control panel display a service message, for example 80 SERVICE? If so, turn the printer off and then on again. If the message reappears, reinstall the HP JetDirect interface. If the service message persists try the following procedure:

  1 Turn off the printer

  2 Remove the HP JetDirect interface from the printer.

  3 Turn the printer on again.

  If the message persists after you have removed the HP JetDirect interface, the problem may be with the printer. Refer to the printer's reference manual for more information. If the message does not persist, and it was an 80 SERVICE message, the problem is with the HP JetDirect interface and you may need to replace it. Refer to replacement instructions in your warranty. If the message is different than these messages, then refer to the printer's reference manual for more information.

Ensure that the HP JetDirect interface is communicating with your network software.

- If using Novell NetWare, does the printer appear in JETADMIN? If not try reconfiguring the printer. If this fails refer to the Novell NetWare troubleshooting section in this chapter.

- If using Apple EtherTalk, does the printer appear in the Chooser? If not try reconfiguring the printer. If this fails refer to the Apple EtherTalk troubleshooting section in this chapter.

- If using IBM LAN Server or Microsoft LAN Manager for OS/2, does the printer appear in the HP SETUP utility? If not try reconfiguring the printer. If this fails refer to the IBM LAN Server/Microsoft LAN Manager for OS/2 troubleshooting section in this chapter.

- If using Microsoft Windows for Workgroups , does the printer appear in MONITOR? If not try reconfiguring the printer. If this fails refer to the Microsoft Windows for Workgroups and Windows NT troubleshooting section in this chapter.

- If using Microsoft Windows NT, does the printer appear in the "Add a Network Printer Port" dialog box? If not try reconfiguring the printer. If this fails refer to the Microsoft Windows for Workgroups and Windows NT troubleshooting section in this chapter.

- If using HP-UX or SunOS, does the printer respond to HPNPADMIN? If not try reconfiguring the printer. If this fails refer to the HP-UX and SunOS troubleshooting section in this chapter.

- Is your protocol enabled? Check JETADMIN if you are using Novell NetWare, or print a self-test page/configuration plot and check the STATUS line for your protocol. Refer to "Understanding the Ethernet Self-Test Page/Configuration Plot," or "Understanding the Token Ring Self-Test Page/Configuration Plot" sections later in this chapter for more information.

- Is there an error message in your protocol's section on the self-test page/configuration plot? If so, refer to either "Understanding the Ethernet Self-Test Page/Configuration Plot," or "Understanding the Token Ring Self-Test Page/Configuration Plot."

- If you are using Token Ring, is the data rate correct? Refer to the self-test page/configuration plot for the current settings.

Novell NetWare Checklist

Troubleshooting with JETADMIN

Log in as supervisor before using JETADMIN.

1 Does the printer appear in JETADMIN? If yes, click on it in the Printer I/O Selection window. If not, print a self-test page/configuration plot, and refer to either "Understanding the Ethernet Self-Test Page/Configuration Plot" or "Understanding the Token Ring Self-Test Page/Configuration Plot" later in this chapter. You will not be able to use JETADMIN until the HP JetDirect interface can communicate with JETADMIN.

2 Click **Status** to view the HP JetDirect interface's and the printer's status. You may click Help to receive more information. Click **Close** to exit the window.

3 Click **Diagnostics...** to view HP JetDirect interface and network information. Scroll the window to view all of the information. You can highlight individual lines to get more information. Click **Close** to exit the window.

NOTE If your HP JetDirect interface is configured to service queues on more than one file server, then you must select **Diagnostics...** to view the status of all connected servers. Selecting **Status** only displays the status of the first connected file server. Also, the printer's self-test page/configuration plot only displays the first file servers status.

4 Click **Configuration...** . Is the configuration correct? Is the printer configured to service the appropriate set of queues? Is the printer correctly set for Queue Server mode or Remote Printer mode?

5 Highlight a queue and click **Test Page**. Does the test page print successfully?

Print Server Checklist

Check the following items to ensure that your print server is configured correctly:

Remote Printer mode:
If the HP JetDirect interface is configured in Queue Server mode, skip this page.

- Is the print server running when the HP JetDirect interface is configured in Remote Printer mode? (Use PCONSOLE to ensure that the print server is running.) Follow the instructions in the "Software Installation and Configuration on Novell NetWare Networks" chapter, to start the print server. If you cannot start the print server, refer to the documentation shipped with your network software.

- Are the print queues set up, shared, and authorized properly? Check that you have set up and shared the print queues correctly. Refer to your network documentation for information on setting up and sharing queues.

- What does the *I/O Connection Status* line read for this HP JetDirect interface in JETADMIN? Online help is available for each status message.

- What does the print server screen show as the print server's status? If the status is not "Waiting for Job," you must configure the HP JetDirect interface using the JETADMIN utility, supplied with your HP JetDirect interface. Refer to the chapter "Software Installation and Configuration on Novell NetWare Networks" for instructions on using JETADMIN.

  Also, make sure that you selected "Remote Other/Unknown" as the printer type in PCONSOLE. If the printer type selection in PCONSOLE is correct, the printer's connection to the network may have been broken. Turn the printer off and wait for the status message to change to "Not Connected." Turn the printer on again and wait for the print server's status to change to "Waiting for Job." If the status does not change, take the print server down and bring it back up again. Refer to the chapter "Software Installation and Configuration on Novell NetWare Networks" for instructions on taking the print server down.

File Server Checklist

Check the following on a file server:

- Is there enough disk space available on the file server?
- Is the file server up and running?
- Do you have the right file server associated with the correct print server?

Print/File Server to Printer Connection Checklist

Check the following items to ensure that your print or file server is communicating with your printer:

- Are any of the queues to be served by that printer disabled? Enable all queues and try printing again.

- Use JETADMIN Status and Diagnostics to check for problems. If the printer does not appear in JETADMIN, check the cable connections and print a self-test page/configuration plot.

  If data is not being sent to the printer, there may be a problem with the network, print server, or configuration. Recheck the HP JetDirect interface's data rate switchs (Token Ring interface only) and installation, and use PCONSOLE to verify print server configuration. Fix any problems you find. Refer to your NetWare documentation for instructions on running PCONSOLE.

- Are the server and the network printer communicating? Run Novell's COMCHECK utility from any workstation connected to the same network segment. If you have a dedicated print server running, you must shut down the dedicated print server before running COMCHECK. Refer to your NetWare documentation for instructions on running COMCHECK.

- Does an `INITIALIZING` message appear on the self-test page or configuration plot? Wait several minutes and print another self-test page/configuration plot. If the message persists, make sure any file servers or bridges on your network are operating correctly and make sure the network is correctly wired. If the message still persists, you may have an unsupported frame type running on your network.

If the interface's node address appears in the COMCHECK screen, your printer is capable of communicating on the network.

If COMCHECK shows that the printer is capable of communicating over the network, check the following:

- Is the printer configured correctly?
- Is the correct file server name and queue name used?
- Is the correct node name used?
- Is the correct print server name used?
- Is the correct remote printer number used?
- Are any of the queues disabled?

Use JETADMIN to reconfigure as necessary.

In addition, use PCONSOLE to confirm that the print server and printer queues are configured correctly:

- Check the print server name.
- Check the remote printer number.
- Check the remote printer configuration.
- Check the queue name.

If Novell's COMCHECK utility does not show that the printer is capable of communicating over the network, the problem is in the interface, or the connection between the printer and the workstation. Recheck the network cabling, frame type, and data rate switch settings (Token Ring interface only) on the HP JetDirect interface by printing a self-test on the printer. If you cannot solve the problem, recheck all checklists. If after rechecking all checklists you still cannot solve the problem, there may be something wrong with your HP JetDirect interface. Refer to your warranty for information on HP JetDirect interface replacement.

The HP JetDirect interface supports the following on an Ethernet/802.3 network:

Table 8-1

Frame Type	802.2 SAP (in Hex.)	Ethernet Type (in Hex.)
ETHERNET 802.3	N/A	N/A
ETHERNET 802.2	E0	N/A
ETHERNET II	N/A	8137
ETHERNET SNAP	AA	8137

The HP JetDirect interface supports the following frmae types on a Token Ring (802.5) network:

Table 8-2

Frame Type	802.2 SAP	Type
TOKEN-RING	E0	N/A
TR SNAP	AA	8137

Workstation Checklist

Check the following items to ensure that your workstation is configured correctly:

Is the workstation running the network software?
Make sure the network operating system software is loaded. If you cannot load your network software, refer to the documentation shipped with your network software.

Is your software application correctly configured to print to the network printer?
Make sure your software application is printing to the correct port using the correct driver. Refer to your network documentation for information on setting up and configuring queues.

Workstation to Print Server Connection Checklist

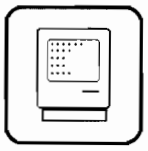
Check the following items to ensure that your workstation is communicating with your print server:

- Is the workstation connected to the shared queue for the network printer? Use PCONSOLE or JETPRINT (for Windows clients) to verify that a printed job is queued to the intended queue.

  Print a file and verify that the job gets to the intended queue. If it does, the problem is not with the connection between the workstation and the print server.

- Is Novell's CAPTURE utility running? You must use the CAPTURE or NPRINT command to send data to the printer.

- Is another printer taking jobs from the queue before the new printer can service the jobs? Disable the other printer until you can verify the new printer's setup.



Apple EtherTalk Checklist.

- Are both the Macintosh and the HP JetDirect interface configured to use the same EtherTalk Phase (Phase 1 or Phase 2)? You tell your Macintosh which network, Phase 1 or Phase 2, you wish to use in the Macintosh Network Control Panel, and you set the Phase on the printer's control panel. (Refer to the HP JetDirect Network Interface Installation Guide for information on setting the printer's control panel.) Your Macintosh and printer must have the same selected Phase. (HP PaintJet XL300 printers are only Phase 2 devices.)

- If your Macintosh is connected to the network through Ethernet, has the EtherTalk driver been selected? Make sure Ethernet is selected in the Network Control Panel.

- If your Macintosh is connected to the network through LocalTalk, has an EtherTalk router been correctly installed to allow your Macintosh to communicate on the Ethernet network?

Printing Checklist

- Does the printer driver appear in the Chooser? Reinstall the software, and ensure that you have only one System folder on your Macintosh.

- Does the printer name appear in the Chooser? Check the following:

  - Make sure that AppleTalk is ON (the button next to Active is highlighted).
  - Make sure the printer has been turned on for a few minutes.
  - If the printer resides on a network with multiple zones, make sure the correct zone is selected from the *AppleTalk Zones:* list.
  - Make sure the printer has not been renamed or rezoned since it last appreared in the Chooser.

- Did you select the printer in the Chooser? Make sure you choose the printer's name after selecting the printer's icon. Refer to the "Software Installation and Configuration on Apple EtherTalk Networks" chapter for information on selecting your printer in the Chooser.

- Did you reselect the printer in the Chooser if it has been renamed or rezoned? In the Chooser select the printer.

- Are there multiple printers with the same or a similar name that may have received the print job? Use THE HP NAMER utility to ensure that all devices have unique names. The name of the printer appears on the self-test page/configuration plot.

- Is Background Printing enabled? Open the *Print Monitor* window to see if a message is displayed indicating that a printing error has occurred, or that the printer needs attention.

HP NAMER Checklist

- Does the printer driver appear in the *Printer Types:* list? Reinstall the software, and ensure that you have only one System folder on the Macintosh.

- Is your printer listed in the peripheral names list? Make sure the printer is turned on. It must be on for a few minutes before it appears. If the printer resides on a network with multiple zones, you need to select the correct zone from the *AppleTalk Zones:* list.

- Does the new name for the printer not stay? Make sure that you selected the correct printer driver from the *Printer Type:* list. After renaming the printer, click **Refresh** to verify that the printer has been renamed. It might take a few minutes for the new name to appear.

HP ZONER Checklist

- Do you receive an error when attempting to run THE HP ZONER? Your printer must be on a Phase 2 EtherTalk network, and an EtherTalk router must be present to run THE HP ZONER.

- Is the printer to be rezoned listed in the *Device @ Zone:* list? Click **Search Internet** to look further for the printer.

- Is the zone in which you wish the printer to reside listed in the *Accessible Zones:* list? Check that the EtherTalk router's software is properly configured.

IBM LAN Server and Microsoft LAN Manager on OS/2 Checklist

Server Checklist

The following items use the command line options, but you may view the server's configuration using the full screen option (refer to the network operating system documentation). Check the following items to ensure that your server is configured correctly:

Is the server running LAN Server or LAN Manager and have the print queues been shared properly?

- Check to make sure the version of OS/2 is 1.3 or above.. At the OS/2 command prompt, type: VER and press Enter.
- Check that the printer queue is operating correctly. At the OS/2 command prompt, type: NET SHARE and press Enter. The shared print queue name should appear on the list.
- Is the printer queue on hold? You can view the shared printer queue using the Print Manager on the server. You can also use the NET PRINT utility. At the OS/2 command prompt, type NET PRINT and press Enter. If the status shows "Queue Held," release the queue.
- Has the printer port (logical address) been altered in Print Manager? Enter Print Manager and check the assigned printer port (logical address) for the correct configuration.
- Are you using the correct printer or plotter device driver? The server will only print jobs from clients with the same device driver indicated.
- Is the IEEE 802.2 protocol selected, configured, and does its device drivers load properly? (802.2 is referred to as Remote Boot Protocol-RPL-for Microsoft LAN Manager). For 802.3 Ethernet, the HP JetDirect interface only supports the 802.3 protocol. Refer to the Readme file for 802.2 configuration requirements.

Server to Printer Connection Checklist

- Run SETUP and check the status of the printers listed on the screen. If the status message reads "See error log" there may be a problem with the network, server, printer, or configuration. Check the error log to see what error is listed (refer to the chapter "Installation and Configuration for IBM LAN Server and Microsoft LAN Manager Networks" for information about accessing the error log). The server may have temporarily lost the printer connection. The connection may be reestablished by sending a print job. For Token Ring only, recheck the interface's data rate switch.

- Is the HP Network Printer Redirector running (HPREDIR.EXE)? SETUP will indicate if the Redirector is not available. It can be started by running SETUP. If it is not running, refer to the message in the error log. If HPREDIR will not run, 20 link stations may not be configured. Refer to your network operating system documentation for more information.

- Is there another status listed under the printer icon? Refer to chapter 4 for printer status messages and their definitions.

  You can also view status information about the shared queue using the NET SHARE utility. At the OS/2 command prompt, type:

  `NET SHARE` and press **Enter**.

  You can also put the queue on hold then send a print job to the queue to see if it appears in the queue. Then release the queue and note if an error occurs.

Workstation Checklist

- Is the shared print queue available to the workstation logged-on user? To check this, type NET USE. If the queue is not available, try to access the shared queue. To connect to the shared queue, PRNPCL, at the server, SERV, type:

  `NET USE LPT1 \\SERV\PRNPCL` and press Enter

- Does the user have access rights to the queue? Check the network operating system documentation.

- Is the software application you are running configured to print to the correct devicename or queue? Refer to your network application documentation for information on setting up and configuring queues.

Workstation to Server Connection Checklist

- Is the workstation connected to the printer queue for the network printer? To check this, place the shared queue on hold at the server. Then, copy a file to the shared queue. For example, type:

  `COPY C:\CONFIG.SYS` *devicename* and press Enter,

  when the printer is set up for PCL printing.

  Copy a PostScript file when the printer is set up for PostScript printing. Return to the server and check the print queue. If the job appears in the print queue, the workstation is connected to the server.

Microsoft Windows for Workgroups Checklist

- Is there an error listed in MONITOR? Run MONITOR. Select the **Display All** item from the Log menu. Check the messages. Double-clicking on a message displays more detailed information.

NOTE

Errors, warnings, and informational messages are continuously recorded, even when MONITOR is not running.

Workstation Checklist

Check the following items on the workstation where the HP MONITOR software was installed:

- If Windows diplays `Can't find MONITOR.EXE or one of its components`, check that the component IPC.DLL resides in the same directory as MONITOR.EXE.

- Has the DLC protocol been installed on the workstation? The Microsoft DLC protocol is included on the "JetDirect Utilities for Windows for Workgroups" disk. It must be installed using the network's applet from the Windows Control Panel. Refer to the "Software Installation and Configuration for Windows for Workgroups and Windows NT Networks" chapter for more information.

- Has the DLC protocol been loaded? The DLC protocol will be loaded from the AUTOEXEC.BAT file. After rebooting, verify that it has been loaded by typing MEM/C at the MS-DOS prompt and look for MSDLC in the list that appears.

- Check your SYSTEM.INI file in the Windows directory. Under [386enh], the following lines must exist:

  device = hpvnpd.386
  v86modelanas = 0
  TimerCriticalSection = 5000

  Under [networks], the following line must exist:
  exclude = 0

- If memory is a problem, check the [HP Network Ports] section of SYSTEM.INI. The MaxNumPorts variable controls the maximum number of ports that can exist at once. Multiply this number by 60 to determine how many bytes of lower memory it takes. The MaxNumBuffers variable controls the number of print buffers available. Each printer buffer takes approximately 1,500 bytes of lower memory.

- Check your PROTOCOL.INI file in the Windows directory. Under [ms$dlc], check that the lanabase variable is set to 0. Under [ms$netbeui], check that the lanabase variable is set to an integer other than zero (0).

Printing Checklist

- From MONITOR, if you are unable to see the status of your network printer (such as offline, out-of-paper, ready) then there is a problem with the physical network components such as the cables or interface cards. If you cannot get printer status, verify that the physical network components are working.

- Check that the network address appears in MONITOR's "Add a Network Peripheral Port" window. If not, there is possibly a printer problem, or there are over 120 printers connected to the network. Make sure the printer is on and connected. If no addresses appear, there may be a network problem.

- If the printer status displayed by MONITOR is `Not Available`, the printer is currently connected to another network operating system's server. If the connection is to an OS/2 server, the printer must be turned off and then back on to break the connection.

- Remember that creating a network port with MONITOR does not allow you to print to it. You must connect a printer to it using the Printers applet from Control Panel.

- Verify that your print job is making it to the spooler. Go to Print Manager and pause the printer that is connected to your network port. Print from your application. Check to see that the print job appears in Print Manager. If it does, unpause the printer and note any changes by checking the printer itself, looking at its status as reported by MONITOR, and checking the error log in MONITOR.

- If the printing load is heavy and performance seems to be low, check the MaxNumBuffers value in SYSTEM.INI. This value may be increased.

- Check MONITOR's error log for useful messages.

- If you can not access MONITOR to delete configurations you may delete *ALL* configurations by erasing the file HPVNPD.CFG. *This will delete ALL previously configured ports.*

Microsoft Windows NT Checklist

Consult the online help available from the "Add an HP Network Peripheral Port" screen. Refer to the "Software Installation and Configuration on Microsoft NT Networks" chapter for procedures to call up the screen. You may also run NTHELP (WINHLP32) and load HPMON.HLP from the NT system directory.

Verifying the Host Software Installation

If the interface and network hardware appear to be functional, verify that the HP JetDirect interface software has been installed properly.

1 Log in as **root** and run the configuration utility hpnpcfg.

2 In the utility's main menu, select item 1 ("Verify installation of software").

This test will display any files that are missing or services that are not available.

3 Check the install log /tmp/hpnpinstall.log to see if a missing file was ever installed or why a service is not available.

4 If necessary, repeat all of the steps in the "Software Installation and Configuration for HP-UX and SunOS Networks" chapter to install and configure the software.

Verifying the Network Configuration Data

Verify that the HP JetDirect interface contains the correct network configuration data. Use the instructions that correspond to the method you used to configure the HP JetDirect interface.

If You Used BOOTP/TFTP

Print a self-test page (or configuration plot) that contains the interface status information, and verify that the following parameters are set correctly:

Table 8-3

CONFIG BY:	Verify that "BOOTP" is set. If "FRONT PANEL" is indicated, change it to "BOOTP"using the front panel keys as described by your HP JetDirect interface installation guide.
IP ADDRESS:	Verify that the correct Internet Protocol address assigned to the HP JetDirect interface is set. The IP address is a required entry.
SUBNET MASK:	Verify that the correct subnet mask is set (if subnetting is being used).
DEF. GATEWAY:	Verify that the correct default gateway address is set (if you specified one with the hpnpcfg utility).

If you need to change these or any other parameters, refer to the "Software Installation and Configuration for HP-UX and SunOS Networks" chapter.

Verify that your BOOTP server will respond to the interface's BOOTP request. Run the configuration utility hpnpcfg, and select item 3 ("Verify BOOTP/TFTP configuration") from the main menu. If this test fails, look in your syslog file for messages from the bootpd daemon program to identify possible causes.

On SunOS systems that use NIS, check the NIS services map to ensure BOOTP services are provided. (See the section "Configuring the HP JetDirect Interface" in the chapter "Software Installation and Configuration for HP-UX and SunOS Networks".)

If You Used the Front Panel

Print a self-test page (or configuration plot) that contains the interface status information, and verify that the following parameters are set correctly:

Table 8-4

CONFIG BY:	Verify that "FRONT PANEL" is set. If "BOOTP" is indicated, change it to "FRONT PANEL" using the front panel keys as described by your HP JetDirect interface installation guide.
IP ADDRESS:	Verify that the correct Internet Protocol address assigned to the HP JetDirect interface is set. The IP address is a required entry.
SUBNET MASK:	Verify that the correct subnet mask is set (if subnetting is being used). All nodes on a network with a given network address must specify the same subnet mask.
DEF GATEWAY:	Verify that the correct default gateway address is set (if you entered one from the front panel.

If you need to correct any of these parameters, refer to your HP JetDirect interface installation guide for front panel configuration instructions.

Verifying the Communication Path

The configuration utility has a script which will use /etc/ping to test the connectivity.

As described in the chapter "Software Installation and Configurationon HP-UX and SunOS Checklist," run the configuration utility and select item 4 ("Verify network printer connectivity") from the main menu.

- If the connectivity test fails:

  - check that all of the gateways between the host running the configuration utility and the printer are up.
  - check that your node names and IP addressess in /etc/hosts, NIS (Network Information Service), or DNS (Domain Name System) are properly entered.
  - check the subnet mask.

- If the connectivity test succeeds, you can send a test file to the printer that bypasses the spooler. Select item 5 ("Verify network printer operation") from the main menu. Then select an appropriate file type for your printer.

  This test also uses the hpnpadmin utility to verify that the host is allowed to print to the printer. You can change the host access list (those hosts that are allowed to print to this printer) by changing the BOOTP/TFTP interface configuration parameters as described in the "HP JetDirect Software Utilities" section in the "HPJetDirectInterface in the UNIX Environment" appendix..) .

NOTE

Two utilities for managing and troubleshooting your network-based printer solution have been provided with the HP JetDirect software: hpnpadmin and hpnpstat. For information on the use of these utilities, refer to the "Software Installation and Configuration for HP-UX and SunOS Networks" chapter.

Verify Spooler Configuration

If you are able to print a file on the printer when you bypass the spooler, but you are not able to print through the spooler (using the lp or lpr command), you may have a bad file or your spooler configuration may not be correct.

The following test files (located in the /usr/lib/hpnp/testfiles directory) are provided with the HP JetDirect software and may be used to test the spooler:

text	(an ASCII text file)
ps	(a PostScript file)
hpgl2	(an HP-GL/2 file)

If you are using an HP-UX spooler, read "On HP-UX Systems" below. If you are using a SunOS spooler, skip to "On SunOS Systems".

NOTE

The use of pseudo-terminal (pty) connections to print jobs on a network-based printer is a special case. Troubleshooting pty connections is discussed in the "HP JetDirect Software Utilities" section in the "HPJetDirectInterface in the UNIX Environment" appendix.

On HP-UX Systems

We assume that you used the configuration utility `hpnpcfg` to set up the spooler. Follow the steps below:

1 Use the lp command to spool one of the test files to the printer.

2 Look for an error message in the log file:

/usr/spool/lp/log

3 If required, refer to your system manuals to troubleshoot the spooler subsystem.

On SunOS Systems

We assume that you used the configuration utility `hpnpcfg` to set up the spooler. Follow the steps below:

1 Use the lpr command to spool one of the test files to the printer.

2 Look for an error message in the default log file for spooler errors:

/var/adm/lpd-errs

NOTE

There is another log file for each specific printer. The log file is specified in the printer's /etc/printcap entry. The log file's printcap entry will look similar to the following:

:lf=/var/spool/*printername*/log:

3 Determine the name and path of the printer's log file, and look for an error message in that file.

4 If required, refer to your system manuals to troubleshoot the spooler subsystem.

Understanding the Ethernet Self-Test Page/ Configuration Plot

Use the information in this section only if you have connected your printer to an Ethernet/802.3 network. This section describes the Ethernet/802.3 self-test page/configuration plot.

If you have connected your printer to a Token Ring (802.5) network, skip to the next section, "Understanding the Token Ring Self-Test Page/Configuration Plot."

The networking section of the Ethernet/802.3 self-test page/configuration plot is divided into seven parts:

1 Multiple environment information.
2 HP JetDirect interface status information
3 Network statistics.
4 Novell NetWare status information.
5 Apple EtherTalk status information.
6 HP-UX and SunOS (TCP/IP) status information.
7 LAN Server/LAN Manager and Windows for Workgroups/ Windows NT status information.

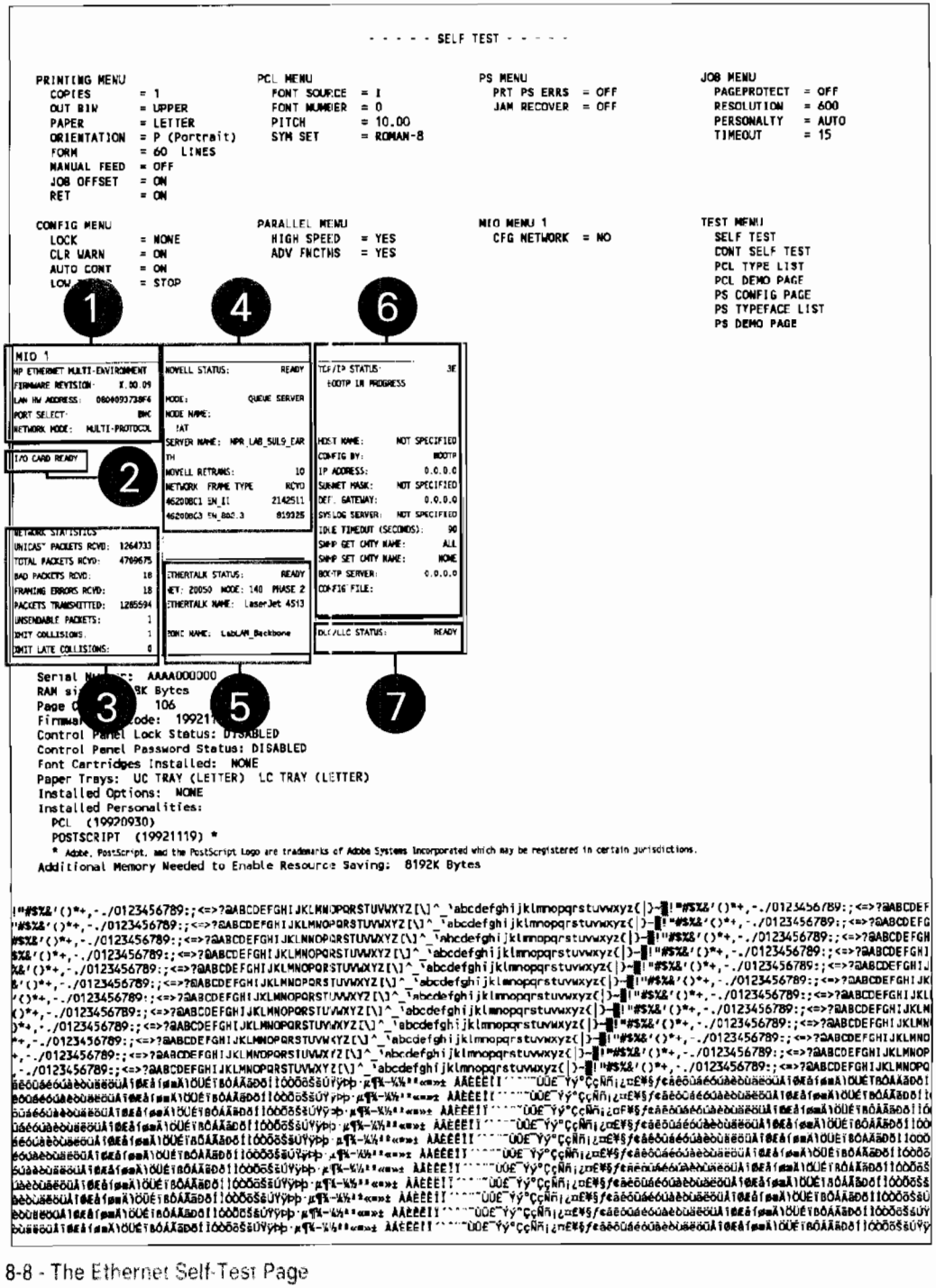


Figure 8-8 - The Ethernet Self-Test Page

802.3/Ethernet Self-Test Page/Configuration Plot Messages

This section describes each of the messages that can be printed on an 802.3/Ethernet self-test page/configuration plot.

Table 8-5

HP Ethernet Multi-Environment Messages	
Field	**Description**
HP ETHERNET MULTI-ENVIRONMENT	Indicates an HP JetDirect interface that supports Novell NetWare, Apple Ethertalk, TCP/IP, OS/2, Windows for Workgroups and Windows NT.
FIRMWARE REVISION: X.XX.XX	Indicates the firmware revision number of the JetDirect interface currently installed in the printer.
LAN HW ADDRESS: 080009XXXXXX	LAN HW ADDRESS is the 12-digit hexadecimal network address of the HP JetDirect interface installed in the printer.
PORT SELECT: BNC 10BASE-T	Indicates the port on the card that was automatically sensed as having the cable attached.
NETWORK MODE UNKNOWN MULTI-PROTOCOL AUTO-SELECT AUTO-NOVELL AUTO-ETHERTALK AUTO DLC/LLC AUTO-TCP/IP NOVELL ETHERTALK DLC/LLC TCP/IP	UNKNOWN indicates that the interface has not yet inittialized its network mode. MULTI-PROTOCOL indicates that the interface is installed in a multi-protocol printer, and can print jobs from any enabled protocol. AUTO-SELECT indicates that the interface is installed in a single protocol printer and is configured to automatically select a protocol. The interface is waiting for an active protocol to connect. AUTO- followed by a protocol name indicates that the interface is in a single-protocol printer and the designated protocol has made the connection. A single protocol name indicates that the interface is in a single-protocol printer and all other protocols, except the one listed, have been disabled through the printer's control panel.

Table 8-5 - continued

HP Ethernet Multi-Environment Messages (continued)	
Field	**Description**
I/O CARD READY	READY indicates that the HP JetDirect interface is connected and awaiting data.
INITIALIZING	INITIALIZING indicates that the HP JetDirect interface is initializing the network protocols. Refer to the network operating system status line on the self-test page/configuration plot for more information.
TRYING TO CONNECT TO SERVER	TRYING TO CONNECT TO SERVER indicates that the HP JetDirect interface is trying to connect to the print or file server after being configured. Wait for the interface to establish a connection with the print or file server.
NOT READY	NOT READY indicates that there is a problem with the interface, its configuration, or the print server. Following the I/O CARD NOT READY message is a two digit code and a status message. Refer to the next table for a detailed explanation of all status messages. The messages are listed by their code numbers.
BOOTP IN PROGRESS	BOOTP IN PROGRESS indicates that the HP JetDirect interface is searching for the BOOTP server where the TCP/IP address and configuration information are stored.

I/O CARD NOT READY Status Messages

I/O CARD READY indicates that the interface is configured correctly and is capable of communicating with the print server.

I/O CARD NOT READY indicates that there is a problem with the interface, its configuration, or the server. Following the I/O CARD NOT READY message is a two digit code and a status message. The following table lists all of the possible HP JetDirect interface status messages, listed by their two digit code number:

Table 8-6

Ethernet I/O CARD NOT READY Status Messages	
Message	Description and Recommended Action
03 LAN ERROR-EXTERNAL LOOPBACK	The HP JetDirect interface is incorrectly connected to your network or is defective. Make sure your HP JetDirect interface is correctly attached to your network. In addition, check the cabling and BNC "T" connectors. When this message is displayed, up to four lines of further explanation may follow. These are the following unnumbered messages:
BABBLE ERROR	Run the power-on self-test by turning the printer off and then on again. If the error persists, replace the HP JetDirect interface. Refer to the appropriate chapter for your network operating system for information on replacing your JetDirect interface.
CRC ERROR	Check the network topology and verify all cable segments. Check for damaged cables.
FRAMING ERROR	Check the network topology and verify all cable segments. Check for damaged cables.
LATE COLLISION ERROR	Check the network topology, verify all cable segments and make sure no segment is too long.
LOSS OF CARRIER ERROR	Check connections. Run the power-on self-test by turning the printer off and then on again. If the error persists, replace the HP JetDirect interface.
MEMORY ERROR	Run the power-on self-test by turning the printer off and then on again. If the error persists, replace the HP JetDirect interface.

Table 8-6 (continued)

Ethernet I/O CARD NOT READY Status Messages (continued)	
Message	**Description and Recommended Action**
RECEIVE BUFFER ERROR	Run the power-on self-test by turning the printer off and then on again. If the error persists, replace the HP JetDirect interface.
RETRY ERROR	Verify that the Ethernet network cable is correctly terminated on both ends. Make sure your HP JetDirect interface is correctly attached to your network.
SQE ERROR	Run the power-on self-test by turning the printer off and then on again. If the error persists, replace the HP JetDirect interface.
TRANSMIT ERROR	Check the network topology and verify all cable segments.
UNDERFLOW ERROR	Check the cabling and BNC "T" connectors. If the error persists, run the power-on self-test by turning the printer off and then on again. If the error still persists, replace the HP JetDirect interface.
07 LAN ERROR-CONTROLLER CHIP	Check the network connections. If the connections are intact, turn the printer off and then on again to run the HP JetDirect interface's power-on self-test. If the error persists, replace the HP JetDirect interface.
08 LAN ERROR-INFINITE DEFERRAL	Your network is not correctly terminated. Check to make sure that both ends of the cable are terminated correctly, and that the HP JetDirect interface is correctly attached to the network.
09 LAN ERROR-BABBLE	Check the network connections. If the connections are intact, turn the printer off and then on again to run the JetDirect interface's power-on self-test. If the error persists, replace the HP JetDirect interface.
0A LAN ERROR-NO SQE	Check the network connections. If the connections are intact, turn the printer off and then on again to run the JetDirect interface's power-on self-test. If the error persists, replace the interface.
OC LAN ERROR-RECEIVER OFF	There may be a problem with your network cabling or the HP JetDirect interface. Check the cabling and BNC "T" connectors on your Ethernet network. If you cannot find a problem with your network cabling, turn the printer off and then on again to run the HP JetDirect interface power-on self-test. If the error persists after the printer is turned on again, there is a problem with the HP JetDirect interface.

Table 8-6 (continued)

Ethernet I/O CARD NOT READY Status Messages (continued)	
Message	Description and Recommended Action
0D LAN ERROR-TRANSMITTER OFF	There may be a problem with your network cabling or the HP JetDirect interface. Check the cabling and BNC "T" connectors on your Ethernet network. If you cannot find a problem with your network cabling, turn the printer off and then on again to run the HP JetDirect interface power-on self-test. If the error persists after the printer is turned on again, there is a problem with the HP JetDirect interface.
0E LAN ERROR-LOSS OF CARRIER	Check connections. Run the power-on self-test by turning the printer off and then on again. If the error persists, replace the HP JetDirect interface.
10 LAN ERROR-UNDERFLOW	There may be a problem with your network cabling or the HP JetDirect interface. Check the cabling and BNC "T" connectors on your network. If you cannot find a problem with your network cabling, turn the printer off and then on again. This activates the HP JetDirect interface power-on self-test. If the error persists after the printer is turned on again, there is a problem with the HP JetDirect interface.
11 LAN ERROR-RETRY FAULTS	There is a problem with your network cabling or external network configuration. Make sure that your network cable is correctly terminated on both ends.
12 LAN ERROR-NO LINKBEAT	With 10Base-T port connected, this message is displayed if Link Beat is not sensed. Check the network cable, and verify that the concentrator/hub is providing Link Beat.
14 DISCONNECTED	The Novell NetWare protocol is disconnected. Check the server and print server.
15 CONFIGURATION ERROR	Indicates that the configuration information for the NetWare functions is not stored correctly on the HP JetDirect interface. Rerun the JETADMIN utility to reconfigure. If this error persists, there may be a problem with the HP JetDirect interface.
16 NOT CONFIGURED	Indicates that the NetWare functions of the HP JetDirect interface have not been configured. To use the HP JetDirect interface with NetWare, you must first run the JETADMIN utility to configure it.

Ethernet I/O CARD NOT READY Status Messages (continued)	
Message	**Description and Recommended Action**
17 UNABLE TO FIND SERVER	The HP JetDirect interface was unable to find the print server (Remote Printer mode) or file server (Queue Server mode) (there was no response to service queries for advertising print servers or file servers that matched the configured print server or file server name). Make sure that the print server or file server is running and that the print server or file server name configured on the HP JetDirect interface matches the actual name used by the print server or file server and that all cables and routers are functioning properly.
18 PASSWORD ERROR	The HP JetDirect interface detected that the password for the print server object is wrong. Use the PCONSOLE utility to erase the password for the print server object. When the HP JetDirect interface interface logs in again, it will set a new password. You can also use the JETADMIN utitlity to create a new print server object and change the HP JetDirect interface's NetWare node name to match. When multiple file servers are configured, the error is only displayed on the test page if none of the file servers were connected. Use JETADMIN to obtain the status of all file servers.
19 NO QUEUE ASSIGNED	The HP JetDirect interface detected that the print server object has not been assigned any queues to service. Assign queues to the print server object using the JETADMIN or PCONSOLE utilities. When multiple file servers are configured, the error is only displayed on the self-test page/configuration plot if none of the file servers were successfully connected. However, JETADMIN can display status for all of the file servers.
1A PRINTER NUMBER NOT DEFINED	The printer number you assigned to the remote printer using the JETADMIN utility has not been defined. Rerun the JETADMIN utility and assign a valid printer number to the JetDirect interface, or run PCONSOLE and define this printer number for the print server. Refer to the "Software Installation and Configuration for Novell NetWare Networks" chapter for instructions on running JETADMIN.

Table 8-6 (continued)

Ethernet I/O CARD NOT READY Status Messages (continued)	
Message	Description and Recommended Action
1B PRINTER NUMBER IN USE	The printer number you assigned to the remote printer using the JETADMIN utility is already in use by another printer. Rerun the JETADMIN utility and assign an unused printer number to the HP JetDirect interface. Refer to Software Installation and Configuration for Novell NetWare Networks for instructions on running JETADMIN.
1C PRINT SERVER NOT DEFINED	The file server does not have a print server object that corresponds to the HP JetDirect NetWare node name. Use the JETADMIN or PCONSOLE utilities to create the print server object or use the JETADMIN utility to change the HP JetDirect NetWare node name to match an existing print server object.
1D UNABLE TO CONNECT TO SERVER	Remote Printer mode: The HP JetDirect interface was unable to establish an SPX connection with the print server. Make sure that the print server is running and that all cables and routers are functioning properly. Queue Server mode: The HP JetDirect interface could not establish an NCP connection to the file server. Make sure that the correct file servers were connected. Use JETADMIN to obtain the status of all file servers.
1E FAIL RESERVING PRINTER NUMBER	The SPX connection to the print server was lost when the HP JetDirect interface attempted to reserve the printer number. This probably indicates a network problem or a problem with the print server. Make sure that all cables and routers are functioning correctly. Try re-starting the print server.
20 UNABLE TO LOGIN	A failure was detected when the HP JetDirect interface tried to log in to the file server. Make sure that the file server name and the print server object name are correct. Try using PCONSOLE to erase the password for the print server object. When multiple file servers are configured, the error is only diplayed on the seltf-test page/configuration plot in fnone of th efile servers were successfully connected. However, JETADMIN can display status for all of the file servers.

Table 8-6 (continued)

Ethernet I/O CARD NOT READY Status Messages (continued)	
Message	Description and Recommended Action
21 UNABLE TO SET PASSWORD	A failure was detected when the HP JetDirect interface tried to set the password for the print server object. (Whenever the HP JetDirect interface is able to log in without a password, it will set password automatically.) This indicates a networking or security problem. Try using JETADMIN to create a new print server object. When multiple file servers are configured, the error is only displayed on the test page if none of the file servers were successfully connected. However, JETADMIN can display status for all of the file servers.
22 UNABLE TO CONNECT TO SERVER	Remote Printer mode: The HP JetDirect interface was unable to establish an SPX connection with the print server. Make sure that the print server is running and that all cables and routers are functioning properly. Queue Server mode: The HP JetDirect interface could not establish an NCP connection to the file server. Make sure that the correct file servers were connected. Use JETADMIN to obtain the status of all file servers.
23 UNABLE TO ATTACH TO QUEUE	A failure was detected when the HP JetDirect interface tried to attach to one of the queues assigned to the print server object. Use PCONSOLE to make sure that servers are allowed to attach to the queue, or to delete the print server object from the list of queue servers if you want the HP JetDirect interface to service other queues. You can also try using PCONSOLE to delete the queue and create a new queue (don't forget to add the print server object to the list of queue servers). When multiple file servers are configured, the error is only displayed on the test page if none of the file servers were successfully connected. However, JETADMIN can display status for all of the file servers.
24 PSERVER CLOSED CONNECTION	The print server requested a termination of the connection with the HP JetDirect interface. Make sure that the print server is running and re-start it if necessary.

Table 8-6 (continued)

Ethernet I/O CARD NOT READY Status Messages (continued)	
Message	**Description and Recommended Action**
25 DISCONNECTING - SPX TIMEOUT	The SPX connection to the print server was lost after the connection was up and running. This probably indicates a network problem or a problem with the print server. Make sure that all cables and routers are functioning correctly. Try re-starting the print server.
26 UNKNOWN NCP RETURN CODE	The HP JetDirect interface encountered a fatal error after it connected to the file server. Many failures could produce this error message, rangng from a down file server to a network router failure. The raw NCP error code is available to the JETADMIN utitlity, and might provide more information.
27 UNEXPECTED PSERVER DATA RCVD	The print server sent data to the HP JetDiect interface without permission. This may indicate a print server problem or software bug.
28 OUT OF BUFFERS	The HP JetDirect interface was unable to allocate a buffer from its internal memory. This means that all buffers are busy because of heavy broadcast traffic or an unusual amount of network traffic directed at the HP JetDirect interface.
29 UNABLE TO SENSE NETWORK NUMBER	The HP JetDirect interface has been trying for over 3 minutes to determine the NetWare protocol used on the network. Make sure that any file servers and routers are operating correctly. Make sure that the settings for NetWare frame type and source routing are correct.
1F ERR NEGOTIATING BUFFER SIZE	A failure was detected when selecting the buffer size to be used when reading print data from the file server. This is an unlikely stage to have an error and probably indicates a networking problem. When multiple file servers are configured, the error is only displayed on the test page if none of the file servers were successfully connected. However, JETADMIN can display status for all of the file servers.

Table 8-6 (continued)

Ethernet I/O CARD NOT READY Status Messages (continued)	
Message	**Description and Recommended Action**
2A ARP DUPLICATE IP ADDRESS	The ARP layer has detected another node on the network using the same IP address as the HP JetDirect interface. Extended error information below this message shows the hardware address of the other node.
2B NOVRAM ERROR	The HP JetDirect interface cannot read the contents of its NOVRAM.
2C INVALID IP ADDRESS	The IP address specified for the HP JetDirect interface (through BOOTP or NOVRAM) is an invalid IP address for specifiying a single node.
2D INVALLID SUBNET MASK	The subnet mask specified for the HP JetDirect interface (through BOOTP or NOVRAM) is an invalid subnet mask.
2E INVALID GATEWAY ADDRESS	The default gateway address specified for the HP JetDirect interface (through BOOTP or NOVRAM) is an invalid IP address for specifying a single node.
2F INVALID SYSLOG ADDRESS	The syslog server address specified for the HP JetDirect interface (through BOOTP) is an invalid IP address for specifying a single node.
30 INVALID SERVER ADDRESS	The TFTP server address specified for the HP JetDirect interface (through BOOTP) is an invalid IP address for specifying a single node.
31 INVALID TRAP DEST ADDRESS	One of the SNMP trap (Trap PDU) destination addresses specified for the HP JetDirect interface (through TFTP) is an invalid IP address for specifying a single node.
32 CF ERR - FILE INCOMPLETE	The TFTP configuration file contained an incomplete last line that did not end in a newline character.

Table 8-6 (continued)

Ethernet I/O CARD NOT READY Status Messages (continued)	
Message	Description and Recommended Action
33 CF ERR - LINE TOO LONG	A line being processed in the TFTP configuraiton file was longer than the HP JetDirect interface could accept.
34 CF ERR - UNKNOWN KEYWORD	A TFTP configuration file line contained an unknown keyword.
35 EF ERR - MISSING PARAM	A line in th eTFTP configuration file was missing a required parameter.
36 CF ERR - INVALID PARAM	A line in the TFTP configuraiton file contained an invalid value for one of the parameters on that line.
37 CF ERR - ACCESS LIST EXCEEDED	The TFTP configuration file specified too many access list entries using the "allow:" keyword.
38 CF ERR - TRAP LIST EXCEEDED	The TFTP configuration file specified too many trap destination list entries using the "trap-destination:" keyword.
39 TFTP REMOTE ERROR	The TFTP transfer of the configuration file from the host to the HP JetDirect interface failed with the remote host sending a TFTP ERROR packet to the interface.
3A TFTP LOCAL ERROR	The TFTP transfer of the configuration file from the host to the HP JetDirect interface failed with the local interface eincountering some form of inactivity timeout, or excessive retransissions situation.

Table 8-6 (continued)

Ethernet I/O CARD NOT READY Status Messages (continued)	
Message	Description and Recommended Action
3B TFTP RETRIES EXCEEDED	The overall retrying of the TRTP transfer of the configuration file from the host to the HP JetDirect interface ahs exceeded a retry limit.
3C BAD BOOTP REPLY,	An error was detected in the BOOTP reply that the HP JetDirect interface received. The BOOTP reply either had insufficient data in the UDP datagram to contain the minimum BOOTP header of 236 bytes, had an operation field that was not BOOTPREPL Y(0X02), had a haddr field that did not match the interfaces hardware address, or had a UDP source prot that was not the BOOTP server port (67/udp).
3D BAD BOOTP TAG SIZE,	The tagsize in a vendor specific field in the BOOTP reply is either 0, or greater than the remaining number of unprocessed bytes in the vendor specified area.
3E BOOTP IN PROGRESS,	The HP JetDirect interface is currently in the process of obtaining its basic configuration information through BOOTP, and has not detected any errors.
3F POSTSCRIPT MODE NOT SELECTED OR POSTSCRIPT UPDATE NEEDED	POSTSCRIPT MODE NOT SELECTED OR POSTSCRIPT UPDATE NEEDED indicates that the printer does not support the EtherTalk MIO extensions. It may be a printer which does not support EtherTalk, a LaserJet IIISi with the revision A PostScript ROM, or a LaserJet IIISi in PCL mode. When this message is displayed the other EtherTalk messages (ADDRESS, ETHERTALK NAME, ZONE NAME) are not displayed.
F2 TFTP IN PROGRESS,	The HP JetDirect interface is currently in the process of obtaining its basic configuration information through TFTP, and has not detected any errors.
F3 BOOTP IN PROGRESS,	The HP JetDirect interface is currently in the process of obtaining its basic configuration information through BOOTP, and has not detected any errors.

Network Statistics

This portion of the self-test page/configuration plot lists network statistics gathered by the HP JetDirect interface. NETWORK STATISTICS consists of the following eight fields. Each field is listed along with the number of times (if any) that the condition occurred. When the printer is turned off and on again, all of the statistic counters are reset to zero.

Table 8-7

Field	Description
UNICAST PACKETS RCVD:	Number of frames specifically addressed to this HP JetDirect interface. Does not include broadcasts or multicasts.
TOTAL PACKETS RCVD:	Total number of frames (packets) received by the JetDirect interface without error. Includes broadcast, multicast packets, and packets specifically addressed to the interface. This number does not include packets specifically addressed to other nodes.
BAD PACKETS RCVD:	Total number of frames (packets) received by the JetDirect interface with errors.
FRAMING ERRORS RCVD:	Maximum of CRC (Cyclic Redundancy Check) errors and framing errors. CRC errors are frames received with CRC errors. Framing errors are frames received with alignment errors. A large number of framing errors could indicate a cabling problem with your network.
PACKETS TRANSMITTED:	Total number of frames (packets) transmitted without error.
UNSENDABLE PACKETS:	Total number of frames (packets) not successfully transmitted because of errors.
XMIT COLLISIONS:	Number of frames not transmitted because of repeated collisions.
XMIT LATE COLLISIONS:	Total number of frames not transmitted because a late collision occurred. A large number may indicate a cabling problem on the network.
NETWARE RETRANS.	Number of retransmissions necessary because a remote node did not acknowledge receipt of a frame sent to it. Excessive retransmissions may degrade performance, cause 40 ERRORS, or indicate developing network hardware or congestion problems.

Table 8-8

NOVELL STATUS: Messages	
Field	**Description**
DISABLED	NetWare was manually disabled through the printer's control panel (if available), or by software (JETADMIN).
READY	The HP JetDirect interface has successfully connected to the server and is awaiting data.
NOT IN USE	The protocol (IPX/SPX) used for NetWare has been disabled on the HP JetDirect interface because another protocol is using the interface. Turn the printer off to reestablish the connection to NetWare. You may also use the control panel to disable the other protocols, or once the connection has been made with NetWare, you may use JETADMIN.
INITIALIZING	When the printer is turned on the HP JetDirect Interface must determine the protocol used by NetWare. This is a normal message. It should take less than 3 minutes to clear.
INITIALIZING TRYING TO CONNECT TO SERVER	The HP JetDirect interface is trying to connect to the server(s). This is a normal message. Wait until the connection is established or another status message appears.
14 DISCONNECTED	The Novell NetWare protocol is disconnected. Check the server and the print server.
15 CONFIGURATION ERROR	Indicates that the configuration information for the NetWare functions is not stored correctly on the HP JetDirect interface. Rerun the JETADMIN utility to reconfigure the interface. If this error persists, there may be a problem with the interface.
16 NOT CONFIGURED	Indicates that the HP JetDirect interface has not been configured for NetWare. Use JETADMIN to configure the interface for NetWare networks.
17 UNABLE TO FIND SERVER	The HP JetDirect interface was unable to find the server. (There was not a response to service queries for advertizing servers that matched the configured server name.) Make sure that the server is running, the configured name in JETADMIN matches the server's actual name, and that all cables and routers are functioning correctly.
18 PASSWORD ERROR	The HP JetDirect interface detected that the password for the print server object is wrong. Use PCONSOLE to erase the password for the print server object. When the interface logs in again, it will set a new password. You may also use JETADMIN to create a new print server object, and change the JetDirect interface's NetWare node name to match.
19 NO QUEUE ASSIGNED	The HP JetDirect interface detected that the print server object has not been assigned any queues to service. Assign queues to the print server object using JETADMIN or PCONSOLE.

Table 8-8 (continued)

NOVELL STATUS: Messages (continued)	
Field	Description and Recommended Action
1A PRINTER NUMBER NOT DEFINED	The printer number assigned to the printer with JETADMIN has not been defined on the print server. Rerun JETADMIN or PCONSOLE and define the printer number. This error may occur if the printer number has been defined, but the print server has never been restarted to read the new configuration.
1B PRINTER NUMBER IN USE	The printer number assigned to the printer with JETADMIN is already in use by another printer. Rerun JETADMIN and assign an unused printer number. This may also occur when a printer is power cycled, in which case the error will go away after the print server times out and detects the lost connection.
1C PRINT SERVER NOT DEFINED	The file server does not have a print server object that corresponds to the NetWare node name entered in JETADMIN. Use JETADMIN or PCONSOLE to create the print server object, or use JETADMIN to change the NetWare node name to match an existing print server object. When the HP JetDirect interface is configured for multiple file servers, the error is only displayed on the self-test page/configuration plot if none of the file servers made the connection. JETADMIN can display all the servers' status in the Diagnostics... section.
1D UNABLE TO CONNECT TO SERVER	The HP JetDirect interface was unable to establish an SPX connection with the print server. Make sure that the print server is running, and all cables and routers are functioning correctly.
1E FAIL RESERVING PRINTER NUM	The SPX connection to the print server was lost during while the HP JetDirect interface was attempting to reserve the printer number. This indicates a possible network problem, or a problem with the print server. Make sure all cables and routers are functioning correctly. Try restarting the print server.
1F ERR NEGOTIATING BUFFER SIZE	A failure was detected when selecting the buffer size to be used when reading print data from the file server. This possibly indicates a network problem. When the HP JetDirect interface is configured for multiple file servers, the error is only displayed on the self-test page/configuration plot if none of the file servers made the connection. JETADMIN can display all the servers' status in the Diagnostics... section.

Table 8-8 (continued)

NOVELL STATUS: Messages (continued)	
Field	**Description and Recommended Action**
20 UNABLE TO LOGIN	A failure was detected when the HP JetDirect interface tried to log into the file server. This could be caused by the print server object not existing on the file server, or because of a security check that prevents the interface from logging in. Make sure the file server name and print server object name are correct. Use PCONSOLE to erase the password for the print server object. Use JETADMIN to create a new print server object. When the HP JetDirect interface is configured for multiple file servers, the error is only displayed on the self-test page/configuration plot if none of the file servers made the connection. JETADMIN can display all the servers' status in the Diagnostics... section.
21 UNABLE TO SET PASSWORD	A failure was detected when the HP JetDirect interface tried to set the password for the print server object. (Whenever the interface is able to login without a password, it will set a password of its own for future use.) This indicates a networking or security problem. Try using JETADMIN to create a new print server object. When the HP JetDirect interface is configured for multiple file servers, the error is only displayed on the self-test page/configuration plot if none of the file servers made the connection. JETADMIN can display all the servers' status in the Diagnostics... section.
22 UNABLE TO CONNECT TO SERVER	The HP JetDirect interface could not establish an NCP connection to the server. Make sure that the correct server name is used, and all cables and routers are functioning correctly. When the HP JetDirect interface is configured for multiple file servers, the error is only displayed on the self-test page/configuration plot if none of the file servers made the connection. JETADMIN can display all the servers' status in the Diagnostics... section.
23 UNABLE TO ATTACH TO QUEUE	A failure was detected when the HP JetDirect interface tried to attach to one of the queues assigned to the print server object. This may be because no servers are allowed to attach to this queue. There may also be a networking or security problem. Use PCONSOLE to make sure that servers are allowed to attach to the queue, to delete the print server object from the list of queue servers if you want the HP JetDirect interface to service other queues, or delete the queue and create a new one (the print server object must be added to the list of queue servers). When the HP JetDirect interface is configured for multiple file servers, the error is only displayed on the self-test page/configuration plot if none of the file servers made the connection. JETADMIN can display all the servers' status in the Diagnostics... section.

Table 8-8 (continued)

NOVELL STATUS: Messages (continued)	
Field	Description and Recommended Action
24 PSERVER CLOSED CONNECTION	The print server requested a termination of the connection with the HP JetDirect interface. No error exists or is indicated. Make sure the print server is running, and restart it if necessary.
25 DISCONNECTING - SPX TIMEOUT	The SPX connection to the print server was lost after the connection had been made. This indicates a possible network problem, or a problem with the print server. Make sure all cables and routers are functioning correctly. Try restarting the print server.
26 UNKNOWN NCP RETURN CODE	The HP JetDirect interface encountered an unexpected fatal error after it had successfully connected to the file server. A wide variety of failures could produce this error message, including a downed file server or a network router failure. The raw NCP error code is available in the Diagnostic... section of JETADMIN, and might provide more information.
27 UNEXPECTED PSERVER DATA RCVD	The print server sent some data when the HP JetDirect interface had not given its permission to do so. This indicates a possible print server or interface problem, possibly a software problem.
28 OUT OF BUFFERS	The HP JetDirect interface was unable to allocate a buffer from its internal memory. This indicates all buffers are busy due possibly to heavy broadcast traffic, or large amounts of network traffic directed to the interface.
29 UNABLE TO SENSE NET NUMBER	The HP JetDirect interface has been trying for over 3 minutes to determine the NetWare protocol used on the network. Make sure that any file servers and routers are operating correctly. Make sure that the settings for NetWare frame type and source routing are correct.
83 DISCONNECTING FROM SERVER	The server has been shut down because of a JETADMIN or PCONFIG configuration change or reset request. This message will automatically clear after a few seconds, unless the printer is offline, is in an error state, or is servicing another I/O port or another network protocol.

Table 8-9

Novell NetWare Messages	
Field	**Description**
MODE:	Indicates the mode used by the interface. QUEUE SERVER indicates that the interface receives data directly from the queue; REMOTE PRINTER, with the printer number following it, indicates that the interface emulates a Novell remote printer. If the printer has not been configured, this field will display QUEUE SERVER.
NODE NAME:	**Queue Server Mode:** Indicates the print server name. This name must match a valid print server on the appropriate file server. The default name is NPIXXXXXX. **Remote Printer Mode:** Indicates the name you gave to the network printer when you used JETADMIN to configure the network printer. The default name is NPIXXXXXX.
SERVER NAME:	Indicates the name of the file server or print server. If no name is displayed, the printer has not been configured.
NOVELL RETRANS	Number of retransmissions necessary because a remote node did not acknowledge receipt of a frame sent to it. Excessive retransmissions may degrade performance
NETWORK FRAME TYPE RCVD XXXXXX XXXXX XXXX	The first line indicates the network number associated with the protocol frame type for communication between server and printer. The interface automatically determines the protocol frame type by listening to the NetWare data being transferred over the network, unless a specific frame type has been configured using JETADMIN or the printer's control panel. If UNKNOWN is listed, the HP JetDirect interface is still trying to determine which network number to use. If the network number is DISABLED, a specific frame type has been manually configured. The Frame Type value can be EN_ 8023, EN_8022, EN_II, or EN_SNAP. The RCVD count indicates how many packets have been received for each frame type.

Table 8-10

EtherTalk Messages	
Field	**Description**
ETHERTALK STATUS: DISABLED	DISABLED indicates that EtherTalk was manually disabled through the printer's control panel (if available), or by software (JETADMIN).
READY	READY indicates the HP JetDirect interface is awaiting data.
NOT IN USE	NOT IN USE indicates the protocol used for EtherTalk has been disabled on the HP JetDirect interface because another protocol is using the interface. Turn the printer off to reestablish the connection to EtherTalk. You may also use the control panel to disable the other protocols.
INITIALIZING	INITIALIZING indicates that the interface is registering the node address or name/type.
POSTSCRIPT MODE NOT SELECTED OR POSTSCRIPT UPDATE NEEDED	POSTSCRIPT MODE NOT SELECTED OR POSTSCRIPT UPDATE NEEDED indicates that the printer does not support the EtherTalk MIO extensions. It may be a printer which does not support EtherTalk. For example, a LaserJet IIISi printer with the revision A PostScript ROM, or a LaserJet IIISi printer in PCL mode. When this message is displayed the other EtherTalk messages (NET, NOTE, PHASE, ETHERTALK NAME, ZONE NAME) are not displayed.
NET: XXXXX NODE:XXX PHASE: X	NET: identifies the AppleTalk Network Number on which the HP JetDirect interface is currently operating. NODE: identifies the AppleTalk Node Number which the interface chose for itself as part of its initialization sequence. PHASE: identifies the the configured EtherTalk network protocol phase. PHASE 1 is the earlier or original version of the EtherTalk protocol. PHASE 2 is the current version of the EtherTalk protocol.
ETHERTALK NAME:	The name of the printer on the EtherTalk network. A number after the name indicates that there are multiple devices with this name, and this is the Nth instance of the name.
ZONE NAME:	Identifies the name of the EtherTalk network zone on which the printer is located.

Table 8-11

UNIX (HP-UX and SunOS) Messages	
Field	**Description**
TCP STATUS: DISABLED	DISABLED indicates that TCP/IP for HP-UX and SunOS was manually disabled through the printer's control panel (if available), or by software (JetAdmin).
READY	READY indicates the HP JetDirect interface is awaiting data.
NOT IN USE	NOT IN USE indicates the protocol used for HP-UX and SunOS (TCP/IP) has been disabled on the HP JetDirect interface because another protocol is using the interface. Turn the printer off to reestablish the connection to the HP-UX or SunOS network. You may also use the control panel to disable the other protocols.
INITIALIZING	INITIALIZING indicates that the interface is searching for the BOOTP server, or trying to get the configuration file through TFTP.
HOST NAME:	The host name configured on the interface. It may be truncated. NOT SPECIFIED indicates that no host name was specified in the BOOTP configuration information, or TFTP configuration file (using a "name:" entry).
CONFIG BY: BOOTP BOOTP/TFTP FRONT PANEL	The location from which the interface is obtaining, or has obtained its configuration information. The options are BOOTP, BOOTP/TFTP, or the printer's control panel.
IP ADDRESS:	The Internet Protocol address assigned to the HP JetDirect network interface. This is a required entry for operation of the interface.
SUBNET MASK:	The subnet mask configured on the HP JetDirect network interface. NOT SPECIFIED is indicated if no subnet mask has been configured, or if the subnet mask is zero.
DEF. GATEWAY:	The address of the gateway used when sending packets off the local network. Only one default gateway may be configured.
SYSLOG SERVER:	Marks the IP address of the syslog server configured on the interface. NOT SPECIFIED indicates no syslog server has been configured, or the syslog server IP address is zero.
IDLE TIMEOUT:	The timeout value expressed in seconds after which the interface closes an idle print data connection. Acceptable values are integers between 0 and 3600. A value of 0 turns off the timeout mechanism.

Table 8-11 (continued)

HP-UX and SunOS (TCP/IP) Messages (continued)	
Field	Description
SNMP GET CMTY NAME: ALL SPECIFIED	Indicates whether or not an SNMP get community name has been configured for the interface. This parameter is omitted when the interface is configured from the peripheral's control. panel. ALL indicates that the interface will accept all SNMP community names for GetRequests. SPECIFIED indicates that a specific SNMP get community name is configured.
SNMP SET CMTY NAME: NONE or SPECIFIED	Indicates whether or not an SNMP set community name has been configured for the interface. This parameter is omitted when the interface is configured from the peripheral's control. panel. NONE indicates that the interface will not accept any SNMP community names for SetRequests. SPECIFIED indicates that a specific SNMP set community name is configured.
'BOOTP SERVER:	The IP address of the system that responds to the interface's BOOTP request with configuration data. This parameter is omitted when the interface is configured from the peripheral's control panel. NOT SPECIFIED indicates that the server's IP address field in the BOOTP reply packet was zero.

Table 8-12

LAN Server/LAN Manager and Windows for Workgroups/Windows NT Messages	
Field	Description
DLC/LLC STATUS: DISABLED,	DISABLED indicates that LAN Server was manually diabled through the printer's control panel (if available)
READY	READY indicates the HP JetDirect interface is awaiting data.
NOT IN USE,	NOT IN USE indicates the protocol used has been disabled on the HP JetDirect interface because another protocol is using the interface Turn the printer off to reestablish the connection. You may also use the control panel to disable the other protocols.
SERVER ADDRESS:	Station address of remote end of connection.

Understanding the Token Ring Self-Test Page/Configuration Plot

This section describes the Token Ring (802.5) self-test page/configuration plot. Use the information in this section only if you have connected your printer to a Token Ring (802.5) network.

If you have connected your printer to an Ethernet/802.3 network, refer to the previous section, "Understanding the Ethernet Self-Test Page/Configuration Plot."

The networking section of the Token Ring self-test page/configuration plot is divided into five parts:

1 Multiple environment information.
2 HP JetDirect interface status information.
3 Novell NetWare status information
4 LAN Server/LAN Manager and Windows for Workgoups/Windows NT status information.
5 Network statistics.

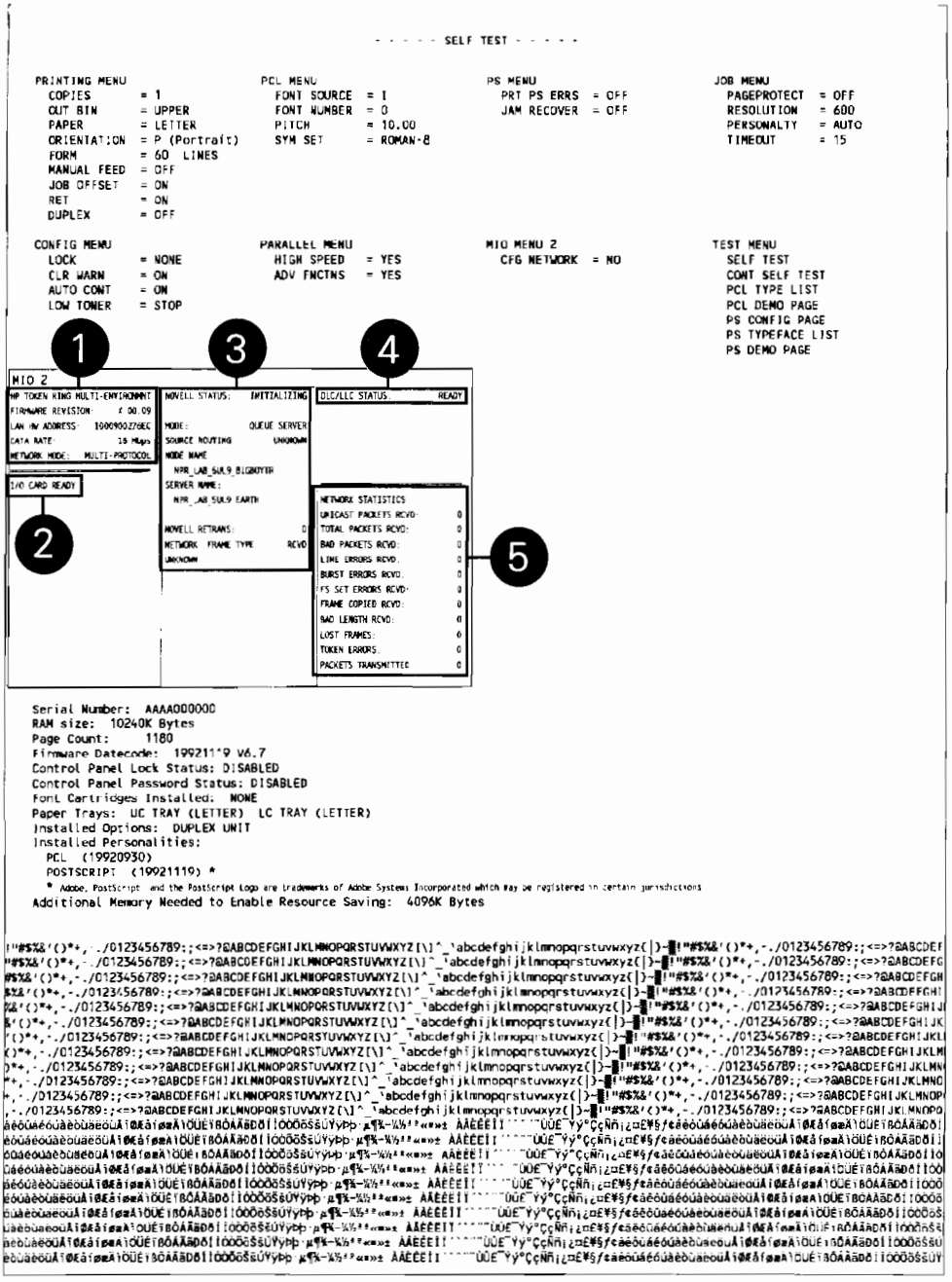


Figure 8-1 - The Token Ring Self-Test Page

Token Ring Self-Test Page/Configuration Plot Messages

This section describes each of the messages that can be printed on a Token Ring self-test page/configuration plot.

Table 8-13

Token Ring Multi-Environment Messages	
Field	**Description**
HP TOKEN RING MULTI-ENVIRONMNT:	Indicates an HP JetDirect interface that supports Novell NetWare, OS/2, Windows for Workgroups and Windows NT.
FIRMWARE REVISION: X.XX.XX	Indicates the firmware revision number of the JetDirect interface currently installed in the printer.
LAN HW ADDRESS: 100090XXXXXX	"LAN HW ADDRESS" is the 12-digit hexadecimal network address of the HP JetDirect interface installed in the printer.
DATA RATE: 4 Mbps 16 Mbps JUMPER ERROR	Indicates the rate at which the JetDirect interface can transfer information. This setting should be either for 4 or 16 Megabits per second (4 or 16 Mbps), depending on your network configuration. If the DATA RATE field displays JUMPER ERROR, check the jumper switch setting on the HP JetDirect interface. Refer to your installation manual for information on setting the jumper switch on the interface.
NETWORK MODE UNKNOWN"	UNKNOWN indicates that the interface has not yet inititalized its network mode.
MULTI-PROTOCOL	MULTI-PROTOCOL indicates that the interface is installed in a multi-protocol printer, and can print jobs from any enabled protocol.
AUTO-SELECT	AUTO-SELECT indicates that the interface is installed in a single protocol printer and is configured to automatically select a protocol. The interface is waiting for an active protocol to connect.
AUTO-NOVELL	AUTO-NOVELL indicates that the interface is in a single-protocol printer and the Novell NetWare protocol has made the connection.
AUTO DLC/LLC	AUTO-DLC/LLC indicates that the interface is in a single-protocol printer and either the IBM LAN Server, Microsoft LAN Manager, Microsoft Windows for Workgroups, or Microsoft Windows NT protocol has made the connection.

Table 8-13 - continued

Token Ring Multi-Environment Messages (continued)	
I/O CARD READY	READY indicates that the HP JetDirect interface is connected and awaiting data.
INITIALIZING	INITIALIZING indicates that the HP JetDirect interface is initializing the network protocols. Refer to the network operating system status line on the self-test page/configuration plot for more information.
TRYING TO CONNECT TO SERVER	TRYING TO CONNECT TO SERVER indicates that the HP JetDirect interface is trying to connect to the print or file server after being configured. Wait for the interface to establish a connection with the print or file server.

This section describes all of the possible messages that can appear following the I/O CARD NOT READY status message:

Table 8-14

Token Ring I/O CARD NOT READY Status Messages	
Message	**Description and Recommended Action**
02 LAN ERROR-INTERNAL LOOPBACK	Check the data rate switch on the HP JetDirect interface to ensure it is set correctly. Refer to your installation manual for information on setting the data rate switch. In addition, check the cabling, external transceiver, wiring concentrator, and taps.
04 LAN ERROR-JUMPER	The data rate switch on the HP JetDirect interface is set incorrectly. Refer to Interface Hardware Installation Guide for instructions on setting the data rate switch.
0A LAN ERROR-OPEN	Indicates the HP JetDirect interface could not insert into the ring and join the network. Check the data rate switch on the HP JetDirect interface to ensure it is set properly. Refer to the Interface Hardware Installation Guide for information on setting the data rate switch. In addition, check the cabling, external transceiver, wiring concentrator, and taps.
0F LAN ERROR-WIRE FAULT	Indicates that there is a problem with the network cabling. Check the cabling between the printer and the network.
10 LAN ERROR-AUTO REMOVAL	Run the interface power-on self test by turning the printer off and then on again. If this message reappears on another self-test page/configuration plot, you may have a problem with one of the HP JetDirect interfaces on your network. Check all the interfaces on the network for proper operation.
11 LAN ERROR-REMOVE RECEIVE	Run the interface power-on self-test by turning the printer off and then on again. If this message reappears on the resulting self-test page/configuration plot, you may have a problem with one of the HP JetDirect interfaces on your network. Check all the cards on the network for proper operation.
14 DISCONNECTED	The Novell NetWare protocol is disconnected. Check the server and the print server.

Table 8-14 - continued

Token Ring I/O CARD NOT READY Status Messages (continued)	
Message	Description and Recommended Action
15 CONFIGURATION ERROR	Indicates that the configuration information for the NetWare functions is not stored correctly on the HP JetDirect interface. Rerun the JETADMIN utility to reconfigure. If this error persists, there may be a problem with the HP JetDirect interface.
16 NOT CONFIGURED	Indicates that the NetWare functions of the HP JetDirect interface have not been configured. To use the HP JetDirect interface with NetWare, you must first run the JETADMIN utility to configure it.
17 UNABLE TO FIND SERVER	The HP JetDirect interface was unable to find the print server (Remote Printer mode) or file server (Queue Server mode) (there was no response to service queries for advertising print servers or file servers that matched the configured print server or file server name). Make sure that the print server or file server is running and that the print server or file server name configured on the HP JetDirect interface matches the actual name used by the print server or file server and that all cables and routers are functioning properly.
18 PASSWORD ERROR	The HP JetDirect interface detected that the password for the print server object is wrong. Use the PCONSOLE utiltiy to erase the password for the print server object. When the HP JetDirect interface interface logs in again, it will set a new password. You can also use the JETADMIN utitlity to create a new print server object and change the HP JetDirect interface's NetWare node name to match. When multiple file servers are configured, the error is only displayed on the test page if none of the file servers were connected. Use JETADMIN to obtain the status of all file servers.
19 NO QUEUE ASSIGNED	The HP JetDirect interface detected that the print server object has not been assigned any queues to service. Assign queus to the print server object using the JETADMIN or PCONSOLE utilities. When multiple file servers are configured, the error is only displayed on the test page if none of the file servers were successfully connected. However, JETADMIN can display status for all of the file servers.

Table 8-14 - continued

Token Ring I/O CARD NOT READY Status Messages (continued)	
Message	**Description and Recommended Action**
1A PRINTER NUMBER NOT DEFINED	The printer number you assigned to the remote printer using the JETADMIN utility has not been defined. Rerun the JETADMIN utility and assign a valid printer number to the HP JetDirect interface, or run PCONSOLE and define this printer number for the print server. Refer to the "Software Installation and Configuration for Novell NetWare Networks" chapter for instructions on running JETADMIN.
1B PRINTER NUMBER IN USE	The printer number you assigned to the remote printer using the JETADMIN utility is already in use by another printer. Rerun the JETADMIN utility and assign an unused printer number to the HP JetDirect interface. Refer to Software Installation and Configuration for Novell NetWare Networks for instructions on running JETADMIN.
1C PRINT SERVER NOT DEFINED	The file server does not have a print server object that corresponds to the HP JetDirect NetWare node name. Use the JETADMIN or PCONSOLE utilities to create the print server object or use the JETADMIN utility to change the HP JetDirect NetWare node name to match an existing print server object.
1D UNABLE TO CONNECT TO SERVER	Remote Printer mode: The HP JetDirect interface was unable to establish an SPX connection with the print server. Make sure that the print server is running and that all cables and routers are functioning properly. Queue Server mode: The HP JetDirect interface could not establish an NCP connection to the file server. Make sure that the correct file servers were connected. Use JETADMIN to obtain the status of all file servers.
1E FAIL RESERVING PRINTER NUMBER	The SPX connection to the print server was lost when the HP JetDirect interface attempted to reserve the printer number. This probably indicates a network problem or a problem with the print server. Make sure that all cables and routers are functioning correctly. Try re-starting the print server.

Table 8-14 - continued

Token Ring I/O CARD NOT READY Status Messages (continued)	
Message	Description and Recommended Action
1F ERR NEGOTIATING BUFFER SIZE	A failure was detected when selecting the buffer size to be used when reading print data from the file server. This is an unlikely stage to have an error and probably indicates an obscure networking problem. When multiple file servers are configured, the error is only displayed on the test page if none of the file servers were successfully connected. However, JETADMIN can display status for all of the file servers.
20 UNABLE TO LOGIN	A failure was detected when the HP JetDirect interface tried to log in to the file server. Make sure that the file server name and the print server object name are correct. Try using PCONSOLE to erase the password for the print server object. Try using JETADMIN to create a brand new print server object. When multiple file servers are configured, the error is only displayed on the test page if none of the file servers were successfully connected. However, JETADMIN can display status for all of the file servers.
21 UNABLE TO SET PASSWORD	A failure was detected when the HP JetDirect interface tried to set the password for the print server object. (Whenever the HP JetDirect interface is able to log in without a password, it will set the password automatically.) This indicates a networking or security problem. Try using JETADMIN to create a brand new print server object. When multiple file servers are configured, the error is only displayed on the test page if none of the file servers were successfully connected. However, JETADMIN can display status for all of the file servers.
22 UNABLE TO CONNECT TO SERVER	Remote Printer mode: The HP JetDirect interface was unable to establish an SPX connection with the print server. Make sure that the print server is running and that all cables and routers are functioning properly. Queue Server mode: The HP JetDirect interface could not establish an NCP connection to the file server. Make sure that the correct file servers were connected. Use JETADMIN to obtain the status of all file servers.

Table 8-14 - continued

Token Ring I/O CARD NOT READY Status Message (continued)	
Message	Description and Recommended Action
23 UNABLE TO ATTACH TO QUEUE	A failure was detected when the HP JetDirect interface tried to attach to one of the queues assigned to the print server object. Use PCONSOLE to make sure that servers are allowed to attach to the queue, or to delete the print server object from the list of queue servers if you want the HP JetDirect interface to service other queues. You can also try using PCONSOLE to delete the queue and create a brand new queue (don't forget to add the print server object to the list of queue servers). When multiple file servers are configured, the error is only displayed on the test page if none of the file servers were successfully connected. However, JETADMIN can display status for all of the file servers.
24 PSERVER CLOSED CONNECTION	The print server requested a termination of the connection with the HP JetDirect interface. Make sure that the print server is running and re-start it if necessary.
25 DISCONNECTING - SPX TIMEOUT	The SPX connection to the print server was lost after the connection was up and running. This probably indicates a network problem or a problem with the print server. Make sure that all cables and routers are functioning correctly. Try re-starting the print server.
26 UNKNOWN NCP RETURN CODE	The HP JetDirect interface encountered a fatal error after it connected to the file server. Many failures could produce this error message, rangng from a down file server to a network router failure. The raw NCP error code is available to the JETADMIN utitlity which may be able to provide more information.
27 UNEXPECTED PSERVER DATA RCVD	The print server sent data to the HP JetDiect interface without permission. This may indicate an obscure print server problem or software bug.
28 OUT OF BUFFERS	The HP JetDirect interface was unable to allocate a buffer from its internal memory. This means that all buffers are busy because of heavy broadcast traffic or an unusual amount of network traffic directed at the HP JetDirect interface.

In addition to the I/O CARD NOT READY messages, the I/O CARD STATUS section of the self-test page/configuration plot also includes phase, code, and ring status messages. The following pages describe these messages.

PHASE Messages

This section describes the PHASE messages that can be displayed on the self-test page/configuration plot. There are five phases that must be completed in order before the HP JetDirect interface is successfully inserted into the network ring. The PHASE message indicates the current phase in which the I/O CARD NOT READY condition occurred.

Table 8-15

Token Ring Phase Messages	
Phase Message	**Description**
LOBE MEDIA TEST	The HP JetDirect interface or relay at the wiring concentrator wraps the transmitter's signal from a station back to its receiver. The HP JetDirect interface verifies that this lobe wrap path is functioning.
PHYS INSERTION	The HP JetDirect interface physically inserts by impressing a DC current on the transmit signal pair. This activates a relay in the wiring concentrator that connects the receive and transmit pairs into the physical ring.
ADDRESS VERIFY	The ring station address must be unique to this HP JetDirect interface. This phase of the insertion process ensures that this address is not being used by another HP JetDirect interface that is inserted into the network ring.
RING POLL	This phase ensures that the HP JetDirect interface has participated in the ring polling process. In this process, the HP JetDirect interface acquires its upstream neighbor's address (UNA) and allows the nearest downstream HP JetDirect interface to acquire its address as that HP JetDirect interface's UNA.
REQUEST INIT	The purpose of the Request Initialization phase is to request additional parameters. These parameters are associated with each node on the ring. The parameters received in this process replace the default parameters set at the start of the ring insertion process.

Code Messages

Associated with each PHASE message is one CODE message. The CODE message provides a specific description of the PHASE problem.

The possible CODE messages are as follows:

Table 8-16

Token Ring Code Messages	
Code Message	Description
FUNCTION FAILURE	The HP JetDirect interface is unable to transmit to itself while wrapped through its lobe at the wiring concentrator. This message may also indicate that data frames are received before physical insertion.
SIGNAL LOSS	A signal loss condition is detected at the HP JetDirect interface receiver input during the open process (either when wrapped or inserted onto the ring).
TIMEOUT	The HP JetDirect interface fails to logically insert onto the ring before the insertion timer expires. Each phase of the insertion process must complete before expiration of the 18-second insertion timer.
RING FAILURE	The HP JetDirect interface times out when attempting a ring purge after becoming the active monitor; that is, the HP HP JetDirect interface is unable to receive its own ring purge data frames.
RING BEACONING	The HP JetDirect interface receives a beacon data frame after physically inserting into the ring. This indicates a break in the ring.
DUP NODE ADDRESS	The HP JetDirect interface finds that another station on the ring already has the address which the HP JetDirect interface wishes to use. Ensure that all addresses are unique.
REQUEST PARAM	The HP JetDirect interface determines that a Ring Parameter Server (RPS) is present on the ring, but does not respond to a request initialization data frame.
REMOVE RECEIVED	The HP JetDirect interface received a Remove Adapter data frame during the insertion process.

Ring Status Messages

The self-test page/configuration plot may list up to three RING STATUS messages for each PHASE and CODE message pair. The following table describes all of the possible RING STATUS messages.

Table 8-17

Token Ring Status Messages	
Message	**Description**
RING RECOVERY	The HP JetDirect interface has received claim token data frames on the ring. The HP JetDirect interface may be transmitting the claim token frames.
SINGLE STATION	The HP JetDirect interface has sensed that it is the only station on the ring.
REMOVE RECEIVED	The HP JetDirect interface has received a remove ring station data frame request, and has removed itself from the ring.
AUTO-REMOVAL ERROR	The HP JetDirect interface has detected an internal hardware error following the beacon auto-removal process and has removed itself from the ring.
LOBE WIRE FAULT	The HP JetDirect interface has detected an open or short circuit in the cable between the HP JetDirect interface and the wiring concentrator. Verify that this cable is functional and replace it if necessary.
TRANSMIT BEACON	The HP JetDirect interface is transmitting beacon frames to the ring.
HARD ERROR	The HP JetDirect interface is transmitting or receiving beacon frames to or from the ring.
SIGNAL LOSS	The HP JetDirect interface has detected a loss of signal on the ring. Check the cable from the HP JetDirect interface to the network and check the wiring concentrator.

Table 8-18

NOVELL STATUS: Messages	
Field	**Description and Recommended Action**
DISABLED	Novell Netware was manually disabled through the printer's control panel.
INITIALIZING	When the printer is turned on the HP JetDirect Interface must determine the protocol used by NetWare. This is a normal message. It should take less than 3 minutes to clear.
INITIALIZING TRYING TO CONNECT TO SERVER	The HP JetDirect interface is trying to connect to the server(s). This is a normal message. Wait until the connection is established or another status message appears.
READY	The HP JetDirect interface has successfully connected to the server and is awaiting data.
NOT IN USE	The protocol (IPX/SPX) used for NetWare has been disabled on the HP JetDirect interface because another protocol is using the interface. Turn the printer off to reestablish the connection to NetWare. You may also use the control panel to disable the other protocols, or once the connection has been made with NetWare, you may use JETADMIN.
15 CONFIGURATION ERROR	Indicates that the NetWare functions of the HP JetDirect interface have not been configured. Use JETADMIN to configure the interface for NetWare networks.
16 NOT CONFIGURED	Indicates that the HP JetDirect interface has not been configured for NetWare. Use JETADMIN to configure the interface for NetWare networks.
17 UNABLE TO FIND SERVER	The HP JetDirect interface was unable to find the server. (There was not a response to service queries for advertizing servers that matched the configured server name.) Make sure that the server is running, the configured name in JETADMIN matches the server's actual name, and that all cables and routers are functioning correctly.
18 PASSWORD ERROR	The HP JetDirect interface detected that the password for the print server object is wrong. Use PCONSOLE to erase the password for the print server object. When the interface logs in again, it will set a new password. You may also use JETADMIN to create a new print server object, and change the HP JetDirect interface's NetWare node name to match.
19 NO QUEUE ASSIGNED	The HP JetDirect interface detected that the print server object has not been assigned any queues to service. Assign queues to the print server object using JETADMIN or PCONSOLE.

Table 8-18 (continued)

NOVELL STATUS: Messages (continued)	
Field	Description and Recommended Action
1A PRINTER NUMBER NOT DEFINED	The printer number assigned to the remote printer using the JETADMIN utility has not been defined. Rerun the JETADMIN utility and assign a valid printer number to the HP JetDirect interface, or run PCONSOLE and define this printer number for the print server. Refer to the Software Installation and Configuration for Novell NetWare Networks chapter for instructions on running JETADMIN.
1B PRINTER NUMBER IN USE	The printer number assigned to the remote printer using the JETADMIN utility is already in use by another printer. Rerun the JETADMIN utility and assign an unused printer number to the HP JetDirect interface. Refer to the Software Installation and Configuration for Novell NetWare Networks chapter for instructions on running JETADMIN.
1C PRINT SERVER NOT DEFINED	The file server does not have a print server object that corresponds to the HP JetDirect NetWare node name. Use the JETADMIN or PCONSOLE utilities to create the print server object, or use the JETADMIN utility to change the HP JetDirect NetWare node name to match an existing print server object.
1D UNABLE TO CONNECT TO SERVER	Remote Printer mode: The HP JetDirect interface was unable to establish an SPX connection with the print server. Make sure that the print server is running, and that all cables and routers are functioning properly. Queue Server mode: The HP JetDirect interface could not establish an NCP connection to the file serer. Make sure that the correct file servers were connected. Use JETADMIN to obtain the status of all file servers.
1E FAIL RESERVING PRINTER NUM	The SPX connection to the print server was lost when the HP JetDirect interface attempted to reserve the printer number. This probably indicates a network problem, or a problem with the print server. Make sure all cables and routers are functioning correctly. Try restarting the print server.
1F ERR NEGOTIATING BUFFER SIZE	A failure was detected when selecting the buffer size to be used when reading print data from the file server. This is an unlikely stage to have an error and probably indicates a network problem. When multiple file servers are configured, the error is only displayed on the self-test page/configuration plot if none of the file servers were successfully connected. However, JETADMIN can display status for all of the file servers.

Table 8-18 (continued)

NOVELL STATUS: Messages (continued)	
Field	**Description and Recommended Action**
21 UNABLE TO SET PASSWORD	A failure was detected when the HP JetDirect interface tried to set the password for the print server object. (Whenever the interface is able to login without a password, it will set the password automatically.) This indicates a networking or security problem. Try using JETADMIN to create a new print server object. When multiple file servers are configured, the error is only displayed on the self-test page/configuration plot if none of the file servers were successfully connected. However, JETADMIN can display status for all of the file servers.
22 UNABLE TO CONNECT TO SERVER	The HP JetDirect interface could not establish an NCP connection to the server. Make sure that the correct server name is used, and all cables and routers are functioning correctly. When multiple file servers are configured, the error is only displayed on the self-test page/configuration plot if none of the file servers were successfully connected. However, JETADMIN can display status for all of the file servers.
23 UNABLE TO ATTACH TO QUEUE	A failure was detected when the HP JetDirect interface tried to attach to one of the queues assigned to the print server object. Use PCONSOLE to make sure that servers are allowed to attach to the queue, or to delete the print server object from the list of queue servers if you want the HP JetDirect interface to service other queues. You can also try using PCONSOLE to delete the queue and crate a new queue (do not forget to add the print server object to the list of queue servers). When multiple file servers are configured, the error is only displayed on the self-test page/configuration plot if none of the file servers were successfully connected. However, JETADMIN can display status for all of the file servers.
24 PSERVER CLOSED CONNECTION	The print server requested a termination of the connection with the HP JetDirect interface. Make sure the print server is running, and restart it if necessary.
25 DISCONNECTING - SPX TIMEOUT	The SPX connection to the print server was lost after the connection was up and running. This probably indicates a network problem, or a problem with the print server. Make sure all cables and routers are functioning correctly. Try restarting the print server.

Table 8-18 (continued)

NOVELL STATUS: Messages (continued)	
Field	**Description and Recommended Action**
26 UNKNOWN NCP RETURN CODE	The HP JetDirect interface encountered a fatal error after it connected to the file server. Many failures could produce this error message, ranging from a downed file server to a network router failure. The raw NCP error code is available to the JETADMIN utility, and might provide more information.
27 UNEXPECTED PSERVER DATA RCVD	The print server sent data to the HP JetDirect interface without permission. This may indicate a possible print server problem, or software bug.
28 OUT OF BUFFERS	The HP JetDirect interface was unable to allocate a buffer from its internal memory. This means that all buffers are busy because of heavy broadcast traffic, or an unusual amount of network traffic directed to the HP JetDirect interface.
29 UNABLE TO SENSE NET NUMBER	The HP JetDirect interface has been trying for over 3 minutes to determin the NetWare protocol used on the network. Make sure that any file servers and routers are operating correctly. Make sure that the settings for NetWare frame type and source routing are correct.

Table 8-19

LAN Server/LAN Manager and Windows for Workgroups/Windows NT Messages	
Field	**Description**
MODE: QUEUE SERVER REMOTE PRINTER	Indicates the mode used by the interface. QUEUE SERVER indicates that the interface receives data directly from the queue;REMOTE PRINTER, with the printer number following it, indicates that the interface emulates a Novell remote printer. If the printer has not been configured, this field will display QUEUE SERVER.
SOURCE ROUTING: UNKNOWN, "NO", "YES" "DISABLED", "SINGLE R", or "ALL RT"	UNKNOWN is displayed when source routing is configured to AUTO, but the source routing method has not been detected. NO is displayed when source routing is configured to AUTO, and the automatic algorithm has detremined that source routing should not be used. YES is displayed when source routing is configured to AUTO, and the automatic algorithm has determined that source routing should be used. DISABLED, SINGL R, and ALL RT are displayed when the user has manually configured source routing through the printer's control panel, or thrcugh software (JETADMIN).
NODE NAME:	**Queue Server Mode:** Indicates the print server name. This name must match a valid print server on the appropriate file server. The default name is NPIXXXXXX. **Remote Printer Mode:** Indicates the name you gave to the network printer when you used JETADMIN to configure the network printer. The default name is NPIXXXXXX.
"SERVER NAME:"	Indicates the name of the file server or print server. If no name is displayed, the printer has not been configured.

Table 8-20

LAN Server/LAN Manager and Windows for Workgroups/Windows NT Messages	
Field	**Description**
DLC\LLC STATUS: DISABLED	DISABLED indicates that DLC/LLC was manually disabled through the printer's control panel.
READY	READY indicates the HP JetDirect interface is awaiting data.
NOT IN USE	NOT IN USE indicates the protocol used has been disabled on the HP JetDirect interface because another protocol is using the interface. Turn the printer off to reestablish the connection to the protocal. You may also use the control panel to disable other protocols.
SERVER ADDRESS:	Station address of remote end of connection.

Network Statistics

This portion of the self-test page/configuration plot lists network statistics for the following fields:

Table 8-21

Field	Description
UNICAST PACKETS RCVD:	Number of frames specifically addressed to this HP HP JetDirect interface. Does not include broadcasts or multicasts.
TOTAL PACKETS RECEIVED:	Total number of data frames (packets) received without error.
BAD PACKETS RCVD:	Total number of data frames (packets) received by the HP JetDirect interface with errors.
LINE ERRORS RCVD:	Total number of frames received by the HP JetDirect interface with code violations or CRC (Cyclic Redundancy Check) errors. A large number may indicate faulty cabling on your network.
BURST ERRORS RCVD:	Number of times the HP JetDirect interface could detect no transitions for 5 half-bit times between the Start Delimiter (SD) and the End Delimiter (ED).
FS SET ERRORS RCVD:	Total number of frames with frame status set errors, indicating another node could not set the frame status.
FRAME COPIED RCVD:	Total number of frames received with frame copy error indicated in the Frame Status (FS) field.
BAD LENGTH RCVD:	Total number of frames missed because they were too long for the HP JetDirect interface to receive.
LOST FRAMES:	Number of times the end of the frame could not be detected while transmitting.
TOKEN ERRORS:	Total number of times a violation of the token-passing protocol has been detected.
PACKETS TRANSMITTED:	Total number of data frames (packets) transmitted without error.

A

HP JetDirect Interface in the UNIX Environment

Overview

This appendix provides reference information for users of the HP JetDirect interface in supported UNIX environments.

The following topics are discussed:

- Network Configurations for Printing
- Operation in the UNIX Environment
- Using BOOTP/TFTP
- Using the Host Access List
- SNMP Overview
- HP JetDirect Software Utilities
- Using Pseudo-Terminal Connections
- Printcap File Entries
- Syslog Messages

Network printing (or plotting) is normally controlled through a spooler subsystem on a host computer. Typically, each host on the network has a print spooler that holds print jobs generated by that host. For network printing, there are two basic types of spoolers: a master spooler and a client spooler.

A master spooler is on a host that controls print jobs directly to a printer. A client spooler is on a host that sends print jobs to a master spooler for printing—a process known as remote spooling. For information on setting up master-client spooling environments, refer to your UNIX system manuals.

Depending on your network setup, a printer can be under control of a single master spooler, or multiple master spoolers.

A single master spooler has the following advantages:

- Print jobs are easy to manage since they will all reside on a single host (the master spooler).
- If the printing environment changes, only the master spooler configuration needs to be updated.
- All print jobs are processed sequentially and queue control is simple.

In most installations, a single master spooler is the preferred configuration.

Networks with multiple master spoolers have the following advantages:

- Disk space usage for printing can be distributed among the host systems.
- Client-to-master spooler transfers can be minimized.

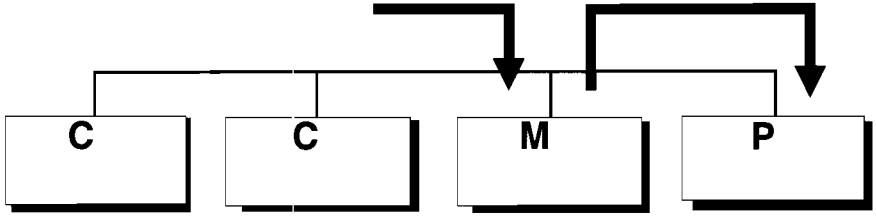
Direct Network Connections

Figures A-1 and A-2 illustrate configurations where a printer is connected directly to the network using a HP JetDirect interface. In these configurations, the printer is logically connected to one or more master spoolers over the network.

These configurations offer the following advantages:

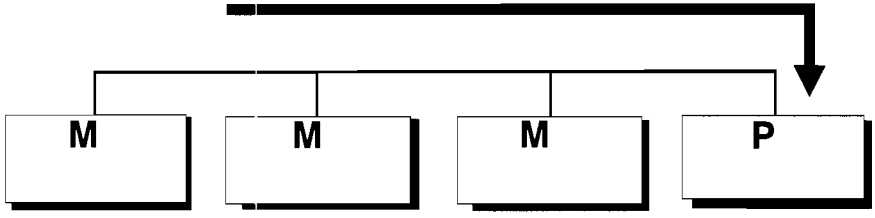
- Print jobs may travel from the spooler to the printer at network speeds. Print job performance will depend more on the printer's performance rather than data transmission speeds.
- The printer may be physically located anywhere on the network. This means it can be near users instead of the host.
- The host does not require extra serial or parallel connections for printing.

C : Client
M : Master
P : Printer



Client spoolers send print jobs over the network to the master spooler host. The master spooler sends each print job to the printer, also over the network.

Figure A-1. Network Printer with S ngle Master Spooler



Multiple master spoolers send print jobs to the printer over the network. Network usage is reduced, but queue control can be complex.

Figure A-2. Network Printer with Multiple Master Spoolers

Operation in a TCP/IP Environment

The HP JetDirect interface accepts a single TCP connection to port 9100 on a first-come-first-serve selection basis. Once established, this TCP connection provides a bidirectional, unaltered data path to the printer.

If the printer is switched offline during an established TCP connection, data transfers will temporarily suspend.

Sources of Interface Configuration Data

The HP JetDirect interface must be configured with network configuration data to operate properly on the network. There are two ways that the interface can obtain its configuration:

- from the network using BOOTP/TFTP and a BOOTP Server, or
- from the control panel of the printer (if supported).

To determine how the interface is set up to receive its configuration data, inspect the "`CONFIG BY:`" parameter on the printer's self-test page.

Using BOOTP/TFTP

In its default state, the interface will attempt to use BOOTP/TFTP on the network to retrieve its configuration data each time the printer is turned on or on command from hpnpadmin using the "-r" (reboot) option. The interface does not save its configuration data when the printer is turned off. Changes to configuration data are typically made by first modifying the appropriate files on the BOOTP server, and then turning the printer off and on.

From the Control Panel

Refer to your HP JetDirect interface installation guide for instructions on configuring the interface from your printer's control panel.

NOTE Your printer may not have a control panel, or may not support control panel configuration.

TCP/IP Ethernet network parameters that are configurable from the control panel are limited. Therefore, control panel configuration is typically used only for troubleshooting or simple installations (for example, where network management processes are not used). The parameters that can be configured from the control panel are:

- IP address of the printer
- Subnet mask
- IP address of the Default Gateway
- IP address of the Syslog Server
- Idle timeout period

The IP address of the printer is a required entry—without a proper IP address, the interface will not operate.

Parameters set from the control panel are activated when the printer is placed online. Because the configuration data is saved, you do not need to re-enter the data each time the printer is turned on.

BOOTP (Bootstrap Protocol) and TFTP (Trivial File Transfer Protocol) are used to download network configuration data from a server (the BOOTP server) to the printer. The BOOTP server and the master spooler for a printer can reside on separate computer systems.

A router must support "BOOTP Relay" (forwarding of a BOOTP request across gateways) to configure a printer that is not on the same subnet as the BOOTP server.

When shipped from the factory, the default state of the interface is to operate using BOOTP/TFTP. BOOTP/TFTP provides three major benefits:

More control of the printer. You can access all features of the interface.

Ease of data management. Network configuration data for the entire network can be in one location.

Ease of HP JetDirect interface configuration. Configuration data is automatically downloaded to the interface each time the printer is turned on.

The use of BOOTP and TFTP is a two phase process.

When turned on, the interface broadcasts BOOTP requests that contain the LAN hardware address of the interface. The server's BOOTP daemon (`bootpd`) receives the request and searches the `/etc/bootptab` file for an entry that matches the interface's LAN hardware address. If a match is found, `bootpd` retrieves the configuration data associated with the entry and sends it to the interface as a BOOTP reply.

The interface then searches for the name of a configuration file specified in the BOOTP reply. This file is referred to as the Network Printer Interface (NPI) configuration file. If a file is identified, the interface downloads the file from the BOOTP server using TFTP.

When using the `hpnpcfg` utility, an NPI configuration file will be created if you:

specify any SNMP configuration entries, or

provide host access list and idle timeout entries that are different from default values.

Otherwise, an NPI configuration file will not be created.

The `/etc/bootptab` file resides on the host from which the HP JetDirect interface will boot. For an example of a bootptab file, refer to the `/usr/lib/hpnp/examples/bootptab` file.

When you use `hpnpcfg` to set up the printer for BOOTP/TFTP operation, the appropriate entries are made in the `/etc/bootptab` file. An entry for an HP JetDirect printer would be similar to the following:

```
picasso:\
  :hn:ht=ether:vm=rfc1048:\
  :ha=08000903212F:\
  :ip=190.40.101.22:\
  :sm=255.255.255.0:\
  :gw=190.40.101.1:\
  :lg=190.40.101.3:\
  :T144="hpnp/picasso.cfg":
```

You can also use hpnpcfg to remove a printer's BOOTP/TFTP configuration. Applicable entries in the /etc/bootptab file will be automatically removed.

The /etc/bootptab file entry for your printer contains "tags" to identify various HP JetDirect interface configuration parameters and their settings (see table A-1). These tags are used by bootpd when it responds to BOOTP requests.

A colon (":") indicates the end of a field, and a backslash ("\") continues an entry on the next line. Spaces are not allowed between the characters on a line. Names, such as hostnames, must begin with a letter and can only contain letters, numbers, periods, or hyphens. The underline character ("_") is not allowed. For more information on tags, use your system man command on "bootpd".

If you run bootpquery to test BOOTP operation on the server, you must add the "ba" tag (broadcast response) to the /etc/bootptab entry. The "ba" tag allows the bootpquery program to hear the response from bootpd. The "ba" tag is not needed during normal operation.

NOTE When hpnpcfg is used to test BOOTP operation, the "ba"tag is automatically added and bootpquery is run.

For specific options and information on bootpquery and bootpd, use your system man command. These programs are located in the /etc directory on HP-UX systems, and in the /usr/etc directory on SunOS systems.

Table A-1. Tags in the /etc/bootptab file

nodename	Identifies an entry point to a list of parameters for a specific printer. *nodename* must be the first field in an entry. (Our example shows `picasso` as the *nodename*.)
`hn`	A tag that causes `bootpd` to send the printer's *nodename*. This tag does not take a parameter. Alternatively, the *nodename* can be provided in the NPI configuration file.
`ht`	The "hardware type" tag. For the HP JetDirect interface, set this to `ether` (for Ethernet). This tag must precede the `ha` tag.
`ha`	The tag for the "hardware address" of the printer. The hardware address is listed on the interface status page (such as the self-test page or configuration plot).
`ip`	The "IP address" tag. This address will be the interface's IP address and listed on the interface status page.
`gw`	The "gateway's IP address" tag. This address identifies the default gateway that allows the printer to communicate with systems that are not on the local cable (or subnet). Only one default gateway can be configured.
`sm`	The "subnet mask" tag. This will be the interface's subnet mask and listed on the interface status page.
`vm`	A required entry that specifies the BOOTP report format. Set the parameter to `rfc1048`.
`lg`	This tag specifies the IP address of the syslog server.
`T144`	A vendor-specific tag that specifies the relative path name of the NPI configuration file. Maximum length of the path name is 33 characters. The path name must be in double quotes (*"pathname"*). On a SunOS system, `/tftpboot` is prepended to the path. On HP-UX systems, `/usr/tftpdir` is prepended to the path. For file format, refer to the section "The NPI Configuration File."

A Network Printer Interface (NPI) configuration file supplements the `/etc/bootptab` file by allowing additional parameters to be configured. If you specify any SNMP parameters, or values for the "host access list" or "idle timeout" parameters that are not default values, then an NPI configuration file is needed.

The *`relative`* path name of the file is specified in the `/etc/bootptab` file using the `T144` vendor-specific tag, which must be recognized by the `bootpd` daemon. For an example of an NPI configuration file, refer to `/usr/lib/hpnp/examples/tftp.cfg`.

If you use `hpnpcfg` to set up the server for BOOTP/TFTP operation, the NPI configuration file will be automatically created. For HP-UX systems, the file will be placed in the `/usr/tftpdir/hpnp` directory. For SunOS systems, the file will be placed in the `/tftpboot/hpnp` directory.

NPI configuration file parameters are described in the HP JetDirect interface's UNIX configuration chapter.

The `subnets-local` parameter is not configured through `hpnpcfg`. Instead, you must manually edit the NPI configuration file by adding it to the bottom of the entry for your printer.

`subnets-local` allows the interface to treat hosts on other subnets as if the hosts were on the interface's subnet. It determines the TCP Maximum Segment size (MSS) advertised by the interface to hosts on other subnets, and affects the interface's initial receive-window size. The interface will use a TCP MSS of 1460 bytes for *local* hosts, and 536 bytes for a *non-local* host. The default is "`off`", that is, the interface will use maximum packet sizes only on the interface's configured subnet.

The hosts table /etc/hosts provides a way to map the printer's name to an IP address so that network services can refer to the printer by name. (Other methods include NIS, Network Information Services, and DNS, Domain Name System.)

In order to use BOOTP, you may need an entry for the IP address 0.0.0.0 in your /etc/hosts table. When you run the configuration utility hpnpcfg it may add the following line to the top of the hosts table:

```
0.0.0.0   dummy_entry
```

This entry should be near the top of the file. Some versions of /etc/inetd (internet services daemon) will look up the name for 0.0.0.0 when it receives a BOOTP request.

The configuration utility hpnpcfg will ask you whether or not the printer should be added to the /etc/hosts table. If your answer is "yes", your printer will be added near the top of the /etc/hosts table. An entry (IP address and printer name) will be similar to the following:

```
75.4.11.128   picasso
```

If your answer is "no", an entry for your printer will not be added. However, you will need to add it later (or use NIS or DNS).

NOTE

On large networks, the /etc/hosts table on your local system may be overwritten by a central or master system's /etc/hosts table during routine updates. In this case, you should assign your network printer's name and IP address in your master system's /etc/hosts file.

The host access list specifies which hosts (or network of hosts) that the printer will accept print data connections from. The list consists of entries in the NPI configuration file. The list is limited to ten entries. If the host access list is empty, the printer will accept connections from all hosts. The default is an empty list.

An entry in the access list consists of an IP address and an address mask. An address mask is a mask of bits where "1" identifies the bit positions of an address to check, and "0" identifies the bits to ignore.

There are two special masks. A mask of `0.0.0.0` is not allowed in the access list. A mask of `255.255.255.255` is the default mask.

An entry for a host system assumes the default mask. Therefore, the address mask may be omitted. For example, a typical host entry would look like this:

```
allow:  15.1.2.3
```

This entry would allow only the host with IP address `15.1.2.3` to access the printer.

An entry for a network consists of a network number and an address mask. For a network access list entry, the address mask is the network or subnet mask. A typical network entry would look like this:

```
allow:  10.0.0.0    255.0.0.0
```

This entry would allow all hosts on network 10 to access the printer.

To change the access list, use `hpnpcfg` to enter a new BOOTP/TFTP configuration or simply edit the NPI configuration file. You must then reboot the interface.

SNMP Overview

A manageable network is composed of one or more *manager* systems and a collection of network elements, or *agents*. A manager system executes network management operation to monitor and control agents. Agents are responsible for performing the network management operations requested by the manager. With the HP JetDirect interface installed, the network-based printer performs the functions of an agent.

The Simple Network Management Protocol (SNMP) allows a manager to retrieve (*"get"*) or alter (*"set"*) management information on an agent—a manager sends requests to the agent, and the agent complies.

A manager request is accompanied by a community name. A community name is similar to a password. The community name supplied by the manager must match the one expected by the agent before it complies.

Conceptually, the information on the agent is known as the Management Information Base (MIB). MIB values are structured according to an Internet standard and act as a virtual data store on the agent system.

NOTE

The HP JetDirect interface supports read-only MIB-II and enterprise-specific MIB values. Refer to the file `/usr/lib/hpnp/examples/hpnp.mib` for enterprise-specific MIB information.

An agent can send information to a manager without an explicit request from the manager. Such an operation is called a *trap*. Traps alert a manager of changes that occur on the agent. The agent knows which manager system to send traps to by reading a configurable trap destination parameter.

The HP JetDirect interface obtains its SNMP-related parameters from the NPI configuration file during the BOOTP/TFTP process.

Security Considerations

Community names are not highly secure; they are not encoded across the network. Security of the SNMP community name for the network-based printer should be considered if:

- the community name is common to host systems and other printers,
- third party intervention and control of printer operations is undesirable (such as aborting a print job).

SNMP community names (such as the "*get*" and "*set*" community names) are configured in the NPI configuration file. Because the name of this file is not secure, it may be accessible to network users.

While steps can be taken to minimize access to the NPI configuration file, the community names can never be completely protected. Therefore, the community names associated with the network-based printer should be different from those of host systems.

Use of Community Names

Community names can be specified on the command lines of SNMP-based management utilities, such as `hpnpadmin` or `hpnpstat`, supplied with the HP JetDirect software. Refer to your system manual (`man` command) pages on `hpnpadmin` and `hpnpstat` for command options.

Alternatively, you can specify community names in the file `/usr/lib/hpnp/hpnpsnmp`, which is automatically accessed by the SNMP-based management utilities if there is no community name specified on the command line. By default, the `hpnpsnmp` file is empty and the community name would default to `public` (`public` is a well known community name that allows requests of standard MIB values from agents). For more information on `hpnpsnmp`, refer to your system `man` command pages.

For security reasons, you typically would enter only the "*get*" community name for your printer in the `/usr/lib/hpnp/hpnpsnmp` file. For example, a "*get*" community name for the network-based printer could be entered as follows:

```
default         public
picasso         blue
```

where `picasso` is the printer name, and `blue` is the "*get*" community name. If a different "*set*" community name for the same printer was assigned, it would be specified on the command line of the utility.

The HP JetDirect interface gathers a number of network and operational statistics. All statistics can be read over the network using SNMP-based utilities (such as `hpnpadmin` and `hpnpstat`).

The network statistics are cleared whenever the interface reconfigures itself. This occurs when the printer is turned off and then on again, or on command from a network management process (such as `hpnpadmin` with the "-r" option).

A number of utilities provided with this product or on your system can be used to help you configure and manage your printer.

Configuration Utility

The `hpnpcfg` utility is a script that was designed to make configuration of the network-based printer easy. For information on running `hpnpcfg`, refer to the chapter on HP JetDirect interface UNIX configuration.

Management and Troubleshooting Utilities

Managing a printer involves checking its operation and responding to reported events or operational problems (for example, a printer may report a paper problem). Typically, such events are reported through syslog messages supported by the system, or network management utilities that use SNMP. For the HP JetDirect interface, two utilities are provided to help manage and troubleshoot a network-based printer: `hpnpstat` and `hpnpadmin`.

hpnpstat

As an SNMP agent, the HP JetDirect interface responds to requests for standard MIB-II (Management Information Base II) variables that are provided by all systems. The `hpnpstat` utility is able to obtain MIB-II values from the interface over the network.

The `hpnpstat` utility is similar in functionality to the `netstat` utility that is commonly used by network administrators. However, `netstat` is issued on a host to obtain the status of network subsystems on that host.

For specific command options and information on `hpnpstat`, see your system `man` command pages.

hpnpadmin

The hpnpadmin utility uses SNMP and was designed specifically for the HP JetDirect interface. Where hpnpstat obtains standard MIB-II values, hpnpadmin obtains and sets variables specific to the interface. By using the appropriate command options, hpnpadmin provides the following functions:

- Obtains printer status (such as "intervention needed").
- Obtains all configuration information that was sent when the printer was turned on.
- Obtains operational statistics (such as bytes received, bytes sent).
- Determines whether this host is allowed to print by checking the host access list.
- Can be used to kill the TCP connection currently being serviced.
- Can initiate the HP JetDirect interface configuration process that was used when the printer was initially turned on.

The hpnpadmin utility is useful to verify that the network configuration data was properly set on the HP JetDirect interface. For example, hpnpadmin can verify that SNMP-related parameters, such as the printer's "location" entry, are correct.

NOTE Although hpnpadmin can be used to kill a TCP connection, the proper method to terminate a print job is through spooler commands.

For specific hpnpadmin command options and information, refer to your system man command pages.

The spooler utilities supplied with this product allow you to print to the network printer. To accommodate different spooler subsystems, two programs are supplied: `hpnpf` and `hpnptyd`.

The `hpnpf` program is designed for use with native spooler subsystems. The `hpnpf` program is a filter that receives a print job and sends it to the network printer. The print job can come from the standard input, or be named as one or more files. The network printer name must be provided to this program.

Typically, this program is run from an HP-UX model script or SunOS printcap file. Output is routed to `hpnpf` which sends the job to the printer. If you are familiar with shell programming and would like to see how this works on HP-UX systems, refer to the model script:

```
/usr/lib/hpnp/hpnp.model
```

For SunOS systems, refer to the printcap entry shell scripts, such as:

```
/usr/lib/hpnp/hplj.if.sh and
/usr/lib/hpnp/hpdsnj.if.sh
```

NOTE

For information on printcap file entries, refer to the section "Printcap File Entries."

The hpnpf program is used by the hpnpcfg configuration utility to help verify printer operation by sending a print job without using the spooler.

For specific command options and information on hpnpf, see your system man command pages.

The hpnptyd program is a pseudo-tty (pty) daemon program intended for applications that may or may not use the native spooling subsystem.

The hpnptyd program provides a network connection between a pseudo-terminal and the network printer. A daemon process is invoked for each network connection. For applications that normally operate on serial ports, operating with hpnptyd has the appearance of operating on a serial port.

The advantage of hpnptyd is that it should work with any application that can write to a serial port. However, hpnptyd has disadvantages. While the hpnpf program starts up as needed and then exits, hpnptyd is always resident even though it may be inactive. Also, while hpnpf is tightly coupled with the spooling subsystem, hpnptyd is detached and may not allow smooth recovery from errors.

Refer to the section "Using Pseudo-Terminal Connections" for information on the use of hpnptyd. For specific command options and information on hpnptyd, see your system man command pages.

Using Pseudo-Terminal Connections

Some applications may not be able to use the network printer filter program, `hpnpf`. For example, some applications may output directly to a device, while others may use their own built-in filters. In either case, you can make a pseudo-terminal (pty) connection to your printer using `hpnptyd`. A virtual connection to the network-based printer is created that appears to the host computer as a direct connection.

Defining a pty Connection

A pseudo-terminal (pty) is a pair of devices: a master device and a slave device. The slave device provides an interface to application processes. The master device provides an interface to the network printer. Because the naming of pty devices will differ from system to system, you must refer to your system documentation for guidelines and conventions.

NOTE Be sure to select a pty device that is not being used for any other purpose.

For example, pty device `p0` would be named as follows:

	Master pty Device	Slave pty Device
On HP-UX Systems	`/dev/ptym/ptyp0`	`/dev/pty/ttyp0`
On SunOS Systems	`/dev/ptyp0`	`/dev/ttyp0`

Starting Up a pty Connection

Use the hpnptyd program to start up a pseudo-terminal (pty) connection. You must use one hpnptyd daemon for each pty connection required. For example, use the following hpnptyd command to start up a single network connection from pty p0 to a printer named picasso:

On HP-UX Systems	`hpnptyd -m /dev/ptym/ptyp0 -x picasso`
On SunOS Systems	`hpnptyd -m /dev/ptyp0 -x picasso`

where -m specifies a master pty, and -x specifies the printer name. If the port number option -p is not specified, the default is port 9100. If the timeout option -t for a network connection is not specified, the default is 30 seconds. Use the system man command for more information on hpnptyd.

NOTE These commands could be placed in your system startup file.

Using the conventions in this section, you can send the contents of a file, output1, to a network-based printer using the following command:

On HP-UX Systems	`cat output1 > /dev/pty/ttyp0`
On SunOS Systems	`cat output1 > /dev/ttyp0`

To troubleshoot a pty connection, perform the following steps:

1 Issue a `kill` command for the `hpnptyd` daemon process assigned to the printer.

2 Restart the `hpnptyd` daemon and have it log to a file by using the `-l` option. The following command lines could be used:

HP-UX Systems	`hpnptyd -m /dev/ptym/ptyp0 -x picasso -l /tmp/`*`logfile`*
SunOS Systems	`hpnptyd -m /dev/ptyp0 -x picasso -l /tmp/`*`logfile`*

where *`logfile`* is the file used for collecting messages.

3 Use a `cat` command to output a job.

HP-UX Systems	`cat /usr/lib/hpnp/testfiles/`*`filetype`*` > /dev/pty/ttyp0`
SunOS Systems	`cat /usr/lib/hpnp/testfiles/`*`filetype`*` > /dev/ttyp0`

where *`filetype`* represents an appropriate file type for your particular printer. (See the `testfiles` directory for the file types supplied, or substitute a suitable user-supplied file.)

Check the log file for error messages. You can use the `more` command as follows:

```
more /tmp/logfile
```

NOTE

The file sent to the pty may not print as you expect. Some pty implementations may translate a *newline* character to a *carriage-return / linefeed* by default, while others may not. Thus, the file sent may not have the proper line termination for your printer. If the file is text, you may be required to send an ESC-E or CTL-L to eject the page on a printer.

For SunOS spooler systems, the /etc/printcap file contains entries that identify particular characteristics of your system printers. To implement specific features of your printer, you may need to add or modify some /etc/printcap file entries.

The UNIX configuration scripts supplied will automatically add entries to the /etc/printcap file. These entries will specify special shell scripts that have been developed for various network-based printers. For example, depending on the type and capabilities of the printer that you specify, printcap file entries will allow you to print PCL and text files, or PostScript files, or both.

Refer to the /usr/lib/hpnp/examples directory for examples of /etc/printcap file entries.

NOTE

For more information on possible entries to your printcap file, refer to your system man command pages.

The HP JetDirect interface may be configured to send syslog messages to a syslog server. The IP address of a syslog server is configured on the interface either from the printer's control panel or through the `hpnpcfg` utility. Syslog messages identify changes in HP JetDirect printer status or error conditions.

A `syslogd` daemon on the server reads and forwards messages to log files or users depending on the message priority (or "severity level") and facility from which the message originates. Typically, `syslogd` obtains routing information from a configuration file `/etc/syslog.conf`. If desired, you can set up special routing of HP JetDirect syslog messages by editing `/etc/syslog.conf`. Refer to your system `man` command pages on `/etc/syslog.conf` or `syslogd`.

A `syslog-facility` parameter on the interface sets the source facility identifier for HP JetDirect syslog messages. Refer to the UNIX software configuration chapter for more information.

HP JetDirect Message / Severity Level	HP JetDirect Message / Severity Level
network interface fatal error / critical	page punt / error
peripheral fatal error / critical	paper out / error
config file error / error	paper problem / error
cover/door open / error	toner/ink low / warning
error cleared / error	connection denied / notice
image dump failed / error	connection aborted / information
memory out / error	image dump / information
offline or intervention needed / error	interface reconfigured / information
output full / error	powered up / information
paper jam / error	

B

Customer Support and Warranty Information

Customer Support

Hewlett-Packard has support services available to help you in case of difficulties with your HP JetDirect interface.

Your Authorized Dealer

If you encounter difficulty, begin by contacting the person who sold you the HP JetDirect interface. Your Hewlett-Packard Authorized Dealer is familiar with your needs, equipment, and software and should be able to provide you with the information you want.

Hewlett-Packard Return Service

If you determine that the HP JetDirect interface requires service, a replacement may be obtained through Hewlett-Packard's Return Service. To order a replacement unit call Hewlett-Packard's toll free number (800) 227-8164, during normal business hours (6:00 a.m. - 5:00 p.m. PST). You must provide the Order Representative with your Hewlett-Packard account number or the account number of a valid major credit interface (Hewlett-Packard can accept Visa and MasterCard). Under normal conditions your replacement unit will be delivered within two working days. An emergency next day service is available upon request. This service carries an additional charge to cover express handling and freight.

After you have received your replacement unit, use the same carton and internal packaging to ensure safe return of the defective HP JetDirect interface. The defective unit must arrive at Hewlett-Packard within 30 days of receiving the new unit.

Send the defective unit to:

Hewlett-Packard Company

Support Materials Organization
3625 Cincinnati Avenue
Rocklin, CA 95677

(Adequate insurance is recommended.)

User Warranty

The Hewlett-Packard HP JetDirect interface is warranted against defects in materials and workmanship for a period of one year from the date of receipt by the end user. During the warranty period, Hewlett-Packard will replace the unit at no charge provided the defective unit is returned and shipping is prepaid to Hewlett-Packard Support Materials Organization. Upon placing your order, Hewlett-Packard will initially charge your account the list price of a new unit. This charge will be credited after the defective unit has been received by Hewlett-Packard (see previous section, Hewlett-Packard Return Service and warranty coverage has been verified. *Be sure to enclose a copy of your purchase receipt.*

This warranty does not apply if the HP JetDirect interface has been damaged by accident or misuse, or as a result of service or modification by other than an authorized Hewlett-Packard Service Facility. No other express warranty is given by Hewlett-Packard. Hewlett-Packard shall not be liable for consequential damages.

Service Billing (Out of Warranty)

When ordering a replacement unit, your account will be charged the list price of a new unit. Upon receipt of the defective unit, Hewlett-Packard will credit your account the amount equal to the difference between the list price and the standard repair cost.

Units returned after 30 days will not qualify for refund and shall be returned to you.

Service Outside the United States

Customers outside the United States should contact their local sales office to obtain information on prices, exchange unit availability and instructions.

Software License Agreement

Important Notice:

Read the license agreement below before installing the HP JetDirect Network Interface utilities on your file server. The right to use these utilities is sold only on the condition that the customer agrees to the following License. If you do not agree to the terms of the License Agreement, you may return the unopened package for a full refund. However, installing the utilities on your file server indicates your acceptance of these terms and conditions.

- In return for the payment of the one-time fee for the HP JetDirect Network Interface the customer receives from Hewlett-Packard Company (HP) a license to use this product subject to the following terms and conditions.
- The HP JetDirect Network Interface utilities may not be duplicated or copied except for archival purposes, program error verification or to replace defective media. All copies must bear the copyright notices contained on the original product.
- No copies of the HP JetDirect Network Interface utilities may be produced for sale to third parties or for any purpose other than those purposes expressly permitted in paragraph 1 above.
- This license and the HP JetDirect Network Interface utilities may be transferred to a third party only with the prior written consent of Hewlett-Packard, provided the third party agrees to all the terms of this License
- Agreement and the customer does not retain any copies of the utilities.
- Purchase of this license does not transfer any right, title or interest in the HP JetDirect Network Interface utilities to the customer except as specifically set forth in this License Agreement.
- Hewlett-Packard reserves the right to terminate this license upon breach. In the event of termination, the customer will either return all copies of the product to Hewlett-Packard, or with Hewlett-Packard's prior written consent, provide Hewlett-Packard either a certificate of destruction of all copies.
- In the event the customer modifies the HP JetDirect Network Interface utilities or includes it with any other software program, the customer agrees upon termination of the license to either remove the HP JetDirect Network Interface utilities or any portion thereof from the modified program and return it to Hewlett-Packard or provide Hewlett-Packard with a certificate of destruction thereof.

Printed in Singapore 4/93

Manual Part No.
J2371-90001

J2371-90001

Printed on
Recycled Paper