HP Jetdirect Print Server

Administrator's Guide

300x
510x

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Administrator's Guide

HP Jetdirect Print Servers (300X/510X)

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Introducing the HP Jetdirect Print Server

Introduction

HP Jetdirect print servers allow you to connect printers and other devices directly to a network. By attaching directly to a network, devices can be conveniently located near users. In addition, a network connection allows data transfers to or from the device at network speeds.

HP Jetdirect *external* print servers connect printers to the network by adapting the printer's parallel port to a network port. Depending on the model, HP Jetdirect external print servers can connect up to three printers to a network.

Note Unless otherwise specified, the term print server in this manual refers to the HP Jetdirect print servers and not a separate computer running print server software.

Supported Print Servers

Unless otherwise specified, the features described in this guide support the following HP Jetdirect print servers with firmware version x.08.55 or later.

- HP Jetdirect 300x/510x external print servers

Supported Networks

HP Jetdirect print servers support a variety of network protocol suites, including TCP/IP, IPX/SPX, DLC/LLC, and AppleTalk protocols. In addition, HP provides software for network configuration on the following networks:

- Microsoft Windows 2000, XP, Server 2003 (Direct Mode printing)
- Apple Mac OS
- UNIX (HP-UX and Solaris)
- Linux (RedHat and SuSE)

Note If not supplied with this product, HP network configuration and management software for supported systems may be obtained from HP online support (http://www.hp.com/support/net_printing).

For software to set up network printing on other systems, consult your system vendor.

Support Materials

The manuals listed below are shipped with your print server or with printers that have factory-installed print servers.

- *User Guide* or equivalent printer documentation
- This manual, the *HP Jetdirect Administrator's Guide*.
- The *HP Jetdirect Print Server Setup Guide* (shipped with non-factory-installed print servers).

Software, Driver, and Flash Image Upgrades

Hewlett-Packard offers downloadable electronic upgrades for HP Jetdirect print servers containing internal Flash memory. The electronic upgrades are available on the World Wide Web at

http://www.hp.com/go/webjetadmin_firmware

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HP Software Solutions Summary

Software Solutions Table

HP provides a variety of software solutions to set up or manage your HP Jetdirect-connected network devices. See Table 2.1 to help you determine which software is best for you:

Table 2.1 Software Solutions

Operating Environment	Function	Remarks
HP Jetdirect Printer Installer for UNIX		
HP-UX 10.x-10.20, 11.x Solaris 2.6, 7, 8 (SPARCsystems only) TCP/IP	Fast and easy installation of HP Jetdirect-connected printers	More information: http://www.hp.com/support/net_printing
HP Web Jetadmin		
(See the HP Website for supported system updates.) Windows 2000, XP Professional, Server 2003 HP-UX* Solaris* Fedora Core and SuSE Linux NetWare* *Supports queue creation and peripheral management from HP Web Jetadmin hosted on a supported system.	Remote installation, configuration, and management of HP Jetdirect-connected print servers, non-HP printers that support the standard MIBs, and printers with embedded Web servers Alerts and consumables management Remote firmware upgrades for HP Jetdirect print servers Asset tracking and utilization analysis	HP's preferred solution for ongoing management and installation of multiple printers-anywhere on your intranet Browser-based management More information: http://www.hp.com/support/net_printing

HP Jetdirect Printer Installer for UNIX

The HP Jetdirect Printer Installer for UNIX contains support for HP-UX and Solaris. The software installs, configures and provides diagnostics capabilities for HP printers connected to TCP/IP networks.

The software may be downloaded from HP online support at:

http://www.hp.com/support/net_printing

HP Web Jetadmin

HP Web Jetadmin allows you to use a Web browser to install, view, manage, and diagnose devices connected to an HP Jetdirect print server or any standard printer MIB devices.

For information about a procedure or window in the HP Web Jetadmin software, see the online help.

System Requirements

HP Web Jetadmin software runs on Microsoft Windows 2000, XP Professional, and Server 2003, and selected Linux systems. For information on supported host operating systems, clients, and compatible browser versions, visit HP online support at:

http://www.hp.com/go/webjetadmin

Note	When installed on a supported host server, HP Web Jetadmin can be accessed from any client through a supported web browser by browsing to the HP Web Jetadmin host. This allows printer installation and management on Novell NetWare, and other networks.

Installing HP Web Jetadmin

Before installing the HP Web Jetadmin software, you must have domain administrator or root privileges:

1. Download the installation files from HP online support at http://www.hp.com/go/webjetadmin
2. Follow the instructions on the screen to install the HP Web Jetadmin software.

Note	The latest installation instructions are included with the HP Web Jetadmin install file.

Verifying Installation and Providing Access

- Verify that the HP Web Jetadmin software is correctly installed by navigating to it with your browser as shown in the following example:

  ```
  http://systemname.domain:port/
  ```

  where `systemname.domain` is the host name of your web server, and `port` is the port number assigned during installation.

- Provide users access to HP Web Jetadmin software by adding a link to your web server's home page that is addressed to HP Web Jetadmin's URL. For example:

  ```
  http://systemname.domain:port/
  ```

Configuring and Modifying a Device

Using your browser, navigate to HP Web Jetadmin's URL. For example:

```
http://systemname.domain:port/
```

Follow the instructions on the appropriate home page to configure or modify your printer.

Note You can also substitute the `systemname.domain` with the TCP/IP address of the host computer on which HP Web Jetadmin is installed.

Removing HP Web Jetadmin Software

To remove HP Web Jetadmin software from your web server, use the uninstall program provided with the software package.

Internet Printer Connection Software

HP Jetdirect print servers (firmware version x.07.16 or later) support the Internet Printing Protocol (IPP). Using the appropriate software on your system, you can create an IPP print path from your system to any HP Jetdirect-connected printer over the Internet.

Note For incoming print path requests, the network administrator must configure the firewall to accept incoming IPP requests. Security features available in the software are currently limited.

Windows 2000/XP/Server 2003

Note Contact Microsoft for support of Windows IPP software.

For supported Windows systems, Internet printing connection software is included with the system.

To set up a print path from a Windows 2000 system to an HP Jetdirect-connected Internet printer, proceed as follows:

1. Open the Printers folder (click **Start**, select **Settings**, and select **Printers**).
2. Run the Add Printer wizard (double-click **Add Printer**), then click **Next**.
3. Select **Network Printer** and click **Next**.
4. Select **Connect to a printer on the Internet** and enter the print server's URL:

   `http://`*`IP_address`*`/ipp/[`*`port#`*`]`

   where IP_address is the IP address configured on the HP Jetdirect print server, and [*port#*] is an optional parameter that identifies the port number on the multi-port HP Jetdirect external print server (port1, port2, or port3) that the printer is connected to. The default is port1.

(Example: http://169.254.227.113/ipp/port2)

Then click **Next**.

5. You will be prompted for a printer driver (the HP Jetdirect print server does not contain printer drivers, so your system cannot automatically obtain the driver). Click **OK** to install the printer driver onto your system and follow the instructions on the screen. (You may need your printer CD-ROM to install the driver.)
6. To complete the print path setup, follow the instructions on the screen.

Features

Features and benefits provided by Internet printing include:

- High-quality, time-sensitive documents.
- Full-color or black-and-white documents.
- A fraction of the cost of current methods (such as fax, mail, or overnight delivery services).
- Extends the traditional LAN printing model to that of an Internet Printing Model.
- IPP requests can be transmitted outbound through firewalls.

System Requirements

- Computer running Microsoft Windows 2000
- IPP-enabled HP Jetdirect print server (firmware must be at revision x.07.16 or later)

Supported Browsers

Windows 2000

- Microsoft Internet Explorer 5 or later.

Supported Proxies

- Web proxy with support for HTTP v1.1 (may not be needed if printing over an intranet)

3

TCP/IP Configuration

Introduction

To operate properly on a TCP/IP network, the HP Jetdirect print server must be configured with valid TCP/IP network configuration parameters, such as an IP address. Depending on your printer and system, this can be done in the following ways:

Note When shipped from the factory, the HP Jetdirect print server has no IP address. If the HP Jetdirect print server is not configured with a valid IP address within two minutes after power up, a factory default value of 192.0.0.192 will be automatically assigned. This address must be reconfigured with a valid address for use on your TCP/IP network. For more information on TCP/IP networks, see appendix A.

- By downloading the data from a network-based UNIX server using BOOTP (Bootstrap Protocol) and TFTP (Trivial File Transfer Protocol) each time the print server is turned on.

Note The BOOTP daemon, bootpd, must be running on a BOOTP server that is accessible by the print server.

- By using Dynamic Host Configuration Protocol (DHCP). This protocol is supported in HP-UX, Solaris, Linux, Windows and Mac OS systems. (Refer to your network operating system manuals to verify that your operating system supports DHCP.)

Note

Linux and UNIX systems: For more information, see the bootpd man page.

On HP-UX systems, a sample DHCP configuration file (dhcptab) may be loaded in the `/etc` directory.

If your HP-UX system does not provide Dynamic Domain Name Services (DDNS) for its DHCP implementations, HP recommends that you set all print server lease durations to *infinite*. This ensures that print server IP addresses remain static until such time as Dynamic Domain Name Services are available.

- By a network-based server using RARP (Reverse Address Resolution Protocol) answering the print server's RARP request and supplying the print server with the IP address. The RARP method only allows you to configure the IP address.
- By using the `arp` and `ping` commands from your system.
- By setting configuration parameters using Telnet. In order to set configuration parameters, set up a Telnet connection from your system to the HP Jetdirect print server using the default IP address. The default IP address takes effect two minutes after the printer is turned on (if none of the other configuration methods have been used). (Older products may take longer for the IP address to take effect.) The default IP address is 192.0.0.192. If Telnet is used, the print server saves the configuration even if the printer or print server is turned off.
- By browsing to the embedded Web server on the HP Jetdirect print server and setting the configuration parameters.

Using BOOTP/TFTP

This section describes how to configure the print server using BOOTP (Bootstrap Protocol) and TFTP (Trivial File Transfer Protocol) services on UNIX servers. BOOTP and TFTP are used to download network configuration data from a server to the HP Jetdirect print server over the network.

Note On supported Windows server systems, use the Microsoft DHCP utilities to set up HP Jetdirect configuration via BOOTP. For more information, see "Using DHCP".

Note If the Jetdirect print server and BOOTP/DHCP server are located on different subnets, IP configuration may fail unless the routing device supports "BOOTP Relay" (allows the transfer of BOOTP requests between subnets).

Why Use BOOTP/TFTP

Using BOOTP/TFTP to download configuration data has the following benefits:

- Enhanced configuration control of the HP Jetdirect print server. Configuration by other methods, such as a printer control panel, are limited to select parameters.
- Ease of configuration management. Network configuration parameters for the entire network can be in one location.
- Ease of HP Jetdirect print server configuration. Complete network configuration can be automatically downloaded each time the print server is powered on.

The factory-default state of the HP Jetdirect print server is to operate through BOOTP/TFTP.

Systems That Use Network Information Service (NIS)

If your system uses NIS, you may need to rebuild the NIS map with the BOOTP service before performing the BOOTP configuration steps. Refer to your system documentation.

Configuring the BOOTP Server

For the HP Jetdirect print server to obtain its configuration data over the network, the BOOTP/TFTP servers must be set up with the appropriate configuration files. BOOTP is used by the print server to obtain entries in the `/etc/bootptab` file on a BOOTP server, while TFTP is used to obtain additional configuration information from a configuration file on a TFTP server.

When the HP Jetdirect print server is powered on, it broadcasts a BOOTP request that contains its MAC (hardware) address. A BOOTP server daemon searches the `/etc/bootptab` file for a matching MAC address, and if successful, sends the corresponding configuration data to the Jetdirect print server as a BOOTP reply. The configuration data in the `/etc/bootptab` file must be properly entered. For a description of entries, see “Bootptab File Entries”.

The BOOTP reply may contain the name of a configuration file containing enhanced configuration parameters. If the HP Jetdirect print server finds such a file, it will use TFTP to download the file and configure itself with these parameters. For a description of entries, see “TFTP Configuration File Entries”. Configuration parameters retrieved via TFTP are optional.

Note — HP recommends that the BOOTP server be located on the same subnet as the printers it serves. **BOOTP broadcast packets may not be forwarded by routers unless the routers are properly configured.**

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

Bootptab File Entries

An example of a `/etc/bootptab` file entry for an HP Jetdirect print server is provided below:

```
picasso:\
   :hn=picasso:ht=ether:vm=rfc1048:\
   :ha=0060b0123456:\
   :ip=192.168.10.248:\
   :sm=255.255.255.0:\
   :gw=192.168.10.1:\
   :lg=192.168.10.2:\
   :T144="hpnp/picasso.cfg":
```

Note that the configuration data contains "tags" to identify the various HP Jetdirect parameters and their settings. The tags are identified in Table 3.1.

Table 3.1 Tags in the "bootptab" file (1 of 2)

nodename	The name of the peripheral. This name identifies an entry point to a list of parameters for a specific peripheral. *nodename* must be the first field in an entry. (In the example above, *nodename* is "picasso".)
hn	The host name tag. This tag causes the BOOTP daemon to download the host name to the HP Jetdirect print server. The host name will be printed on the Jetdirect configuration page, or returned on an SNMP sysName request by a network application.
ht	The hardware type tag. For the HP Jetdirect print server, set this to **ether** (for Ethernet) or **token** (for Token Ring). This tag must precede the **ha** tag.
vm	The BOOTP report format tag (required). Set this parameter to **rfc1048**.

Table 3.1 Tags in the "bootptab" file (2 of 2)

ha	The hardware address tag. The hardware (MAC) address is the link-level, or station address of the HP Jetdirect print server. It can be found on the HP Jetdirect configuration page as the **LAN HW ADDRESS**. On HP Jetdirect external print servers, it is printed on a label attached to the print server.
ip	The IP address tag (required). This address will be the HP Jetdirect print server's IP address.
gw	The gateway IP address tag. This address identifies the IP address of the default gateway (router) that the HP Jetdirect server will use for communications with other subnets.
sm	The subnet mask tag. The subnet mask will be used by the HP Jetdirect print server to identify the portions of an IP address that specify the network/subnetwork number and the host address.
lg	The syslog server's IP address tag. It specifies the server that the HP Jetdirectprint server sends syslog messages to.
T144	A vendor-specific tag that specifies the relative path name of the TFTP configuration file. Maximum length of the path name is 33 characters. The path name must be in double quotes (for example, *"pathname"*). On HP-UX systems, `/usr/tftpdir` is prepended to the path. For file format information, refer to "TFTP Configuration File Entries".

A colon (:) indicates the end of a field, and a backslash (\) indicates that the entry is continued on the next line. Spaces are not allowed between the characters on a line. Names, such as host names, must begin with a letter and can contain only letters, numbers, periods, or hyphens.The underline character (_) is not allowed. Refer to your system documentation or online help for more information.

TFTP Configuration File Entries

To provide additional configuration parameters for your HP Jetdirect print server, such as SNMP (Simple Network Management Protocol) or non-default settings, an additional

configuration file can be downloaded using TFTP. This TFTP configuration file's relative path name is specified in the BOOTP reply using the `/etc/bootptab` file's T144 vendor-specific tag entry. An example of a TFTP configuration file is provided below (the symbol '#' denotes a remark and is not included in the file).

```
#
# Example of an HP Jetdirect TFTP Configuration File
#
# Allow only Subnet 192.168.10 access to peripheral.
# Up to four 'allow' entries can be written via TFTP.
# Up to 10 'allow' entries can be written via SNMP.
# 'allow' may include single IP addresses.
#
allow: 192.168.10   255.255.255.0
#
#
# Disable Telnet
#
telnet: 0
#
# Enable the embedded web server
#
ews-config: 1
#
# Detect SNMP unauthorized usage
#
authentication-trap: on
#
# Send Traps to 192.168.10.1
#
trap-dest: 192.168.10.1
#
# Specify the Set Community Name
#
set-community-name: 1homer2
#
# End of file
```

Table 3.2 describes parameters that may be included in the TFTP configuration file.

Table 3.2 TFTP Configuration File Parameters (1 of 3)

ews-config:	Enables or disables the embedded web server on the HP Jetdirect print server. To enable, set to 1. To disable, set to 0.
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 values range from 0 to 3600 (1 hour). If “0” is typed, the timeout mechanism is disabled. The default is 90 seconds.
allow: netnum [mask]	Provides an entry into the host access list stored on the HP Jetdirect print server. Each entry specifies a host or network of hosts that are allowed to connect to the printer. The format is “allow: netnum [mask]” where netnum is a network number or host IP address, and mask is an address mask of bits applied to the network number and host address to verify access. Up to 10 access list entries are allowed. If there are no entries, all hosts are permitted access. For example: allow: 192.0.0.0 255.0.0.0 allows hosts on network 192. allow: 192.168.10.1 allows a single host. In this case, the default mask 255.255.255.255 is assumed and is not required.
tcp-mss:	Specifies the maximum segment size (MSS) that the HP Jetdirect print server will advertise for use when communicating with local subnets (MSS=1460 bytes or more) or remote subnets (MSS=536 bytes): 0 (default) All networks are assumed to be local (MSS=1460 bytes or more). 1 Use MSS=1460 bytes (or more) for subnets, and MSS=536 bytes for remote networks. 2 All networks are assumed to be remote (MSS=536 bytes), except the local subnet.
location:	Identifies the physical location of the printer (SNMP sysLocation object). Only printable ASCII characters are allowed. The maximum length is 64 characters. The default location is undefined. (Example: `1st floor, south wall`)

Table 3.2 TFTP Configuration File Parameters (2 of 3)

contact:	ASCII character string that identifies the person who administers or services the printer (SNMP sysContact object). This may include how to contact this person. The default contact is undefined.
get-community-name:	Specifies a password that determines which SNMP GetRequests the HP Jetdirect print server will respond to. This is optional. The community name must be ASCII characters. The maximum length is 32 characters.
set-community-name:	Specifies a password that determines which SNMP SetRequests (control functions) the HP Jetdirect print server will respond to. The community name of an incoming SNMP SetRequest must match the print server's "set community name" for the print server to respond. SetRequests must come from hosts that are configured in the print server's host access list. Community names must be ASCII characters. The maximum length is 32 characters.
trap-dest:	Enters a host's IP address into the HP Jetdirect print server's SNMP trap destination list. If the list is empty, the print server does not send SNMP traps. The list may contain up to four entries. The default SNMP Trap Destination List is empty. To receive SNMP traps, the systems listed on the SNMP trap destination list must have a trap daemon to listen to those traps.
trap-community-name:	Community name (password) included with SNMP traps that are sent by the HP Jetdirect print server to a host computer. The default community name is `public`. Community names must be ASCII characters. The maximum length is 32 characters.
authentication-trap:	Configures the print server to send (on) or not send (off) SNMP authentication traps. Authentication traps indicate that an SNMP request was received, but the community name check failed. The default is "off."

Table 3.2 TFTP Configuration File Parameters (3 of 3)

telnet:	If set to 0, this parameter instructs the print server not to allow incoming Telnet connections. To regain access, change the setting in the TFTP configuration file and power cycle the print server, or cold reset the print server to factory default values. If this parameter is set to 1, incoming Telnet connections are allowed.
port:	For multiport Jetdirect print servers, identifies the port (1, 2, or 3) for port-specific commands. The default is 1.
banner:	A port-specific parameter that specifies printing an LPD banner page. 0 disables banner pages. 1 (default) enables banner pages.

Using DHCP

Dynamic Host Configuration Protocol (DHCP, RFC 2131/2132) is one of several auto configuration mechanisms that the HP Jetdirect print server uses. If you have a DHCP server on your network, the HP Jetdirect print server automatically obtains its IP address from that server and registers its name with any RFC 1001 and 1002-compliant dynamic name services.

Note DHCP services must be available on the server. Refer to your system documentation or online help to install or enable DHCP services.

Note If the Jetdirect print server and BOOTP/DHCP server are located on different subnets, IP configuration may fail unless the routing device supports “BOOTP Relay” (allows the transfer of BOOTP requests between subnets).

UNIX Systems

For more information on setting up DHCP on UNIX systems, see the bootpd man page.

On HP-UX systems, a sample DHCP configuration file (dhcptab) may be located in the `/etc` directory.

If your HP-UX system does not support Dynamic Domain Name Services (DDNS) for its DHCP implementations, HP recommends that you set all print server lease durations to *infinite*. This ensures that print server IP addresses remain static until dynamic name services are available.

Windows Systems

HP Jetdirect print servers support IP configuration from a Windows DHCP server. This section describes how to set up a pool, or "scope," of IP addresses that the Windows server can assign or lease to any requester. When configured for BOOTP/DHCP operation (factory default), the HP Jetdirect print server makes a request to the DHCP server for its IP configuration when the print server is turned on.

Note This information is provided as an overview. For specific information or for additional support, see the information supplied with your DHCP software.

Note To avoid problems resulting from IP addresses that change, HP recommends that all printers be assigned IP addresses with infinite leases or reserved IP addresses.

Windows 2000 Server/Server 2003

To set up a DHCP scope on a Windows 2000 server, perform the following steps:

1. Run the Windows DHCP manager utility.
   - Windows 2000: Click **Start**, select **Settings** and **Control Panel**. Open the **Administrative Tools** folder and run the **DHCP** utility.
   - Server 2003: Click **Start**, then select **Control Panel**. Open the **Administrative Tools** folder and run the **DHCP** utility.
2. In the DHCP window, locate and select your Windows server in the DHCP tree.

   If your server is not listed in the tree, select **DHCP** and click the **Action** menu to add the server.
3. After selecting your server in the DHCP tree, click the **Action** menu and select **New Scope**. This runs the **Add New Scope** Wizard.
4. In the **Add New Scope** Wizard, click **Next**.
5. Enter a Name and Description for this scope, then click **Next**.
6. Enter the range of IP addresses for this scope (beginning IP address and ending IP address). Also, enter the subnet mask. then click **Next**.

Note If subnetting is used, the subnet mask defines which portion of an IP address specifies the subnet and which portion specifies the client device. For more information, see Appendix A.

---

7. If applicable, enter the range of IP addresses within the scope to be excluded by the server. Then click **Next**.
8. Set the IP address lease duration for your DHCP clients. Then click **Next**.

   HP recommends that all printers be assigned reserved IP addresses. This can be accomplished after you set up the scope (see step 11).
9. Select **No** to configure DHCP options for this scope later. Then click **Next**.

To configure DHCP options now, select **Yes** and click **Next**.

a. If desired, specify the IP address of the router (or default gateway) to be used by clients. Then click **Next**.

b. If desired, specify the Domain Name and DNS (Domain Name System) servers for clients. Click **Next**.

c. If desired, specify WINS server names and IP addresses. Click **Next**.

d. Select **Yes** to activate the DHCP options now, and click **Next**.

10. You have successfully set up the DHCP scope on this server. Click **Finish** to close the wizard.

11. Configure your printer with a reserved IP address within the DHCP scope:

    a. In the DHCP tree, open the folder for your scope and select **Reservations**.

    b. Click the **Action** menu and select **New Reservation**.

    c. Enter the appropriate information in each field, including the reserved IP address for your printer. (Note: the MAC address for your HP Jetdirect-connected printer is available on the HP Jetdirect configuration page.)

    d. Under "Supported types", select **DHCP only**, then click **Add**. (Note: Selecting **Both** or **BOOTP only** will result in a BOOTP configuration due to the sequence in which HP Jetdirect print servers initiate configuration protocol requests.)

    e. Specify another reserved client, or click **Close**. The reserved clients added will be displayed in the Reservations folder for this scope.

12. Close the DHCP manager utility.

Enabling or Disabling DHCP

If you do not want your HP Jetdirect print server configured via DHCP, you must disable DHCP configuration. There are three methods for enabling or disabling DHCP:

1. You can use Telnet to enable or disable DHCP operation on the HP Jetdirect print server. When you disable a DHCP configuration via Telnet, the print server automatically releases any names and IP addresses associated with the DHCP server and re-initializes the TCP/IP protocol for the print server. At this point, the print server is unconfigured and begins to send BOOTP and RARP requests to acquire new (non-DHCP) configuration information.
2. You can modify the TCP/IP parameters via HP Web Jetadmin.

If you manually provide an IP address when disabling DHCP via Telnet, the print server still releases its DHCP-provided IP address but does not send BOOTP and RARP configuration requests. Instead, it uses the configuration information you have provided. **Therefore, if you provide the IP address you should also manually set all of the configuration parameters, such as subnet mask, default gateway, and idle timeout.**

Note If the DHCP configuration state is changed from disabled to enabled, the print server assumes it should acquire its configuration information from a DHCP server. This means that when the Telnet session is completed, the TCP/IP protocol for the print server is re-initialized and all current configuration information is deleted. The print server then attempts to acquire new configuration information by sending DHCP requests on the network to a DHCP server.

For DHCP configuration via Telnet, refer to “Using Telnet” in this chapter.

Using RARP

This subsection describes how to configure the print server using the Reverse Address Resolution Protocol (RARP) on UNIX and Linux systems.

This setup procedure enables the RARP daemon running on your system to respond to a RARP request from the HP Jetdirect print server and to supply the IP address to the print server.

1. Turn the printer off.
2. Log onto your UNIX or Linux system as a superuser.
3. Make sure the RARP daemon is running on your system by typing the following command at the system prompt:

   `ps -ef | grep rarpd` (Unix)

   `ps ax | grep rarpd` (BSD or Linux)
4. The system response should be similar to the following:

   ```
   861 0.00.2  24  72  5  14:03  0:00  rarpd -a
   860 0.00.5  36 140  5  14:03  0:00  rarpd -a
   ```
5. If the system does not display a process number for the RARP daemon, see the *rarpd* man page for instructions on starting the RARP daemon.
6. Edit the `/etc/hosts` file to add your designated IP address and node name for the HP Jetdirect print server. For example:

   ```
   192.168.0.1 laserjet1
   ```
7. Edit the `/etc/ethers` file (`/etc/rarpd.conf` file in HP-UX 10.20) to add the LAN hardware address/station address (from the configuration page) and the node name for the HP Jetdirect print server. For example:

   ```
   00:60:b0:a8:b0:00 laserjet1
   ```

Note If your system uses Network Information Service (NIS), you need to incorporate changes to the NIS host and ethers databases.

8. Turn the printer on.

9. To verify that the card is configured with the correct IP address, use the ping utility. At the prompt, type:

   `ping <IP address>`

   where `<IP address>` is the assigned address from RARP. The default IP address is 192.0.0.192.

10. If ping does not respond, see the chapter "Troubleshooting the HP Jetdirect Print Server."

Using the arp and ping Commands

You can configure an HP Jetdirect print server with an IP address using an ARP (Address Resolution Protocol) command from a supported system. The protocol is not routable, that is, the workstation from which the configuration is made must be located on the same network segment as the HP Jetdirect print server.

Using the arp and ping commands with HP Jetdirect print servers requires the following:

- Windows or UNIX system configured for TCP/IP operation
- HP Jetdirect firmware version x.08.55 or later
- The LAN hardware (MAC) address of the HP Jetdirect print server (specified on an HP Jetdirect configuration page, or on a label attached to HP Jetdirect external print servers)

Note On some systems, superuser rights may be required for the `arp` command.

After an IP address is assigned via `arp` and `ping` commands, use other tools (such as Telnet, embedded web server, or HP Web Jetadmin software) to configure other IP parameters.

To configure a Jetdirect print server, use the following commands. Depending on the system, the LAN hardware address requires a specific format.

- From a DOS prompt (Windows):

  `arp -s` <IP address> <LAN hardware address>

  `ping` <IP address>

- From a UNIX command prompt:

  `arp -s` <IP address> <LAN hardware address>

  `ping` <IP address>

where <IP address> is the desired IP address to be assigned to the print server. The `arp` command writes the entries to the arp cache on the workstation, and the `ping` command configures the IP address on the print server.

For example:

- In Windows

```
arp -s 192.168.10.1 00-b0-60-a2-31-98
ping 192.168.10.1
```

- In UNIX

```
arp-s 192.168.10.1 00:b0:60:a2:31:98
ping 192.168.10.1
```

Note

Once the IP address has been set on the print server, additional `arp` and `ping` commands will be ignored. Once the IP address is configured, `arp` and `ping` cannot be used unless the print server is reset to factory values.

On UNIX systems, the `arp -s` command may vary between different systems.

Some BSD-based systems expect the IP address (or host name) in reverse order. Other systems may require additional parameters. See your system documentation for specific command formats.

Using Telnet

This subsection describes how to configure the print server using Telnet.

Note To use Telnet commands with the HP Jetdirect print server, a route must be available from your workstation to the print server. Simplistically, this means that there must be a match between the network identification of your system to that of the HP Jetdirect print server.

On Windows systems, you can use the following `route` command at a DOS prompt to add a route to the print server:

`route add <IP address Jetdirect> <IP address workstation>`

where `<IP address` Jetdirect> is the IP address configured on the HP Jetdirect print server, and `<IP address workstation>` is the IP address of the workstation's network card that is attached to the same physical LAN as the print server.

CAUTION Using Telnet to change dynamically-configured Jetdirect print servers (for example, using BOOTP, RARP, DHCP), may result in a static configuration depending on the parameter being changed.

To set configuration parameters, you must set up a Telnet connection from your system to the HP Jetdirect print server.

1. Type the following at the system prompt:

   `telnet <IP address>`

   where `<IP address>` may be the assigned address from BOOTP, RARP, DHCP, the printer control panel, or the default IP address. The default IP address is 192.0.0.192. The `<IP address>` is listed on the Jetdirect configuration page.

2. When the server responds `connected to IP address`, press **Enter** twice to make sure that the Telnet connection is initialized.
3. If you are prompted for a password, type the correct password.

   By default, Telnet does not require a password, but you can set up to a 14-character password by using the password command (passwd). Once a password is set, password protection is enabled. You can disable password protection by typing `0` (zero) when prompted for a new password, or by performing a cold reset on the print server.

Note Any time during the Telnet session you can type: `?` then press **Enter** to view available configuration parameters, the correct command format, and a list of additional commands to display. To print current configuration information, type `/` then press **Enter**.

Note The Present Config field in the *Telnet Configuration* menu describes how the HP Jetdirect print server is configured. For example, if the HP Jetdirect print server is configured by your BOOTP server, the menu will contain the line, "present config=BOOTP." Other possible configuration types are RARP, DHCP, or Telnet/Front Panel.

Note On Windows systems **local echo** should be selected. To determine if **local echo** is enabled, perform the following:

- Run Microsoft Telnet and enter the **display** command.

On UNIX systems, it is not necessary to select **local echo**.

4. At the Telnet prompt ">" type:

   `parameter: value`

   then press **Enter**, where `parameter` refers to the configuration parameter you are defining, and `value` refers to the definitions you are assigning to that parameter. Each parameter entry is followed by a carriage return.

   See Table 3.3 for examples on assigning configuration parameters.

5. Repeat step 4 to set any additional configuration parameters.

6. When you have finished typing the configuration parameters, type:

   `quit`

   and press **Enter** to activate the configuration parameters.

   To exit without activating parameters, type `exit` and press **Enter**.

Telnet Configuration Parameter Examples

The examples in Table 3.3 show how to use Telnet configuration commands.

Note If a parameter is supplied by the DHCP server, its value cannot be changed using Telnet without disabling DHCP.

Table 3.3 Telnet Configuration Parameter Examples (1 of 2)

IP Address Parameter Example	`ip: 192.168.10.1`	where `ip` identifies the parameter and `192.168.10.1` specifies the address for the printer. By typing this parameter, you can overwrite the IP address used to make the Telnet connection with one you have selected.
Subnet Mask Example	`subnet-mask: 255.255.255.0`	where `subnet-mask` identifies the parameter and `255.255.255.0` specifies the subnet mask.
Default Gateway Example	`default-gw: 192.168.10.2`	where `default-gw` identifies the parameter and `192.168.10.2` specifies the IP address of the gateway. **Note:** If the HP Jetdirect print server is configured by DHCP and you change the subnet mask or the default gateway address (using front-panel, Telnet, or other tool), you should change the IP address to release the present IP address back to the DHCP server IP address pool.
Syslog Server Example	`syslog-server: 192.168.10.3`	where `syslog-server` identifies the parameter and `192.168.10.3` specifies the IP address of that server.

Protocol Enabling/Disabling Example	`IPX/SPX: 1`
	`dlc-llc: 1`
	`ethertalk: 1`
		(1 enables, 0 disables)
		(1 enables, 0 disables)
		(1 enables, 0 disables)

Idle Timeout Parameter Example	`idle-timeout: 120`	where `idle-timeout` identifies the parameter and `120` specifies the number of seconds an idle print data connection is allowed to remain open. If you set this parameter to `0`, the connection does not terminate and no other host is able to make a connection.
Banner Page Parameter Example	`banner: 1`	(1 enables, 0 disables)

Table 3.3 Telnet Configuration Parameter Examples (2 of 2)

Port and Banner Page Example	`port:2` `banner:0`	For multiport Jetdirect print servers, 'port' specifies the port that you want to enable or disable a banner page. (In this example, disable banner page on port 2.) The default port is port 1.
Set Community Name Example	`set-cmnty-name:` `my_network`	where `set-cmnty-name` identifies the parameter and `my_network` specifies the name you want to set. The Set Community Name parameter is a network management security mechanism that enables external network management entities to set internal print server management (mib) values. The name can be from 1 to 32 alpha and numeric characters and can include the underscore (_) symbol.
DHCP Parameter Example	`dhcp-config:` `1`	where `dhcp-config:` identifies the Dynamic Host Configuration Protocol. (1 enables, 0 disables)
Host Name Example (to assign or change a name)	`host-name:` `MY_PRINTER`	where `MY_PRINTER` is an alphanumeric string and must be all uppercase letters.

Using Telnet to Erase the Existing IP Address

To erase the IP address during a Telnet session:

1. Type `cold-reset`, then press **Enter**.
2. Type `quit`, then press **Enter** to exit Telnet.

Note	This procedure resets all TCP/IP parameters, but only affects the TCP/IP subsystem. After this has been done the print server should be power cycled. Parameters for other subsystems such as IPX/SPX (Novell NetWare) or AppleTalk are not affected.

Using the Embedded Web Server

You can set IP parameters on HP Jetdirect print servers that support the embedded web server. For more information, refer to Appendix B.

Moving to Another Network

When moving an HP Jetdirect print server that is configured with an IP address to a new network, make sure that the IP address does not conflict with addresses on the new network. You may change the IP address of the print server to one that can be used on the new network, or erase the current IP address and configure another address after you are installed on the new network. Cold reset the print server (see Chapter 6, “Troubleshooting the HP Jetdirect Print Server,” for instructions).

If the current BOOTP server is not reachable, you may need to locate a different BOOTP server and configure the printer to this server.

If the print server was configured using BOOTP, DHCP or RARP, edit the appropriate system files with updated settings. If the IP address was manually set (for example, Telnet), reconfigure IP parameters as described in this chapter.

4

Configuring for LPD Printing

Introduction

The HP Jetdirect print server contains an LPD (Line Printer Daemon) Server module to support LPD printing. This chapter describes how to configure the HP Jetdirect print server for use with various systems that support LPD printing. These instructions include:

- LPD on UNIX Systems
  - Configuring BSD-based UNIX systems using LPD
  - Configuring print queues using the SAM utility (HP-UX systems)
- LPD on Windows Systems

About LPD

Line Printer Daemon (LPD) refers to the protocol and programs associated with line-printer spooling services that may be installed on various TCP/IP systems.

Some of the widely used systems in which the HP Jetdirect print server functionality supports LPD include:

- Berkeley-based (BSD) UNIX systems
- HP-UX
- Solaris
- IBM AIX
- Linux
- Microsoft Windows
- Apple Mac OS

The UNIX configuration examples in this section show the syntax for BSD-based UNIX systems. The syntax for your system may vary. See your system documentation for the correct syntax.

Note The LPD functionality can be used with any host implementation of LPD that complies with the RFC 1179 document. The process for configuring printer spoolers, however, may differ. See your system documentation for information on configuring these systems.

The LPD programs and protocol include the following:

Table 4.1 LPD Programs and Protocols

Program Name	Purpose of Program
lpr	Queues jobs for printing
lpq	Displays print queues
lprm	Removes jobs from print queues
lpc	Controls print queues
lpd	Scans and prints the files if the specified printer is connected to the system. If the specified printer is connected to another system, this process forwards the files to an lpd process on the remote system where the files are to be printed.

Requirements for Configuring LPD

Before you can use LPD printing, your printer must be properly connected to the network through the HP Jetdirect print server, and you must have print server status information. This information is listed on the HP Jetdirect printer configuration page. If you have not printed a configuration page from your printer, see the hardware installation guide for your print server or your printer's getting started guide for instructions. You must also have the following:

- An operating system that supports LPD printing.
- Superuser (root) or Administrator access to your system.

- The LAN hardware address (or station address) of the print server. This address is printed with print server status information on the HP Jetdirect configuration page and is of the form:

  LAN HW ADDRESS: xxxxxxxxxxxx

  where x is a hexadecimal digit (for example, 001083123ABC).

- An IP address configured on the HP Jetdirect print server.

LPD Setup Overview

The following steps are necessary to configure the HP Jetdirect print server for LPD printing:

1. Setting up IP parameters.
2. Setting up print queues.
3. Printing a test file.

The following sections provide detailed descriptions for each step.

Step 1. Setting Up IP Parameters

To set up IP parameters on the HP Jetdirect print server, refer to chapter 3. For more information on TCP/IP networks, refer to appendix A.

Step 2. Setting Up Print Queues

You must set up a print queue for each printer or printer personality (PCL or PostScript) you use on your system. Also, different queues are required for formatted and unformatted files. The queue names `text` and `raw` in the following examples (see `rp` tag) have special meanings.

Table 4.2 Supported Queue Names

`raw, raw1, raw2, raw3`	no processing
`text, text1, text2, text3`	carriage return added
`auto, auto1, auto2, auto3`	automatic

The line printer daemon on the HP Jetdirect print server treats data in the `text` queue as unformatted text or ASCII, and adds a carriage return to each line before sending it to the printer. (Note that the actual observed behavior is that a PCL line termination command (value of 2) is issued at the beginning of the job.) The line printer daemon treats data in the `raw` queue as formatted files in PCL, PostScript, or HP-GL/2 languages and sends the data without change to the printer. Data in the `auto` queue will be automatically processed as text or raw, as appropriate. If the queue name is not one of the above, the HP Jetdirect print server assumes it to be `raw1`.

Step 3. Printing a Test File

Print a test file using the LPD commands. For instructions, see the information provided for your system.

LPD on UNIX Systems

Configuring Print Queues for BSD-based Systems

Edit the `/etc/printcap` file to include the following entries:

```
printer_name|short_printer_name:\
:lp=:\
:rm=node_name:\
:rp=remote_printer_name_argument:\ (this should be
text, raw, or auto)
:lf=/usr/spool/lpd/error_log_filename:\
:sd=/usr/spool/lpd/printer_name:
```

where `printer_name` identifies the printer to the user, `node_name` identifies the printer on the network, and `remote_printer_name_argument` is the print queue designation.

For more information on printcap see the **printcap** man page.

Example 1

(suggested name for an ASCII or text printer):

```
lj1_text|text1:\
:lp=:\
:rm=laserjet1:\
:rp=text:\
:lf=/usr/spool/lpd/lj1_text.log:\
:sd=/usr/spool/lpd/lj1_text:
```

Example 2

(suggested name for PostScript, PCL, or HP-GL/2 printers):

```
lj1_raw|raw1:\
:lp=:\
:rm=laserjet1:\
:rp=raw:\
:lf=/usr/spool/lpd/lj1_raw.log:\
:sd=/usr/spool/lpd/lj1_raw:
```

If your printer does not support automatic switching between PostScript, PCL, and HP-GL/2 languages, use the printer's control panel (if the printer has one) to select the printer language or rely on the application to select the printer language via commands embedded in the print data.

Make sure your users know the printer names for the printers, since they must type those names on the command line for printing.

Create the spooling directory by making the following entries. At the root directory, type:

```
mkdir /usr/spool/lpd
cd /usr/spool/lpd
mkdir printer_name_1 printer_name_2
chown daemon printer_name_1 printer_name_2
chgrp daemon printer_name_1 printer_name_2
chmod g+w printer_name_1 printer_name_2
```

where `printer_name_1` and `printer_name_2` refer to the printers to be spooled. You may spool several printers. The following example shows the command to create the spooling directories for printers used for text (or ASCII) printing and for PCL or PostScript printing.

Example:

```
mkdir /usr/spool/lpd
cd /usr/spool/lpd
mkdir lj1_text lj1_raw
chown daemon lj1_text lj1_raw
chgrp daemon lj1_text lj1_raw
chmod g+w lj1_text lj1_raw
```

Configuring Print Queues Using SAM (HP-UX systems)

On HP-UX systems you can use the SAM utility to configure remote print queues for printing "text" (ASCII) files or "raw" (PCL, PostScript, or other printer language) files.

Before you execute the SAM program, select an IP address for the HP Jetdirect print server and set up an entry for it in the `/etc/hosts` file on your system running HP-UX.

1. Start the SAM utility as a superuser.
2. Select **Peripheral Devices** from the *Main* menu.
3. Select **Printers/Plotters** from the *Peripheral Devices* menu.
4. Select **Printers/Plotters** from the *Printers/Plotters* menu.
5. Select **Add a Remote Printer** from the *Actions* list, then select a printer name.

   Examples: `my_printer or printer1`
6. Select a remote system name.

   Example: `jetdirect1` (node name of the HP Jetdirect print server)
7. Select a remote printer name.

   Type `text` for ASCII or `raw` for PostScript, PCL, or HP-GL/2.
8. Check for a remote printer on a BSD system. You must type `Y`.
9. Click **OK** at the bottom of the menu. If the configuration is successful, the program prints the message:

   ```
   The printer has been added and is ready to accept
   print requests.
   ```
10. Click **OK** and select **Exit** from the *List* menu.
11. Select **Exit Sam**.

Note By default, the lpsched is not running. Make sure you turn the scheduler on when you set up your print queues.

Printing a Test File

To verify that the printer and print server connections are correct, print a test file.

1. At the UNIX system prompt type:

   `lpr -Pprinter_name file_name`

   where `printer_name` is the designated printer and `file_name` refers to the file to be printed.

   Examples (for BSD-based systems):

   Text File: `lpr -Ptext1 textfile`
   PCL File: `lpr -Praw1 pclfile.pcl`
   PostScript File: `lpr -Praw1 psfile.ps`
   HP-GL/2 File: `lpr -Praw1 hpglfile.hpg`

   For HP-UX systems, substitute `lp -d` *for* `lpr -P`.

2. To get print status, type the following at the UNIX prompt:

   `lpq -Pprinter_name`

   where `printer_name` is the designated printer.

   Examples (for BSD-based systems):

   ```
   lpq -Ptext1
   lpq -Praw1
   ```

   For HP-UX systems, substitute `lpstat` *for* `lpq -P` *to get print status.*

This completes the process for configuring the HP Jetdirect print server to use LPD.

LPD on Windows 2000/Server 2003 Systems

This section describes how to configure Windows systems to use the HP Jetdirect LPD (Line Printer Daemon) services.

The process consists of two parts:

- Installing TCP/IP software (if not already installed).
- Configuring a network LPD printer.

Installing TCP/IP Software

This procedure lets you check whether you have TCP/IP installed on your Windows system, and to install the software if necessary.

Note You may need your Windows System distribution files or CD-ROMs to install TCP/IP components.

1. To check whether you have Microsoft TCP/IP Printing protocol and TCP/IP printing support:
   - Windows 2000: Click **Start**, **Settings**, **Control Panel**. Then double-click the **Network and Dial-up Connections** folder. Select the **Local Area Connection** for your network, then click the **File** menu and select **Properties**.
   - Server 2003: Click **Start**, **All Programs**, **Accessories**, **Communications**, and open the **Network Connections** folder. Double-click the **Local Area Connection** for your network and click **Properties**.

   If Internet Protocol (TCP/IP) is listed and enabled in the list of components used by this connection, the necessary software is already installed. (Proceed to "Configuring a Network Printer for Windows 2000/Server 2003 Systems"). if not, go to step 2.

2. If you have not previously installed the software:

   - Windows 2000/Server 2003: In the *Local Area Connection Properties* window, click **Install**. In the *Select Network Component Type* window, select **Protocol** and click **Add** to add the **Internet Protocol (TCP/IP)**.

   Follow the instructions on the screen.

3. Enter TCP/IP configuration values for the computer:

   - Windows 2000/Server 2003: On the **General** tab in the *Local Area Connection Properties* window, select **Internet Protocol (TCP/IP)** and click **Properties**.

   If you are configuring a Windows server, type the IP address, default gateway address, and subnet mask in the appropriate spaces.

   If you are configuring a client, check with your Network Administrator to learn whether you should enable automatic TCP/IP configuration or whether you should type a static IP address, default gateway address, and subnet mask in the appropriate spaces.

4. Click **OK** to exit

5. If prompted, exit Windows and restart your computer for the changes to take effect.

Configuring a Network Printer for Windows 2000/Server 2003 Systems

Set up the default printer by performing the following steps.

1. Verify that the Print Services for Unix is installed (required for LPR port availability):

   a. Windows 2000: Click **Start**, **Setup**, and **Control Panel**. Double-click the **Network and Dial-up Connections** folder.

      Server 2003: Click **Start**, **All Programs**, **Accessories**, **Communications**, and open the **Network Connections** folder.

   b. Click the **Advanced** menu and select **Optional Networking Components**.

c. Select and enable **Other Network File and Print Services**.

d. Click **Details**, and verify that **Print Services for Unix** is enabled. If not, enable it.

e. Click **Okay**, and then **Next**.

2. Windows 2000: Open the **Printers** folder (from the Desktop, click **Start**, **Settings**, and **Printers**).

   Server 2003: Open the **Printers and Faxes** folder (from the Desktop, click **Start**, **Printers and Faxes**).

3. Double-click **Add Printer**. From the Add Printer Wizard welcome screen, click **Next**.

4. Select **Local printer**, and disable automatic detection for Plug and Play printer installation. Click **Next**.

5. Choose **Create a new port**, and select **LPR Port**. Click **Next**.

6. In the *Add LPR compatible printer* window:

   - Enter the DNS name or IP address of the HP Jetdirect print server.
   - Enter (in lower case) **raw**, **text**, or **auto** for the name of the printer or print queue on the HP Jetdirect print server.

   Then click **OK**.

Note The HP Jetdirect print server treats text files as unformatted text or ASCII files. Files that are raw are formatted files in PCL, PostScript, or HP-GL/2 printer languages.

For HP Jetdirect external print servers with three ports, use `raw1`, `raw2`, `raw3`, `text1`, `text2`, `text3` or `auto1`, `auto2`, `auto3` to specify the port.

7. Select the Manufacturer and Printer model. (If necessary, click **Have Disk** and follow the instructions to install the printer driver.) Click **Next**.

8. Choose to keep the existing driver, if prompted. Click **Next**.

9. Enter a printer name, and choose whether this printer will be the default printer. Click **Next**.

10. Choose whether this printer will be available to other computers. If shared, enter a share name that identifies the printer to other users. Click **Next**.
11. If desired, enter a location and other information for this printer. Click **Next**.
12. Choose whether to print a test page, and click **Next**.
13. Click **Finish** to close the wizard.

Verifying the Configuration

Print a file from any application. If the file prints correctly, the configuration was successful.

If the print job is not successful, try printing directly from DOS using the following syntax:

```
lpr -S<ipaddress> -P<queuename> filename
```

where `ipaddress` is the IP address of the print server, `queuename` is the name "raw" or "text" and `filename` is the file you wish to print.If the file prints correctly, the configuration was successful. If the file does not print, or prints incorrectly, see the chapter "Troubleshooting the HP Jetdirect Print Server."

Printing from Windows Clients

If the LPD printer on the Windows server is shared, Windows clients can connect to the printer on the server using the Windows Add Printer utility in the Printers folder.

5

FTP Printing

Introduction

FTP (File Transfer Protocol) is a basic TCP/IP connectivity utility to transfer data between systems. FTP printing is a way to use FTP to send print files from a client system to an HP Jetdirect-connected printer. In an FTP printing session, the client connects and sends a print file to the HP Jetdirect FTP server which in turn passes the print file to the printer.

The HP Jetdirect FTP server can be enabled or disabled through a configuration utility, such as Telnet.

Requirements

FTP printing requires the following:

- HP Jetdirect print servers with firmware version x.08.55 or later.
- TCP/IP client systems with FTP that complies with RFC 959.

Note For the most recent list of tested systems, visit the HP online support at www.hp.com/support/net_printing.

Print Files

The HP Jetdirect FTP server transfers print files to the printer but does not interpret them. For proper printing, print files must be in a language recognized by the printer (such as PostScript, PCL, or unformatted text). For formatted print jobs, you must first print to a file from your application using the driver for the selected printer, then transfer the print file to the printer through an FTP session. For formatted print files, use binary (image) type transfers.

Using FTP Printing

FTP Connections

Similar to standard FTP file transfers, FTP printing uses two TCP connections: a control connection and a data connection.

Once an FTP session is opened, it remains active until either the client closes the connection or the data and control connections are idle for 900 seconds (15 minutes). (This setting cannot be configured.)

Control Connection

Using standard FTP, a control connection is opened by the client to the FTP server on the HP Jetdirect print server. FTP control connections are used to exchange commands between the client and the FTP server. The HP Jetdirect print server supports up to three control connections (or FTP sessions) simultaneously. If the number of allowed connections is exceeded, a message indicating that service is not available will be displayed.

FTP control connections use TCP port 21.

Data Connection

A second connection, a data connection, is created each time a file is transferred between the client and the FTP server. The client controls the creation of a data connection by issuing the commands that require a data connection (such as FTP `ls`, `dir` or `put` commands).

Although the `ls` and `dir` commands are always accepted, the HP Jetdirect FTP server supports only one data connection for printing at a time.

The transmission mode for an FTP data connection with the HP Jetdirect print server is always in stream mode, which marks the end-of-file by closing the data connection.

Once a data connection is established, the file transfer type (ASCII or binary) can be specified. Although some clients may attempt to autonegotiate a transfer type, the default is ASCII. To specify the transfer type, enter the `bin` or `ascii` command at the FTP prompt.

FTP Login

To start an FTP session, enter the following command from a MS-DOS or UNIX command prompt:

```
ftp <IP address>
```

where `<IP address>` is the valid IP address or node name configured for the HP Jetdirect print server.

If the connection is successful, the HP Jetdirect model and firmware version will be displayed.

After a successful connection, the user is prompted for a login name and password. The default is the client's login name. The Jetdirect FTP server will allow any user name. Passwords are ignored.

If login is successful, a message "230" will be displayed on the client system. In addition, the available HP Jetdirect ports for printing will be displayed. HP Jetdirect external print servers with multiple ports will display all available ports, with Port1 the default port. To change ports, use the FTP `cd` (change directory) command. For an example of a successful login, see "Example of an FTP Session."

Ending the FTP Session

To end an FTP session, type `quit` or `bye`.

Commands

Table 5.1 summarizes commands available to the user during an FTP printing session.

Table 5.1 User Commands for HP Jetdirect FTP Server

Command	Description
`user <username>`	`<username>` specifies a user. Any user will be accepted and can print to the selected port.
`cd <port#>`	`<port#>` selects a port number for printing. For HP Jetdirect single-port print servers, only port1 is available. For multiport print servers, specify port1 (default), port2, or port3.
`cd/`	`/` specifies the root directory of the HP Jetdirect FTP server.
`quit`	`quit` or `bye` terminates the FTP session with the HP Jetdirect print server.
`bye`	
`dir`	`dir` or `ls` displays the contents of the current directory. If this command is typed in the root directory, a list of available ports for printing is displayed. For multiport print servers, the available ports for printing are PORT1 (default), PORT2, and PORT3.
`ls`	
`pwd`	Displays the current directory or the current Jetdirect printing port.
`put <filename>`	`<filename>` specifies the file to send to the selected HP Jetdirect print server port. For multiport print servers, a different port can be specified in the command: `put <filename> <port#>`
`bin`	Configures an FTP binary (image) file transfer.
`ascii`	Configures an FTP ASCII file transfer. HP Jetdirect print servers support only non-print format control for character transfers (standard values for spacing and margins are used).
Ctrl-C	Press the **Ctrl** and **C** keyboard keys simultaneously to abort the FTP service command and any transfer of data. The data connection is closed.
`rhelp`	Displays the FTP commands supported.

Example of an FTP Session

This is an example of a typical FTP printing session:

```
System> ftp 192.168.10.1
Connected to 192.168.10.1
220 JD FTP Server Ready
Name (192.168.10.1:root): Deke
331 Username OK, send identity (email name) as password.
Password:

230- Hewlett-Packard J7983G FTP Server Version 1.0

Directory:     Description:
---------------------------
PORT1 (default) Print to port 1 (HP LaserJet 4000)
PORT2           Print to port 2 (HP Color LaserJet 4500)
PORT3           Print to port 3 (unknown device)

To print a file use the command: put <filename> [portx]
or 'cd' to desired port and use: put <filename>

Ready to print to PORT1

230 User logged in.
Remote system type is UNIX.
Using binary mode to transfer files.
ftp> pwd
257  "/" is current directory. (default port is PORT1: HP
LaserJet 4000)
ftp> cd port1
250 CWD command successful
ftp>pwd
257  "/PORT1" is current directory. (HP LaserJet 4000)
ftp> bin
200 Type set to I
ftp> put test
200 PORT command successful
150 Opening data connection...
226 Transfer complete.
18 bytes sent in 0.00 seconds (37.40 Kbytes/s)
ftp> quit
221 Goodbye
System>
script done on Mon Apr 12 16:50:24 2006
```

6

Troubleshooting the HP Jetdirect Print Server

Introduction

This chapter describes how to diagnose and correct problems associated with the HP Jetdirect print server.

A flowchart guides you to the correct procedures for troubleshooting the following:

- Printer problems
- HP Jetdirect hardware installation and connection problems
- Network related problems

This chapter also helps you to understand your HP Jetdirect print server configuration page.

To troubleshoot your HP Jetdirect print server, you may need the following items:

- Your printer's user guide
- Your printer's getting started guide
- The installation manuals for your print server
- The diagnostics tools and utilities provided with your network software (such as the PCONSOLE or NWADMIN utility provided with Novell NetWare software, or the ping command provided with UNIX systems)
- A printer configuration page

Note	Frequently asked questions about installing and configuring HP Jetdirect print servers can be found at HP online support at http://www.hp.com/support/net_printing.

Resetting to Factory Defaults

Parameters on the HP Jetdirect print server (for example, the IP address) can be reset to factory default values using the following procedures:

- **HP Jetdirect External Print Servers**

  Reset the HP Jetdirect external print server by holding down the **Test** button on the print server while connecting the power cord.

After resetting the HP Jetdirect print server, you may need to reconfigure your computers for printing.

General Troubleshooting

Troubleshooting Chart - Assessing the Problem

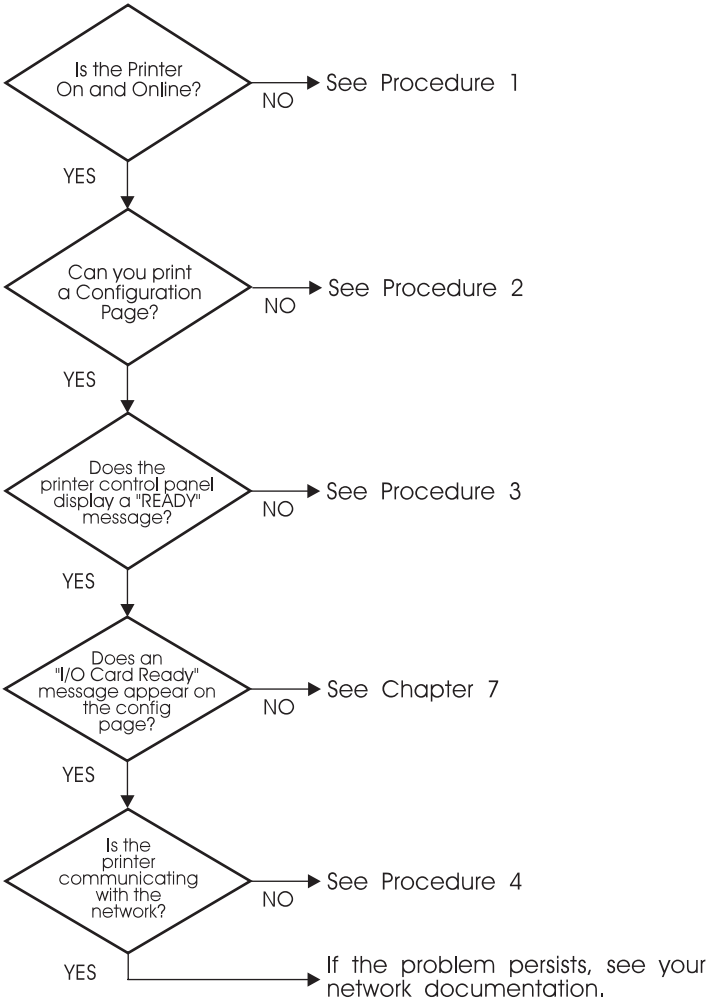

Figure 6.1 Assessing the Problem

Procedure 1: Verifying that the Printer is On and Online

Check the following items to make sure the printer is ready to print.

1. Is the printer plugged in and turned on?

   Make sure the printer is plugged in and turned on. If the problem persists, you may have a defective power cable, power source, or printer.

2. Is the printer online?

   The online light should be lit. If it is not, press the appropriate key to place the printer online.

3. Is the printer's control panel display indicate normal operation (on printers with displays)?

   - Make sure the HP Jetdirect print server is installed correctly.
   - See your printer documentation for a complete list of control panel messages and corrective actions.

Procedure 2: Printing an HP Jetdirect Configuration Page

The HP Jetdirect configuration page is an important troubleshooting tool. The information on this page reveals the status of your network and the HP Jetdirect print server. The ability to print a configuration page provides an indication that the printer is operating correctly. See the end of this chapter for descriptions of the information on the configuration pages.

Check the following items if the configuration page does not print.

1. Is the print server turned on and properly connected to the printer? Ensure the print server is plugged into a power source. Check the cable connection to the printer.

2. Did you perform the correct steps on the printer to print the configuration page?

   Press the **Test** button.

3. Does an error message appear on the printer control panel display?

   - See your printer documentation for a complete list of control panel messages and corrective actions.

Procedure 3: Resolving Printer Display Error Messages

Try to isolate the problem to either the printer or the print server.

1. Disconnect the print server from the printer. Does the same error message appear on the printer?
   - See your printer documentation for a complete list of control panel messages and corrective actions.

Procedure 4: Resolving Printer Communication Problems with the Network

Check the following items to verify that the printer is communicating with the network. *This information assumes you have already printed a configuration page.*

1. Is there any physical connection problems between the workstation or file server and the HP Jetdirect print server?

   Verify network cabling, connections, and router configurations.

2. Are your network cables connected properly?

   Make sure that the printer is attached to the network using the appropriate HP Jetdirect print server port and cable. Check each cable connection to make sure it is secure and in the right place. If the problem continues, try a different cable or ports on the switch, hub or transceiver.

3. Have any software applications been added to the network?

   Make sure they are compatible and that they are installed correctly with the correct printer drivers. Refer to the appropriate chapter for your network operating system to verify the connection.

4. Are other users able to print?

   The problem may be workstation specific. Check the workstation network drivers, printer drivers, and redirection (capture in Novell NetWare).

5. If other users are able to print, are they using the same network operating system?

   Check your system for proper network operating system setup.

6. Is your protocol enabled?

   Check the STATUS line for your protocol on the Jetdirect configuration page. See the end of this chapter for descriptions of the information on the configuration page.

7. Is there an error message in the protocol's section on the configuration page?

   See the chapter "HP Jetdirect Configuration Page Messages" for a list of error messages.

8. If you are using Novell NetWare, does the printer (node address) appear in the HP Web Jetadmin software?

   - Verify network and HP Jetdirect settings on the configuration page. See the end of this chapter for descriptions of the information on the configuration page.
   - See the troubleshooting section in the online help included with the HP Web Jetadmin software.

9. On a TCP/IP network, can you communicate with the print server.

   - Use a **ping** command to verify a network connection with the print server.

10. If you are on a TCP/IP network, can you use Telnet to print directly to the printer?

    - Use the following Telnet command:
      `telnet <IP address> <port>`

      where `<IP address>` is the IP address assigned to the HP Jetdirect print server and `<port>` is 9100. (HP Jetdirect data port 9101 or 9102 can also be used for ports 2 or 3 respectively, of a Jetdirect multiport external print server.)

    - In the Telnet session, type in data and press **Enter**.
    - The data should print to the printer (a manual form feed may be required).

11. Does the printer appear in the HP Web Jetadmin software?

    - Verify network and HP Jetdirect settings on the configuration page. See the end of this chapter for descriptions of the information on the configuration page.
    - See the troubleshooting section in the online help included with the HP Web Jetadmin software.

Understanding the Ethernet Configuration Pages (External Print Servers)

This section describes the Ethernet/802.3 configuration page for HP Jetdirect external print servers.

The networking section of each configuration page is divided into sections. The item numbers in the following table correspond to the callouts in Figures 6.2 and 6.3.

Table 6.1 External Print Server (1 of 2) Configuration Pages

Item	Description	Troubleshooting Information
1	HP Jetdirect product information (Table 7.1)	Firmware revision number, type of network (Ethernet), LAN hardware address, port selection type, active ports (three-port print servers), speed, and manufacturing identification number.
2	HP Jetdirect print server status information (Table 7.2)	Lists error conditions or Ready.
3	Network statistics (Table 7.3)	Packets received, framing errors, transmit collisions, and other network statistics.
4	Novell NetWare status information (Table 7.4)	Novell NetWare frame types received. May indicate if the print server is locking onto the wrong frame type, that multiple frames are using the same network number, and more.
5	DLC/LLC configuration messages (Table 7.5)	Status for the DLC/LLC protocol.
6	TCP/IP status information (Table 7.6)	TCP/IP status, IP address, BOOTP server, and other configuration information.

Table 6.1 External Print Server (2 of 2) Configuration Pages

Item	Description	Troubleshooting Information
7	Apple EtherTalk status information (Table 7.7)	(Ethernet only) If the AppleTalk protocol is working properly, or if it is enabled. Use NET and NODE to verify the printer is communicating correctly on the network. ZONE verifies you selected the correct printer. P2 (below READY) indicates you are using the Phase 2 EtherTalk protocol, which should be the same on your printer as on your Mac OS.
8	SNMP Messages (Table 7.8)	Provides SNMP community name status.

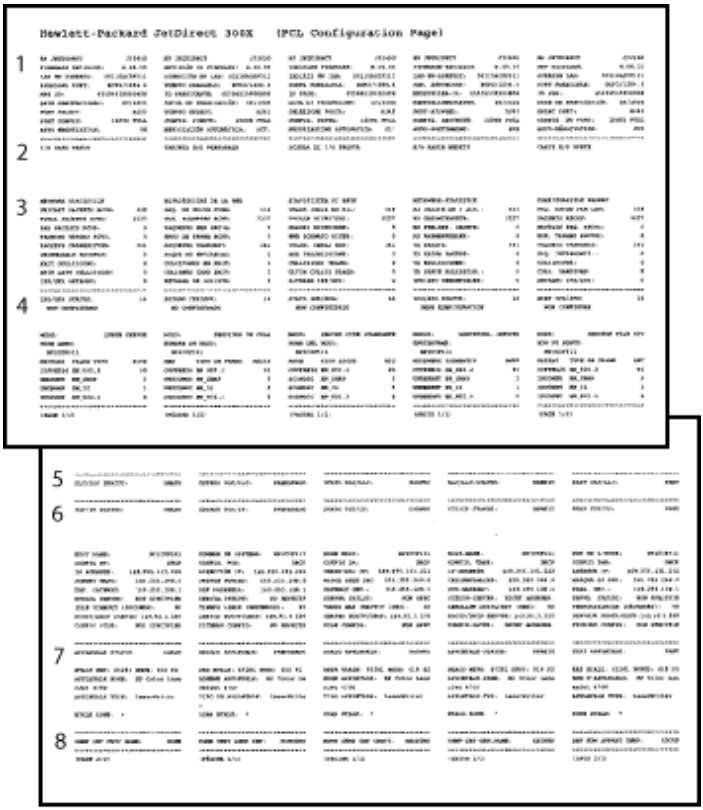

Figure 6.2 Ethernet Configuration Page (External Single Port Print Servers)

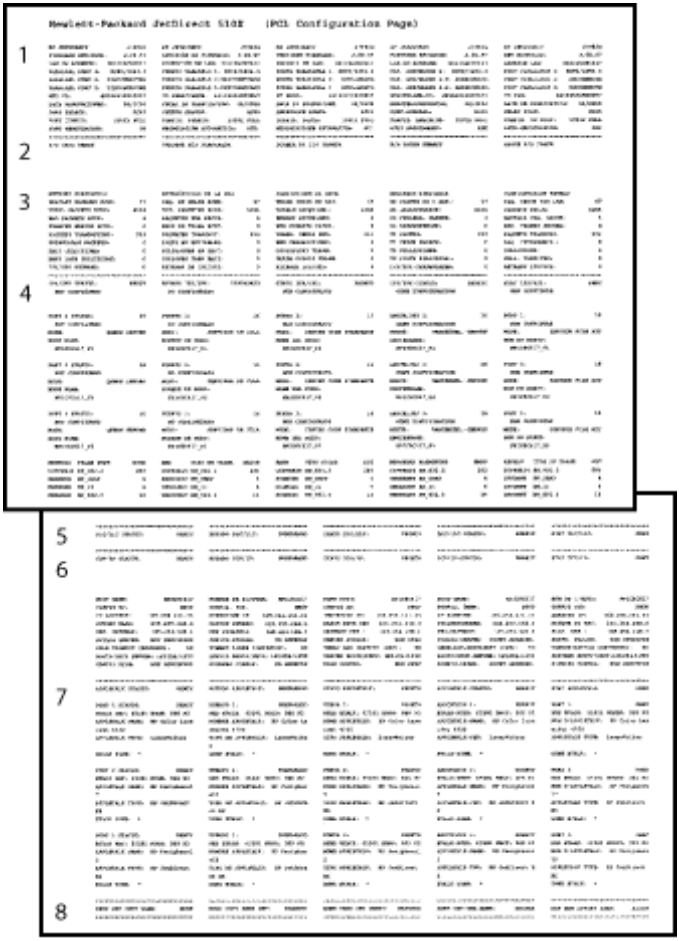

Figure 6.3 Ethernet Configuration Page (External Three-Port Print Servers)

7

HP Jetdirect Configuration Page Messages

Introduction

This chapter describes the messages, network statistics, and status that can be printed on a Jetdirect configuration page.

These messages include configuration information and error messages for each network operating system. The configuration information for individual networks is listed in the following tables:

- **Table 7.1** — HP Jetdirect Product Information
- **Table 7.2** — General HP Jetdirect Messages (status and error messages listed in alphabetical order)
- **Table 7.3** — Network Statistics
- **Table 7.4** — Novell NetWare Configuration Messages
- **Table 7.5** — DLC/LLC Configuration Messages
- **Table 7.6** — TCP/IP Configuration Messages
- **Table 7.7** — Apple EtherTalk Configuration Messages
- **Table 7.8** — SNMP Messages

Note See the chapter "Troubleshooting the HP Jetdirect Print Server" for descriptions and illustrations of Ethernet configuration pages.

Table 7.1 HP Jetdirect Product Information

Message	Description
HP JETDIRECT JXXXXX	Identifies the HP Jetdirect print server model number.
FIRMWARE REVISION: X.XX.XX	The firmware revision number of the HP Jetdirect print server currently installed in the printer.
LAN HW ADDRESS: XXXXXXXXXXXX	The 12-digit hexadecimal network address of the HP Jetdirect print server.
PARALLEL PORT X:	CENTRONICS indicates a standard parallel connection that transfers data in one direction only (to the printer). BIDIRECTIONAL indicates a parallel connection that supports bidirectional communications. BITRONICS indicates a parallel connection that supports bidirectional communications. ECP_MLC or ECP_MLC2 indicates a bidirectional parallel connection (IEEE-1284) that supports an enhanced capabilities port. DISCONNECTED indicates that no printer is attached to the port or the printer is not turned on.
MFG ID:	The manufacturing identification code.
DATE MANUFACTURED	Identifies the date of manufacture of the HP Jetdirect print server.
PORT SELECT:	Specifies the port on the print server that has been detected for use: RJ-45. If DISCONNECTED is displayed, verify that the network cable has been properly attached to the desired port.
PORT CONFIG	Indicates whether the RJ-45 port on the HP Jetdirect print server is configured for network communications using a 10/100Base-TX full- or half-duplex channel.
AUTONEGOTIATION ON OFF	Identifies whether IEEE 802.3 Autonegotiation on the HP Jetdirect 10/100TX port is enabled (ON) or disabled (OFF). If ON, the HP Jetdirect print server will attempt to automatically configure itself onto the network at the proper speed (10 or 100 Mbps) and mode (half or full duplex). If OFF, you must manually configure the speed and mode using switches or jumpers on the print server.
WEBJA SERVER xxx.xxx.xxx.xxx	Identifies the IP address or domain name of the server that the HP Jetdirect print server uses for Web Jetadmin services.

Table 7.2 General HP Jetdirect Messages (1 of 10)

Message	Description
ARP DUPLICATE IP ADDRESS	The ARP layer has detected another node on the network using the same IP address as the HP Jetdirect print server. Extended error information below this message shows the hardware address of the other node.
BABBLE ERROR	Run the power-on self-test: turn the printer off, then on again. If the error persists, replace the HP Jetdirect print server. For information on replacing your HP Jetdirect print server, see the hardware installation guide for your print server.
BAD BOOTP REPLY	An error was detected in the BOOTP reply that the HP Jetdirect print server 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 BOOTPREPLY(0X02), had a header field that did not match the print servers hardware address, or had a UDP source port that was not the BOOTP server port (67/udp).
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.
BOOTP/DHCP IN PROGRESS	The HP Jetdirect print server is currently in the process of obtaining its basic IP configuration information through BOOTP/DHCP, and has not detected any errors.
CF ERR - ACCESS LIST EXCEEDED	The TFTP configuration file specified too many access list entries using the “allow:” keyword.
CF ERR - FILE INCOMPLETE	The TFTP configuration file contained an incomplete last line that did not end in a newline character.
CF ERR - INVALID PARAM	A line in the TFTP configuration file contained an invalid value for one of the parameters on that line.
CF ERR - LINE TOO LONG	A line being processed in the TFTP configuration file was longer than the HP Jetdirect print server could accept.
CF ERR - MISSING PARAM	A line in the TFTP configuration file was missing a required parameter.
CF ERR - TRAP LIST EXCEEDED	The TFTP configuration file specified too many trap destination list entries using the “trap-destination:” keyword.
CF ERR - UNKNOWN KEYWORD	A TFTP configuration file line contained an unknown keyword.

Table 7.2 General HP Jetdirect Messages (2 of 10)

Message	Description
CONFIGURATION ERROR	The configuration information for the NetWare functions is not stored correctly on the HP Jetdirect print server. Rerun the installation software to reconfigure. If this error persists, there may be a problem with the HP Jetdirect print server.
CRC ERROR	Check the network topology and verify all cable segments. Check for damaged cables.
DHCP NACK	After several attempts, the DHCP server has failed to acknowledge the configuration. The Jetdirect print server will restart the configuration process.
DISCONNECTED	The Novell NetWare protocol is disconnected. Check the server and the print server.
DISCONNECTING FROM SERVER	The server has been shut down because of a configuration change or reset request. This message automatically clears 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.
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.
DUP NODE ADDRESS	The HP Jetdirect print server found another station on the ring that already has the address which the HP Jetdirect print server wishes to use. Make sure that all addresses are unique.
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 may indicate a network problem. When the HP Jetdirect print server is configured for multiple file servers, the error is only displayed on the configuration page if none of the file servers was successfully connected.
FAIL RESERVING PRINTER NUM	The SPX connection to the print server was lost when the HP Jetdirect print server attempted 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.
FRAMING ERROR	Check the network topology and verify all cable segments. Check for damaged cables.

Table 7.2 General HP Jetdirect Messages (3 of 10)

Message	Description
INITIALIZING TRYING TO CONNECT TO SERVER	The HP Jetdirect print server is trying to connect to the NetWare server(s). This is a normal message. Wait until the connection is established or another status message appears.
INVALID GATEWAY ADDRESS	The default gateway IP address specified for the HP Jetdirect print server (through BOOTP or NOVRAM) is an invalid IP address for specifying a single node.
INVALID IP ADDRESS	The IP address specified for the HP Jetdirect print server (through BOOTP or NOVRAM) is an invalid IP address for specifying a single node.
INVALID SERVER ADDRESS	The TFTP server IP address specified for the HP Jetdirect print server (through BOOTP) is an invalid IP address for specifying a single node.
INVALID SUBNET MASK	The IP subnet mask specified for the HP Jetdirect print server (through BOOTP or NOVRAM) is an invalid subnet mask.
INVALID SYSLOG ADDRESS	The syslog server IP address specified for the HP Jetdirect print server (through BOOTP) is an invalid IP address for specifying a single node.
INVALID TRAP DEST ADDRESS	One of the SNMP trap (Trap PDU) destination IP addresses specified for the HP Jetdirect print server (through TFTP) is an invalid IP address for specifying a single node.
I/O CARD INITIALIZING (INIT)	The HP Jetdirect print server is initializing the network protocols. For more information, see the network operating system status line on the configuration page.
I/O CARD NOT READY	There is a problem with the print server or its configuration. Following the I/O CARD NOT READY message is a status message. See this table for a detailed explanation of all status messages.
I/O CARD READY	The HP Jetdirect print server is connected and awaiting data.
LAN ERROR-AUTO REMOVAL	Run the power-on self-test: turn the printer off, then on again. If this message reappears on another configuration page, you may have a problem with one of the HP Jetdirect print servers on your network. Check all the print servers on the network for proper operation.
LAN ERROR-BABBLE	Check the network connections. If the connections are intact, run the power-on self-test: turn the printer off, then on again. If the error persists, replace the HP Jetdirect print server. For replacement instructions, see the hardware installation guide for your print server.

Table 7.2 General HP Jetdirect Messages (4 of 10)

Message	Description
LAN ERROR-CONTROLLER CHIP	Check the network connections. If the connections are intact, run the power-on self-test: turn the printer off, then on again. If the error persists, replace the HP Jetdirect print server.
LAN ERROR-EXTERNAL LOOPBACK	The HP Jetdirect print server is incorrectly connected to your network or is defective. Make sure your HP Jetdirect print server is correctly attached to your network. In addition, check the cabling and connectors.
LAN ERROR-INFINITE DEFERRAL	There is a network congestion problem. Check network cables. **Note:** If the print server is not connected to the network, this error cannot occur.
LAN ERROR-INTERNAL LOOPBACK	Check all network connections.
LAN ERROR-LOSS OF CARRIER	Check the network connections. If the connections are intact, run the power-on self-test: turn the print server off, then on again. If the error persists, replace the HP Jetdirect print server.
LAN ERROR-NO LINKBEAT	This message is displayed if Link Beat is not sensed. Check the network cable, and verify that the concentrator/hub is providing Link Beat.
LAN ERROR-NO SQE	Check the network connections. If the connections are intact, run the power-on self-test: turn the print server off, then on again. If the error persists, replace the HP Jetdirect print server.
LAN ERROR-RECEIVER OFF	There may be a problem with your network cabling or the HP Jetdirect print server. Check the cabling and connectors on your Ethernet network. If you cannot find a problem with your network cabling, run the power-on self-test: turn the print server off, then on again. If the error persists after the printer is turned on again, there is a problem with the HP Jetdirect print server.
LAN ERROR-REMOVE RECEIVE	Run the power-on self-test: turn the print server off, then on again. If this message reappears on the resulting configuration page, you may have a problem with one of the HP Jetdirect print servers on your network. Check all the HP Jetdirect print servers on the network for proper operation.
LAN ERROR-RETRY FAULTS	There is a problem with your network cabling or external network configuration. Check the network cables and connections. Verify operation of the hub or switch port.

Table 7.2 General HP Jetdirect Messages (5 of 10)

Message	Description
LAN ERROR-TRANSMITTER OFF	There may be a problem with your network cabling or the HP Jetdirect print server. Check the cabling and connectors on your Ethernet network. If you cannot find a problem with your network cabling, run the power-on self-test: turn the print server off, then on again. If the error persists, there is a problem with the HP Jetdirect print server.
LAN ERROR-UNDERFLOW	There may be a problem with your network cabling or the HP Jetdirect print server. Check the cabling and connectors on your network. If you cannot find a problem with your network cabling, run the power-on self-test: turn the print server off, then on again. If the error persists, there is a problem with the HP Jetdirect print server.
LAN ERROR-WIRE FAULT	There is a problem with the network cabling. Check the cabling between the printer and the network.
LATE COLLISION ERROR	Check the network topology, verify all cable segments, and make sure no segment is too long.
LOSS OF CARRIER ERROR	Check the network connections. If the connections are intact, run the power-on self-test: turn the print server off, then on again. If the error persists, replace the HP Jetdirect print server.
MEMORY ERROR	Run the power-on self-test: turn the print server off, then on again. If the error persists, replace the HP Jetdirect print server.
NDS AUTHENTICATION ERROR	Unable to log onto the NetWare directory tree. Make sure that the print server object is defined in the directory at the correct context.
NDS CONNECTION STATE ERROR	The HP Jetdirect print server cannot change the NDS connection state. Check licenses on the spooling server.
NDS ERR: CANNOT READ Q HOST	Cannot locate the file server on the network. The server may not be running at this time or a communications problem may exist.
NDS ERR: CHANGE PSSWD FAILED	Cannot modify the print server password to the value expected by the HP Jetdirect print server.
NDS ERR: EXCEEDS MAX SERVERS	More queues were assigned than the HP Jetdirect print server can handle. Remove one or more print queues from the list to be serviced by Queue Server Mode.
NDS ERR: INVALID SRVR VERS	The current version of the NetWare file server is not supported.
NDS ERR: MAX PRINT OBJECTS	Too many printer objects are assigned to the print server object. Reduce the number of printer objects assigned to the print server using NWADMIN.

Table 7.2 General HP Jetdirect Messages (6 of 10)

Message	Description
NDS ERR: MAX QUEUE OBJECTS	Too many print queue objects are assigned to the printer. Reduce the number of queues assigned.
NDS ERR: NO PRINTER OBJECTS	No printer objects are assigned to the print server object configured to this HP Jetdirect print server.
NDS ERR: NO QUEUE OBJECTS	No print queue objects are assigned to the printer objects located in the NDS directory.
NDS ERR: SRVR NAME UNRESOLVD	The file server on the network cannot be located. The server may not be running at this time or a communications problem may exist.
NDS ERR: UNABLE TO FIND TREE	The NDS tree cannot be located. The message may be caused because the file server is not running or because a network communications problem exists.
NDS ERR: UNABLE TO LOGIN	Unable to log onto the NetWare directory tree. Make sure that the print server object is defined in the directory at the correct context. Clear the print server password using NWADMIN.
NDS ERR: UNRESOLVD PRNTR OBJ	The printer object cannot be located in the NDS directory.
NDS ERR: UNRESOLVED QUEUE	The print queue object cannot be located in the specified NDS context.
NDS PRINT OBJ QUEUE LIST ERROR	The list of print queues assigned to the printer objects cannot be located.
NDS PRINT SERVER NAME ERROR	The print server object cannot be located in the specified NDS context.
NDS PRINTER OBJ NOTIFY ERR	The list of notification objects assigned to the printer object cannot be located.
NDS PRNT SRVR PUBLIC KEY ERR	Print Server Object Name mismatch. Verify object names.
NDS PS PRINTER LIST ERROR	Cannot locate a list of printers objects that should be assigned to the print server object.
NDS SRVER PUBLIC KEY ERR	Print Server Object Name mismatch. Verify object names.
NO QUEUE ASSIGNED	The HP Jetdirect print server detected that the print server object has not been assigned any queues to service. Assign queues to the print server object using printer installation or NetWare utilities. Note: When multiple file servers are configured, the error is only displayed on the configuration page if none of the file servers were successfully connected.

Table 7.2 General HP Jetdirect Messages (7 of 10)

Message	Description
NOT CONFIGURED	The HP Jetdirect print server has not been configured for NetWare. Use the printer installation software to configure the print server for NetWare networks.
NOVRAM ERROR	The HP Jetdirect print server cannot read the contents of its NOVRAM.
OUT OF BUFFERS	The HP Jetdirect print server 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 print server.
OVERFLOW ERROR	Run the power-on self-test: turn the print server off, then on again.
PASSWORD ERROR	The HP Jetdirect print server detected that the password for the NetWare print server object is wrong. Use the PCONSOLE utility to erase the password for the print server object. When the HP Jetdirect print server logs on again, it sets a new password. Note: When multiple file servers are configured, the error is only displayed on the configuration page if none of the file servers are connected.
POSTSCRIPT MODE NOT SELECTED or POSTSCRIPT UPDATE NEEDED	The printer does not support the EtherTalk extensions. It may be a printer which does not support AppleTalk. When this message is displayed, the other AppleTalk messages (ADDRESS, APPLETALK NAME, ZONE NAME) are not displayed.
PRINT SERVER NOT DEFINED	The file server does not have a print server object that corresponds to the specified NetWare node name. Use printer installation software or PCONSOLE to create the print server object. When the HP Jetdirect print server is configured for multiple file servers, the error is only displayed on the configuration page if none of the file servers made the connection.
PRINTER NUMBER IN USE	The printer number assigned to the printer is already in use by another printer. Assign an unused printer number. This may also occur when a printer is power cycled, in which case the error goes away after the print server times out and detects the lost connection.
PRINTER NUMBER NOT DEFINED	The printer number you assigned to the remote printer has not been defined. Assign a valid printer number to the HP Jetdirect print server, or run PCONSOLE and define a printer number for the print server.

Table 7.2 General HP Jetdirect Messages (8 of 10)

Message	Description
PSERVER CLOSED CONNECTION	The print server requested a termination of the connection with the HP Jetdirect print server. No error exists or is indicated. Make sure the print server is running, and restart it if necessary.
READY	The HP Jetdirect print server has successfully connected to the server and is awaiting data.
RECEIVE BUFFER ERROR	Run the power-on self-test: turn the print server off, then on again. If the error persists, replace the HP Jetdirect print server.
RETRY ERROR	Check the Ethernet cable. Make sure your HP Jetdirect print server is correctly attached to your network.
SQE ERROR	Run the power-on self-test: turn the print server off, then on again. If the error persists, replace the HP Jetdirect print server.
TFTP IN PROGRESS	The HP Jetdirect print server is currently in the process of obtaining its basic IP configuration information through TFTP and has not detected any errors.
TFTP LOCAL ERROR	The TFTP transfer of the configuration file from the host to the HP Jetdirect print server failed with the local print server encountering some form of inactivity timeout, or excessive retransmissions situation.
TFTP REMOTE ERROR	The TFTP transfer of the configuration file from the host to the HP Jetdirect print server failed with the remote host sending a TFTP ERROR packet to the print server.
TFTP RETRIES EXCEEDED	The overall retrying of the TFTP transfer of the configuration file from the host to the HP Jetdirect print server has exceeded a retry limit.
TRANSMIT ERROR	Check the network topology and verify all cable segments.
TRYING TO CONNECT TO SERVER	The HP Jetdirect print server is trying to connect to the print server or NetWare file server after being configured. Wait for the print server to establish a connection with the print or file server.
TURN PRINTER OFF/ON	This message may appear after you upgrade to a new version of firmware. When this message appears, turn the print server off, then back on to enable any new functionality that was recently downloaded.

Table 7.2 General HP Jetdirect Messages (9 of 10)

Message	Description
UNABLE TO ATTACH TO QUEUE	A failure was detected when the HP Jetdirect print server 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 print server to service other queues, or to 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 print server is configured for multiple file servers, the error is only displayed on the configuration page if none of the file servers made the connection.
UNABLE TO CONNECT TO SERVER	**Remote Printer mode:** The HP Jetdirect print server 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 correctly. **Queue Server mode:** The HP Jetdirect print server could not establish an NCP connection to the file server. Make sure that the correct file servers are connected. When multiple file servers are configured, the error is only displayed on the configuration page if none of the file servers were successfully connected.
UNABLE TO FIND SERVER	The HP Jetdirect print server was unable to find the NetWare 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 print server matches the actual name used by the print server or file server. Also make sure that all cables and routers are functioning correctly.
UNABLE TO GET NDS SRVR ADDR	The NDS server address cannot be located or accessed.

Table 7.2 General HP Jetdirect Messages (10 of 10)

Message	Description
UNABLE TO LOGIN	A failure was detected when the HP Jetdirect print server tried to log onto 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 print server 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. Create a new print server object. When the HP Jetdirect print server is configured for multiple file servers, the error is only displayed on the configuration page if none of the file servers made the connection.
UNABLE TO SENSE NET NUMBER	The HP Jetdirect print server 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.
UNABLE TO SET PASSWORD	A failure was detected when the HP Jetdirect print server tried to set the password for the print server object. (Whenever the HP Jetdirect print server is able to log in without a password, it sets the password automatically.) This indicates a networking or security problem. Create a new print server object. When multiple file servers are configured, the error is only displayed on the configuration page if none of the file servers were successfully connected.
UNDERFLOW ERROR	Check the cabling and connectors. If the error persists, run the power-on self-test: turn the print server off, then on again. If the error persists, replace the HP Jetdirect print server.
UNEXPECTED PSERVER DATA RCVD	The HP Jetdirect print server received data without providing permission to do so. This indicates a possible software problem.
UNKNOWN NCP RETURN CODE	The HP Jetdirect print server 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.

Table 7.3 Network Statistics

Message	Description
UNICAST PACKETS RCVD:	Number of frames specifically addressed to this HP Jetdirect print server. This does not include broadcasts or multicasts.
TOTAL PACKETS RECEIVED:	Total number of frames (packets) received by the HP Jetdirect print server without error. This includes broadcast, multicast packets, and packets specifically addressed to the print server. This number does not include packets specifically addressed to other nodes.
BAD PACKETS RCVD:	Total number of frames (packets) received by the HP Jetdirect print server 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.
IPX/SPX 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.
BAD LENGTH RCVD:	Total number of frames missed because they were too long for the HP Jetdirect print server to receive.
LOST FRAMES:	Number of times the end of the frame could not be detected while transmitting.

Table 7.4 Novell NetWare Configuration Messages (1 of 2)

Message	Description
IPX/SPX STATUS:	Indicates the current IPX/SPX protocol status. DISABLED indicates that IPX/SPX was manually disabled. READY indicates the HP Jetdirect print server is awaiting data. INITIALIZING indicates that the print server is registering the node address or name. Code is in the middle of a download.
MODE:	The mode used by the print server. QUEUE SERVER indicates that the print server receives data directly from the queue; REMOTE PRINTER, with the printer number following it, indicates that the print server emulates a Novell remote printer. If the printer is not configured, this field displays QUEUE SERVER.
SOURCE ROUTING:	Indicates the current status of source routing. UNKNOWN is displayed when NetWare 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 determined 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, SINGLE R, or ALL RT is displayed when the user has manually configured source routing through the printer's control panel or through software.
NODE NAME:	Queue Server Mode: The print server name. This name must match a valid print server on the appropriate NetWare file server. The default name is NPIXXXXXX. Remote Printer Mode: The name you gave the network printer when you configured the network printer. The default name is NPIXXXXXX.

Table 7.4 Novell NetWare Configuration Messages (2 of 2)

Message	Description
PORT X STATUS:	READY: Print server is awaiting data. INITIALIZING: Print server is registering the node address or name/type.
SERVER NAME:	The name of the NetWare file server or print server. If no name is displayed, the Jetdirect print server has not been configured. If the message "UNABLE TO FIND FILE SERVER" appears in the "IPX/SPX STATUS:" section of the configuration page, the SERVER NAME field identifies the Jetdirect discovery method [NSQ] (Nearest Service Query) or [GSQ] (General Service Query) and the name of the proxy file server used to locate the configured bindery servers.
NETWORK XXXXXX FRAME TYPE XXXXX RCVD XXXX	The first column indicates the network number associated with the protocol frame type for communication between server and printer. Unless a specific frame type has been manually configured, the print server automatically determines the protocol frame type by listening to the NetWare data being transferred over the network. If UNKNOWN is listed, the HP Jetdirect print server 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 7.5 DLC/LLC Configuration Messages

Message	Description
DLC/LLC STATUS:	Current DLC/LLC status: DISABLED: Indicates that DLC/LLC was manually disabled through the printer's control panel (if available). DISABLED: Indicates that LAN Server was manually disabled through the printer's control panel (if available). READY: Indicates the HP Jetdirect print server is awaiting data. NOT IN USE: Code is in the middle of a download.
SERVER ADDRESS:	Station address of the remote end of the connection.

Table 7.6 TCP/IP Configuration Messages (1 of 2)

Message	Description
TCP STATUS:	Current TCP status. DISABLED: Indicates that TCP/IP was manually disabled. READY: Indicates the HP Jetdirect print server is awaiting data. INITIALIZING: Indicates that the print server is searching for the BOOTP server, or trying to get the configuration file through TFTP. NOT IN USE: Code is in the middle of a download.
HOST NAME:	The host name configured on the print server. 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	The location from which the print server is obtaining or has obtained its IP configuration information. The options are BOOTP, RARP, default IP, BOOTP/TFTP, DHCP, DHCP/TFTP, or USER SPECIFIED (Telnet, printer's control panel, HP Web Jetadmin, or other).
IP ADDRESS:	The Internet Protocol (IP) address assigned to the HP Jetdirect print server. This is a required entry for operation of the print server.
SUBNET MASK:	The IP subnet mask configured on the HP Jetdirect print server. NOT SPECIFIED is indicated if no subnet mask has been configured, or if the subnet mask is zero.
DEF. GATEWAY:	The IP 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 print server. 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 print server closes an idle TCP print data connection. Acceptable values are integers between 0 and 3600. A value of zero turns off the timeout mechanism.
BOOTP SERVER	The IP address of the system that responds to the print server's BOOTP request with configuration data. This parameter is omitted when the print server is not configured using BOOTP. NOT SPECIFIED indicates that the server's IP address field in the BOOTP reply packet was zero.

Table 7.6 TCP/IP Configuration Messages (2 of 2)

Message	Description
DHCP SERVER	The IP address of the system that responds to the print server's DHCP request with configuration data. This parameter is omitted when the print server is not configured using DHCP.
CONFIG FILE:	The name of the HP Jetdirect configuration file. The file pathname may be truncated to fit on two lines. This parameter is omitted when the print server is configured from the printer's control panel. NOT SPECIFIED indicates that a file was not specified in the BOOTP reply from the host.

Table 7.7 Apple EtherTalk Configuration Messages (1 of 2)

Message	Description
APPLETALK STATUS:	Current AppleTalk status. DISABLED indicates that EtherTalk was manually disabled. LocalTalk is always enabled. READY indicates that the HP Jetdirect print server is awaiting data. INITIALIZING indicates that the print server is registering the node address or name.
ETALK NET: XXXXX NODE:XXX: X	NET: identifies the AppleTalk Network Number on which the HP Jetdirect print server is currently operating. NODE: identifies the AppleTalk Node Number that the print server chose for itself as part of its initialization sequence. PX identifies the configured EtherTalk network protocol phase. P1 is the earlier or original version of the EtherTalk protocol. P2 is the current version of the EtherTalk protocol.
APPLETALK NAME:	The name of the printer on the AppleTalk network. A number after the name indicates that there are multiple devices with this name, and this is the Nth instance of the name.
APPLETALK TYPE	The type of the printer being advertised on the network.
ETALK ZONE:	The name of the EtherTalk network zone on which the printer is located.

Table 7.7 Apple EtherTalk Configuration Messages (2 of 2)

Message	Description
PORT X STATUS:	READY: Print server is awaiting data. INITIALIZING: Print server is registering the node address or name/type.

Table 7.8 SNMP Messages

Message	Description
SNMP SET CMTY NAME: NONE or SPECIFIED	Indicates whether or not an IP SNMP set community name has been configured for the print server. This parameter is omitted when the print server is configured from the printer's control panel. NONE indicates that the print server will not accept any SNMP community names for SetRequests. SPECIFIED indicates that a specific SNMP set community name is configured.
SNMP GET CMTY NAME: ALL or SPECIFIED	Indicates whether or not an IP SNMP get community name has been configured for the print server. This parameter is omitted when the print server is configured from the printer's control panel. ALL indicates that the print server will accept all SNMP community names for GetRequests. SPECIFIED indicates that a specific SNMP get community name is configured.

A

TCP/IP Overview

Introduction

This appendix is intended to provide information to help you gain a basic understanding of TCP/IP.

TCP/IP (Transmission Control Protocol/Internet Protocol) is a suite of protocols designed to define the way data is passed to network devices.

TCP/IP is rapidly becoming the most used set of protocols. The main reason this is happening is the fact that the internet only uses TCP/IP. If you have a network that you wish to connect to the internet, you must be using TCP/IP to communicate.

Internet Protocol (IP)

When information is sent across the network, the data is broken down into small packets. Each packet is sent independently of one another. IP routes all data packets on the network and provides connectionless, nonguaranteed delivery of data packets across the network. Each node on the network is assigned an IP address, including HP Jetdirect connected devices.

Transmission Control Protocol (TCP)

TCP handles breaking the data into packets and recombining the packets on the receiving end by providing a connection-oriented, reliable, and guaranteed delivery service to another node on the network. When data packets are received at their destination, TCP calculates a checksum for each packet to verify the data is not corrupt. If the data in the packet has been corrupted during transmission, TCP discards the packet and the packet is resent.

User Datagram Protocol (UDP)

UDP provides similar services to TCP. However, UDP does not acknowledge data receipt and supports request/reply transactions with no added reliability or guarantee of delivery. UDP is used when acknowledgment and reliability are not required, such as during a "discovery broadcast."

IP Address

Every host (workstation or node) on an IP network requires a unique IP address for each network interface. This address is a software address that is used to identify both the network and specific hosts located on that network. Each IP address can be divided into two separate parts: the network portion and the host portion. It is possible for a host to query a server for a dynamic IP address each time the device boots-up (see the section "Dynamic Host Configuration Protocol (DHCP).")

Note When assigning IP addresses, always consult the IP address administrator. Setting the wrong address can disable other equipment operating on the network or interfere with communications.

IP Address: (Network Portion)

Network addresses are managed by an organization in Norfolk, Virginia recognized as InterNIC. InterNIC has been contracted by the National Science Foundation to manage the Internet addresses and domains. Network addresses are distributed to organizations that are in turn responsible for making sure all attached devices or hosts on the network are properly numbered. The network address is a four-byte address although some bytes may be expressed as zeros.

IP Address: (Host Portion)

Host addresses numerically identify specific network interfaces on an IP network. Usually a host has only one network interface; thus, only one IP address. Because no two devices can share the same number at the same time, administrators typically maintain address tables to assure correct assignment of addresses in the host network.

IP Address Structure and Class

An IP address is comprised of 32 bits of information and divided into 4 sections containing 1 byte each section or 4 bytes total: `xxx.xxx.xxx.xxx`

For efficiency in routing, networks were broken down into three classes, so routing can begin simply by identifying the leading byte of information in the IP address. The three IP addresses that InterNIC assigns are class A, B, and C. The network class determines what each of the four IP address sections identify as shown in Table A.1:

Table A.1 IP Address Class Format

Class	First Address Byte xxx.	Second Address Byte xxx.	Third Address Byte xxx.	Fourth Address Byte xxx
A	Network.	Host.	Host.	Host
B	Network.	Network.	Host.	Host
C	Network.	Network.	Network.	Host

Explained in more detail in the table “Network Class Characteristics,” you will see how each network class differs further by the leading bit identifier, the address range, the number of each type available, and the maximum number of hosts each class allows.

Table A.2 Network Class Characteristics

Class	Leading Bit Identifier	Address Range	Maximum number of networks in the class	Maximum hosts in the network
A	0	0.0.0.0 to 127.255.255.255	126	Over 16 Million
B	10	128.0.0.0 to 191.255.255.255	16,382	65,534
C	110	192.0.0.0 to 223.255.255.255	Over 2 Million	254

Configuring IP Addresses

TCP/IP configuration parameters (such as IP address, subnet mask, default gateway) can be configured on the HP Jetdirect print server in a variety of ways. These values can be configured manually through HP-supplied software, or they can be automatically downloaded using DHCP or BOOTP each time the print server is turned on.

Dynamic Host Configuration Protocol (DHCP)

DHCP allows a group of devices to use a set of IP addresses that are maintained by a DHCP server. The device or host sends a request to the server, and if an IP address is available, the server assigns it to that device.

BOOTP

BOOTP is a bootstrap protocol used to download configuration parameters and host information from a network server. BOOTP uses UDP for its transport. In order for devices to boot and load configuration information into RAM, they must communicate through the bootstrap protocol BOOTP as a client with their server.

To configure the device, the client broadcasts a boot request packet containing at least the hardware address of the device (HP Jetdirect print server hardware address). The server answers with a boot reply packet containing the information the device needs to configure.

Subnets

When an IP address is assigned to an organization, no provision is made for more than one network being present at that location. Local network administrators use subnets to partition a network into several different subnetworks. Splitting a network into subnets can result in better performance and improved use of limited network address space.

Subnet Mask

The subnet mask is a mechanism used to divide a single IP network into several different networks. To subnet the IP address, the administrator must take part of the host area of the address and assign it for subnet numbers. The subnet mask "masks" out that specific portion of the host IP address along with the entire network section of the address with ones and leaves this portion as zeros, available to host addressing.

Table A.3 Subnet Masks

Bytes (Sections)	Network	Subnet	Host	Host
Class A Network	15	xxx	xxx	xxx
Subnet Mask	255	255	0	0
Example IP Address	15	254	64	2

In the table above, "Subnet Masks," the Class A network 15 has been assigned to Hewlett-Packard. To allow additional networks at the HP site, the subnet mask of 255.255.0.0 is used. This address designates the second byte of the IP address as the subnet address. Using this designation, each device is uniquely identified on its own subnet, but HP can incorporate up to 254 subnetworks without violating their assigned address space.

Gateways

Gateways are devices that act as translators between systems that do not use the same communication protocols, data formatting, structures, languages, or architectures. Gateways repackage the data packets and change the syntax to match that of the destination system. When networks are divided into subnets, gateways are required to connect one subnet to another.

Default Gateway

The Default Gateway is the address of the gateway or router that you use to move packets between subnets. If multiple gateways or routers exist, then the default gateway is the address of the first gateway or router that you use to move packets between subnets.

Using the Embedded Web Server

Introduction

Each HP Jetdirect print server contains an embedded web server that can be accessed through a supported web browser on an intranet. The embedded web server provides access to configuration and management pages for the HP Jetdirect print server and the attached peripheral device.

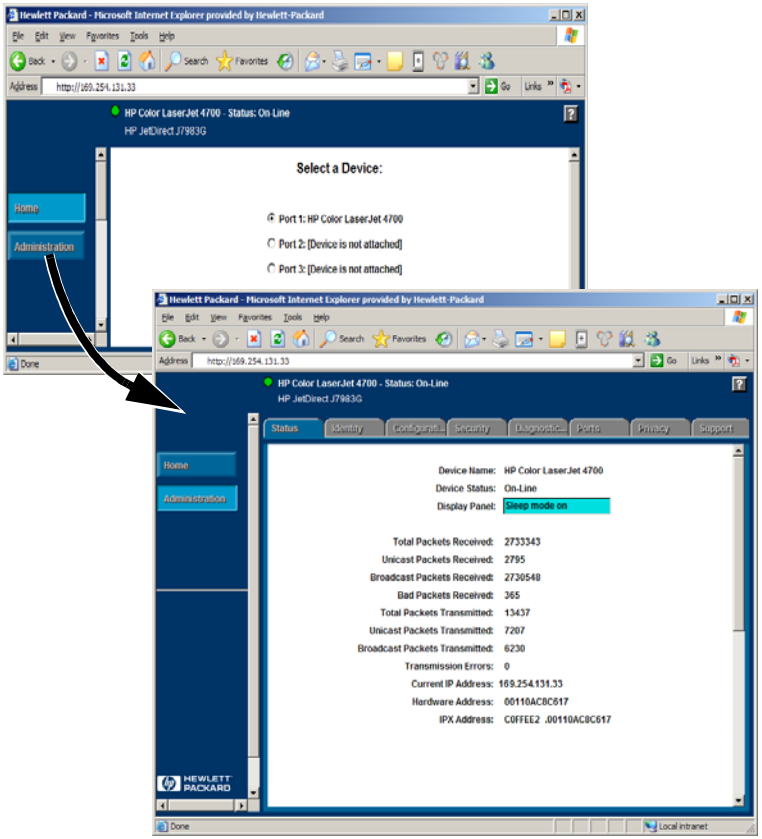

Figure B.1 Embedded Web Server

Requirements

Compatible Web Browsers

To access the embedded Web server, you must use a compatible Web browser. In general, the embedded Web server can be used with Web browsers that support HTML 4.01 and cascading style sheets.

Hewlett-Packard tests a number of current and older browsers using a variety of systems. In general, we recommend using the following browsers:

- Microsoft Internet Explorer 5.0 or greater
- NetScape Navigator 6.0 or greater
- Mozilla Firefox 1.x or greater

For the latest list of supported web browsers, visit HP online support (http://www.hp.com/go/support).

Browser Exceptions

Due to known problems experienced during testing, we recommend that you do not use the following browsers:

- Netscape Navigator 6.2.x with SSL

Supported HP Web Jetadmin Version

HP Web Jetadmin is a printer installation and management application for intranets and is available from HP online support (http://www.hp.com/go/webjetadmin).

HP Web Jetadmin version 8.0 or later is recommended for operation with the HP Jetdirect embedded web server.

Viewing the Embedded Web Server

Before you can use the embedded web server, the HP Jetdirect print server must be configured with an IP address.

There are many ways to configure an IP address on the print server. For example, you can automatically configure IP parameters over the network using BOOTP (Bootstrap Protocol) or DHCP (Dynamic Host Configuration Protocol) each time the printer is turned on. Or, you can manually configure IP parameters using the printer's control panel (for selected printers), Telnet, HP Web Jetadmin or other management software.

If the HP Jetdirect print server does not receive its IP configuration within two minutes, a default IP address is automatically assigned: 192.0.0.192. This address is not a valid IP address for your network but can be used to initially access the HP Jetdirect print server. However, to use the default IP address, you must temporarily set up your system with the same IP network number or establish a route to it.

After an IP address is established on the print server, perform the following steps:

1. Run a supported version of your web browser.
2. Enter the IP address of the print server as the URL.

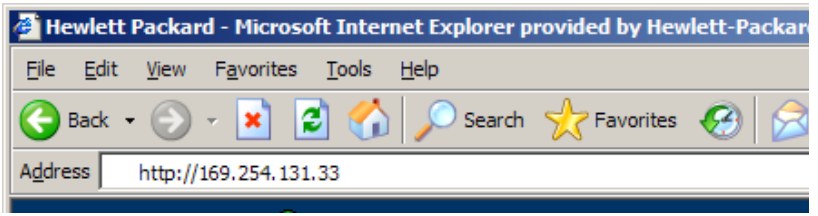

Figure B.2 Entering the IP Address

The HP Jetdirect main web page will be displayed.

Click the "?" icon on the web page for more information.

Special Features

- HP Jetdirect external print servers provide scanning capabilities for selected HP All-in-One peripherals. When connected to a supported peripheral, a **Scan** button provides you with access to the scanning feature. For more information, click the "**?**" icon on the *Scan* page.
- If your printer has been discovered through HP Web Jetadmin 8.0 (or later), the embedded web server on the HP Jetdirect print server will provide a link to HP Web Jetadmin for management of this and other HP Jetdirect devices on the network.
- A link to HP.com is provided. Simply click on the HP logo.

Operating Notes

- Changes to the IP address and other parameters will close the connection to the embedded web server. To re-establish a connection, use the new IP address.

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