HP Jetdirect Print Server
Administrator's Guide

hp

HP Color LaserJet
3600n/dn printers

HP Jetdirect Print Server for HP Color LaserJet 3600n/dn Printers

Administrator's Guide

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1 Introducing the HP Jetdirect Print Server

HP Color LaserJet 3600n/dn printers contain an HP Jetdirect embedded print server that is integrated directly on the printer. Using this print server, you can connect this device directly to a network and share it among multiple users or systems. Because the print server is built into the device, an external port is not needed for network connectivity and may be used for other purposes.

Network Connection

Using the embedded print server and built-in RJ-45 connector, the printer can connect to an IEEE 802.3 10/100Base-TX (Ethernet/Fast Ethernet) network through unshielded twisted-pair network cables.

Auto-negotiation (10/100Base-TX) is used to automatically configure link operation at 10 Mbps or 100 Mbps, and full- or half-duplex communication mode, as required by the network. However, link operation may be manually set using several configuration tools, such as the printer control panel (if supported), Telnet and TFTP commands, a Web browser, and network management software. These tools are described later in this guide.

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

Identification

Product Number and Firmware Version

The features and capabilities of an HP Jetdirect print server depends on the print server's product model number and its operating firmware version. The print server in this printer does not support firmware upgrades.

The product model number and operating firmware version are listed on the HP Jetdirect configuration page. The HP Jetdirect configuration page will print when you print the printer's configuration page.

The features and capabilities described in this guide support the following HP Jetdirect print server and firmware version:

> **NOTE** For an HP Jetdirect embedded print server, a *non-orderable* product number has been assigned. The product number is for identification purposes only.

- HP Product Number: J7973E

- Firmware Version: V.30.*xx.nn*

  where *xx* identifies a sequential release number. Note that *nn*, if it appears, is an encoded value for HP support use only.

The installed firmware version can be identified using various methods, including the HP Jetdirect configuration page (see HP Jetdirect Configuration Page), Telnet (see TCP/IP Configuration), embedded Web server (see Using the Embedded Web Server), and network management applications.

Supported Network Protocols

The supported network protocols, and popular network printing environments that use those protocols, are listed in Table 1-1 Supported Network Protocols.

Table 1-1 Supported Network Protocols

Supported Network Protocols	Network Printing Environments[1]
TCP/IP	Microsoft Windows 98/Me/NT4.0/2000/XP (32- and 64-bit), Direct Mode printing
	Microsoft Terminal Server and Citrix MetaFrame environments[2]
	Apple Mac OS (TCP/IP)[2]
	LPR/LPD (Line Printer Daemon)[2]

[1] Refer to the current HP Jetdirect product data sheets for additional network systems and versions. For operation with other network environments, consult your system vendor or authorized HP dealer.
[2] For these network systems, contact your network system vendor for software, documentation, and support.

If not supplied with this product, HP network setup and management software for supported systems may be obtained from HP support at:

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

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

Security Protocols

SNMP (IP)

SNMP (Simple Network Management Protocol) is used by network management applications for device management. HP Jetdirect print servers support SNMP and standard MIB-II (Management Information Base) objects on IP networks.

The HP Jetdirect embedded print server supports an SNMP v1/v2c agent.

HP Support

HP Online Support

Click your way to a quick solution! The HP Web site

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

is a great place to start for answers to questions about your HP Jetdirect print server — 24 hours a day, 7 days a week.

HP Support By Phone

Highly trained technicians are ready to take your call. For the most recent HP support telephone numbers and available services worldwide, visit:

- http://www.hp.com/support/support_assistance

> **NOTE** For toll-free support in the USA and Canada, call 1-800-HPINVENT or 1-800-474-6836.
>
> **NOTE** Telephone fees are the responsibility of the caller. Rates may vary. Contact your local telephone company for current rates.

Product Registration

To register for better access to HP support and services for this product, use the following HP Web page:

- http://www.hp.com/go/jetdirect_register

Product Accessibility

For information on HP's commitment to accessibility of HP Jetdirect print server products:

- Visit the HP Web site at: http://www.hp.com/accessibility
- Send email to: accessibility@hp.com

2 HP Software Solutions Summary

HP provides software solutions to set up or manage your HP Jetdirect-connected network printer. See Table 2-1 Software Solutions to help you determine which software is best for you.

For more information on these and other HP solutions, visit HP online support at:

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

> **NOTE** For Mac OS systems on TCP/IP networks, use your system utilities to discover and install your printer. On Mac OS X 10.x systems, use the Print Center to select IP Printing or Rendezvous to install your printer.

Table 2-1 Software Solutions

Operating Environment	Function	Remarks
HP Install Network Printer Wizard (Windows)		
Windows 98, Me, 2000, XP, Server 2003 (TCP/IP direct-mode printing)	Install a single network printer on your system for peer-to-peer (direct mode) or client-server (shared) printing.	■ Simple printer installation, typically integrated with printer installation software ■ Runs from CD-ROM ■ Installable version that runs from your hard disk is available
HP Web Jetadmin		
(See the HP Website for supported system updates.) Windows 2000, XP Professional, Server 2003 Fedora Core and SuSE Linux HP-UX[1] Solaris[1] NetWare[1] TCP/IP, IPX/SPX *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

[1] Supports queue creation and peripheral management from HP Web Jetadmin hosted on a supported system.

HP Install Network Printer Wizard (Windows)

The HP Install Network Printer Wizard is a software module for quick and easy printer installation on a TCP/IPnetwork. During installation, the wizard allows you to configure your device with basic TCP/IP parameters necessary for operation on your network.

Wizard components are typically integrated with your CD-ROM printing system software. However, a standalone version that runs from your system disk is also available and can be downloaded from HP online support at:

■ http://www.hp.com/go/inpw_sw

Requirements

When the wizard components are integrated on your printer CD-ROM, you should have everything that you need. See your printer manuals for system requirements. When running the standalone version of the wizard, you will need the following:

- Microsoft Windows XP, Windows 2000, Windows 98/Me, Windows Server 2003

    - TCP/IP network protocol

- The correct printer driver

- A network connection using an HP Jetdirect print server

HP Web Jetadmin

HP Web Jetadmin is an enterprise management tool that allows you to remotely install, configure and manage a wide variety of HP and non-HP network printing devices simply through a standard Web browser. HP Web Jetadmin can be used to proactively manage both individual or groups of devices.

While HP Web Jetadmin supports devices that contain Standard Printer MIB (Management Information Base) objects for common management, it is well-integrated with HP Jetdirect print servers and HP printers to provide enhanced management features.

To use HP Web Jetadmin, see the online help and documentation supplied with the software.

System Requirements

HP Web Jetadmin software runs on Microsoft Windows 2000, Windows XP Professional, Windows Server 2003, and selected Linux (Fedora Core and SuSE Linux) systems. For information on supported 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 compatible Web browser by browsing to the HP Web Jetadmin host. This allows printer installation and management on a variety of networks.

Installing HP Web Jetadmin

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

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** Installation instructions are also contained in 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. By default, the port number is 8000.

■ 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/
```

> **NOTE** In place of `systemname.domain`, the IP address of the host computer on which HP Web Jetadmin is installed can be used.

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

Removing HP Web Jetadmin Software

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

3   TCP/IP Configuration

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 that is valid for your network. For general information on TCP/IP networks, see TCP/IP Overview.

Server-Based and Manual TCP/IP Configuration

When in a factory-default state and initially powered on, the HP Jetdirect print server will systematically try to obtain its TCP/IP configuration using a server-based method (BOOTP, DHCP, and RARP, described later in this chapter). Up to two minutes are used. If configuration is not successful, a default IP address will be assigned.

The print server may also be configured manually. Manual-based tools include Telnet, a Web browser, the printer control panel, arp and ping commands (when the default IP address is 192.0.0.192), or SNMP-based management software. TCP/IP configuration values assigned manually will be retained when powered off/on.

The print server can be re-configured to use either server-based or manual configuration of TCP/IP settings at any time.

To identify the IP address that is configured on the print server at any time, see the HP Jetdirect configuration page.

Default IP Address

When in a factory-default state (for example, when shipped from the factory or after a cold reset), the HP Jetdirect print server has no IP address. A default IP address may or may not be assigned depending on the network environment.

Default IP Address Will Not Be Assigned

A default IP address will not be assigned if a server-based method (such as BOOTP or DHCP) is successful. And if the print server is powered off/on, the same method will again be used to retrieve IP configuration settings. If this method now fails to retrieve the IP configuration settings (for example, the BOOTP or DHCP server is no longer available), a default IP address will not be assigned. Instead, the print server will continue to send IP configuration requests indefinitely. You must cold-reset the print server to change this behavior.

In addition, a default IP address will not be assigned if a network cable is not attached to the print server.

Default IP Address Will Be Assigned

A default IP address will be assigned if the factory-default methods fail, or if the print server has just been re-configured by an administrator to use a server-based method (such as BOOTP or DHCP) and it fails.

If a default IP address is assigned, the address will depend on the network to which the print server is connected. The print server senses broadcast packets on the network to determine the appropriate default IP settings:

- On small private networks that adhere to automated, standards-based IP address assignments, the print server uses a link-local addressing technique to assign a unique IP address. Link-local addressing may be referenced as *Auto IP*. The IP address assigned will be in the range of 169.254.1.0 to 169.254.254.255 (commonly referenced as 169.254/16), and should be valid. However, it can be further modified for your network using supported TCP/IP configuration tools if necessary.

  With link-local addresses, subnetting is not used. The subnet mask will be 255.255.0.0, and cannot be changed.

  Link-local addresses will not route off the local link, and access to or from the Internet will not be available. The default gateway address will be the same as the link-local address.

  If a duplicate address is sensed, the HP Jetdirect print server will automatically reassign its address, if necessary, in accordance with standard link-local addressing methods.

- On large or enterprise IP networks, a temporary address of 192.0.0.192 will be assigned until it is re-configured with a valid address through supported TCP/IP configuration tools. We refer to this address as *Legacy Default IP*.

- On mixed-environment networks, the self-assigned default IP address may be either 169.254/16 or 192.0.0.192. In this case, you should verify on the Jetdirect configuration page that the assigned default IP address is as expected.

The IP address configured on your print server may be determined by inspecting the Jetdirect configuration page for the print server. See HP Jetdirect Configuration Page.

Default IP Address Configuration Options

Default IP Parameter Options

A Default IP configuration parameter on the print server controls how the default IP address is assigned. Whenever the print server is unable to obtain an IP address during a forced TCP/IP re-configuration (for example, when manually configured to use BOOTP or DHCP), this parameter will determine the default IP address to use.

When the print server is in a factory-default state, this parameter is undefined.

If the print server is initially configured with a default IP address (either a link-local IP address or the legacy default 192.0.0.192 IP address), the Default IP parameter will be set to either **Auto IP** or **Legacy Default IP** to match.

The Default IP parameter can be changed through a supported configuration tool, such as Telnet, a Web browser, the printer control panel, and SNMP management applications.

DHCP Requests Enable/Disable

When a default IP address is assigned, you can choose to send, or not send, periodic DHCP requests. DHCP requests are used to retrieve IP configuration settings from a DHCP server on the network. By default, this parameter is enabled, allowing DHCP requests to be transmitted. However, this parameter may be disabled through supported configuration tools such as Telnet, a Web browser, and SNMP management applications.

TCP/IP Configuration Tools

Depending on your printer and operating system, an HP Jetdirect print server can be configured with valid TCP/IP parameters for your network in the following ways:

- **Using Software.** You can use your printer installation software on supported systems. For more information see HP Software Solutions Summary.

- **BOOTP/TFTP.** You can download the data from a network-based server using BOOTP (Bootstrap Protocol) and TFTP (Trivial File Transfer Protocol) each time the printer is turned on. For more information, see Using BOOTP/TFTP.

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

- **DHCP/TFTP.** You can use Dynamic Host Configuration Protocol (DHCP) and TFTP (Trivial File Transfer Protocol) each time the printer is turned on. These protocols are supported on HP-UX, Solaris, Linux, Windows NT/2000/Server 2003, NetWare and Mac OS systems. (Refer to your network operating system manuals to verify that your server operating system supports DHCP.) For more information, see Using 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 located in the `/etc` directory.
  >
  > Since HP-UX presently 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 provided.

- **RARP.** A network-based server can use RARP (Reverse Address Resolution Protocol) to answer 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. For more information, see Using RARP.

- **arp and ping commands.** (For print servers configured with Legacy default IP address 192.0.0.192 only) You can use the `arp` and `ping` commands from your system. For more information, see Using the arp and ping Commands.

- **Telnet.** You can set 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. Once configured, the print server saves the configuration when powered off/on. For more information, see Using Telnet.

- **Embedded Web server.** You can browse to the embedded Web server on the HP Jetdirect print server to set the configuration parameters. For more information, see Using the Embedded Web Server.

- **Printer Control Panel.** You can manually enter the configuration data using the printer control panel keys. The control panel method allows you to configure only a limited subset of configuration parameters. Therefore, control panel configuration is recommended only during troubleshooting or for simple installations. If control panel configuration is used, the print server saves the configuration when powered off/on. For more information, see Using the Printer Control Panel.

Using BOOTP/TFTP

BOOTP (Bootstrap Protocol) and TFTP (Trivial File Transfer Protocol) provide a convenient way to automatically configure the HP Jetdirect print server for TCP/IP network operation. When powered on, the Jetdirect print server sends a BOOTP request message onto the network. A properly configured BOOTP server on the network will respond with a message that contains basic network configuration data for the Jetdirect print server. The BOOTP server's response may also identify a file that contains extended configuration data for the print server. The Jetdirect print server downloads this file using TFTP. This TFTP configuration file may be located on the BOOTP server, or a separate TFTP server.

BOOTP/TFTP servers are typically UNIX or Linux systems. Windows NT/2000/Server 2003 and NetWare servers can respond to BOOTP requests. Windows NT/2000/Server 2003 servers are configured through Microsoft DHCP services (see Using DHCP). However, Windows NT/2000/Server 2003 systems may require third-party software for TFTP support. For setup of NetWare BOOTP servers, refer to your NetWare documentation.

> **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).

> **NOTE**   While the print server may be configured from systems that support BOOTP/DHCP services, this printer may not support printing from these systems (such as UNIX or NetWare systems).

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.

> **NOTE**   BOOTP operation is similar to DHCP, but the resulting IP parameters will be the same when powered off/on. In DHCP, IP configuration parameters are leased and may change over time.

When in its factory-default state and powered on, the HP Jetdirect print server will attempt to automatically configure itself using several dynamic methods, one of which is BOOTP.

BOOTP/TFTP on UNIX

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.

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 through 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.**

Bootptab File Entries

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

```
picasso:\
    :hn:\
    :ht=ether:\
    :vm=rfc1048:\
    :ha=0001E6123456:\
    :ip=192.168.40.39:\
    :sm=255.255.255.0:\
    :gw=192.168.40.1:\
    :lg=192.168.40.3:\
    :T144="hpnp/picasso.cfg":
```

Note that the configuration data contains "tags" to identify the various HP Jetdirect parameters and their settings. Entries and tags supported by the HP Jetdirect print server are listed in Table 3-1 Tags Supported in a BOOTP/DHCP Boot file.

Table 3-1 Tags Supported in a BOOTP/DHCP Boot file

Item	RFC 2132 Option	Description
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".)
ht	--	The hardware type tag. For the HP Jetdirect print server, set this to **ether** (for Ethernet). This tag must precede the **ha** tag.
vm	--	The BOOTP report format tag (required). Set this parameter to **rfc1048**.
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 **HARDWARE ADDRESS**.
ip	--	The IP address tag (required). This address will be the HP Jetdirect print server's IP address.
sm	1	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.
gw	3	The gateway IP address tag. This address identifies the IP address of the default gateway (router) that the HP Jetdirect print server will use for communications with other subnets.
ds	6	DNS (Domain Name System) server's IP address tag. Only a single name server can be specified.
lg	7	The syslog server's IP address tag. It specifies the server that the HP Jetdirect print server sends syslog messages to. For more information, see TCP/IP Overview.
hn	12	The host name tag. This tag does not take a value but 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.
dn	15	Domain name tag. Specifies the domain name for the HP Jetdirect print server (for example, support.hp.com). It does not include the host name; it is not the Fully Qualified Domain Name (such as printer1.support.hp.com).
ef	18	Extensions file tag that specifies the relative path name of the TFTP configuration file. **NOTE** This tag is similar to the vendor-specific tag T144, described below.
na	44	Tag for IP addresses of the NetBIOS-over-TCP/IP Name Server (NBNS). A primary and secondary server may be specified in order of preference.
lease-time	51	DHCP IP address lease duration time (seconds).
tr	58	DHCP T1 timeout, specifying the DHCP lease renewal time (seconds).
tv	59	DHCP T2 timeout, specifying the DHCP lease rebind time (seconds).
T69	69	The IP address (in hexadecimal) of the preferred outgoing e-mail SMTP (Simple Mail Transport Protocol) server, for use with supported Scan devices.
T144	--	An HP-proprietary tag that specifies the relative path name of the TFTP configuration file. Long path names may be truncated. The path name must be in double quotes (for example, *"pathname"*). For file format information, refer to TFTP Configuration File Entries. **NOTE** Standard BOOTP option 18 (extensions file path) also allows a standard tag (**ef**) to specify the relative path name of the TFTP configuration file.

Table 3-1 Tags Supported in a BOOTP/DHCP Boot file (continued)

Item	RFC 2132 Option	Description
T145	--	Idle Timeout option. An HP-proprietary tag to set the idle timeout (seconds), which is the amount of time that a print data connection may remain idle before being closed. The range is 1 - 3600 seconds.
T146	--	Buffer Packing option. An HP-proprietary tag to set buffer packing for TCP/IP packets. 0 (default): Normal data buffers are packed before sending to the printer. 1: Disable buffer packing. Data is sent to the printer when received.
T147	--	Write Mode option. An HP-proprietary tag that controls the TCP PSH flag setting for device-to-client data transfers. 0 (default): disables this option, flag not set. 1: all-push option. The push bit is set in all data packets. 2: eoi-push option. The push bit is set only for data packets that have an End-of-Information flag set.
T148	--	IP Gateway Disable option. An HP-proprietary tag to prevent configuration of a Gateway IP address. 0 (default): allows an IP address. 1: prevents a Gateway IP address to be configured.
T149	--	Interlock Mode option. An HP-proprietary tag that specifies whether an acknowledgement (ACK) on all TCP packets is required before the printer is allowed to close a Port 9100 print connection. A Port Number and Option value are specified, in the form: *<Port Number> <Option>* *<Port Number>*: For an HP Jetdirect embedded print server, the Port Number is 1. *<Option>*: Option value 0 (default) disables interlock, 1 enables. Example: 1 1 specifies port 1, interlock enabled
T150	--	TFTP server's IP address option. An HP-proprietary tag to specify the TFTP server's IP address where the TFTP configuration file is located.
T151	--	Network Configuration option. An HP-proprietary tag to specify either "BOOTP-ONLY" or "DHCP-ONLY" requests be sent.

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 (for domain names only), 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 (or the "ef" standard

BOOTP 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 subnet 192.168.10.0 access

allow: 192.168.10.0    255.255.255.0

#

# Disable Telnet

telnet-config: 0

#

# Enable the embedded Web server

ews-config: 1

#

# Detect SNMP unauthorized usage

auth-trap: on

#

# Send traps to 192.168.10.1

trap-dest: 192.168.10.1

#

# Specify the Set Community Name

set-cmnty-name: 1homer2

#

# End of File
```

The `allow` command enables subnet 192.168.10.0 with access to the printer. Up to 10 'allow' entries can be written through TFTP, Telnet or embedded Web server. Single IP addresses for a specific systems can also be specified.

The `telnet-config` command disables Telnet.

The `ews-config` command enables the embedded Web server.

The `auth-trap` command enables sending of SNMP authentication traps.

The `trap-dest` command specifies the system to send SNMP traps to.

The `set-cmnt-name` command specifies the community name required in SNMP Set commands.

TFTP Command Parameters

The table below describes TFTP command parameters for HP Jetdirect firmware version V.30.xx and later. (Optional commands for the same function are shown in parentheses).

Table 3-2 TFTP Configuration File Parameters

General

---

passwd: (or passwd-admin:)

- A password (up to 16 alphanumeric characters) that allows administrators to control changes of HP Jetdirect print server configuration parameters through Telnet, HP Web Jetadmin, or embedded Web server. The password may be cleared by a cold reset.

---

sys-location: (or host-location:, 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 (continued)

sys-contact: (or host-contact:, contact:)

- ASCII character string (up to 64 characters) 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.

security-reset:

- Reset security settings on the print server to factory default values. 0 (default) does not reset, 1 resets the security settings.

tftp-parameter-attribute:

- Specifies whether TFTP parameters can be manually overwritten on the print server (for example, through Telnet) after it has been configured by TFTP.

  tftp-ro (default): Do not allow TFTP parameters to be manually changed, and always overwrite manual configurations.

  tftp-rw: Allow TFTP parameters to be manually changed, and always overwrite manual configurations.

  manual-ro: Do not allow TFTP parameters to overwrite manually configured parameters.

TCP/IP Main

host-name: (or sys-name:, name:)

- Specifies the node name that will appear on the Jetdirect configuration page. Default is NPIxxxxxx, where xxxxxx is the last six digits of the LAN hardware address.

parm-file:

- Specifies the path and file name whose contents are sent to the printer for printing each time the print server is powered on. The path and filename entry is limited to 64 alphanumeric characters.

domain-name:

- The domain name for the device (for example, support.hp.com). It does not include the host name; it is not the Fully Qualified Domain Name (such as printer1.support.hp.com).

pri-dns-svr: (or dns-srv:)

- The IP address of the DNS (Domain Name System) server.

sec-dns-svr:

- The IP address of a secondary DNS server to use if the primary DNS server is unavailable.

pri-wins-svr: (or pri-wins-srv:)

- The IP address of the primary Windows Internet Naming Service (WINS) server.

sec-wins-svr: (or sec-wins-srv:)

- The IP address of the secondary Windows Internet Naming Service (WINS) server.

TCP/IP Print Options

9100-printing: (or 9100-config:)

- Enables or disables printing to TCP port 9100 on the print server. 0 disables, 1 (default) enables.

Table 3-2 TFTP Configuration File Parameters (continued)

lpd-printing: (or lpd-config:, lpd:)

- Enables or disables LPD (Line Printer Daemon) printing services on the Jetdirect print server. 0 disables, 1 (default) enables.

banner:

- A port-specific parameter that specifies printing an LPD banner page. 0 disables banner pages. 1 (default) enables banner pages.

interlock: (or interlock-mode:)

- Specifies whether an acknowledgement (ACK) on all TCP packets is required before the printer is allowed to close a Port 9100 print connection. A Port Number and Option value are specified. For current HP Jetdirect print servers, the Port Number is 1. Option value 0 (default) disables interlock, 1 enables. For example, "interlock 1 1" specifies Port 1, interlock enabled.

buffer-packing: (or packing:)

- Enables or disables buffer packing for TCP/IP packets.

  0 (default): is normal, the data buffer is packed before sending to the printer.

  1: disables buffer packing, data is sent to the printer as it is received.

write-mode:

- Controls the setting of the TCP PSH flag for device-to-client data transfers.

  0 (default): disables this option, flag is not set.

  1: all-push option. The push bit is set in all data packets.

mult-tcp-conn:

- Enables or disables multiple TCP connections. 0 (default) allows multiple connections. 1 disables multiple connections.

TCP/IP Raw Print Ports

raw-port: (or addrawport:)

- Specifies additional ports for printing to TCP port 9100. Valid ports are 3000 to 9000, which are application-dependent.

TCP/IP Access Control

allow: netnum [mask]

- Makes 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: 192.168.1.2 allows a single host. In this case, the default mask 255.255.255.255 is assumed and is not required.

  allow: 0 This entry clears the host access list.

  For additional information, see Security Features.

TCP/IP Other Settings

Table 3-2 TFTP Configuration File Parameters (continued)

syslog-config:

■ Enables or disables syslog server operation on the print server: 0 disables, 1 (default) enables.

syslog-svr: (or syslog-srv:)

■ The syslog server's IP address. It specifies the server that the HP Jetdirect print server sends syslog messages to. For more information, see TCP/IP Overview.

syslog-max:

■ Specifies the maximum number of syslog messages that can be sent by the HP Jetdirect print server on a per-minute basis. This setting allows administrators to control the log file size. The default is 10 per minute. If it's set to zero, the number of syslog messages is not restricted.

syslog-priority:

■ Controls the filtering of syslog messages sent to the syslog server. The filter range is 0 to 8, with 0 being the most specific and 8 the most general. Only messages that are lower than the filter level specified (or higher in priority) are reported. The default is 8, messages of all priorities are sent. If 0, all syslog messages are disabled.

syslog-facility:

■ A code used to identify the source facility of a message (for example, to identify the source of selected messages during troubleshooting). By default, the HP Jetdirect print server uses LPR as the source facility code, but local user values of local0 through local7 can be used to isolate individual or groups of print servers.

slp-config:

■ Enables or disables the Service Location Protocol (SLP) operation on the print server: 0 disables, 1 (default) enables.

slp-keep-alive:

■ Specifies a time period for the print server to send multicast packets on the network to prevent being deleted from network device tables. Some infrastructure devices, such as switches, may delete active devices from their device tables due to inactivity on the network. To enable this feature, set a value from 1 to 1440 minutes. Set 0 to disable this feature.

ttl-slp:

■ Specifies the IP multicast "Time To Live" (TTL) setting for Service Location Protocol (SLP) packets. The default value is 4 hops (the number of routers from the local network). The range is 1–15. When set to a -1, multicast capability is disabled.

mdns-config:

■ Enables or disables Multicast Domain Name System (mDNS) services. 0 disables, 1 (default) enables. mDNS is typically used on small networks for IP address and name resolution (through UDP port 5353) where a conventional DNS server is neither used or available.

mdns-service-name:

■ Specifies an alphanumeric string of up to 64 ASCII characters assigned to this device or service. This name is persistent and is used to resolve a particular device or service if socket information (such as the IP address) changes from session to session. Apple Rendezvous will display this service. The default service name is the printer model and the LAN Hardware (MAC) address.

Table 3-2 TFTP Configuration File Parameters (continued)

mdns-pri-svc:

- Specifies the mDNS highest priority service to use for printing.To set this parameter, choose one of the following printing option numbers:

  1: Port 9100 printing

  2: IPP port printing

  3: The default LPD raw queue

  4: The default LPD text queue

  5: The default LPD auto queue

  6: The default LPD binps (binary postscript) queue

  7 through **12**: If user-specified LPD queues are defined, corresponds to user-specified LPD queues 5 through 10.

  The default selection will depend on the printer, typically port 9100 printing or LPD binps.

ipv4-multicast:

- Enables or disables the receipt and transmission of IP version 4 multicast packets by the print server. 0 disables, 1 (default) enables.

  NOTE If this parameter is disabled, other protocols that use multicast protocols, such as mDNS and SLP, may also be disabled without notification.

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 270 seconds.

user-timeout: (or telnet-timeout:)

- An integer (1..3600) that specifies the number of seconds that your Telnet or FTP session can be idle before it will be automatically disconnected. The default is 900 seconds. 0 disables the timeout.

  CAUTION Small values, such as 1–5, may effectively disable the use of Telnet. A Telnet session may terminate before any changes can be made.

ews-config: (or web:)

- Enables or disables the print server's embedded Web server to change configuration values: 0 disables, 1 (default) enables.

tcp-mss: (or subnets-local:)

- Specifies the maximum segment size (MSS) that the HP Jetdirect print server will advertise for use when communicating with local subnets (Ethernet MSS=1460 bytes or more) or remote subnets (MSS=536 bytes):

  0 (default): All networks are assumed to be local (Ethernet 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.

  MSS affects performance by helping to prevent IP fragmentation that may result in data retransmission.

Table 3-2 TFTP Configuration File Parameters (continued)

tcp-msl:

- Specifies the maximum segment life (MSL) in seconds. The range is 5–120 seconds. The default is 15 seconds.

telnet-config: (or 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.

default-ip:

- Specifies the IP address to use when the print server is unable to obtain an IP address from the network during a forced TCP/IP reconfiguration (for example, when powered off/on or manually configured to use BOOTP/DHCP).

  DEFAULT_IP: sets the legacy default IP address 192.0.0.192.

  AUTO_IP: sets a link-local IP address 169.254.x.x.

  The initial setting is determined by the IP address obtained when first powered on.

default-ip-dhcp:

- Specifies whether DHCP requests will be periodically transmitted when a legacy default IP address 192.0.0.192 or link-local IP address 169.254.x.x has been automatically assigned.

  0: Disables DHCP requests.

  1 (default): Enables DHCP requests.

dhcp-arbitration:

- Specifies the amount of time, in seconds, that the print server will wait for DHCP configuration offers. A value from 1 to 10 may be set. The default is 5 seconds.

phone-home-config:

- Specifies privacy settings on the print server during embedded Web server access. This command controls whether statistical data on product use may be sent to HP. For HP to collect data, Internet access is required.

  2: Prompt the user to allow sending data on initial access to the Networking tab of the embedded Web server. This is the factory-default and cold-reset value. Once changed, this value cannot be re-selected.

  1: Allows the sending of data to HP without prompting the user.

  0: Disables sending data to HP without prompting the user.

web-refresh:

- Specifies the time interval (1–99999 seconds) for embedded Web server diagnostic page updates. If set to 0, the refresh rate is disabled.

SNMP

snmp-config:

- Enables or disables SNMP operation on the print server. **0** disables, **1** (default) enables SNMP.

  △ **CAUTION** Disabling SNMP will disable all SNMP agents (SNMP v1, v2c) as well as communications with HP Web Jetadmin. In addition, firmware upgrades through current HP downloading utilities will be disabled.

Table 3-2 TFTP Configuration File Parameters (continued)

get-cmnty-name: (or get-community-name:)

■   Specifies a password that determines which SNMP GetRequests the HP Jetdirect print server will respond to. This is optional. If a user-specified get community name is set, the print server will respond to either a user-specified community name or the factory-default. The community name must be ASCII characters. The maximum length is 255 characters.

set-cmnty-name: (or 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. (For additional security, you may limit configuration access through the print server's host access list). Community names must be ASCII characters. The maximum length is 255 characters.

auth-trap: (or 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 "on."

trap-dest: (or trap-destination:)

■   Enters a host's IP address into the HP Jetdirect print server's SNMP trap destination list. The command format is:

trap-dest: *ip-address* [community name] [port number]

The default community name is "public"; the default SNMP port number is "162". The port number cannot be specified without a community name.

If a "trap-community-name" command is followed by "trap-dest" commands, the trap community name will be assigned to those entries unless a different community name is specified in each "trap-dest" command.

To delete the table, use "trap-dest: 0".

If the list is empty, the print server does not send SNMP traps. The list may contain up to three 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.

Other Settings

link-type:

■   Sets the print server's link speed (10, 100 Mbps) and communication mode (Full- or Half-Duplex). The available link-speed selections are AUTO, 100FULL, 100HALF, 10FULL, 10HALF.

For AUTO (default), the print server uses auto-negotiation to configure itself with the highest link speed and communication mode allowed. If auto-negotiation fails, either 100TX HALF or 10TX HALF is set depending on the detected link speed of the hub/switch port.

Support

support-name: (or support-contact:)

■   Typically used to identify the name of a person to contact for support of this device.

support-number:

■   Typically used to specify a phone number or extension to call for support of this device.

Table 3-2 TFTP Configuration File Parameters (continued)

support-url:

■ A Web URL for product information on this device over the Internet or an intranet.

tech-support-url:

■ A Web URL for technical support over the Internet or an intranet.

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 as long as a WINS (Windows Internet Naming Service) server IP address has been specified.

A TFTP (Trivial File Transfer Protocol) configuration file may also be used with DHCP to configure extended parameters. For more information on TFTP parameters, see Using BOOTP/TFTP.

> **NOTE** DHCP services must be available on a network 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 allows the transfer of DHCP 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.

Since older HP-UX systems may not provide Dynamic Domain Name Services (DDNS) for its DHCP implementations, HP recommends that you set all print server lease durations to "infinite" for these systems. This ensures that print server IP addresses remain static until dynamic domain name services are provided.

Windows Systems

HP Jetdirect print servers support IP configuration from a supported 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 or DHCP operation and powered on, the HP Jetdirect print server automatically sends a BOOTP or DHCP request for its IP configuration. If properly set up, a Windows DHCP server will respond with the print server's IP configuration data.

> **NOTE** This information is provided as an overview. For specific information or for additional support, see the information supplied with your DHCP server 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 or Server 2003 system, perform the following steps:

1. Run the Windows DHCP manager utility.

   - Windows 2000: Click **Start**, then 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 TCP/IP Overview.

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 below).

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 configuration through BOOTP 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.

NetWare Systems

NetWare 5.x servers provide DHCP configuration services for network clients, including the HP Jetdirect print server. To set up DHCP services on a NetWare server, refer to Novell documentation and support.

To Discontinue DHCP Configuration

    ⚠ **CAUTION** Changes to an IP address on your HP Jetdirect print server may require updates to printer or system printing configurations for clients or servers.

If you do not want your HP Jetdirect print server configured through DHCP, you must re-configure the print server to use a different configuration method.

1 If you use the printer control panel to set Manual or BOOTP configuration, then DHCP will not be used.

2 You can use Telnet to set Manual (status indicates "User Specified") or BOOTP configuration, then DHCP will not be used.

3 You can manually modify the TCP/IP parameters through a supported Web browser using the Jetdirect embedded Web server or HP Web Jetadmin.

If you change to BOOTP configuration, the DHCP-configured parameters are released and the TCP/IP protocol is initialized.

If you change to Manual configuration, the DHCP-configured IP address is released and the user-specified IP parameters are used. **Therefore, if you manually provide the IP address, you should also manually set all of the configuration parameters, such as subnet mask, default gateway, and idle timeout.**

For DHCP configuration through Telnet, refer to Using Telnet in this chapter.

Using RARP

This section 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:

    `192.168.45.39 laserjet1`

7   Edit the `/etc/ethers` file (the `/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:

    `00:01:E6: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.

10 If ping does not respond, see 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 NT/2000/XP/Server 2003 or UNIX system configured for TCP/IP operation

- A legacy default IP address 192.0.0.192 has been set on the print server

- The LAN hardware (MAC) address of the HP Jetdirect print server (specified on an HP Jetdirect configuration page)

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

After an IP address is assigned through `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:

```
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.

Depending on the system, the LAN hardware address may require a specific format.

For example:

- For Windows NT 4.0, 2000, XP, Server 2003

  ```
  arp -s 192.168.45.39 00-01-E6-a2-31-98

  ping 192.168.45.39
  ```

- For UNIX

  ```
  arp -s 192.168.45.39 00:01:E6:a2:31:98

  ping 192.168.45.39
  ```

> 📝 **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 (see Troubleshooting the HP Jetdirect Print Server).
>
> 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 section describes how to configure the print server (firmware version V.30.xx) using Telnet.

Although a Telnet connection may be protected by an administrator password, Telnet connections are not secure. For networks with high security levels, Telnet connections can be disabled on the print server using other tools (for example, TFTP, embedded Web server, or HP Web Jetadmin software).

Creating a Telnet Connection

To use Telnet commands with the HP Jetdirect print server, a route must be available from your workstation to the print server. If the print server and your computer must have a similar IP address, that is, the network portion of their IP addresses match, chances are that a route will exist. For information on IP address structure, see TCP/IP Overview.

If their IP addresses do not match, then you can either change your workstation's IP address to match, or you can try an operating system command to create a route to the print server. (For example, if the print server is configured with a legacy default IP address 192.0.0.192, a route will not likely exist.)

On Windows systems, you can use the **route** command at a Windows command (DOS) prompt to create a route to the print server.

For information on system command prompts, see your Windows online help. On Windows NT systems, the command prompt utility is in the **Programs** folder (click **Start**, **Programs**, **Command Prompt**). On Windows 2000/XP/Server 2003 systems, it is in the **Accessories** folder in the **Programs** or **All Programs** folder.

To use the route command, you will also need the IP address of your workstation. To view it, you can enter the appropriate command at the command prompt:

`C:\> ipconfig` (on Windows NT/2000/XP/Server 2003)

`C:\> winipconfig` (on Windows 98)

To create a route from the system command prompt, enter the following command:

`route add <Jetdirect IP Address> <system IP Address>`

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

For example, to create a route from your workstation with IP address 169.254.2.1 to a print server with a default IP address of 192.0.0.192, try this command:

```
route add 192.0.0.192 169.254.2.1
```

> ⚠ **CAUTION**   Using Telnet to manually set an IP address will override dynamic IP configuration (such as BOOTP, DHCP, or RARP), resulting in a static configuration. In a static configuration, the IP values are fixed and the operation of BOOTP, DHCP, RARP and other dynamic configuration methods may no longer function.
>
> Whenever you are manually changing an IP address, you should also re-configure the subnet mask and default gateway at the same time.

A Typical Telnet Session

Initiating a typical Telnet session is illustrated below.
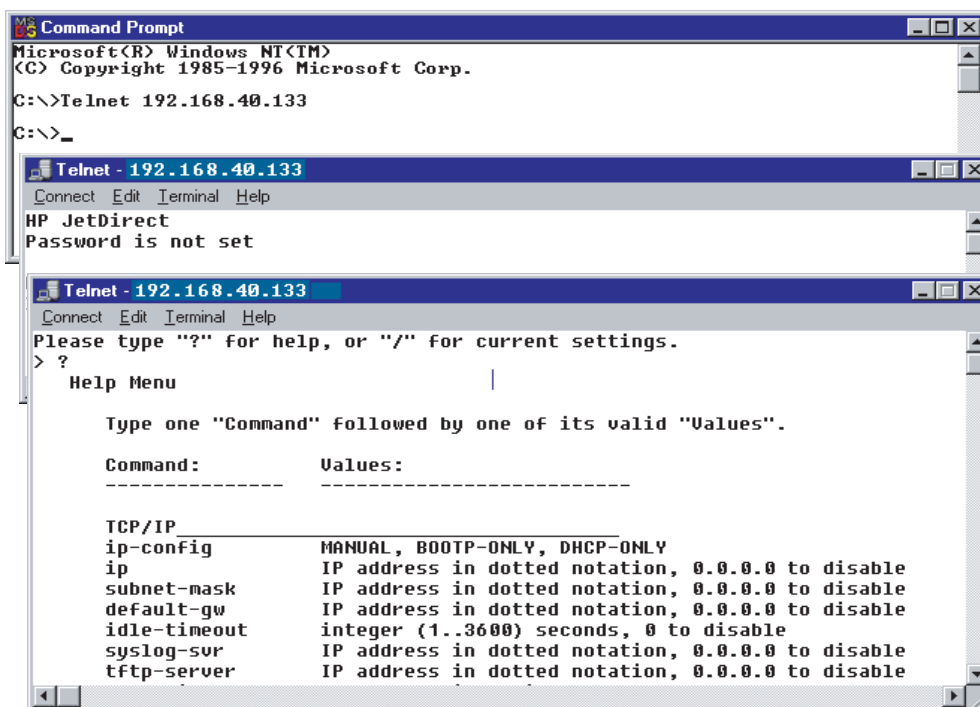
To set configuration parameters, you must set up a Telnet session from your system to the HP Jetdirect print server.

1   Type the following at the system prompt:

```
telnet <IP address>
```

where `<IP address>` is the IP address listed on the Jetdirect configuration page. See HP Jetdirect Configuration Page.

2   A connection to the HP Jetdirect print server will be displayed. If the server responds with `"connected to IP address"`, press **Enter** twice to make sure that the Telnet connection is initialized.

3   If prompted for a user name and password, enter the correct values.

By default, the Telnet interface does not require a user name or password. If an administrator password has been set, you will be prompted for a user name and this password before you can enter and save Telnet command settings.

4   By default, a Command Line interface is provided. To configure parameters using a Menu interface, enter **Menu**. For more information, see User Interface Options.

For a list of supported commands and parameters, see Table 3-3 Telnet Commands and Parameters.

User Interface Options

The HP Jetdirect print server provides two interface options to enter Telnet commands: a Command Line Interface (Default) and a Menu Interface.

Command Line Interface (Default)

Using the Telnet command line interface, you can set configuration parameters using the following procedures:

> **NOTE**   During a Telnet session, enter `?` to view available configuration parameters, the correct command format, and a list of commands.
>
> To list additional (or advanced) commands, enter the command `advanced` befored entering `?`.
>
> To display current configuration information, enter /.

1   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 Telnet Commands and Parameters for configuration parameters.

2   Repeat the previous step to set any additional configuration parameters.

3   When you have finished typing the configuration parameters, type `exit` or `quit` (depending on your system).

When prompted whether to save settings that you have changed, enter `Y` (default) for Yes, or `N` for No.

If you enter `save` instead of `exit` or `quit`, you will not be prompted to save settings.

Telnet Commands and Parameters. Table 3-3 Telnet Commands and Parameters lists the available Telnet commands and parameters.

> **NOTE**   If a parameter is supplied dynamically (for example, from a BOOTP or DHCP server), its value cannot be changed using Telnet without first setting Manual configuration. To set Manual configuration, see the `ip-config` command.
>
> Whenever you are manually changing an IP address, you should also re-configure the subnet mask and default gateway at the same time.

Table 3-3 Telnet Commands and Parameters

Command	Description
User Control Commands	
?	Displays the Help and Telnet commands.
/	Displays current values.
menu	Displays the Menu Interface for access to configuration parameters.
advanced	Enables the Advanced commands. Help (?) will include the Advanced commands in the list.
general	Disables the Advanced commands. Help (?) will not include Advanced commands (default).
save	Save the configuration values and exit the session.
exit	Exit the session.
export	Export the settings to a file for editing, and importing through Telnet or TFTP (this command is only supported by systems, such as UNIX, that support input/output redirection).
General	
passwd	Set the administrator password (shared with the embedded Web server and HP Web Jetadmin). For example, "passwd jd1234 jd1234" sets the password to jd1234. Note that "jd1234" is entered twice for confirmation.
	Up to 16 alphanumeric characters may be used. When initiating the next Telnet session, you will be prompted for a user name and this password.
	To clear the password, enter the command without password and confirmation entries.
	Passwords may be cleared by a cold reset.
sys-location	Alpha-numeric string (up to 255 characters), typically used to identify a location.
sys-contact	Alpha-numeric string (up to 255 characters), typically used to identify the name of a network or device administrator.
security-reset	Reset security settings on the print server to factory default values. 0 (default) does not reset, 1 resets the security settings.
TCP/IP Main	
host-name	Alphanumeric string (up to 32 characters), to assign or change the name of the network device. For example,
	"host-name printer1" assigns the name "printer1" to the device. The default host name is NPIxxxxxx, where xxxxxx are the last six digits of the LAN hardware (MAC) address.
ip-config	Specify the configuration method:
	manual: The print server will wait for IP parameters using manual tools (such as Telnet, embedded Web server, control panel, installation/management software). Status will be User Specified.
	bootp: The print server will send BOOTP requests on the network for dynamic IP configuration.

Table 3-3 Telnet Commands and Parameters (continued)

	dhcp: The print server will send DHCP requests on the network for dynamic IP configuration.
	auto_ip: The print server will be automatically configured with a unique link-local address 169.254.x.x.
ip	IP address for the print server, in dotted notation. For example: `ip-config manual ip 192.168.45.39` where `ip-config` specifies manual configuration and `ip` manually sets the IP address 192.168.45.39 on the print server. Specifying 0.0.0.0 clears the IP address. If you exit and save a new IP address, it must be specified on the next Telnet connection.
subnet-mask	A value (in dotted notation) that identifies the network and host portions of an IP address in received messages. For example, `subnet-mask 255.255.255.0` stores the subnet mask value 255.255.255.0 on the print server. The value 0.0.0.0 disables the subnet mask. For more information see TCP/IP Overview.
default-gw	The IP address of a default gateway, in dotted notation. For example, `default-gw 192.168.40.1` assigns 192.168.40.1 as the IP address of the default gateway for the print server. **NOTE** If the HP Jetdirect print server is configured by DHCP and you manually change the subnet mask or the default gateway address, you should manually change the print server's IP address. This will release the DHCP-assigned address back to the DHCP IP address pool.
Config Server	(Read-only parameter) The IP address of the server (such as a BOOTP or DHCP server) that last configured the IP address on the HP Jetdirect print server.
TFTP Server	(Read-only parameter) The IP address of the TFTP server that provided TFTP parameters to the HP Jetdirect print server.
TFTP Filename	(Read-only parameter) The path and TFTP filename on the TFTP server. For example, hpnp/printer1.cfg
domain-name	The domain name for the device. For example, `domain-name support.hp.com` assigns `support.hp.com` as the domain name. The domain name does not include the host name; it is not the Fully Qualified Domain Name (such as printer1.support.hp.com).
pri-dns-svr	IP address of the primary DNS (Domain Name System) server.
sec-dns-svr	IP address of a secondary DNS server to use if the primary DNS server is unavailable.
pri-wins-svr	The IP address of the primary Windows Internet Naming Service (WINS) server, in dotted notation.
sec-wins-svr	The IP address of the secondary Windows Internet Naming Service (WINS) server, in dotted notation.

Table 3-3 Telnet Commands and Parameters (continued)

TCP/IP Print Options

9100-printing	Enables or disables printing to TCP port 9100 on the print server. **0** disables, **1** (default) enables.
lpd-printing	Enables or disables the ability to print using LPD. **0** disables, **1** (default) enables.(TCP port 515)
banner	Enables or disables printing an LPD banner page. **0** disables banner pages. **1** (default) enables banner pages.
interlock	Specifies whether an acknowledgement (ACK) on all TCP packets is required before the printer is allowed to close a Port 9100 print connection. A Port Number and Option value are specified. For HP embedded print servers, the default Port Number is 1. Option value **0** (default) disables interlock, **1** enables. For example, "interlock 1 1" specifies port 1, interlock enabled.
mult-tcp-conn	(Restrict Multiple Ports) Enables or disables multiple TCP connections. Allows you to restrict the use of multiple ports. **0** (default): allows multiple connections. **1**: disables multiple connections.
buffer-packing	Enables or disables buffer packing for TCP/IP packets. **1** (default): is normal, the data buffer is packed before sending to the printer. **0**: disables buffer packing, data is sent to the printer as it is received.
write-mode	Controls the setting of the TCP PSH flag for device-to-client data transfers. **0** (default): disables this option, flag is not set. **1**: all-push option. The push bit is set in all data packets.

TCP/IP LPD Queues

addq	Adds a user-defined queue. The queue name (up to 32 displayable ASCII characters), prepend string name, append string name, and processing queue (typically, RAW) must be specified in the command line. Up to six user-defined queues may be added. ⚠️ **CAUTION** Avoid the differentiation of queue names through the use of lower- and upper-case characters only. Otherwise, management of LPD queues by other tools may yield unpredictable results.
deleteq	Delete a user-specified queue. The queue name must be specified in the deleteq command line.
defaultq	Name of the queue to be used if the queue specified for a print job is unknown. By default, the default queue is **AUTO**.
addstring	Adds a user-defined character string that may be prepended or appended to print data. Up to eight character strings may be specified. A string name and the character string contents are specified in the addstring command line.
deletestring	Deletes a user-defined string. The string name is specified in the deletestring command line.

TCP/IP Raw Print Ports

raw-port	Specifies additional ports for printing to TCP port 9100. Valid ports are 3000 to 9000, which are application-dependent. Up to two ports can be specified.

TCP/IP Access Control

Table 3-3 Telnet Commands and Parameters (continued)

allow	Makes 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 192.168.1.2 — allows a single host. In this case, the default mask 255.255.255.255 is assumed and is not required. allow 0 — clears the host access list. For additional information, see <u>Security Features</u>.
TCP/IP Other	
syslog-config	Enables or disables syslog server operation on the print server: **0** disables, **1** (default) enables. (UDP port 514)
syslog-svr	The syslog server's IP address in dotted notation. It specifies the server that the HP Jetdirect print server sends syslog messages to. For example, syslog-svr: 192.168.40.1 assigns 192.168.40.1 as the IP address of that server. For more information, see <u>TCP/IP Overview</u>.
syslog-max	Specifies the maximum number of syslog messages that can be sent by the HP Jetdirect print server on a per-minute basis. This setting allows administrators to control the log file size. The default is 10 per minute. If it's set to zero, the number of syslog messages is not restricted.
syslog-priority	Controls the filtering of syslog messages sent to the syslog server. The filter range is **0** to **8**, with **0** being the most specific and **8** the most general. Only messages that are lower than the filter level specified (or higher in priority) are reported. The default setting is **8**, where messages of all priorities are sent. If **0**, all syslog messages are disabled.
syslog-facility	A code used to identify the source facility of a message (for example, to identify the source of selected messages during troubleshooting). By default, the HP Jetdirect print server uses **LPR** as the source facility code, but local user values of **local0** through **local7** can be used to isolate individual or groups of print servers.
slp-config	Enables or disables the Service Location Protocol (SLP) operation on the print server: **0** disables, **1** (default) enables. SLP is used by selected HP software applications (through UDP port 427) to automate device discovery. If SLP will use multicast protocols, Multicast IPv4 must be enabled.
slp-keep-alive	Specifies a time period for the print server to send multicast packets on the network to prevent being deleted from network device tables. Some infrastructure devices, such as switches, may delete active devices from their device tables due to inactivity on the network. To enable this feature, set a value from 1 to 1440 minutes. Set 0 to disable this feature.
mdns-config	Enables or disables Multicast Domain Name System (mDNS) services. **0** disables, **1** (default) enables. mDNS is typically used on small networks for IP address and name resolution (through UDP port 5353) where a conventional DNS server is not available.

Table 3-3 Telnet Commands and Parameters (continued)

	For mDNS operation, Multicast IPv4 must be enabled.
mdns-service-name	Specifies an alphanumeric string of up to 64 ASCII characters assigned to this device or service. This name is persistent and is used to resolve a particular device or service if socket information (such as the IP address) changes from session to session. Apple Rendezvous will display this service. The default service name is the printer model and the LAN Hardware (MAC) address.
mDNS Domain Name	(Read-only parameter) Specifies the mDNS domain name assigned to the device, in the form <host name>.local. If a user-specified host name has not been assigned, the default host name NPIxxxxxx is used, where xxxxxx are the last 6 digits of the LAN hardware (MAC) address.
mdns-pri-svc	Specifies the mDNS highest priority service to use for printing.To set this parameter, choose one of the following printing option numbers: **1**: Port 9100 printing **2**: IPP port printing **3**: The default LPD raw queue **4**: The default LPD text queue **5**: The default LPD auto queue **6**: The default LPD binps (binary postscript) queue **7** through **12**: If user-specified LPD queues are defined, corresponds to user-specified LPD queues 5 through 10. The default selection will depend on the printer, typically port 9100 printing or LPD binps.
ttl-slp	Specifies the IP multicast "Time To Live" (TTL) setting for Service Location Protocol (SLP) packets. The default value is 4 hops (the number of routers from the local network). The range is 1–15. When set to a -1, multicast capability is disabled.
ipv4-multicast	Enables or disables the receipt and transmission of IP version 4 multicast packets by the print server. **0** disables, **1** (default) enables. **NOTE** If this parameter is disabled, other protocols that use multicast protocols, such as mDNS and SLP, may also be disabled without notification.
idle-timeout	An integer (1to 3600) that specifies the number of seconds an idle print data connection is allowed to remain open. For example, `idle-timeout 120` assigns 120 seconds as the desired idle timeout value. The default is 270 seconds. If set to 0, the connection will not terminate and other hosts will not be able to make a connection.
user-timeout	An integer (1to 3600) that specifies the number of seconds that your Telnet or FTP session can be idle before it will be automatically disconnected. The default is 900 seconds. 0 disables the timeout. **CAUTION** Small values, such as 1–5, may effectively disable the use of Telnet. A Telnet session may terminate before any changes can be made.

Table 3-3 Telnet Commands and Parameters (continued)

cold-reset	**1**: Sets TCP/IP factory default settings. After a cold reset, power cycle the print server. Parameters for other subsystems, such as IPX/SPX or AppleTalk, are not affected. **0**: Normal operation, and reset is disabled.
ews-config	Enables or disables the print server's embedded Web server. **0** disables, **1** (default) enables. For more information, see Using the Embedded Web Server.
web-refresh	Specifies the time interval (1–99999 seconds) for embedded Web server diagnostic page updates. If set to 0, the refresh rate is disabled.
tcp-mss	Specifies the maximum segment size (MSS) that the HP Jetdirect print server will advertise for use when communicating with local subnets (Ethernet MSS=1460 bytes or more) or remote subnets (MSS=536 bytes): **0**: (default) All networks are assumed to be local (Ethernet 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. MSS affects performance by helping to prevent IP Fragmentation that may result in data retransmission.
tcp-msl	Specifies the maximum segment life (MSL) in seconds. The range is 5–120 seconds. The default is 15 seconds.
gw-disable	Specifies whether or not to automatically assign the device IP address as the gateway when a network gateway is not configured. **0**: A gateway using the device IP address will be assigned. **1**: A gateway is not assigned. The gateway address 0.0.0.0 will be configured.
default-ip	Specifies the IP address to use when the print server is unable to obtain an IP address from the network during a forced TCP/IP reconfiguration (for example, when powered off/on or manually configured to use BOOTP/DHCP). **DEFAULT_IP**: sets the legacy default IP address 192.0.0.192. **AUTO_IP**: sets a link-local IP address 169.254.x.x. The initial setting is determined by the IP address obtained when first powered on.
default-ip-dhcp	Specifies whether DHCP requests will be periodically transmitted when a legacy default IP address 192.0.0.192 or link-local IP address 169.254.x.x has been automatically assigned. **0**: Disables DHCP requests. **1** (default): Enables DHCP requests.
dhcp-fqdn-config (dhcp-fqdn-behavior)	Specifies configuration control of the Fully Qualified Domain Name (FQDN), using either DHCP, manual configuration, or both. The fully qualified domain name consists of the device's host name and domain name. Select one of the following command values: **0** (default): DHCP may be used to supply the host name and domain name. The host name may be changed using a manual configuration method (such as the embedded Web server, printer control panel, or Telnet). However, the domain name cannot be manually changed if it was configured through DHCP.

Table 3-3 Telnet Commands and Parameters (continued)

	1: Keep DHCP settings only. Once the Fully Qualified Domain Name is configured through DHCP, manual changes cannot be made.
	2: Keep manual settings. The settings can be manually configured. DHCP may be used only if the settings are factory-default values.
	3: Keep manual settings only. While manual configuration methods may be used, configuration through DHCP is not allowed.
dhcp-arbitration	Specifies the amount of time, in seconds, that the print server will wait for DHCP configuration offers. A value from 1 to 10 may be set. The default is 5 seconds.
phone-home-config	Specifies privacy settings on the print server during embedded Web server access. This command controls whether statistical data on product use may be sent to HP. For HP to collect data, Internet access is required.
	2: Prompt the user to allow sending data on initial access to the Networking tab of the embedded Web server. This is the factory-default and cold-reset value. Once changed, this value cannot be re-selected.
	1: Allows the sending of data to HP without prompting the user.
	0: Disables sending data to HP without prompting the user.
TCP/IP Diagnostics	
Last Config IP	(Read-only parameter) The IP address of the system from which the HP Jetdirect print server's IP address was configured.
TCP Conns Refused	(Read-only parameter) The number of client TCP connections that are refused by the print server.
TCP Access Denied	(Read-only parameter) The number of times that client systems were denied access to the print server because there was no allowable entry in the print server's host access list.
DHCP Lease Time	(Read-only parameter) DHCP IP address lease duration time (seconds).
DHCP Renew Time	(Read-only parameter) DHCP T1 timeout, specifying the DHCP lease renewal time (seconds).
DHCP Rebind Time	(Read-only parameter) DHCP T2 timeout, specifying the DHCP lease rebind time (seconds).
SNMP	
snmp-config	Enables or disables SNMP operation on the print server. 0 disables, 1 (default) enables SNMP.
	⚠️ **CAUTION** Disabling SNMP will disable all SNMP agents (SNMP v1, v2c) as well as communications with management applications, such as HP Web Jetadmin. In addition, firmware upgrades through current HP downloading utilities will be disabled.
get-cmnty-name	Specifies a password that determines which SNMP GetRequests the HP Jetdirect print server will respond to. This is optional. If a user-specified get community name is set, the print server will respond to either a user-specified community name or the factory-default. The community name must be ASCII characters. The maximum length is 255 characters.
set-cmnty-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

Table 3-3 Telnet Commands and Parameters (continued)

	SetRequest must match the print server's "set community name" for the print server to respond. (For additional security, you may limit configuration access through the print server's host access list.) Community names must be ASCII characters. The maximum length is 255 characters.
default-get-cmnty	Enables or disables the default Get community name.
	0 disables, 1 (default) enables.
	Disabling this parameter may prohibit communications with SNMP management applications.
SNMP Traps	
auth-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. 0 is off, 1 (default) is on.
trap-dest	Enters a host IP address into the HP Jetdirect print server's SNMP trap destination list. The command format is:
	trap-dest: ip–address [community name] [port number]
	The default community name is 'public'; the default SNMP port number is '162'. The port number cannot be specified without a community name.
	To delete the table, use 'trap-dest: 0'.
	If the list is empty, the print server does not send SNMP traps. The list may contain up to three 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.
Other	
link-type	Sets the print server's link speed (10, 100 Mbps) and communication mode (Full- or Half-Duplex). The available link-speed selections depend on the print server model. The selections that may be displayed are listed below.

> ⚠ **CAUTION** If you change the link setting, network communications with the print server and network device may be lost.

AUTO (default):

100FULL: 100 Mbps, full-duplex operation.

100HALF: 100 Mbps, half-duplex operation.

10FULL: 10 Mbps, Full-duplex operation.

10HALF: 10 Mbps, half-duplex operation.

Support	
Web JetAdmin URL	(Read-only parameter) If HP Web Jetadmin discovers this device, the URL to access HP Web Jetadmin will be specified.
Web JetAdmin Name	(Read-only parameter) If HP Web Jetadmin discovers this device, the name of the HP Web Jetadmin host will be specified (if known).
support-contact	Typically used to identify the name of a person to contact for support of this device.
support-number	Typically used to specify a phone or extension number to call for support of this device.

Table 3-3 Telnet Commands and Parameters (continued)

support-url	A Web URL address for product information on this device over the Internet or an intranet.
tech-support-url	A Web URL address for technical support over the Internet or an intranet.

Menu Interface

An optional Menu interface is displayed when you type menu at the Telnet command prompt. The Menu interface eliminates the need to memorize commands, and provides structured menu lists for easy access to configuration parameters.

Figure 3-1 Example: Using the Menu Interface illustrates the Menu interface, using the TCP/IP menus as an example.

■ From the **Main Menu** screen, select and enter a menu number. If there are submenus, select and enter a submenu number.

■ If you want to change a parameter setting, enter "Y" (for "Yes") when prompted.

Changes to parameters are made by editing the setting through the use of the **Backspace** key. If an unrecognized value is entered, the correct entry options will be displayed.

NOTE Changes are not saved on the Jetdirect print server until you exit a menu and, when prompted, choose to save your changes.

```
       Main Menu
------------------------------

1. General Menu
2. TCP/IP Menu...
3. SNMP Menu...
4. Other Settings
5. Support Settings
?. Help
e. Exit Menu
0. Exit Telnet
Enter Selection => 2
```

```
        TCP/IP Menu
------------------------------

1. TCP/IP - Main Settings
2. TCP/IP - Print Options
3. TCP/IP - Raw Print Ports
4. TCP/IP - Access Control
5. TCP/IP - Other Settings
6. TCP/IP - Diagnostics
0. Return to Main Menu


Enter Selection => 1
```

```
   TCP/IP - Main Settings
  -----------------------------

  Host Name        : printer1
  IP Config Method : USER SPECIFIED
  IP Address       : 192.168.45.39
  Subnet Mask      : 255.255.0.0
  Default Gateway  : 192.168.40.1
  Config Server    : 192.168.2.21
  TFTP Server      : 192.168.2.21
  TFTP File Name   : hpnp/print.cfg
  Domain Name      : Not Specified
  Pri DNS Server   : Not Specified
  Sec DNS Server   : Not Specified
  Pri WINS Server  : Not Specified
  Sec WINS Server  : Not Specified


Would you like to change any of the settings? (Y/[N]):Y
```
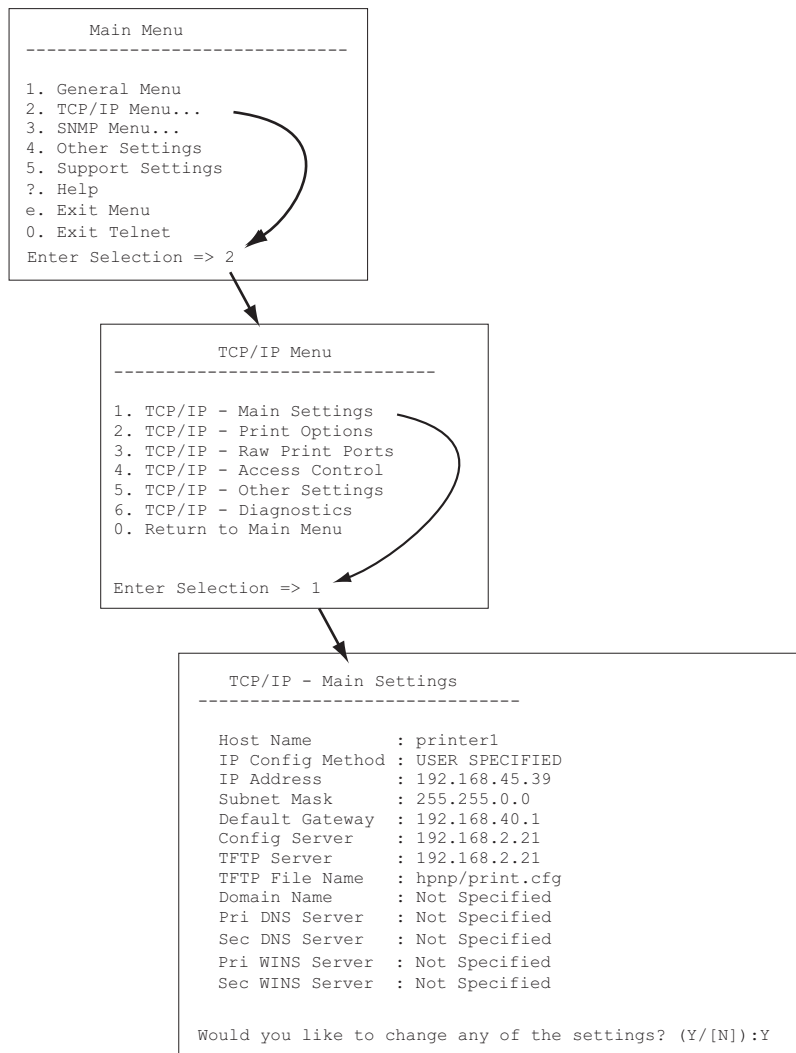
Figure 3-1 Example: Using the Menu Interface

To edit these parameters, enter Y. Use the **Backspace** key to edit the parameters.

Changes are not saved until you save them when you exit the session.

Using Telnet to Erase the Existing IP Settings

To erase the IP address during a Telnet session, use the following command line entries:

1 Type `cold-reset`, then press **Enter**.

2 Type `quit`, then press **Enter** to exit Telnet.

3 Power the print server off/on.

> **NOTE** This procedure resets all TCP/IP parameters, but only affects the TCP/IP subsystem.
>
> To reset all parameters to factory default values, refer to Troubleshooting the HP Jetdirect Print Server.

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 Using the Embedded Web Server.

Using the Printer Control Panel

When supported by the printer, HP Jetdirect print servers provide a configuration menu that can be accessed from the printer's control panel. Using this menu, you can enable, disable and set basic network parameters. For a summary of the available menu items, see The HP Jetdirect Control Panel Menu.

> **NOTE** For instructions on using the control panel for your printer, refer to your printer documentation.

When accessing the HP Jetdirect menu from the printer's control panel, the TCP/IP network configuration parameters that you can set include the following:

- IP address of the print server

- Subnet mask

- Default gateway address

- Syslog server address

- Idle timeout period

- IP host name

- DHCP lease behavior (release or renew)

- Primary and Secondary DNS servers

- Link speed and communication mode

If you need to configure more TCP/IP parameters than allowed by control panel configuration, use an alternate configuration tool (such as Telnet or the embedded Web server).

If the HP Jetdirect print server is configured with TCP/IP settings from the printer control panel, the configuration is saved on the print server when powered off/on.

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 on the new network. See Troubleshooting the HP Jetdirect Print Server for instructions to reset the print server to factory default settings.

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, from the printer control panel or Telnet), re-configure IP parameters as described in this chapter.

4 Using the Embedded Web Server

The print server contains an embedded Web server that can be accessed from a compatible Web browser over an intranet. The embedded Web server provides access to configuration and management pages for the HP Jetdirect print server.

The Jetdirect print server provides two tabs across the upper portion of your Web browser window: **Home** and **Networking**. These tabs provide access to basic printer status and detailed networking pages. Typical **Home** and **Networking** pages are illustrated below.
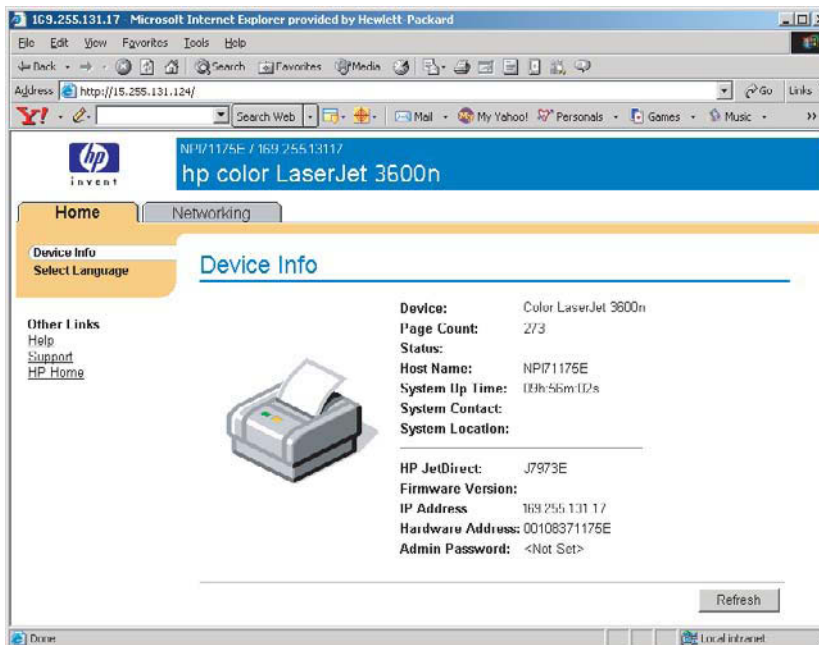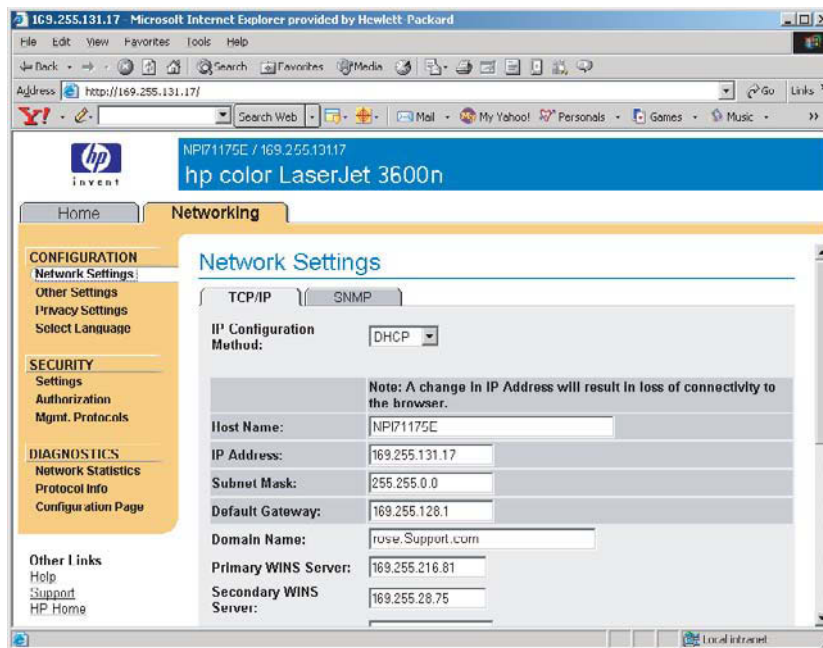

Figure 4-1 Embedded Web Server Home Tab

Figure 4-2 Embedded Web Server Networking Tab

For information supplied on the **Home** tab, see Home Tab.

Network configuration for the HP Jetdirect print server are accessed through the **Networking** tab. For detailed configuration information, see Networking Tab.

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

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 browser-based, enterprise management tool for network devices. It is available from HP online support at the following URL:

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

HP Web Jetadmin version 7.8 (or greater) is recommended for operation with the HP Jetdirect embedded Web server.

A link to HP Web Jetadmin will be displayed on the embedded Web server if HP Web Jetadmin has discovered this device through an Integration URL.

Currently, browser support between HP Web Jetadmin and the embedded Web server may differ. For supported browsers with HP Web Jetadmin, visit http://www.hp.com/go/webjetadmin.

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. For a description of an IP address and an overview of TCP/IP networking, see TCP/IP Overview.

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 print server is turned on. Or, you can manually configure IP parameters using the printer's control panel, Telnet, the "arp" and "ping" system commands, HP Web Jetadmin or other management software. For more information on TCP/IP configuration options, see TCP/IP Configuration.

When powered on, an HP Jetdirect print server that is unable to retrieve a valid IP address from the network will automatically assign itself either a legacy default IP address 192.0.0.192 or a link-local address in the range 169.254.1.0 to 169.254.254.255. The IP address configured on your print server can be determined by inspecting the Jetdirect configuration page for the print server. See TCP/IP Configuration for more information.

If the legacy default IP address 192.0.0.192 has been assigned, you must temporarily set up your computer with the same IP network number or establish a route to the print server before you can gain access to the embedded Web server.

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

1   Run a supported Web browser.

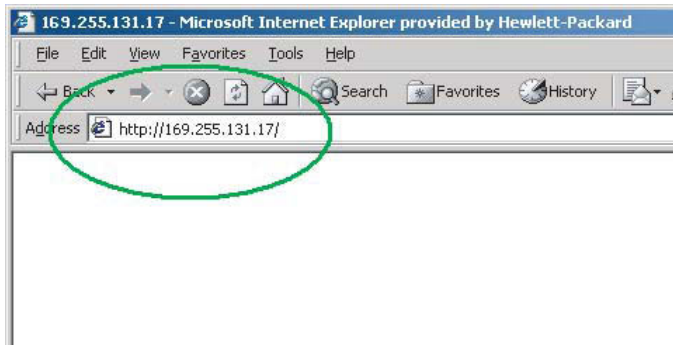**2** Enter the IP address of the print server as the URL.

Figure 4-3 Entering the IP Address

Standard HTTP is used to access the embedded Web server.

3 An embedded Web server page will be displayed.

Operating Notes

■ If you enter or change a configuration parameter value, click **Apply** to enable your change, or click **Cancel** to erase your change.

■ Changes to the IP address will close the connection to the embedded Web server. To re-establish a connection, use the new IP address.

> ⚠ **CAUTION** Changes to the IP address on the HP Jetdirect print server may result in printing failures for clients that have been configured to print using the previous IP address.

Home Tab

The **Home** tab will display the HP Jetdirect home page if a Web server in the attached device cannot be accessed or does not exist. The HP Jetdirect home page displays a generic printer graphic to represent the attached device. The HP Jetdirect print server's product model, firmware version, and network addresses are displayed along with any device information that can be retrieved. Table 4-1 HP Jetdirect Home Page Items provides a summary of the items displayed on the HP Jetdirect home page.

Table 4-1 HP Jetdirect Home Page Items

Item	Description
Networking tab	Provides access to network configuration, security, and diagnostic parameters. For more information, see Networking Tab.
Device Info	Identifies the printer (such as the model name).
	Other information that can be retrieved from the printer will also be displayed (such as Page Count, or Control Panel status) if the information can be retrieved.
Select Language	Appears if the HP Jetdirect Web pages support multiple languages. Supported languages may also be selected through language preference settings in your browser.

Table 4-1 HP Jetdirect Home Page Items (continued)

Item	Description
	To display supported non-English languages, the use of cookies must be enabled in your browser settings.
Host Name	Specifies the IP host name assigned to the device and stored on the HP Jetdirect print server. See TCP/IP on the Networking Tab.
System Up Time	The length of time since either the HP Jetdirect print server or the printer was last powered off/on.
System Contact	A text string (stored on the HP Jetdirect print server) for the name of a person to contact for this device. See the Networking TCP/IP configuration pages.
System Location	A text string (stored on the HP Jetdirect print server) that identifies the physical location of this device. See the Networking TCP/IP configuration pages.
HP Jetdirect	The product number assigned to the HP Jetdirect print server (for example HP J7973E) for identification.
Firmware Version	The version of the operating instructions installed on the HP Jetdirect print server.
IP Address	The Internet Protocol address configured on the HP Jetdirect print server. For general information on IP addresses, see TCP/IP Overview.
Hardware Address	The LAN hardware (or MAC, Media Access Control) address of the HP Jetdirect print server. This unique address is assigned by Hewlett-Packard.
Admin Password	Specifies whether or not an administrator password has been set. This password may also be configured through a Telnet session with the HP Jetdirect print server, or from HP Web Jetadmin.
	Use the **Admin Password** page to set or clear administrator passwords.
	If an administrator password has been set, you will be prompted for a User Name and Password to access network parameters. For more information, click Help, or see the Admin. Account section in this guide.

Networking Tab

The **Networking** tab provides access to HP Jetdirect network configuration parameters and status. The menu items in the left margin are listed below and provide access to network configuration and status pages.

- CONFIGURATION

  - Network Settings

  - Other Settings

  - Privacy Settings

  - Select Language

- SECURITY

  - Security: Settings

  - Authorization

  - Mgmt. Protocols

- DIAGNOSTICS

  - Network Statistics

  - Protocol Info

  - Configuration Page

Sending Product Information to HP

The first time that you access the **Networking** tab, you will be prompted whether to allow sending product information to HP. Product identification and usage data collected by HP will be used to improve product features and services. Personal data is not collected in accordance with HP privacy policies. See Hewlett-Packard Online Privacy Statement.

You can choose to enable or disable this feature at any time using the **Privacy Settings** page under the **Networking** tab.

Network Settings

The **Network Settings** pages allow you to set or change configuration parameters for TCP/IP and SNMP protocols. To assign a parameter setting, enter the desired value and click **Apply**.

TCP/IP

The TCP/IP page provides configuration parameters summarized in Table 4-2 TCP/IP Settings.

Table 4-2 TCP/IP Settings

Item	Description
IP Configuration Method	Selects the method that the HP Jetdirect print server will use for its IP configuration parameters: **BOOTP** (default), **DHCP**, **Manual**, or **Auto IP**.

Table 4-2 TCP/IP Settings (continued)

Item	Description
	For **BOOTP** or **DHCP**, the IP parameters will be automatically configured by a BOOTP or DHCP server each time the print server is powered on.
	If you select **Manual**, then basic IP parameters can be manually entered using this Web page, or using other available tools.
	If you select **Auto IP**, then a unique link-local address 169.254.x.x will be assigned.
	For more information, see TCP/IP Configuration.
Host Name	Specifies a readable IP name (the SNMP SysName object) for the network device. The name must start with a letter and can end in a letter or number, up to 32 ASCII characters. The default name is NPIxxxxxx, where xxxxxx is the last six digits of the LAN hardware (MAC) address.
IP Address	Use this field to manually assign the Internet Protocol address on the HP Jetdirect print server. The IP address is a four byte (32-bit) address in the form `n.n.n.n`, where `n` is a number from 0 to 255.
	An IP address uniquely identifies a node on a TCP/IP network. Duplicate IP addresses on a TCP/IP network are not allowed. For more information on IP addresses, see TCP/IP Overview.
Subnet Mask	If subnetting is used, use this field to manually assign a subnet mask. A subnet mask is a 32-bit number that, when applied to an IP address, determines which bits specify the network and subnet, and which bits uniquely specify the node.
	For more information on subnet masks, see TCP/IP Overview.
Default Gateway	Identifies the IP address of a router or computer that is used to connect to other networks or subnetworks.
Domain Name	Specifies the name of the Domain Name System (DNS) domain that the HP Jetdirect print server resides in (for example, support.hp.com). It does not include the host name; it is not the Fully Qualified Domain Name (such as printer1.support.hp.com).
Primary WINS Server	Specifies the IP address of the primary Windows Internet Naming Service (WINS) server. The WINS server provides IP address and name resolution services for network computers and devices.
Secondary WINS Server	Specifies the IP Address to be used for WINS if the primary WINS Server is unavailable.
Syslog Server	Specifies the IP address of a host computer that is configured to receive syslog messages from the HP Jetdirect print server. If a Syslog Server is not specified, syslog messages are disabled.
	For more information, see TCP/IP Overview.
Syslog Maximum Messages	Specifies the maximum number of syslog messages that can be sent by the HP Jetdirect print server on a per-minute basis. This setting allows administrators to control the log file size. The default is 10 per minute. If set to zero, no maximum number is defined.
Syslog Priority	Controls the filtering of syslog messages that are sent to the syslog server. The filter range is 0 to 8, with 0 being the most specific and 8 being the most general. Only messages that are lower than the filter level specified (that is, higher in priority) are reported. The default value is 8 which reports all syslog messages. A value of zero effectively disables syslog reporting.
Idle Timeout	Specifies the number of seconds that an idle connection is allowed to remain open. Up to 3600 seconds can be set. 270 is the default value. If set to 0, the timeout is disabled and TCP/IP connections will remain open until closed by the device at the other end of the network (for example, a workstation).

Table 4-2 TCP/IP Settings (continued)

Item	Description
TTL/SLP	Specifies the IP multicast Time To Live (TTL) discovery setting for Service Location Protocol (SLP) packets. The default value is 4 hops (the number of routers from the local network). The range is 1-15. If set to -1, multicast capability is disabled.
	For print servers configured for Auto IP (link-local) addresses, this field will be ignored. TTL on outbound packets will always be set to 255 and limited to the link-local network.
System Contact	Identifies a person who is assigned to administer or service this device. This field may include a phone number or similar information.
	When configured, this parameter will be displayed on the HP Jetdirect **Home** page.
System Location	Specifies the physical location of the device or related information. Only printable ASCII characters are allowed, up to 64 characters.
	When configured, this parameter will be displayed on the HP Jetdirect **Home** page.
Banner Page	Specifies whether to enable or disable printing of an LPD banner page for print jobs.
Default IP	Specifies the IP address to use when the print server is unable to obtain an IP address from the network during a forced TCP/IP reconfiguration (for example, when manually configured to use BOOTP/DHCP).
	LEGACY DEFAULT_IP: sets the legacy default IP address 192.0.0.192.
	AUTO_IP: sets a link-local IP address 169.254.x.x.
	The initial setting is determined by the IP address obtained when first powered on.
Send DHCP requests	A checkbox is used to specify whether DHCP requests will be periodically transmitted when a legacy default IP address 192.0.0.192 or link-local IP address 169.254.x.x has been automatically assigned.
	Clear the checkbox to disable DHCP requests.
	Check the checkbox (default) to enable DHCP requests.

SNMP

You can specify or change the SNMP (Simple Network Management Protocol) parameters supported by the print server. See the table below.

Table 4-3 SNMP Settings

Item	Description
Enable SNMPv1/v2 read-write access	This option enables the SNMP v1/v2c agents on the print server. Custom community names can be configured to control management access to the print server.
	An SNMP Set Community Name is a password to be able to configure (or "write") SNMP information on the HP Jetdirect print server.
	An SNMP Get Community Name is a password to retrieve (or "read") SNMP information on the HP Jetdirect print server.
	An incoming SNMP SetRequest or GetRequest command must contain the appropriate Set or Get community name before the print server will respond.
	A community name must be ASCII characters and can be up to 255 characters long.

Table 4-3 SNMP Settings (continued)

Item	Description
	The default Get community name is "public", which can be disabled to restrict access by checking the checkbox provided.
	NOTE If "public" is disabled, some port monitors or discovery utilities may not operate properly.
Enable SNMPv1/v2 read-only access	This option enables the SNMP v1/v2c agents on the print server, but limits access to read-only. Write-access is disabled. The default Get community name "public" is automatically enabled.
Disable SNMPv1/v2	This option disables the SNMP v1/v2c agents on the print server, which is recommended for secure environments. If SNMP v1/v2c is disabled, some port monitors or discovery utilities may not operate properly.

Other Settings

This item provides access to a variety of management and printing configuration options. The following tabs are provided:

- Misc. Settings: for enabling miscellaneous advanced protocols and functions

- LPD Queues: for setting up print queues used in printing under LPD (line printer daemon) printing services

- Support Info: to set up the **Support** link located under **Other Links** in the left margin

- Refresh Rate: to set the time interval (in seconds) for embedded Web diagnostic page updates

Misc. Settings

The Miscellaneous Settings parameters allow you to set a variety of advanced protocols and features, as described below. See Table 4-4 Miscellaneous Settings.

Table 4-4 Miscellaneous Settings

Item	Description
SLP Config	Enable or disable SLP (Service Location Protocol), used by selected client application software to automatically discover and identify the HP Jetdirect print server.
Telnet Config	Enable or disable access to HP Jetdirect configuration parameters using Telnet. For more information, see TCP/IP Configuration.
mDNS	Enable or disable Multicast Domain Name System (mDNS) services. mDNS is typically used on small networks for IP address and name resolution (through UDP port 5353) where a conventional DNS server is not used. For mDNS operation, Multicast IPv4 must be enabled.
Multicast IPv4	Enable or disable the receipt and transmission of IP version 4 multicast packets by the print server. If this parameter is disabled, other protocols that use multicast protocols, such as mDNS and SLP, may also be disabled without notification. **NOTE** If this parameter is disabled, other protocols that use multicast protocols, such as mDNS and SLP, may also be disabled without notification.

Table 4-4 Miscellaneous Settings (continued)

Item	Description
9100 Printing	Enable or disable port 9100 services. Port 9100 is an HP-proprietary raw TCP/IP port on the HP Jetdirect print server and is the default port for printing. It is accessed by HP software (for example, the HP Standard Port Monitor).
LPD Printing	Enable or disable the Line Printer Daemon services on the HP Jetdirect print server. LPD on the HP Jetdirect print server provides line printer spooling services for TCP/IP systems. For more information, see Configuring for LPD Printing.
Link settings	Set the network link speed(10 or 100 Mbps) and communication mode (full- or half-duplex) for HP Jetdirect 10/100TX print servers. The available settings are listed below.

⚠ **CAUTION** If you change the link setting, network communications with the print server and network device may be lost.

- **AUTO**: (Default) The print server uses auto-negotiation to match the network's link speed and communication mode. If auto-negotiation fails, either 100TX HALF or 10T HALF is set depending on the detected link speed of the hub/switch port.

- **10T FULL**: 10 Mbps, full-duplex operation

- **10T HALF**: 10 Mbps, half-duplex operation

- **100TX FULL**: 100 Mbps, full-duplex operation

- **100TX HALF**: 100 Mbps, half-duplex operation |
Primary DNS Server	Specify the IP address of the primary DNS (Domain Name System) server.
Secondary DNS Server	Specify the IP address of a secondary DNS server to use if the primary DNS server is unavailable.
Syslog Facility	Specify the encoded source facility of a message (for example, to identify the source of selected messages during troubleshooting). By default, the HP Jetdirect print server uses LPR as the source facility code, but local user values of local0 through local7 can be used to isolate individual or groups of print servers.
Dynamic Raw Port Setting	Allows additional ports to be specified for printing to TCP port 9100. Valid ports are 3000 to 9000, which are application-dependent.
mDNS Service Name	Specifies an alphanumeric string of up to 64 ASCII characters assigned to this device or service. This name is persistent and is used to resolve a particular device or service if socket information (such as the IP address) changes from session to session. Apple Rendezvous will display this service. The default service name is the printer model and the last six digits of the LAN Hardware (MAC) address.
mDNS Domain Name	(Read-only parameter) Specifies the mDNS domain name assigned to the device, in the form <host name>.local. If a user-specified host name has not been assigned, the default host name NPIxxxxxx is used, where xxxxxx are the last 6 digits of the LAN hardware (MAC) address.
mDNS Highest Priority Service	Specifies the mDNS highest priority service to use for printing.To set this parameter, choose one of the following printing options:

9100 Printing: Raw IP printing through HP-proprietary port 9100.

IPP Printing: Internet Printing Protocol printing.

LPD Printing (RAW): Default LPD raw queue printing.

LPD Printing (TEXT): Default LPD text queue printing. |

Table 4-4 Miscellaneous Settings (continued)

Item	Description
	LPD Printing (AUTO): Default LPD auto queue printing.
	LPD Printing (BINPS): Default LPD binary postscript queue printing.
	LPD Printing (<user-defined>): Up to 5 user-specified LPD queues will be listed if they have been configured, where <user-defined> is the name of the user-specified LPD print queue.
	The default selection will depend on the printer, typically 9100 Printing or LPD Printing (BINPS).

LPD Queues

The **LPD Queues** page allows you to specify LPD (line printer daemon) print queues on the Jetdirect print server. For more information on LPD printing and print queues, see Configuring for LPD Printing.

LPD printing must be enabled on the print server before you can set LPD queues. If LPD is disabled, go to the Misc. Settings tab to enable it.

If LPD printing is enabled, ten different named print queues are available. Four of these queues are configured automatically and their parameters cannot be changed. The remaining six queues can be defined by the user.

The six user-defined queues can be set up with character strings -- such as job control commands -- that are automatically added before or after the print job. You can define up to eight named strings, and you can set up each queue so that any of these named strings precedes the print data ("prepend string name") or follows the print data ("append string name").

LPD Queue Parameters for setting up LPD queues are described below. See Table 4-5 LPD Queue Parameters.

Table 4-5 LPD Queue Parameters

Item	Description
Queue Name	Name of the user-defined queue. This name can be up to 32 characters long, and can consist of any ASCII characters that can be displayed. You can define up to six user-defined queues.
	⚠️ **CAUTION** Avoid the differentiation of queue names through the use of lower- and upper-case characters only. Otherwise, management of LPD queues by other tools (such as Telnet) may yield unpredictable results.
Prepend String Name	Enter the name of one or more strings to be added before (or prepended to) the print data. You specify string names and values in the table at the bottom of the page.
	To prepend a long string, multiple string names may be concatenated, that is, entered and separated by a "+" character. For example, to prepend a long string that has been divided into two separate strings, enter:
	`<stringname1>+<stringname2>`
	where `stringname1` and `stringname2` are specified as two separate string names with different values.
Append String Name	Enter the name of one or more strings to be added after (or appended to) the print data. You specify string names and values in the table at the bottom of the page.

Table 4-5 LPD Queue Parameters (continued)

Item	Description
	To append a long string, multiple string names may be concatenated, that is, entered and separated by a "+" character. For example, to append a long string that has been divided into two separate strings, enter: `<stringname1>+<stringname2>` where `stringname1` and `stringname2` are specified as two separate string names with different values.
Queue Type	Processing instruction for the queue. Choose from these four queue types: ■ **RAW** -- No processing. The line printer daemon treats the data in a *raw* queue as a print job that has already been formatted in PCL, PostScript, or HP-GL/2, and sends it to the printer without modification. (Note that any user-defined prepend or append string will be added to the job in the appropriate position.) ■ **TEXT** -- Carriage return added. The line printer daemon treats data in *text* queues as unformatted or ASCII text, and adds a carriage return to each line before sending it to the printer. ■ **AUTO** -- Automatic. The line printer daemon uses autosensing to determine whether the print data should be sent as *raw* or *text*. ■ **BINPS** -- Binary PostScript. This instructs the PostScript interpreter that the printjob is to be interpreted as Binary PostScript data.
Default Queue Name	Name of the queue to be used if the queue specified for a print job is unknown. By default, the Default Queue Name is AUTO.
String Name	Name of a character string. You may define up to eight character strings for use in LPD queues; this parameter names the string, and the *Value* parameter defines the content of the string. *Prepend* and *Append* string names (specified in the table at the top of the browser window) must be chosen from the names specified here. The string name can be up to 32 characters long, and can consist of any displayable ASCII characters.
Value	The content of the string. The **String Name** parameter names the string; the **Value** parameter defines its content. When a string name is specified for a prepend or append string (in the table at the top of the browser window), the line printer daemon sends the value of that string to the printer before or after the print data (as appropriate). Character values can be anywhere in the extended ASCII range of 0 to 255 (hex 00 to FF). You can specify a non-printing character using its hexadecimal value, by entering a backslash followed by two hexadecimal characters. For example, to enter the escape character (hex 1B), type in \1B. If your string includes the backslash character itself, specify it as \5C. The maximum number of characters you can type into this field is 240. The characters in the field are checked for hexadecimal values, converted if necessary, and stored internally. The maximum number of characters stored internally in the string is 80; any characters that exceed this are discarded.

To set up a user-defined print queue, you first define the strings, assign them as prepend or append strings, and define the queue type. Once you have defined an LPD queue, you specify its use by setting up an LPD printer that uses that queue. For instance, if you set up string "a" with a value of "abc" and string "z" with a value of "xyz", you can define print queue "az_queue" with a prepend string of "a", an append string of "z", and a queue type of "raw". Then, when you send a print job consisting of <formatted_text> through queue az_queue, the job sent to the printer is "abc<formatted_text>xyz".

Instructions for setting up an LPD printer are different for different operating systems; refer to Configuring for LPD Printing for details.

Example. If you had an LPD printer and wanted to reset it at the start of each print job, you could set up a user-defined print queue named "clear_printer" that issues a PCL reset command (Escape-E) at the beginning of each job. You could set this up as follows:

First, set up the print queue:

■ Name a string: Type "reset_string" into the **String Name** field in row 1.

■ Define the string's value: Type "\1BE" (Escape-E) into the **Value** field in row 1. (Alternatively, you could type "\1B\45".)

■ Name the queue: Type "clear_printer" into the **Queue Name** field in row 5.

■ Set up the prepend string: Type "reset_string" into the **Prepend String** field in row 5.

■ Leave the **Append String** field in row 5 blank.

■ Set the queue type: Using the pull-down menu, set the **Queue Type** field in row 5 to "RAW".

Then, set up the printer to use the queue, making sure to specify "clear_printer" when asked for a queue name. (For details of setting up the printer, refer to Configuring for LPD Printing.) After that, any print jobs sent to the printer -- either from the server or from a client computer that has set up that printer -- will include a reset command at the beginning of the job.

Support Info

Use this page to configure links for Support assistance. These links are accessed when you click **Support** in the left margin of the embedded Web server pages. You can designate a Support person and phone number of an administrator for this device, as well as URL addresses for Web-based product and technical support.

Refresh Rate

The refresh rate is the time period (in seconds) that the diagnostic pages will be automatically updated. The value 0 disables the refresh rate.

Privacy Settings

On the **Privacy Settings** page, you can allow the embedded Web server to collect product identification and use information and then send the information to HP (Internet access is required). Product use information assists HP in improving product features and services. The default setting for this page will depend on the user's selection on initial access to the Networking tab.

To enable this feature, check the checkbox and click **Apply**.

To disable this feature, clear the checkbox and click **Apply**.

Select Language

This link appears if the HP Jetdirect Web pages support multiple languages. Supported languages may also be selected through language preference settings in your browser (see your browser's Help).

To display supported non-English languages, the use of cookies must be enabled in your browser settings.

Security: Settings

In the **SECURITY** section, the **Settings** menu provides access to the following tabs: **Status** (default), **Wizard**, **Restore Defaults**. The available settings depend on your particular print server model.

Status

The **Status** page displays the current security configuration settings of the print server. The settings that will be displayed depend on the features supported by the print server.

Wizard

> **NOTE** If you use HP Web Jetadmin to manage your devices, you should not use this wizard. Instead, use HP Web Jetadmin to configure your network security settings to ensure they are properly set for your network.

The **Wizard** page allows you to run the **HP Jetdirect Security Configuration Wizard**. This wizard will guide you through the print server's security configuration needed for your network. Click **Start Wizard** to run the wizard. This opens the **Security Level** page.

The optional configuration parameters presented by the wizard will depend on your choice of security level. For an overview, see Table 4-6 Wizard Security Levels.

> **NOTE** If you improperly exit the wizard (for example, by failing to use the **Cancel** button), an **Operation Failed** screen may appear. If so, wait approximately two minutes before running the wizard again.

Table 4-6 Wizard Security Levels

Security Level	Description
Basic Security	This option requires that you configure an administrator password for configuration management. The administrator password is shared with other management tools, such as Telnet and SNMP applications. However, some management tools, such as Telnet, use plain-text communications and are not secure.
	The **Administrator Account** page is used to enter the administrator password. The Administrator Password will also be used as the SNMP v1/v2 Set Community Name for SNMP management applications.
	The **Configuration Review** page displays all the current settings that may affect security. Click **Finish** to set your basic security selections.
Custom Security	This option proceeds through all available security settings supported by the print server. For more information on specific parameters and selections, see the tabs on the Mgmt. Protocols and Authorization menu pages under **SECURITY**.
	The **Administrator Account** page is used to enter the administrator password.
	The **Management Tools** page allows configuration of supported management protocols that are not secure (such as Telnet).
	SNMP Configuration pages are used to configure custom SNMP settings:
	■ **Enable SNMPv1/v2**: Enable this option to allow management software that use SNMP v1/v2. If selected the SNMPv1/v2 Configuration page is displayed to configure SNMP community names.

Table 4-6 Wizard Security Levels (continued)

Security Level	Description
	The **Access Control** page is used to set up an Access Control List, if desired to control host access to the device.
	The **Print Protocols and Services** page is used to enable or disable network printing, print services, and device discovery protocols that may affect security.
	The **Configuration Review** page displays all the current settings that may affect security. Click **Finish** to set your basic security selections.

Restore Defaults

This page is used to restore security configuration settings to factory defaults. The default settings displayed depend on the features supported by the print server.

Only the security settings listed are restored to factory defaults, other configuration settings are not affected.

Authorization

The **Authorization** page provides tabs that allow you to control access to the device, as well as to device configuration and management features.

Admin. Account

Use this page to set an administrator password for controlled access to Jetdirect configuration and status information. The administrator password is shared by Jetdirect configuration tools, such as the embedded Web server, Telnet, and HP Web Jetadmin.

If a password is set and you attempt to access Jetdirect print server settings, you will be prompted for a user name and *this password* before you are allowed access.

> **NOTE** The administrator password may be cleared by a cold reset of the print server, which resets the print server to factory default settings.

A checkbox allows you to synchronize HP Web Jetadmin and the SNMP v1/v2c Set Community Name. If you enable this feature (the checkbox is checked), the administrator password will also be used as the SNMP Set Community Name for SNMP v1/v2c management applications.

> **NOTE** If you subsequently change the SNMP Set Community Name (for example, using the SNMP tab on the **Network Settings** page or from Web Jetadmin), the two settings will no longer be synchronized.

Access Control

Use this tab to display the Access Control List (ACL) on the HP Jetdirect print server. An access control list (or host access list) specifies individual host systems, or networks of host systems, that will be allowed to access the printer. Up to 10 entries can be included on the list. If the list is empty (no hosts are listed), any supported system can access the print server.

> **! CAUTION** Use caution when using this feature. You may lose your ability to communicate with the HP Jetdirect print server if your system is not properly specified in the list, or access through HTTP is disabled.
>
> For use of the host access list as a security feature, see Security Features.

> **NOTE** By default, hosts with HTTP connections are allowed access to the print server regardless of access control list entries.
>
> To disable access by HTTP hosts, clear the **Allow Web Server (HTTP) access** checkbox near the bottom of the page.

Host systems are specified by their IP addresses or network number. If the network contains subnets, an address mask may be used to identify whether the IP address designates an individual host system or a group of host systems.

Examples. See the table of sample entries below:

IP Address	Mask	Description
192.0.0.0	255.0.0.0	Allow all hosts with network number 192.
192.1.0.0	255.1.0.0	Allow all hosts on network 192, subnet 1.
192.168.1.2		Allow the host with IP address 192.168.1.2. The mask 255.255.255.255 is assumed and is not required.

To add an entry into the access control list, use the **IP Address** and **Mask** fields to specify a host, and click (check) the **Save** checkbox for that entry. Then click **Apply**.

To delete an entry from the list, clear the **Save** checkbox for that entry. Then click **Apply**.

To clear the entire access control list, clear all **Save** checkboxes, and click **Apply**.

Mgmt. Protocols

This link provides access to management communications and other protocols that affect security.

SNMP

Use this tab to enable or disable SNMP v1/v2c agents on the print server. For a description of SNMP selections, see Table 4-3 SNMP Settings.

Other

Use this tab to enable or disable various protocols supported by the print server for printing, print services, and management. See Table 4-7 Other Protocols.

Table 4-7 Other Protocols

Item	Description
Enable Print Services	Enable or disable various print services supported by the print server: **, port 9100**, **LPD** (Line Printer Daemon). Disable unused print services to prevent access through those services.

Table 4-7 Other Protocols (continued)

Item	Description
Enable Device Discovery	Enable or disable device discovery protocols supported by the print server:
	SLP (Service Location Protocol).
	If enabled (checked), the HP Jetdirect print server sends SLP packets, which are used by system applications for automated discovery and installation.
	If disabled (cleared), SLP packets are not sent.
	mDNS (multicast Domain Name System).
	If enabled (checked), Multicast Domain Name System (mDNS) services are provided. mDNS is typically used on small networks for IP address and name resolution (through UDP port 5353) where a conventional DNS server is not used.
	Multicast IPv4.
	If enabled (checked), the print server will send and receive IP version 4 multicast packets. If this parameter is disabled, other protocols that use multicast protocols, such as mDNS and SLP, may also be disabled without notification.
Enable Management Protocols	Enable or disable Telnet access. Telnet is not secure and commands (such as passwords) may be intercepted.

Network Statistics

This page is used to display counter values and other status information currently stored on the HP Jetdirect print server. This information is often useful to diagnose performance and operational problems associated with the network or network device.

Protocol Info

This page provides a list of various network configuration settings on the HP Jetdirect print server for each protocol. Use these lists to validate your desired settings.

Configuration Page

This page provides a view of the HP Jetdirect configuration page that contains a summary of HP Jetdirect status and configuration information. The contents of this page are described in HP Jetdirect Configuration Page.

Other Links

Help

The **Help** page provides a quick summary of the HP Jetdirect embedded Web server features. In the **Help** page, a link to the latest information on the embedded Web server is provided (Internet access is required).

Support

The information displayed on the **Support** page depends on the values configured in the Support Info tab in the Other Settings menu. Support information may include the name and telephone

number of a Support person, or Web links to Product and Technical Support pages. The default Web links include HP online support and HP product information Web pages (Internet access is required).

HP Home

HP Home provides a link to Hewlett-Packard's home page on the HP Web site (Internet access is required). This link may also be accessed by clicking on the HP logo.

HP Web Jetadmin

HP Web Jetadmin is HP's premier network peripheral management software tool.

A link to HP Web Jetadmin will be displayed only if HP Web Jetadmin has discovered this device through an "Integration URL". You can then use HP Web Jetadmin to provide enhanced management capabilities for this and other HP Jetdirect-connected devices on your network.

5 Security Features

Security features are provided that can help to minimize unauthorized access to network configuration parameters and other data stored on HP Jetdirect print servers. The features may differ depending on the version of firmware resident on the print server.

> △ **CAUTION** Although these features can help to minimize unauthorized access to stored data and configuration parameters on HP Jetdirect print servers, the prevention of unauthorized access cannot be guaranteed.
>
> For advanced security needs, contact HP Consulting services.

Table 5-1 Summary of HP Jetdirect Security Features summarizes the basic security features provided with HP Jetdirect print servers.

Table 5-1 Summary of HP Jetdirect Security Features

Network Protocol Control

- Network printing, printing services, device discovery, and management protocols on the HP Jetdirect print server can be enabled or disabled. By disabling unused or unnecessary protocols, unauthorized access through applications that use these protocols can be prevented.

- Protocols may be enabled or disabled through Telnet, embedded Web server, and HP Web Jetadmin.

IP Administrator Password

- Used by Telnet, HP Web Jetadmin, and the embedded Web server to control access to HP Jetdirect configuration parameters.

- Up to 16 alphanumeric characters may be used.

- Configured on the HP Jetdirect print server using TFTP (TCP/IP Configuration), Telnet (TCP/IP Configuration), embedded Web server (Using the Embedded Web Server) services, or HP Web Jetadmin. Up to 16 alphanumeric characters are allowed.

- If configured through the embedded Web server, may be synchronized as the SNMP Set Community Name used in HP Web Jetadmin SNMP v1/v2c Set commands.

- Cleared by cold reset of the print server to factory default settings.

IP Access Control List

- Specifies up to 10 host systems, or networks of host systems, that are allowed access to the HP Jetdirect print server and the attached network device.

- Access is generally limited to host systems specified in the list.

Table 5-1 Summary of HP Jetdirect Security Features (continued)

- By factory default, host systems that use HTTP (for example, using the embedded Web server) are not checked against entries in the Access List and are allowed access. However, HTTP host access can be disabled through the embedded Web server.

- If the list is empty, then all hosts are allowed access.

- Configured on the HP Jetdirect print server using TFTP (TCP/IP Configuration), Telnet (TCP/IP Configuration), embedded Web server (Using the Embedded Web Server), or management software.

Telnet Control

- Telnet may be disabled using TFTP (TCP/IP Configuration), the embedded Web server (see Using the Embedded Web Server) and management software. Telnet access is not secure.

SNMP v1/v2c Set Community Name

- A password on the HP Jetdirect print server that allows incoming SNMP Set commands (for example, from management software) to write (or *set*) HP Jetdirect configuration parameters.

- For a user-assigned Set Community Name, SNMP Set commands must contain this name, which is authenticated by the print server before the command is performed.

- On IP networks, authentication of SNMP Set commands may be further restricted to systems identified on the access control list.

- Configured on the HP Jetdirect print server using TFTP (TCP/IP Configuration), Telnet (TCP/IP Configuration), embedded Web server (Using the Embedded Web Server), or Management application services.

- SNMP v1/v2c uses plain text and can be disabled.

HP Web Jetadmin Password and Profiles

- Access control to Jetdirect configuration parameters through the Jetdirect IP Administrator password, which may be configured from HP Web Jetadmin, Telnet, or embedded Web server. For instructions, refer to the HP Web Jetadmin online help.

- HP Web Jetadmin provides access control through User Profiles. User Profiles allow password protection for individual profiles and controlled access to HP Jetdirect and printer features. For more information, refer to the HP Web Jetadmin online help.

Printer Control Panel Lock

- Selected HP printers provide a control panel lock that prevents access to HP Jetdirect embedded print server configuration parameters. In many cases, this lock may be set remotely by management applications (such as HP Web Jetadmin). To determine whether your printer supports a control panel lock, refer to your printer documentation.

Using Security Features

Access to HP Jetdirect configuration parameters can be controlled through combined use of the available security features. Table 5-2 Settings for Access Control provides examples of various settings and the associated level of access control.

Table 5-2 Settings for Access Control

Settings	Level of Access Control
■ Accessible through HTTP (embedded Web server), SNMP v1/v2c applications, or Telnet ■ Administrator password not set ■ Default SNMP v1/v2c community names used ■ No authentication or encryption ■ Access control list empty	**Low** Best suited for trusted environments. Any system can access the HP Jetdirect configuration parameters through the embedded Web server, Telnet, or SNMP management software. Passwords are not required.
■ Administrator password set ■ User-specified SNMP v1/v2 Set Community Name set ■ The Access Control List contains host entries and checks HTTP connections ■ Telnet and other non-secure protocols disabled.	**Medium** limited security for non-trusted environment. If the Administrator password and SNMP v1/v2c Set Community Name are known, access is limited to: ■ systems listed in the Access Control List, and ■ SNMP v1/v2c management applications
■ Unused protocols disabled ■ SNMP v1/v2c disabled ■ Telnet disabled ■ Passwords set ■ The Access Control List contains specified entries and HTTP connections are checked ■ Printer control panel locked	**Medium-High** Additional security for non-trusted, professionally managed environments, but security is limited by lack of authentication and encryption. Access is limited to hosts that are specified in the Access Control List. ⚠ **CAUTION** Power-on settings (for example, configurations from a BootP/TFTP or DHCP/TFTP server) may change the print server's settings when it is power-cycled. Be sure to confirm your intended power-on settings.

6   Troubleshooting the HP Jetdirect Print Server

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 print server problems

■   Network-related problems

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

■   A Jetdirect configuration page (see HP Jetdirect Configuration Page)

■   A Printer Configuration or Diagnostic Page

■   Documentation that came with your printer

■   The diagnostics tools and utilities provided with your network operating system (for example, Novell NetWare utilities, TCP/IP utilities, or network printer management applications such as HP Web Jetadmin)

> **NOTE**   For frequently asked questions on using the HP Jetdirect print server, visit:
>
> 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:

The HP Jetdirect print server can be reset to factory defaults when a cold reset is performed on the printer. A cold reset clears all data from the printer memory and sets all the defaults to factory settings.

> ⚠ **CAUTION**   Be sure to print a Jetdirect configuration page before performing a cold reset. Resetting the printer will clear all data from the printer memory and reset all printer settings, including network configurations, to their factory default values. After a cold reset, users may be affected due to changes in user-specified printer settings. Network systems may lose their connection to the printer.

NOTE The **Restore Factory Settings** menu item in the printer control panel menu will not reset the HP Jetdirect print server. After resetting to factory default values, print a Jetdirect configuration page to confirm that factory-reset values have been assigned.

To perform a cold reset:

1   Turn the printer on and watch for the memory count to begin.

2   Press and hold the **Select** ✓ button until the three control panel lights (**Ready**, **Data**, **Attention**) blink and then remain on.

3   Release the **Select** ✓ button. The control panel will display **Select Language**.

4   Press the down arrow ▼ button until **Cold Reset** appears.

5   Press the **Select** ✓ button to perform a cold reset and then continue its power-on sequence.

Disabling the Embedded LAN

For fault isolation to either printer or networking components, you can disable the Jetdirect embedded network interface. To disable the network components, follow these steps:

1   Turn the printer on and watch for the memory count to begin.

2   Press and hold the **Select** ✓ button until the three control panel lights (**Ready**, **Data**, **Attention**) blink and then remain on.

3   Release the **Select** ✓ button. The control panel will display **Select Language**.

4   Press the down arrow ▼ button until **Disable Embedded LAN** appears.

5   Press the **Select** ✓ button. The embedded networking components will be disabled, and the printer will continue its power-on sequence.

NOTE To enable the embedded network interface, use the same procedures, except choose **Enable Embedded LAN** in step 4 above.

General Troubleshooting

Troubleshooting Chart - Assessing the Problem
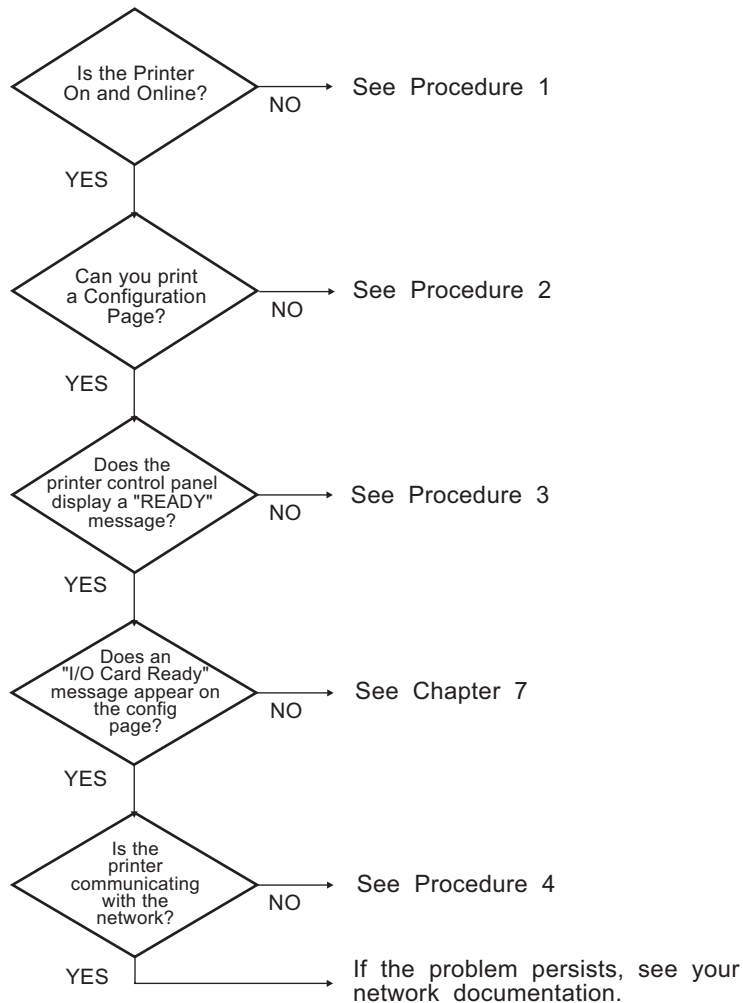

Figure 6-1 Assessing the Problem

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 printer control panel should indicate **Ready**. If it does not, press the **Select** ✓ button to continue (or the **Menu** button to access the menus) to place the printer online.

3   Is the printer's control panel display blank?

● Make sure the printer is turned on.

● Make sure the printer is not in Power Save mode.

4   Isolate the embedded LAN from the printer using the instructions in Disabling the Embedded LAN to see if the printer **Ready** message will appear without the LAN.

5   Does a message other than **Ready** appear on the printer control panel display?

● See Procedure 3 in this section for a list of network-related error messages and corrective actions.

● 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 HP Jetdirect Configuration Page for information on the HP Jetdirect configuration page.

> **NOTE**   For a TCP/IP network, the Jetdirect configuration page can also be viewed from a browser by accessing the Jetdirect embedded Web server. See Using the Embedded Web Server for more information.

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

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

A Jetdirect configuration page prints when you print a printer configuration page. See your printer user guide for instructions.

2   Is there a print job in process?

You cannot print an HP Jetdirect configuration page while a print job is in process. Wait until the print job is complete, then print the configuration page.

3   Is the embedded LAN enabled? If embedded LAN services are disabled, the Jetdirect page will not print. See Disabling the Embedded LAN.

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

- See Procedure 3 in this section for a list of network-related error messages and corrective actions.

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

Procedure 3: Resolving Printer Display Error Messages

Check the following information to resolve network-related error messages that appear on the printer control panel display. *This information assumes you have already printed a configuration page.*

1   Does the printer's control panel display a Service Error message, such as **49.xxxx**, **79.xxxx** or **8x.xxxx** error?

- Refer to your printer manuals to interpret the error message.

- Power the print server off/on by turning the printer off, then on again.

- Verify the network cable is properly connected.

- Inspect and verify the configuration parameters on the Jetdirect configuration page. To interpret HP Jetdirect configuration page messages, see HP Jetdirect Configuration Page.

- Record all error codes and contact your service provider. For warranty service, include all diagnostic and configuration pages with the faulty print server.

2   Does **Initializing/Do Not Power Off** or similar message appear on the display?

Wait several minutes to see if it clears. If it does not, isolate the embedded LAN from the printer using the instructions in Disabling the Embedded LAN to see if the printer **Ready** message will appear without the LAN.

3   Does a **40 Error** appear on the printer's control panel display?

The HP Jetdirect print server detected a break in the data communications. When this error occurs, the printer goes offline.

A break in communications may result from the physical network connection being disrupted or the server going down. After the communications problem is solved, press the **Select** ✓ button to put the printer back online.

4   Does an Initializing or similar message appear on the display?

This is a normal message. Wait several minutes for the message to clear, or for another message to appear. If another message appears, see the printer's documentation and configuration pages for additional information.

5   Does a message other than **Ready** appear on the display?

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 Jetdirect configuration page.*

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

   Verify network cabling, connections, and router configurations. Verify that network cable lengths meet network specifications.

2   Are your network cables connected properly?

    Ensure the network cable connectors are properly connected. If the problem continues, try a different cable or a different network port on the hub or switch.

3   Is auto-negotiation properly configured?

    The speed and communication mode on the print server must match the network for proper operation. Auto-negotiation for the print server may be configured from the printer's control panel.

    Verify that a Link LED on the print server is turned on. If the Link LED is off, there is no network link.
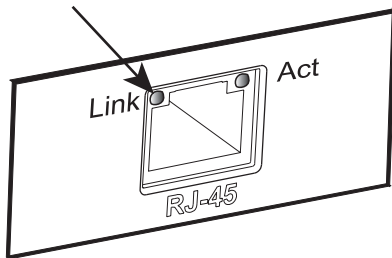
4   Can the print server's ping test communicate with any remote node on the network?

    Use the Jetdirect Diagnostic menu from the printer's control panel to run a ping test with a remote node. For a description of the Jetdirect Diagnostic menu, see The HP Jetdirect Control Panel Menu.

5   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.

6   Are other users able to print?

    The problem may be workstation-specific. Check the workstation network drivers, printer drivers, and related settings.

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

    Check your system for proper network operating system setup.

8   Is there an error message in the protocol sections on the Jetdirect configuration page?

    See HP Jetdirect Configuration Page for a list of print server error messages.

9   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, the default printing port of the 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).

10 Does the printer appear in HP Web Jetadmin or other management application?

- Verify network and HP Jetdirect settings on the Jetdirect configuration page. See HP Jetdirect Configuration Page for information on the configuration page.

- Confirm the network settings for the printer using the printer control panel.

- See the troubleshooting section in the online help included with the HP Web Jetadmin software.

7 HP Jetdirect Configuration Page

The HP Jetdirect configuration page is an important tool for managing or troubleshooting HP Jetdirect print servers. This page provides identification information (such as the HP Jetdirect model, firmware version, and LAN hardware address), as well as status and configuration parameters of supported network protocols. Network statistics gathered by the print server are also provided.

The HP Jetdirect configuration page may be printed directly on the attached printer. The format of the Jetdirect configuration page depends on:

- the printer model

- the HP Jetdirect model and firmware version

A Jetdirect configuration page will automatically print after a printer configuration page is printed. For instructions, see your printer manuals.

An HP Jetdirect configuration page can also be viewed over the network from a management utility (such as HP Web Jetadmin), or by accessing the embedded Web server (see Using the Embedded Web Server).

Status Field Error Messages

The HP Jetdirect configuration page contains several status fields for the print server and the supported protocols. One or more error codes and related error messages may be displayed in a Status field. For information on each error message, see Table 7-5 Error Messages.

Configuration Page Format

A typical Jetdirect configuration page is illustrated in Figure 7-1 Typical Jetdirect Configuration Page. The configuration page information provided will vary depending on the print server.

```
                                                                              HP
HP Color LaserJet 3600 Printers

JetDirect Page
                                                                    Page 1

------ HP JetDirect Configuration ------         --------------- TCP/IP ----------------
Status:                    I/O Card Ready         Status:                          Ready

Model Number:                     J7973E
Hardware Address:          001083561079          Host Name:                    CLJ3600n
Firmware Version:               V.30.XX          IP Address:                 13.32.8.115
Port Config:                  100TX FULL          Subnet Mask:                  255.0.0.0
Auto Negotiation:                     On          Default Gateway:            13.32.8.115
Manufacturing ID:                               Config By:                        BOOTP
Build Date:          XX/23/2005 11:48:09          BOOTP Server:               13.32.9.113
                                                 TFTP Server:              Not Specified
---------- Security Settings ----------          Config File:              Not Specified
Admin Password:            Not Specified          Domain Name:              Not Specified
SNMP Versions:                       1:2          Primary DNS Server:       Not Specified
SNMP Set Cmty Name:        Not Specified          Secondary DNS Server:     Not Specified
Access List:               Not Specified          WINS Server:              Not Specified
                                                 Idle Timeout:                   270 sec
---------- Network Statistics ----------          Web JetAdmin URL:         Not Specified
Total Packets Received:             1563
Unicast Packets Received:           1389          mDNS Service Name:
Bad Packets Received:                  0          HP Color LaserJet 3600 [561079]
Framing Errors Received:               0
Total Packets Transmitted:          1182
Unsendable Packets:                    0
Transmit Collisions:                   0
Transmit Late Collisions:              0
```

Figure 7-1 Typical Jetdirect Configuration Page

The Jetdirect configuration page is divided into sections, as identified in the following table. For each section, the detailed parameter descriptions and settings, including error messages, are provided in the remainder of this chapter.

Section Name	Description
HP Jetdirect Configuration or General Information	Identifies the HP Jetdirect print server and provides general status. For information on items in this section, see Table 7-1 HP Jetdirect Configuration. (For error messages, see Table 7-5 Error Messages.)
Security Settings	Provides the current status of configuration and access security parameters. See Table 7-2 Security Settings.
Network Statistics	Provides the current values for various network parameters monitored by the HP Jetdirect print server. See Table 7-3 Network Statistics.
TCP/IP	Provides the current status and parameter values for the TCP/IP network protocols. See Table 7-4 TCP/IP Configuration Information. (For error messages, see Table 7-5 Error Messages.)

Configuration Page Messages

HP Jetdirect Configuration/General Information

Information in this section provides general HP Jetdirect print server configuration as described in Table 7-1 HP Jetdirect Configuration. For error messages, see Table 7-5 Error Messages.

Table 7-1 HP Jetdirect Configuration

Message	Description
STATUS:	Current state of the HP Jetdirect print server.
	I/O CARD READY: The HP Jetdirect print server has successfully connected to the network and is awaiting data.
	I/O CARD INITIALIZING: The HP Jetdirect print server is initializing the network protocols. For more information, see the status line for each protocol on the configuration page.
	I/O CARD NOT READY: There is a problem with the print server or its configuration.
	An error code and message is displayed if the print server is not ready. For more information, see Table 7-5 Error Messages.
MODEL NUMBER:	The model number of the HP Jetdirect print server (for example, J7973E).
HARDWARE ADDRESS:	The 12-digit hexadecimal network hardware (MAC) address of the HP Jetdirect print server installed in the printer or device. This address is assigned by the manufacturer.
FIRMWARE VERSION:	The firmware revision number of the HP Jetdirect print server currently installed in the printer.
PORT SELECT:	(Ethernet only) Specifies the port on the HP Jetdirect print server that has been detected for use:
	NONE: The print server is not connected to the network.
	RJ-45: The RJ-45 network port is connected.
PORT CONFIG:	Identifies the link configuration of the RJ-45 port on the HP Jetdirect 10/100Base-TX print server:
	10BASE-T HALF: 10 Mbps, half-duplex
	10BASE-T FULL: 10 Mbps, full-duplex
	100TX HALF: 100Mbps, half-duplex
	100TX-FULL: 100Mbps, full-duplex
	UNKNOWN: The print server is in an initialization state.
	DISCONNECTED: A network connection has not been detected. Check network cables.
AUTO NEGOTIATION	Identifies whether IEEE 802.3u Auto-negotiation on the HP Jetdirect 10/100TX port is enabled (ON) or disabled (OFF).
	ON (default): 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).
	Auto-negotiation is enabled after a cold reset.

Table 7-1 HP Jetdirect Configuration (continued)

Message	Description
	OFF: You must manually configure the speed and mode using the Jetdirect integrated menu from the printer's control panel. If Auto-negotiation is off, the settings must match those of the network for proper operation.
MANUFACTURING ID:	The manufacturing identification code for use by HP online support personnel.
BUILD DATE:	Identifies the date of manufacture of the HP Jetdirect print server.

Security Settings

Information in this section of the Jetdirect configuration page is described in Table 7-2 Security Settings.

Table 7-2 Security Settings

Message	Description
Admin Password:	Specifies whether an IP Administrator password has been configured on the print server. This password is shared by Telnet, the embedded Web server, and HP Web Jetadmin to control access to print server configuration parameters. Up to 16 case-sensitive, alphanumeric characters can be used.
	Not Set: An Administrator password has not been set.
	Set: An Administrator password has been set.
	(The password may be cleared from the print server through a cold reset.)
SNMP Versions:	Specifies the SNMP versions enabled on the print server.
	Disabled: All SNMP versions are disabled on the print server. No SNMP access is allowed.
	1;2: SNMP v.1 and SNMP v.2c are supported.
SNMP Set Cmty Name:	Specifies whether an SNMP set community name has been configured on the HP Jetdirect print server. An SNMP set community name is a password for write access to SNMP control functions (SNMP SetRequests) on the HP Jetdirect print server.
	Not Specified: An SNMP set community name has not been set.
	Specified: A user-specified SNMP set community has been set.
Access List:	Identifies whether a host access control list is configured on the HP Jetdirect print server. A host access control list specifies the IP address of individual systems, or IP network of systems, that are allowed access to the print server and device.
	Specified: A host access list is configured on the HP Jetdirect print server.
	Not Specified: A host access list is not configured on the print server. All systems are allowed access.

Network Statistics

Information in this section of the Jetdirect configuration page is described in Table 7-3 Network Statistics.

Table 7-3 Network Statistics

Message	Description
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.
UNICAST PACKETS RECEIVED:	Number of frames specifically addressed to this HP Jetdirect print server. This does not include broadcasts or multicasts.
BAD PACKETS RECEIVED:	Total number of frames (packets) received with errors by the HP Jetdirect print server.
FRAMING ERRORS RECEIVED:	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.
TOTAL PACKETS TRANSMITTED:	Total number of frames (packets) transmitted without error.
UNSENDABLE PACKETS:	Total number of frames (packets) not successfully transmitted because of errors.
TRANSMIT COLLISIONS:	Number of frames not transmitted because of repeated collisions.
TRANSMIT LATE COLLISIONS:	Total number of frames not transmitted because a late collision occurred. Late collisions often occur when cable lengths exceed network specifications. A large number may indicate a cabling problem on the network.

TCP/IP Protocol Information

Information in this section of the Jetdirect configuration page is described in Table 7-4 TCP/IP Configuration Information. For error messages, see Table 7-5 Error Messages.

Table 7-4 TCP/IP Configuration Information

Message	Description
STATUS:	Current TCP status.
	READY: Indicates the HP Jetdirect print server is awaiting data over TCP/IP.
	DISABLED: Indicates that TCP/IP was manually disabled.
	INITIALIZING: Indicates that the print server is searching for the BOOTP server, or trying to get the configuration file through TFTP. An additional status message may also be displayed.
	An error code and message is displayed if the print server is not ready. For more information, see Table 7-5 Error Messages.
HOST NAME:	The host name configured on the print server. It may be truncated.
	NOT SPECIFIED: Indicates that no host name was specified in a BOOTP response or TFTP configuration file.
	NPIxxxxxx: The default name is NPIxxxxxx, where xxxxxx represents the last six digits of the LAN hardware (MAC) address.
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 on a TCP/IP network. During initialization, a temporary value 0.0.0.0 is displayed. For initial installations, a default IP address

Table 7-4 TCP/IP Configuration Information (continued)

Message	Description
	169.254/16 or 192.0.0.192 is assigned if a valid IP address cannot be obtained over the network after 2 minutes.
	NOT SPECIFIED: Indicates that an IP address is not assigned or the value is zero.
SUBNET MASK:	The IP subnet mask configured on the HP Jetdirect print server. During initialization, a temporary value 0.0.0.0 is displayed. Depending on configuration parameters, the print server may automatically assign a usable default value.
	NOT SPECIFIED: Indicates that a subnet mask is not configured.
DEFAULT GATEWAY:	The IP address of the gateway used when sending packets off the local network. Only one default gateway may be configured. During initialization, a temporary value 0.0.0.0 is displayed. If not provided, the IP address of the Jetdirect print server is used.
	NOT SPECIFIED: Indicates that a default gateway is not configured.
CONFIG BY:	Identifies how the HP Jetdirect print server obtained its IP configuration:
	BOOTP: Automatic configuration through a BOOTP server.
	BOOTP/TFTP: Automatic configuration through a BOOTP server and TFTP configuration file.
	DHCP: Automatic configuration through a DHCP server
	DHCP/TFTP: Automatic configuration through a DHCP server and TFTP configuration file.
	RARP: Automatic configuration through the Reverse Address Resolution Protocol.
	USER SPECIFIED: Manual configuration through Telnet, the printer's control panel, HP Web Jetadmin, embedded Web server, or other method.
	DEFAULT IP: The default IP address was assigned. This address may not be a valid address for your network.
	AUTO IP: A link-local IP address (169.254.x.x) was assigned. If the network is a link-local network, this address should be valid.
	NOT CONFIGURED: The print server was not configured with IP parameters. Verify that TCP/IP is enabled, or check for error status.
BOOTP SERVER: or DHCP SERVER: or RARP SERVER:	Displayed if BOOTP, DHCP, or RARP is used for TCP/IP configuration. It specifies the IP address of the system that responds to the HP Jetdirect print server's request for automatic TCP/IP configuration over the network.
	NOT SPECIFIED: Indicates that the configuration server's IP address could not be determined or was set to zero in the response packet.
BOOTP/DHCP SERVER:	Displayed during initialization while the HP Jetdirect print server attempts to obtain its TCP/IP configuration from a BOOTP or DHCP server. The temporary address displayed is 0.0.0.0.
TFTP SERVER:	The IP address of the system where the TFTP configuration file is located. During initialization, the temporary address 0.0.0.0 is displayed.
	NOT SPECIFIED: Indicates that a TFTP server has not been not been set.
CONFIG FILE:	The name of the HP Jetdirect configuration file. The file pathname may be truncated to fit on two lines.
	NOT SPECIFIED: Indicates that a file was not specified in the BOOTP reply from the host.

Table 7-4 TCP/IP Configuration Information (continued)

Message	Description
DOMAIN NAME:	The Domain Name System (DNS) name of the domain in which the HP Jetdirect print server resides (for example, support.company.com). It is not the fully qualified DNS name (for example, printer1.support.company.com) because the host printer name is not included.
	NOT SPECIFIED: Indicates that a domain name has not been configured on the print server.
PRIMARY DNS SERVER:	The IP address of the primary Domain Name System (DNS) server.
	NOT SPECIFIED: Indicates that a primary DNS server has not been configured on the print server.
SECONDARY DNS SERVER:	The IP address of the secondary Domain Name System (DNS) server.
	NOT SPECIFIED: Indicates that a secondary DNS server has not been configured on the print server.
WINS SERVER:	The IP address of the Windows Internet Name Service (WINS) server.
	NOT SPECIFIED: Indicates that a WINS server's IP address has not been configured on the print server.
SYSLOG SERVER:	The IP address of the syslog server configured on the print server.
	NOT SPECIFIED: Indicates that a syslog server has not been configured.
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. The default value is 270 seconds.
SLP:	Specifies whether the HP Jetdirect print server sends Service Location Protocol (SLP) packets used by system applications for automated installation.
	ENABLED: The print server sends SLP packets.
	DISABLED: The print server does not send SLP packets.
WEB JETADMIN URL:	If the HP Jetdirect print server is found on the network by HP Web Jetadmin, the URL of the host system used for HP Web Jetadmin services is displayed. The URL is limited to two lines and may be truncated.
	NOT SPECIFIED: Indicates that the URL of the Web Jetadmin host system could not be identified or is not configured.
MDNS SERVICE NAME:	Specifies an alphanumeric string of up to 64 ASCII characters assigned to this device or service. This name is persistent and is used to resolve a particular device or service if socket information (such as the IP address) changes from session to session. Apple Rendezvous will display this service. The default service name is the printer model and the last six digits of LAN Hardware (MAC) address.

Error Messages

Error codes and messages that may appear in the Status sections of the Jetdirect configuration page are described in the following table.

Table 7-5 Error Messages

Error Code and Message	Description
02 LAN ERROR - INTERNAL LOOPBACK	During self-test, the HP Jetdirect print server detected an internal loopback test error. The print server may be faulty. If the error persists, replace the HP Jetdirect print server.
03 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.
07 LAN ERROR - CONTROLLER CHIP	(Wired Ethernet) 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.
07 AUTHENTICATION FAILED	The Jetdirect print server could not access the network because of an authentication error. The error depends on the authentication method used. Verify the authentication method and settings on the print server.
08 LAN ERROR - INFINITE DEFERRAL	There is a network congestion problem. **NOTE** If the print server is not connected to the network, this error cannot occur.
08 AUTHENTICATION IN PROGRESS	Link-level authentication is in progress.
09 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, there may be a problem with the print server. Contact HP support.
0A LAN ERROR - NO SQE	(Wired Ethernet) 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, there may be a problem with the print server. Contact HP support.
0C 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 printer 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.
0D 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 printer off, then on again. If the error persists, there is a problem with the HP Jetdirect print server.
0E LAN ERROR - LOSS OF CARRIER	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, there may be a problem with the print server. Contact HP support.
10 LAN ERROR - UNDERFLOW	(Wired Ethernet) 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 printer off, then on again. If the error persists, there is a problem with the HP Jetdirect print server.
11 LAN ERROR - RETRY FAULTS	(Wired Ethernet) There is a problem with your network cabling or external network configuration. Verify operation of the hub or switch port.
12 LAN ERROR - NO LINKBEAT	With a 10/100 Base-TX port connected, this message is displayed if Link Beat is not sensed. Check the network cable, and verify that the concentrator/hub is providing Link Beat.
13 NETWORK RECONFIG - MUST REBOOT	Reset or power off/on the HP Jetdirect print server to enable new configuration values.

Table 7-5 Error Messages (continued)

Error Code and Message	Description
40 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.
41 NOVRAM ERROR	The HP Jetdirect print server cannot read the contents of its NOVRAM.
42 INVALID IP ADDRESS	The IP address specified for the HP Jetdirect print server (through BOOTP) is an invalid IP address for specifying a single node. Check your Bootptab file for proper entries.
43 INVALID SUBNET MASK	The IP subnet mask specified for the HP Jetdirect print server (through BOOTP) is an invalid subnet mask. Check your Bootptab file for proper entries.
44 INVALID GATEWAY ADDRESS	The default gateway IP address specified for the HP Jetdirect print server (through BOOTP) is an invalid IP address for specifying a single node. Check your Bootptab file for proper entries.
45 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. Check your Bootptab file for proper entries.
46 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. Check your Bootptab file for proper entries.
47 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. Check your TFTP configuration file.
48 CF ERR - FILE INCOMPLETE	The TFTP configuration file contained an incomplete last line that did not end in a new-line character.
49 CF ERR - LINE TOO LONG	A line being processed in the TFTP configuration file was longer than the HP Jetdirect print server could accept.
4A CF ERR - UNKNOWN KEYWORD	A TFTP configuration file line contained an unknown keyword.
4B CF ERR - MISSING PARAMETER	A line in the TFTP configuration file was missing a required parameter.
4C CF ERR - INVALID PARAMETER	A line in the TFTP configuration file contained an invalid value for one of the parameters on that line.
4D CF ERR - ACCESS LIST EXCEEDED	The TFTP configuration file specified too many access list entries using the "allow:" keyword.
4E CF ERR - TRAP LIST EXCEEDED	The TFTP configuration file specified too many trap destination list entries using the "trap-destination:" keyword.
4F 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.
50 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.
51 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.
52 BAD BOOTP/DHCP REPLY	An error was detected in the BOOTP or DHCP reply that the HP Jetdirect print server received. The reply either had insufficient data in the UDP datagram to contain the minimum BOOTP/DHCP 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/DHCP server port (67/udp).

Table 7-5 Error Messages (continued)

Error Code and Message	Description
53 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.
54 BOOTP/RARP IN PROGRESS	The HP Jetdirect print server is currently in the process of obtaining its basic IP configuration information through BOOTP/RARP.
55 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.
56 DHCP NAK	The HP Jetdirect print server received a negative acknowledgement message from the DHCP server in response to a configuration request.
57 UNABLE TO CONNECT DHCP SVR	The HP Jetdirect print server had received IP parameters from a DHCP server, but communication with the DHCP server has been lost. Check status of the DHCP server. If an infinite lease was assigned, the print server will use the IP address of the most recent DHCP server used, but operation may be degraded until a DHCP server responds.
58 POSTSCRIPT MODE NOT SELECTED	The printer does not support AppleTalk or AppleTalk extensions.
5C DHCP BAD REPLY	A bad reply was received from the DHCP server. Check your DHCP server settings for this print server.
5D DHCP LEASE DURATION TOO SHORT	The DHCP lease times for this print server's TCP/IP configuration settings are too short. Re-configure the DHCP lease times on the DHCP server.
5E DHCP LEASE RELEASED	The lease for DHCP-configured parameters, including the IP address, have been released through a manual configuration method, such as through the printer's control panel.
5F WINS REGISTRATION FAILED	Attempts to register the print server's name on the WINS server failed. Check for duplicate names, or verify the WINS server configuration.
61 AUTO IP CONFIGURED	An IP address could not be retrieved over the network. The print server will default to an IP address using link-local addressing in the form 169.254.x.x.
62 DEFAULT IP CONFIGURED	An IP address could not be retrieved over the network. The print server will default to a legacy default IP address 192.0.0.192.
63 AUTO IP IN PROGRESS	The print server is automatically assigning an IP address using link-local addressing in the form 169.254.x.x.
64 INVALID PASSWORD	An invalid password was specified through TFTP. Verify that the password consists of a maximum of 16 printable characters.
83 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.
84 DHCP LEASE TIMERS ADJUSTED	The print server detected a DHCP lease error due to one of the following conditions: ■ Renew time is less than 30 seconds. ■ Rebind time is less than 52 seconds. ■ Rebind time is less than, or equal to, the Renew time. ■ The lease duration is less than, or equal to, the Rebind time.
F2 TFTP IN PROGRESS	The print server is attempting to use TFTP to obtain TCP/IP configuration settings over the network.

Table 7-5 Error Messages (continued)

Error Code and Message	Description
F3 BOOTP/RARP IN PROGRESS	The print server is attempting to use BootP or RARP to obtain TCP/IP configuration settings over the network.
F4 BOOTP/DHCP IN PROGRESS	The print server is attempting to use BootP or DHCP to obtain TCP/IP configuration settings over the network.

A   TCP/IP Overview

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

Similar to a common language that people use to communicate with each other, TCP/IP (Transmission Control Protocol/Internet Protocol) is a suite of protocols designed to define the way computers and other devices communicate with each other over a network.

TCP/IP is rapidly becoming the most used set of protocols. The main reason this is happening is the fact that the Internet is based on 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. Each packet is encoded with IP information, such as the IP address of the sender and receiver. IP packets can be routed over routers and gateways, devices that connect a network with other networks.

IP communications is connectionless. When IP packets are sent, there is no guarantee that they arrive at their destination in the proper sequence. That task can be performed by higher level protocols and applications thereby allowing IP communications to be efficient.

Each node or device that will communicate directly onto the network requires 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 requests that the packet be 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 (for example, using DHCP and BootP).

> **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. For more information on the network portion of an IP address, see IP Address Structure and Class and Subnets later in this appendix.

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 IP Address Class Format:

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

As illustrated in Table A-2 Network Class Characteristics, each network class differs 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 Parameters

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 (for example, through the printer control panel, Telnet, the embedded Web server, the arp and ping commands, and HP management software), or they can be automatically downloaded using DHCP or BOOTP each time the print server is turned on. For configuration methods, see TCP/IP Configuration.

When powered on, a new HP Jetdirect print server that is unable to retrieve a valid IP address from the network will automatically assign itself a default IP address. The default IP address will depend on the type of network to which the print server is connected. On a small private network, a technique called link-local addressing is used to assign a unique IP address in the range of 169.254.1.0 to 169.254.254.255, which should be valid. On a large or enterprise network, a temporary address of 192.0.0.192 will be assigned until it is properly configured for your network. The IP address configured on your print server may be determined by inspecting the Jetdirect configuration page for the print server.

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 network address for a particular network class 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 subnetworks. For a given network class, a portion of an IP address that would normally be used to identify a node is used, instead, to identify a subnetwork. A subnet mask is applied to each IP address to specify the portion used for subnetworks, and the portion used to identify the node. For example, see Table A-3 Example: Subnet Mask 255.255.0.0 Applied to Class A Network.

Table A-3 Example: Subnet Mask 255.255.0.0 Applied to Class A Network

Class A Network Address	15	xxx	xxx	xxx
Subnet Mask	255	255	0	0
IP Address fields with Subnet Mask applied	**Network**	**Subnet**	**Host**	**Host**
Example of a node's IP Address on Subnet 1	15	1	25	7
Example of a node's IP Address on Subnet 254	15	254	64	2

As illustrated in Table A-3 Example: Subnet Mask 255.255.0.0 Applied to Class A Network, the Class A IP network address "15" has been assigned to company ABC. To allow additional networks at company ABC's site, the subnet mask of 255.255.0.0 is used. This subnet mask specifies that the second byte of the IP address will be used to identify up to 254 subnets. Using this designation, each device is uniquely identified on its own subnet, but company ABC can incorporate up to 254 subnetworks without violating their assigned address space.

Gateways

Gateways (routers) are used to connect networks together. 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 gateway or router that, if not specified, will be used to move packets between networks. It is specified by an IP address.

If multiple gateways or routers exist, then the default gateway is typically the address of the first, or nearest, gateway or router. If no gateways or routers exist, then the default gateway will typically assume the IP address of the network node (such as the workstation or HP Jetdirect print server).

Syslog Server

A syslog server is a system on the network (typically a UNIX system) that can receive and log syslog messages from other devices on the network. Syslog messages allow administrators to monitor status or troubleshoot network devices.

A syslog server requires software that provides syslog capabilities running on the server. UNIX systems provide a daemon, syslogd, that monitors User Datagram Protocol (UDP) port 514 for incoming messages. The messages are processed depending on their priority and on how syslogd is set up to operate.

You can configure the HP Jetdirect print server with the syslog server's IP address. When a syslog server is configured, both the HP Jetdirect print server and attached device can send syslog messages using UDP.

The syslog server may not receive all syslog events from the HP Jetdirect print server:

- UDP does not guarantee delivery of messages.

- The HP Jetdirect print server attempts to eliminate duplicate messages (to minimize unnecessary network traffic).

- The volume of messages sent by the HP Jetdirect print server is configurable.

Methods to configure HP Jetdirect syslog parameters include BOOTP, DHCP, Telnet, the embedded Web server, and management software. For selected printers, a menu accessed through the printer control panel provides limited syslog configuration. The syslog configuration command or parameter entries may vary depending on the method used. For more information, see the applicable sections in this guide.

Selected syslog parameters on the HP Jetdirect print server are listed in .

Table A-4 HP Jetdirect Syslog Parameters

Item	Description
Syslog Server IP address	IP address of a syslog server for sending syslog messages. If zero (0.0.0.0) or not specified, syslog messages are disabled.
Syslog Maximum Messages	The number of syslog messages that can be sent by the HP Jetdirect print server on a per-minute basis, from 0 to 1000. This parameter helps to control the syslog file size. The default is 10 messages per minute. If 0, the number of syslog messages is not restricted.
Syslog Priority	A method for filtering syslog messages that are sent to the syslog server. The range is 0 through 8, with 0 the most specific and 8 the most general. Only messages that are lower than the specified filter level (or higher in priority) are reported. The default is 8, messages of all priorities are sent. If 0, all syslog messages are disabled.
Syslog Facility	A code used to identify the source facility of a message (for example, to identify the source of selected messages during troubleshooting). By default, the HP Jetdirect print server uses LPR as the source facility code, but local user values of local0 through local7 can be used to isolate individual or groups of print servers.

Typical logfile entries of syslog messages are illustrated below:

- Oct 22 08:10:33 jd08 printer: error cleared

- Oct 22 15:06:07 jd04 printer: powered up

- Oct 22 15:07:56 jd04 printer: offline or intervention needed

- Oct 22 15:08:58 jd04 printer: error cleared

- Oct 24 17:52:27 jd37 printer: powered up

- Oct 24 18:28:13 jd37 printer: printer is disconnected

- Oct 24 18:37:46 jd07 printer: error cleared

- Oct 24 18:38:42 jd37 printer: powered up

- Oct 25 07:50:16 jd04 printer: toner/ink low

B The HP Jetdirect Control Panel Menu

HP Jetdirect embedded print servers provide a configuration menu that can be accessed from the printer's control panel. The keystrokes to access this menu from the printer control panel depend on the printer. Refer to your printer *User* guide, or print a control panel menu map, for more information.

The printer's graphical control panel is used to access the Jetdirect print server menu items. Graphical control panels typically display 18 characters on a line, and as many as four lines at a time. In addition, scrolling may be supported to allow display of additional lines.
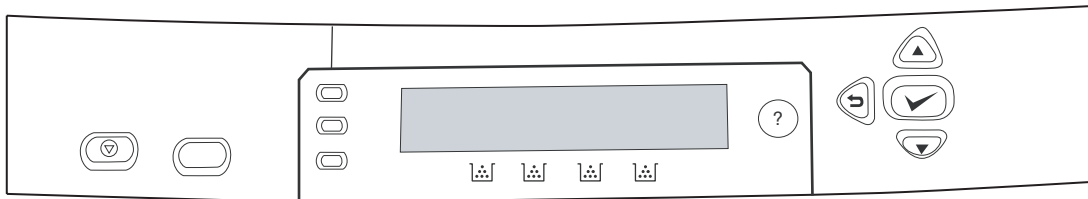
On graphical control panels, navigation buttons are used to access HP Jetdirect menu items.

Parameter Descriptions

For a description of menu items and options, see the following table.

Table B-1 HP Jetdirect Control Panel Menu

Menu Item	Options	Description of settings
TCP/IP	ENABLE	■ ON: Enable the TCP/IP protocol ■ OFF: Disable the TCP/IP protocol
	HOST NAME	An alphanumeric string, up to 32 characters, used to identify the device. This name is listed on the Jetdirect configuration page. The default host name is NPIxxxxxx, where xxxxxx is the last six digits of the LAN hardware (MAC) address.
	CONFIG METHOD	Specifies the method that TCP/IP parameters will be configured on the Jetdirect print server. ■ BOOTP: Use BootP (Bootstrap Protocol) for automatic configuration from a BootP server. ■ DHCP: Use DHCP (Dynamic Host Configuration Protocol) for automatic configuration from a DHCP server. If selected and a DHCP lease exists, DHCP RELEASE and DHCP RENEW menus will be available to set DHCP lease options.

Menu Item	Options	Description of settings
		■ AUTO IP: Use automatic link-local IP addressing. An address in the form 169.254.x.x will be automatically assigned.
		■ MANUAL: Use the MANUAL SETTINGS menu to configure TCP/IP parameters.
	DHCP RELEASE	This menu appears if CONFIG METHOD was set to DHCP and a DHCP lease for the print server exists.
		■ NO (default): The current DHCP lease is saved.
		■ YES: The current DHCP lease along with the leased IP address are released.
	DHCP RENEW	This menu appears if CONFIG METHOD was set to DHCP and a DHCP lease for the print server exists.
		■ NO (default): The print server does not request to renew the DHCP lease.
		■ YES: The print server requests to renew the current DHCP lease.
	MANUAL SETTINGS	(Available only if CONFIG METHOD is set to MANUAL) Configure parameters directly from the printer control panel:
		■ IP ADDRESS n.n.n.n: The unique IP address of the printer, where n is a value from 0 to 255.
		■ SUBNET MASK m.m.m.m: The subnet mask for the printer, where m is a value from 0 to 255.
		■ SYSLOG SERVER n.n.n.n: The IP address of the syslog server used to receive and log syslog messages.
		■ DEFAULT GATEWAY n.n.n.n: The IP address of the gateway or router used for communications with other networks.
		■ IDLE TIMEOUT: The time period, in seconds, after which an idle TCP print data connection is closed (default is 270 seconds, 0 disables the timeout).
	DEFAULT IP	Specify the IP address to default to when the print server is unable to obtain an IP address from the network during a forced TCP/IP reconfiguration (for example, when manually configured to use BootP or DHCP).
		■ AUTO IP: A link-local IP address 169.254.x.x will be set.
		■ LEGACY: The address 192.0.0.192 will be set, consistent with older Jetdirect products.
	PRIMARY DNS	Specify the IP address (n.n.n.n) of the Primary Domain Name System (DNS) Server.
	SECONDARY DNS	Specify the IP address (n.n.n.n) of the Secondary Domain Name System (DNS) Server.
DIAGNOSTICS		A Jetdirect Diagnostics menu provides tests to help diagnose network hardware or TCP/IP network connection problems.

Table B-1 HP Jetdirect Control Panel Menu (continued)

Menu Item	Options	Description of settings
	LOOPBACK TEST	⚠ **CAUTION** **This test will erase your TCP/IP configuration.**
		An internal loopback test will send and receive packets only on the internal network hardware. There are no external transmissions on your network.
		The test will run continuously until either the printer is turned off, or an error occurs and a diagnostic page is printed.
		At the EXECUTE prompt, select one of the following:
		■ YES: The loopback test will be initiated.
		■ NO: The loopback test will not be initiated.
	PING TEST	This test is used to check network communications. This test sends link-level packets to a remote network host, then waits for an appropriate response. To run a ping test, set the following items:
		■ DEST IP: Specify the IP address of the remote host. A valid IP address must be entered. For example, 0.0.0.0 is not allowed.
		■ PACKET SIZE: Specify the size of each packet, in bytes, to be sent to the remote host. The minimum is 64 (default) and the maximum is 2048.
		■ TIMEOUT: Specify the length of time, in seconds, to wait for a response from the remote host. The default is 1 and the maximum is 100.
		■ COUNT: Specify the number of ping test packets to send for this test. Select a value from 1 to 100. To configure the test to run continuously, select 0.
		■ PRINT RESULTS: If the ping test was not set for continuous operation, you can choose to print the test results. Select YES to print results. If you select NO (default), results will not be printed.
		■ EXECUTE: Specify whether to initiate the ping test. Selet YES to initiate the test, or NO to not run the test.
	PING RESULTS	Use this item to view the ping test status and results using the control panel display. You can select the following items:
		■ PACKETS SENT: Displays the number of packets (0 - 65535) sent to the remote host since the most recent test was initiated or completed.
		■ PACKETS RECEIVED: Displays the number of packets (0 - 65535) received from the remote host since the most recent test was initiated or completed.
		■ PERCENT LOST: Displays the percent of ping test packets that were sent with no response from the remote host since the most recent test was initiated or completed.

Menu Item	Options	Description of settings
		■ RTT MIN: Displays the minimum detected round-trip-time (RTT), from 0 to 4096 milliseconds, for packet transmission and response.
		■ RTT MAX: Displays the maximum detected round-trip-time (RTT), from 0 to 4096 milliseconds, for packet transmission and response.
		■ RTT AVE: Displays the average round-trip-time (RTT), from 0 to 4096 milliseconds, for packet transmission and response.
		■ PING IN PROGRESS: Displays whether or not a ping test is in progress. YES indicates a test in progress, and NO indicates that a test completed or was not run.
		■ REFRESH: When viewing the ping test results, this item updates the ping test data with current results. Select YES to update the data, or NO to maintain the existing data. However, a refresh will automatically occur when the menu times out or you manually return to the main menu.
RESET SECURITY		Specify whether the current security settings on the print server will be saved or reset to factory defaults.
		■ NO (default): The current security settings are maintained.
		■ YES: Security settings are reset to factory defaults.
LINK SPEED		(10/100Base-TX print servers only) Selects the network link speed and communication mode for the 10/100TX print server. For proper communications, the Jetdirect settings must match the network.
		AUTO: (Default) The print server will automatically configure itself to match the network's link speed and communication mode. If it fails, either 100TX HALF or 10T HALF is set depending on the detected link speed of the hub/switch port.
		10T HALF: 10Mbps, half-duplex operation.
		10T FULL: 10 Mbps, full-duplex operation.
		100TX HALF: 100 Mbps, half-duplex operation
		100TX FULL: 100 Mbps, full-duplex operation

C Configuring for LPD Printing

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

- LPD on Windows 2000/Server 2003 Systems

- LPD on Windows XP Systems

> **NOTE** For other systems not listed, refer to your operating system documentation and online help. Consult HP for availability of supported printer drivers.

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 LPD printing is supported include:

- Linux

- Windows

The syntax for your system may vary. See your system documentation for the correct syntax.

> **NOTE** For supported systems, the LPD functionality can be used with host implementations of LPD that comply 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 C-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 your printer documentation for instructions. You must also have the following:

- A supported 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:

  HARDWARE ADDRESS: xxxxxxxxxxxx

  where x is a hexadecimal digit (for example, 0001E6123ABC).

- 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 TCP/IP Configuration. For more information on TCP/IP networks, refer to TCP/IP Overview.

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 C-2 Supported Queue Names

`raw, raw1, raw2, raw3`	no processing
`text, text1, text2, text3`	carriage return added
`auto, auto1, auto2, auto3`	automatic
`binps, binps1, binps2, binps3`	binary PostScript
<user-defined>	defined by user; optionally including command strings before and after the print data

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.

For the `binps` queue, the PostScript interpreter interprets the print job as binary PostScript data.

For user-defined queue names, the line printer daemon adds user-defined strings before or after the print data (user-defined print queues can be set up through Telnet, TCP/IP Configuration, or the embedded Web server, Using the Embedded Web Server).

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 Windows 2000/Server 2003 Systems

This section describes how to configure Windows 2000 and 2003 Server networks 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 services 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/Server 2003—

    Windows 2000: Click **Start**, **Settings**, **Control Panel**. Then double-click the **Network and Dial-up Connections** folder. Double-click the **Local Area Connection** for your network and click **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 services are 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 services:

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

   On 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 **OK**, and then **Next**.

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

   On 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:

   a Enter the DNS name or IP address of the HP Jetdirect print server.

   b For the name of the printer or print queue on the HP Jetdirect print server, enter (in lowercase) **raw**, **text**, **auto**, **binps**, or the name of a user-defined print queue (user-defined print queues can be set up through the embedded Web server, see Using the Embedded Web Server).

   c 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.

If the queue type is *binps*, the PostScript interpreter is instructed to interpret the print job as binary PostScript data.

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

From within Windows, 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 Troubleshooting the HP Jetdirect Print Server.

Printing from Windows Clients

If the Windows system acts as a server by sharing the LPD printer, Windows clients can connect to the printer on the Windows server using the client's **Add Printer** utility in the **Printers** folder.

LPD on Windows XP Systems

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

The process consists of two parts:

■   Adding Windows Optional Networking Components

■   Configuring a Network LPD Printer.

Adding Windows Optional Networking Components

1 Click **Start**.

2 Click **Control Panel**.

3 Click **Network and Internet Connections**.

4 Click the **Network Connections** icon.

5 Select **Advanced** in the top menu bar. In the drop-down list, select **Optional Networking Components**.

6 Select **Other Network File and Print Services** and click **Next**. (If you select Details before selecting Next, you will see "Print Services for UNIX (R)" as a component of Other Network File and Print Services.) The files being loaded will be shown.

7 Close the Network Connections window. LPR port is now an option in the **Properties** of a printer under **Ports**, **Add Port**.

Configuring a Network LPD Printer

Adding a New LPD Printer

1 Open the **Printers** folder (from the desktop, click **Start**, **Printers and Faxes**).

2 Click **Add Printer**. On the Add Printer Wizard welcome screen, click **Next**.

3 Select **Local printer**, then *uncheck* the automatic detection for Plug and Play printer installation. Click **Next**.

4 Select **Create a new port**, and select **LPR Port** from the pull-down menu. Click **Next**.

5 In the Add LPR Compatible Printer window, do the following:

   a Type the Domain Name System (DNS) name or Internet protocol (IP) address of the HP Jetdirect print server.

   b Type (in lowercase) the name of the print queue for the HP Jetdirect print server (for example: `raw`, `text`, `auto`, or `binps`.)

   c Click **OK**.

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

7 Click **Yes** to keep the existing driver, if prompted. Click **Next**.

8 Type a printer name and (if desired) click this printer as default (if desired). Click **Next**.

9 Select whether to *share* this printer with other network computers (for example, if your system is a printer server). If shared, type a share name to identify the printer to other users. Click **Next**.

10 If desired, enter a location and other information for this printer. Click **Next**.

11 Click **Yes** to print a test page, then click **Next**.

12 Click **Finish** to close the wizard.

Creating an LPR Port for an Installed Printer

1 Click **Start**, **Printers and Faxes**.

2 Right-click the **Printer** icon, and select **Properties**.

3 Select the **Ports** tab and **Add Port**.

4 Select **LPR Port** from the Printer Ports dialog box, and select **New Port**.

5 In the field labeled **Name or address of server providing lpd**, enter the DNS name or IP address of the HP Jetdirect print server.

6 In the dialog box labeled **Name of printer or print queue on that server**, (in lowercase) type the name of the print queue for the HP Jetdirect print server (for example: `raw`, `text`, `auto`, `binps`, or user-specified print queue).

7 Select **OK**.

8 Select **Close** and **OK** to close the **Properties** box.

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