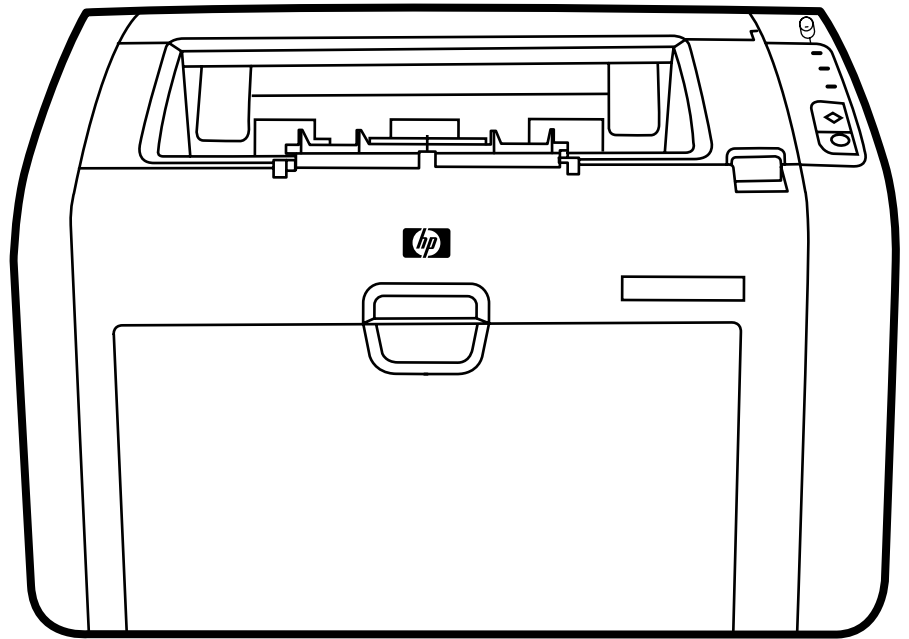


HP LaserJet 1022nw Wireless Printer User Guide



HP LaserJet 1022nw Wireless Printer

User Guide



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Part number: Q5914-90904

Edition 1, 02/2005

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Glossary

Index

1

Networking basics

This chapter provides information on the following topics:

- [Manual contents and sources for support and information](#)
- [Wireless networking basics](#)

Manual contents and sources for support and information

NOTE

Only the HP LaserJet 1022nw printer contains wireless capability.

This manual is a supplementary document to the *HP LaserJet 1022 Series Printer User Guide* and to the *HP LaserJet 1022nw Wireless Getting Started Guide*. Both of these documents are included with the printer. This manual provides the following information about installing and connecting the printer to a wireless network:

- The [Networking basics](#) chapter contains overview information about wireless networking and the wireless features of the HP LaserJet 1022nw printer.
- The [Support information for installing to a wireless network](#) chapter contains support information that will be useful if you are installing the printer to a wireless network, or if you wish to change printer or network settings after you have installed the printer. You can find procedures for installing to a wireless network in the *HP LaserJet 1022nw Printer Wireless Start Guide* packaged with the printer.
- The [Problem solving](#) chapter contains troubleshooting information.

In addition, this manual contains an appendix of regulatory information, a glossary of wireless terms, and an index.

WWW links for drivers, software, and support

If you need to contact HP for service or support, use the following link: <http://www.hp.com/support/lj1022/>.

Where to look for more information

- **CD user guide:** Detailed information on using and troubleshooting the printer. Available on the CD-ROM that came with the printer.
- **Online Help:** Information on printer options that are available from within printer drivers. To view a Help file, access the online Help through the printer driver.

HTML (online) user guide: Detailed information on using and troubleshooting the printer. Available at <http://www.hp.com/support/lj1022/>. Once connected, select **Manuals**.

Wireless networking basics

The HP LaserJet 1022nw printer has an internal HP wireless print server that supports both wired and wireless connectivity. However, the printer does not support simultaneous wired and wireless connections. To connect to a wireless network, the printer uses wireless protocol IEEE 802.11b/g that communicates data through radio transmission. After installing the printer to a wireless network, cables are not required to communicate with the computers or devices that are part of the network.

NOTE

The printer is compatible with 802.11b/g-compliant devices.

A wireless local area network (WLAN) is a collection of two or more computers, printers, and other devices linked by radio waves. A WLAN uses high-frequency airwaves (radio) to communicate information from one point to another.

To connect a computer or device to a wireless network, the computer or device must have a wireless network adapter. The HP LaserJet 1022nw printer uses an internal networking component that contains a wireless network adapter and radio. No cabling is necessary between networked devices that use wireless technology, although it is possible to use a cable to configure your printer for a wireless network. This is the recommended installation method.

Common wireless network adapters include the following:

- USB adapter: An external device that connects to a USB port on the computer (typically has a PCMCIA card attached to one end).
- Notebook adapter: A PCMCIA card that plugs directly into one of the PCMCIA slots on your laptop or other portable computer.
- Desktop computer adapter: A dedicated ISA or PCI card, or a PCMCIA card with a special adapter, that plugs into your desktop computer.
- AirPort adapter: A wireless card that plugs directly into the AirPort slot on your Macintosh laptop or desktop computer. AirPort adapters eliminate the need for cable connections to the computer.

The following sections contain overview information about wireless channels and communication modes, networking profiles, and network security.

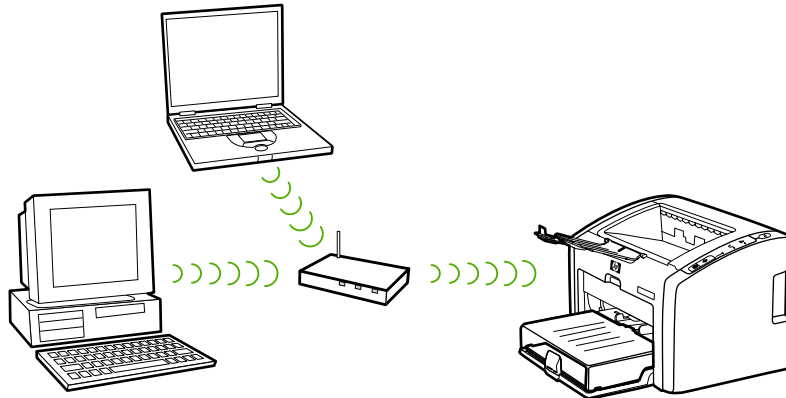
Channels and communication modes

The band of radio signals used for IEEE 802.11b/g wireless networking is segmented into specific frequencies, or channels. For IEEE 802.11b/g wireless networks, 14 channels are available. But each country/region specifies the channels that are authorized for use. For example, in North America, only channels 1 through 11 are allowed. In Japan, channels 1 through 14 can be used. In Europe, except for France, channels 1 through 13 are allowed. Because existing standards change frequently, you should check with your local regulatory agencies for authorized channel use. In most countries/regions channels 10 and 11 may be used without restriction.

Channel selection depends on the communication mode of the network. The communication mode defines how devices, such as computers and printers, communicate on a wireless network. There are two primary types of wireless communication modes: infrastructure and ad-hoc.

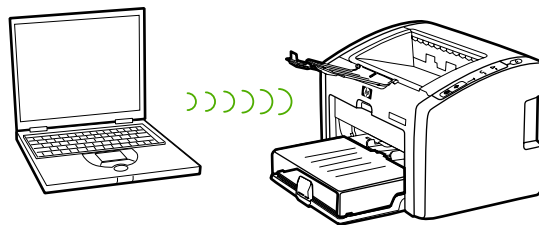
Infrastructure mode (preferred)

In infrastructure mode, the printer communicates with network computers through a wireless access point (WAP) or a base station. The access point acts as a central hub or gateway connecting wireless and, optionally, wired devices. (Most access points have an integrated Ethernet controller to connect to an existing wired-Ethernet network.) If your printer connects through a wireless residential gateway that provides access point functions, choose infrastructure mode.



Ad-hoc mode

In ad-hoc mode, which is sometimes called peer-to-peer mode, the printer communicates with your computer directly, rather than through an access point or base station. Each device on an ad-hoc network must have a wireless network adapter. The adapter enables each device to communicate with the other devices on the network. Ad-hoc mode is usually limited to simple, small wireless networks because performance degrades significantly after connecting too many network devices. This option is most often used if you are connecting only two network devices that are not sharing an Internet connection.



NOTE

For maximum performance, HP recommends connecting the printer to a network that communicates using the infrastructure mode.

Security

As with other networks, security for wireless networks focuses on access control and privacy. Traditional wireless network security includes the use of Service Set Identifiers (SSIDs), open or shared-key authentication, static Wired Equivalent Privacy (WEP) keys, and optional Media Access Control (MAC) authentication. This combination offers a basic level of access control and privacy.

More advanced levels of security (such as Wi-Fi protected access [WPA] and Pre-shared key) are available through the printer's embedded Web server. For introductory information about the embedded Web server, see [Embedded Web server](#). For detailed information about using the features, see the embedded Web server online help.

NOTE

It is highly recommended that you implement a wireless security scheme (either WEP or WPA) prior to setup. In addition, use an antivirus program to protect against computer viruses, and follow basic security rules such as setting strong passwords and not opening unknown attachments. Other network components, including firewalls, intrusion-detection systems, and segmented networks, should also be considered as part of your network design.

Authentication and encryption are two different approaches to network security. Authentication verifies the identity of a user or device before granting access to the network, making it more difficult for unauthorized users to access network resources. Encryption encodes the data being sent across the network, making the data unintelligible to unauthorized users. Both of these security methods are common on wireless networks.

Authentication

The HP installation software supports Open System authentication. More advanced forms of authentication are available through the embedded Web server.

A network with Open System authentication does not screen network users based on their identities and usually involves supplying the correct SSID. Such a network might use Wired Equivalent Privacy (WEP) encryption to provide a first level of security, or Wi-Fi protected access (WPA) to provide security by encrypting data sent over radio waves from one wireless device to another wireless device. The HP LaserJet 1022nw wireless printer allows for either WEP or WPA.

NOTE

Shared key and server-based authentication protocols are implemented through the embedded Web server. For introductory information about the embedded Web server, see [Embedded Web server](#). For detailed information about using the features, see the embedded Web server online help.

Network name (SSID)

Wireless devices are configured with the name of the network to which they will connect. The network name is also called the SSID and identifies the ESS (Extended Service Set) that is normally associated with larger infrastructure networks.

The SSID should not be considered a security feature because it can be easily identified. However, as a network administration or management feature, it does provide basic network access control.

Encryption

To reduce your network exposure to eavesdropping, establish a wireless security key for your network. The printer installation software supports the WEP security scheme, which hinders unauthorized users from accessing data transmitted over the radio waves. It is based on the use of a single WEP key, in which case each computer or device is configured with the same key to communicate on that network.

NOTE

Up to four WEP keys might be used on a wireless network for transmission of data. For example, if you have three computers and an access point, each might be assigned a distinct key for transmitting data. However, the remaining keys must also be entered on each device so they can communicate with each other. The installation software for the HP LaserJet 1022nw printer provides the option to type one WEP key. If you want to use more than one WEP key, those keys must be entered into the printer's embedded Web server prior to installing the software. For introductory information about the embedded Web server, see [Embedded Web server](#). For detailed information about using the features, see the embedded Web server online help.

Media access control address authentication

Some WLAN vendors support authentication based on the physical address, or MAC address, of the client Network Interface Card (NIC). In this scenario, an access point allows association by a client only if that client's MAC address matches an address in an authentication table used by the access point. This is not configurable through the printer.

Wireless profiles

A wireless profile is a set of network settings unique to a given wireless network. Many wireless devices have configuration utilities that allow the device to have wireless profiles for several wireless networks. In order to use the printer, the printer's wireless settings must match the computer's network settings for that wireless network.

For example, a person uses the same wireless-enabled laptop at work and at home. Each network has a unique set of wireless settings. The person creates the following wireless profiles on the laptop:

- `at_work`: Contains the network settings for the office wireless network
- `at_home`: Contains the network settings for the home wireless network

When the laptop is being used at work, the person must set the wireless profile to `at_work` in order to connect to the office network. Conversely, the laptop must be set to the `at_home` wireless profile when the person is at home and wants to connect the laptop to the home network.

NOTE

The HP LaserJet 1022nw printer cannot be connected to a wired and wireless network at the same time.

2

Support information for installing to a wireless network

This chapter provides information on the following topics:

- [Chapter overview](#)
- [Printer Wireless light](#)
- [Configuration page](#)
- [Embedded Web server](#)
- [Switching from wired to wireless](#)
- [Resetting the printer to the factory default settings](#)

Chapter overview

This chapter contains information that will be useful if you are installing the printer to a wireless network, or if you are changing printer or network settings after you have installed the printer. Specifically, this chapter contains a description of the printer Wireless light and the configuration page, and an overview of the embedded Web server (EWS). In addition, this chapter contains procedures for resetting the printer network setting and for switching between wireless and wired communications.

The procedure you follow for installing the printer to a wireless network depends on whether the network communicates through an infrastructure mode or through an ad-hoc mode. You can find procedures for installing the printer to a wireless network in the *HP LaserJet 1022nw printer Wireless Getting Started Guide* that was packaged with the printer. For more information about infrastructure and ad-hoc networks, see [Wireless networking basics](#).

NOTE

For maximum efficiency, HP recommends the printer be connected to a network that uses the infrastructure communication mode.

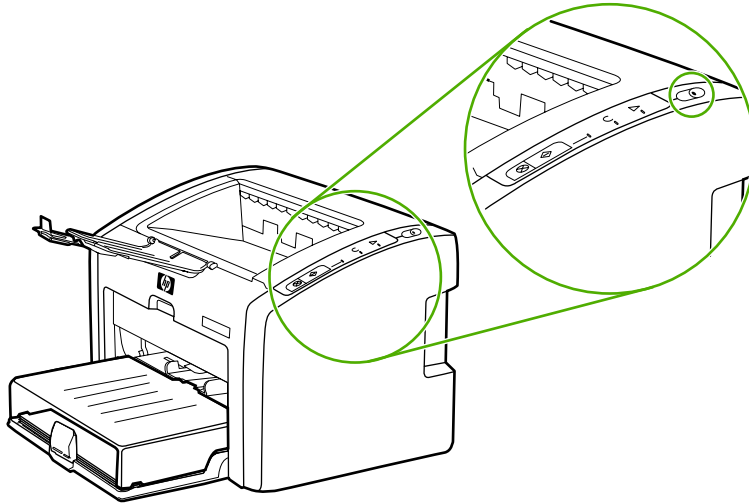
NOTE

The printer cannot be connected to a wired and wireless network at the same time.

Printer Wireless light

The HP LaserJet 1022nw printer has an internal networking component that provides wireless connectivity. To view the status of the wireless communications, the printer contains a Wireless light.

- If the light is on, the printer is connected to a wireless network.
- If the light flashes, the printer is scanning for a wireless network.
- If the light is off, wireless networking is disabled.



Configuration page

The printer includes an internal component that provides networking capability for both wired and wireless connectivity. This section contains a procedure for printing a configuration page, as well as a description of the general network and wireless network fields that display on the page.

Printing a configuration page

When the printer is in the Ready state, press and hold the **Go** button until the Ready light starts blinking.

General and wireless network settings

NOTE

All of the settings on the configuration page should match the settings of the network with which you are trying to connect. If any values are different, you might not be able to connect to the network.

The following sections describe the various fields on the configuration page.

General network settings

Field	Description
Hardware Address	<p>The Media Access Control (MAC) address that uniquely identifies the printer. This is a unique 12-digit identification number assigned to networking hardware for identification, like a digital fingerprint. No two pieces of hardware have the same MAC address.</p> <hr/> <p>NOTE</p> <p>Some ISPs require that you register the MAC address of the Network Card or LAN Adapter that was connected to your cable or DSL modem during installation.</p> <hr/>
Firmware Version	<p>The internal networking component and device firmware revision code separated by a hyphen.</p> <hr/> <p>NOTE</p> <p>You might be asked to provide the firmware revision code if you call for support.</p> <hr/>
Host Name	<p>The TCP/IP name assigned by the install software to the device. By default, these are the letters NPI followed by the last six digits of the MAC address. You can also configure the device name through the embedded Web server.</p>

Field	Description
IP Address	<p>The printer's Internet Protocol (IP) address. This address uniquely identifies the device on the network.</p> <p>IP addresses are assigned dynamically through DHCP or AutoIP. You can also set up a static IP address, though this is not recommended.</p> <p>Manually assigning an invalid IP address during install will cause your network components to not see the device.</p>
Config by	<p>The protocol used to assign the IP address to the device:</p> <ul style="list-style-type: none"> ● AutoIP: the installation software determines the configuration parameters. ● DHCP: the configuration parameters are supplied by a dynamic host configuration protocol (DHCP) server on the network. On small networks, this could be a router. ● Manual: the configuration parameters are set manually, such as a static IP address. ● BOOTP: Bootstrap Protocol (BOOTP) is an Internet protocol that enables a device to discover its own IP address, the IP address of a BOOTP server on the network, and a file to be loaded into memory to boot the machine. This enables the device to boot without requiring a hard or floppy disk drive.
mDNS Name	<p>Multicast Domain Name Server Service Name. The name used by Apple Rendezvous to identify the printer, which consists of the device name and the MAC address.</p> <p>Apple Rendezvous is used with local and ad-hoc networks that do not use central DNS servers. To perform name services, Rendezvous uses a DNS alternative called mDNS.</p> <p>With mDNS, your computer can find and use any printer connected to your local area network. It can also work with any other Ethernet-enabled device that appears on the network.</p>
Link Status	<p>The protocol for transmitting data over a network:</p> <ul style="list-style-type: none"> ● 802.11b and 802.11g: for wireless network ● 10T-Full: for wired network ● 10T-Half: for wired network ● 100TX-Full: for wired network ● 100TX-Half: for wired network

Wireless network settings

Field	Description
Wireless Status	Status of the wireless network: <ul style="list-style-type: none">• Disabled: the wireless 802.11b/g network is disabled when the wired 802.3 network is active. This is the default setting.• Enabled
Communication Mode	An IEEE 802.11 networking framework in which devices or stations communicate with each other: <ul style="list-style-type: none">• Infrastructure: the printer communicates with other network devices through a wireless access point, such as a wireless router or base station.• Ad-hoc: the printer communicates directly with each device on the network. No wireless access point is used. This is also called a peer-to-peer network. On Macintosh networks, ad-hoc mode is called computer-to-computer mode.
Network Name (SSID)	Service Set Identifier. A unique identifier (up to 32 characters) that differentiates one wireless local area network (WLAN) from another. The SSID is also referred to as the Network Name—the name of the network to which the printer is connected.

Data transmission and receipt information

Field	Description
Total Packets Received	The number of packets received by the printer without error since it has been turned on. The counter clears after the printer is turned off.
Bad Packets Received	The number of packets received with errors since the printer has been turned on. The counter clears after the printer is turned off.
Total Packets Transmitted	The number of packets transmitted by the printer without error since it has been turned on. The counter clears after the printer is turned off. When a message is transmitted over a packet-switching network, it is broken up into packets. Each packet contains the destination address as well as the data.

Embedded Web server

The embedded Web server provides a convenient way to manage your printer on a network. The embedded Web server is available for the HP LaserJet 1022nw printer over the Internal HP network connection. The following information applies to the embedded Web server:

- You do not need to install any software on the computer. You only need to have a supported Web browser. To use the embedded Web server, you must have Microsoft Internet Explorer 5.5 or later or Netscape Navigator 6.0 or later.
- The embedded Web server is available in English only.
- The embedded Web server does not provide e-mail or status alerts.

The embedded Web server allows you to view printer and network status and to manage printing functions from your computer instead of from the printer control panel. The following are examples of what you can do using the embedded Web server:

- View printer status information
- Order new supplies
- View and change the printer default configuration settings
- View and change the printer's wired -or wireless network settings

The embedded Web server works when the printer is connected to an IP-based network. The embedded Web server does not support IPX-based printer connections or AppleTalk.

NOTE

Internet access is not required to open and use the embedded Web server. However, if you click a link in the **Other Links** area, you must have Internet access in order to go to the site associated with the link.

CAUTION

It is recommended that the printer and associated computers reside on the same subnet. Printer installation across subnets can be problematic depending on the type of router used. However, if the printer is on a different subnet than your computer, enter the printer's IP address (for example, <http://192.168.1.1>) in the browser's **Address** fields to open the embedded Web server. Also, if your computer uses a proxy server to access the Internet, you might need to configure your browser to by-pass the proxy server in order to access the embedded Web server.

To open the embedded Web server

1. In a supported Web browser, type the IP address or hostname for the printer. To find the IP address, print a configuration page at the printer by pressing and holding the **Go** button until the Ready light starts blinking.

NOTE

Once you open the URL, you can bookmark it so that you can return to it quickly in the future.

2. The embedded Web server has three tabs that contain settings and information about the printer: the **Information** tab, the **Settings** tab, and the **Networking** tab. Click the tab that you want to view.

Information tab

The **Information** tab contains the following pages:

- **Device Status.** This page displays the printer and supplies status. This page also displays product information such as the network name, network address, and model information.
- **Configuration.** This page shows information found on the printer Configuration page.

Settings tab

This tab allows you to configure the printer from your computer. If this printer is networked, always consult with the printer administrator before changing settings on this tab. The **Settings** tab contains the **Print Settings** page. On the **Print Settings** page you can view and change basic information about the printer.

Networking tab

This tab allows the network administrator to control network-related settings for the printer when it is connected to an IP-based network.

Other links

This section contains links that connect you to the Internet. You must have Internet access in order to use any of these links. If you use a dial-up connection and did not connect when you first opened the embedded Web server, you must connect before you can visit these Web sites. Connecting might require that you close the embedded Web server and reopen it.

- **Product Registration.** Connects you to the product registration page on the HP Web site.
- **Order Supplies.** Click this link to connect to the Sure Supply Web site and order genuine HP supplies from HP or a reseller of your choice.
- **Product Support.** Connects to the support site for the HP LaserJet 1022nw printer. You can search for help regarding general topics.
- **HP Instant Support.** Connects you to the HP Web site to help you find solutions. This service analyzes your printer error log and configuration information to provide diagnostic and support information specific to your printer.

CAUTION

Use caution when changing the print server's wireless network settings. It is possible that the printer could lose the connection, which might require resetting the printer to the factory defaults and reinstalling the software.

Switching from wired to wireless

If the printer is communicating with a wireless network and you plug a LAN cable into the printer, it automatically switches to wired communications. For more information, see [Embedded Web server](#).

Resetting the printer to the factory default settings

Once the printer is configured for a network, its configuration settings are saved in its memory. Resetting the printer to its factory default settings will clear all the settings from the printer's memory for your network. This should only be done as a last resort when troubleshooting the printer.

Resetting the printer to its factory default settings may require you to reinstall the printer software. Additionally, you will also have to reconfigure the printer's security settings.

The printer's default settings are:

Option	Default settings
Communication mode	ad-hoc
Network Name (SSID)	hpsetup
Encryption	None
Wireless Radio	On, if no LAN cable is attached

Resetting the factory defaults

When the printer is turned off, press and hold the **Go** and **CANCEL** buttons. Turn on the printer, and continue to hold the **Go** and **CANCEL** buttons until all lights are blinking in unison.

3

Problem solving

This chapter provides information on the following topics:

- [Solving problems that occur during installation](#)
- [Solving infrastructure mode problems](#)
- [Solving ad-hoc mode problems](#)
- [Solving general wireless networking problems](#)

Solving problems that occur during installation

This section contains solutions to problems that might occur while initially installing the printer to a wireless network.

Computer is unable to discover a device

1. Verify that the following cables are connected properly:
 - Power cables
 - Cables between the printer and the hub or router
 - Cables between the hub or router and your computer
 - (If applicable) cables to and from your modem or Internet connection
2. Verify that you have an active network connection.
 - Look at the light on the network connector. If the light is on, the printer is connected to a wired network. If the light is off, check the cable connections from the printer to the gateway, router, or hub to ensure connections are secure.
 - If the connections are secure, recycle the power on the printer to initiate another search for a wireless network.

Personal software firewall is blocking communication

The personal software firewall is a security program that protects a computer from intrusion. However, the personal firewall might block communication between the computer and the printer. If you cannot communicate with the printer, try disabling the personal firewall. If you are still unable to communicate with the printer, then re-enable the firewall. If disabling the firewall allows you to communicate with the printer, you might want to assign the printer a static IP address and then re-enable the firewall. For information about firewalls that are used in an HP environment, see http://www.hp.com/support/XP_firewall_information.

Device is unable to connect to the network after removing cable (infrastructure only)

If the access point/gateway has MAC filtering enabled, enter the MAC address of the printer into the access point. The printer should then be able to connect to the wireless network. For more information, see [Wireless access point \(WAP\) filters MAC addresses](#).

System Requirements Error: No TCP/IP error displays

Make sure your LAN card is installed properly and set up for TCP/IP (Windows only). For more information, see [Computer is unable to discover a device](#).

Printer not found screen appears during installation

1. Verify that the printer is turned on.
2. Verify that you have an active network connection.
 - Look at the light on the network connector on the back of the unit. If the light is on, the printer is connected to a wired network. If the light is off, check the cable connections from the printer to the gateway, router, or hub to ensure connections are secure.
 - Verify that the printer is connected to the network with the cable that is packaged with the printer.
 - If the connections are secure, recycle the power on your printer.
3. Print a configuration page. **To print a configuration page**, when the printer is in the Ready state, press and hold the **Go** button until the Ready light starts blinking. For more information, see [Configuration page](#).
4. Verify that the printer's internal networking component is set to its factory default settings. If the print server was previously configured, it might need to be reset to the factory default settings.
 - Communication mode: ad-hoc (peer-to-peer)
 - Network name (SSID): hpsetup
 - Encryption: disabled

You can check the print server's configuration by printing a configuration page. **To reset the printer to the factory settings**, when the printer is turned off, press and hold the **Go** and **CANCEL** buttons. Turn on the printer, and continue to hold the **Go** and **CANCEL** buttons until all lights are blinking in unison.
5. Move the printer and the computer closer together. If the distance between your computer and the printer is significant, try reducing the distance. If possible, provide a clear path between the computer and print server, and minimize sources of radio interference. For more information, see [Radio signal is weak](#).

Unable to determine or verify network name during installation

Setup has either detected multiple networks or has been unable to read or verify the network name from the access point.

In the Select Network Name screen, do one of the following:

- If the wireless access point or router was turned on after the printer was turned on, you should turn the printer off and then on again to allow the printer to find the SSID.
- Enter a new SSID entry. If you choose to enter the wireless Network Name (SSID), also select the Communication Mode (**Ad-Hoc** or **Infrastructure**).
- Select an existing network name from the list. Up to 12 SSIDs, detected at the time the internal networking component booted up, might be listed.

NOTE

The SSID entry is case-sensitive and can be up to 32 alphanumeric characters long, including spaces. You cannot leave the network name field blank.

Verification fails at end of installation

Possible problem: You are using advanced forms of encryption, such as dynamic encryption, WPA, or WPA-PSK, the encryption methods must be entered through the embedded Web server. For more information, see [Embedded Web server](#).

In dynamic encryption, each device has a different key and all keys change frequently. Dynamic encryption is much harder for an intruder to circumvent, since the keys are likely to change before the intruder can reverse engineer them.

Possible problem: Your SSID or WEP key might be incorrectly set. Complete the following procedure to set the SSID or WEP key:

1. Print a configuration page. **To print a configuration page**, when the printer is in the Ready state, press and hold the **Go** button until the Ready light starts blinking. For more information, see [Configuration page](#).
2. Make sure the network SSID and WEP key on the device and the wireless network match.
3. If one or both are incorrect, enter either the URL or device IP address from the configuration page into the **Address** field on your Web browser. The printer EWS Home page appears.
4. Select the **Networking** tab.
5. Click the **Wireless** option.
6. Enter the correct values in the appropriate sections (**Network Name (SSID)** and **Encryption**).
7. Click **Apply**.

Possible problem: Your network uses multiple WEP keys, and you have chosen the wrong key for transmitting.

1. Print a configuration page. **To print a configuration page**, when the printer is in the Ready state, press and hold the **Go** button until the Ready light starts blinking. For more information, see [Configuration page](#).
2. Enter either the URL or device IP address from the configuration page into the **Address** field on your Web browser. The EWS Home page appears, showing the printer device information.
3. Click the **Networking** tab.
4. Click the **Wireless** option.
5. In the **Encryption** section, select the **Static (WEP)** option.
6. Under **Static (WEP)**, enter the WEP keys used by your network. In static encryption, the same key is used for all devices on the network and the key remains the same for long periods of time.
7. Choose the key to be used to encrypt transmitted data. (The installer defaults to **WEP Key 1**.)
8. Click **Apply**.
9. If the installation has terminated, restart the printer software CD-ROM.

Possible problem: You are using advanced authentication protocols that are not supported by the installation software, such as LEAP, PEAP, EAP-MD5, EAP-TLS, or EAP-TTLS.

1. Print a configuration page. **To print a configuration page**, when the printer is in the Ready state, press and hold the **Go** button until the Ready light starts blinking. For more information, see [Configuration page](#).
2. Enter either the URL or device IP address from the configuration page into the **Address** field on your Web browser. The EWS Home page appears, showing the printer device information.
3. Click the **Networking** tab.
4. Click the **Wireless** option.
5. In the **Communication Mode** section, select **Infrastructure**.
6. Select a network name (SSID) from the list of detected networks, or enter the name of a new wireless network.
7. Select **WPA/PSK**, enter a pass phrase (from 8 to 63 characters in length, including spaces) that will be used by the software to generate a pre-shared key.

NOTE

All devices on the network must use the same pass phrase.

8. Click **Apply**.

Setup failed

Possible problem: No signal is being received by the device because it is not in range of the access point (infrastructure) or computer (ad-hoc).

Move the printer and the computer closer together. If the distance between your computer and the printer is significant, try reducing the distance. If possible, provide a clear path between the computer and print server, and minimize sources of radio interference.

Possible problem: The setup program tried to change the computer's wireless configuration so that it can communicate to the printer, but was unable to reprogram the settings on the computer's wireless access card.

1. Quit all applications.
2. If your computer is connected to the Internet, disable the connection to your computer by removing the Ethernet cable that connects the modem (cable, DSL, or dial-up) to your computer.
3. Click **Setup**. The **Setup** menu appears.
4. Select **6**. The **Network** menu appears.
5. Select **2**. The wireless radio setting options appear.

NOTE

The default setting for the wireless radio is **Off**.

6. Use the up and down buttons to select **On**.
7. Select **OK**.
8. Open the configuration utility for your wireless network adapter.
9. Write down the existing wireless profile settings.

10. Create a new wireless profile with the following values:

- Communication mode: Ad Hoc
- Network name (SSID): hpsetup
- Encryption: disabled

NOTE

This is the default configuration for your printer's internal networking component.

11. Activate the profile.

When the configuration change is complete, the computer is ready to communicate on the printer's network. (The computer is no longer part of its original network.)

NOTE

Unless you change your computer settings, the computer will continue to communicate with your existing wireless network. However, the wireless device that you need to configure is on its own network (called hpsetup). To configure that device, you need to temporarily change your computer to the printer's network.

12. Print a configuration page and obtain the IP address of the printer. **To print a configuration page**, when the printer is in the Ready state, press and hold the **Go** button until the Ready light starts blinking. For more information, see [Configuration page](#).
13. Open your Web browser on your computer.
14. Type either the URL or device IP address from the configuration page into the **Address** field in your browser. The EWS Home page appears.
15. Select the **Networking** tab.
16. Click the **Wireless** option.
17. In the appropriate section, enter the profile values you recorded in step 9.
18. Click **Apply**.
19. Exit the EWS by closing your browser.
20. Open the configuration utility for your wireless network adapter.
21. Restore the previous wireless profile settings.
22. Unplug the network cable from the printer.
23. Wait 60 seconds and then print a configuration page. The Wireless light should be on.
24. Open your Web browser on your computer.
25. Enter either the URL or device IP address from the configuration page into the **Address** field in your browser. If the EWS Home page appears, your printer is properly configured.
26. Exit the EWS by closing your browser.
27. Insert the printer software installation CD into your computer's CD-ROM drive.
28. Run the installation software again.

Installation software does not install correctly

During a normal installation of the printer software, the following actions occur:

- The printer CD-ROM runs automatically
- The software installs
- Files are copied to your hard drive
- You are requested to plug in the printer
- You are requested to restart your computer
- The registration process runs

If any of these actions did not occur, there might be a problem with the installation. To check the installation on a PC, verify the following:

- Open the Printers dialog box and check to see that the printer is listed.
- Look at the Task Tray for a printer icon. This indicates that the printer is ready.

If nothing happens when you insert the CD-ROM into the computer's CD-ROM drive, do the following:

1. From the Windows **Start** menu, choose **Run**.
2. In the **Run** box, type `d:\setup.exe` (if your CD-ROM drive is not assigned to drive letter d, use the appropriate drive letter), and then click **OK**.

If the minimum system checks screen appears, your system does not meet the minimum requirements to install the software. Click **Details** to view the specific problem. Correct the problem before attempting to install the software.

Solving infrastructure mode problems

This section contains solutions to problems that might occur if the printer is connecting to a wireless network that communicates using the infrastructure mode. For more information, see [Channels and communication modes](#).

The printer cannot find the WLAN

1. Verify your access point is broadcasting its network name (SSID).
 - a. See your access point User Guide and check the access point settings.
 - b. Turn on options, such as **broadcast network name**, and turn off **silent broadcast**.
2. Turn off the access point unit, and then turn it on. Then run the printer software setup program again.
3. Move the access point and the printer closer together. Then run the printer software setup program again. For more information, see [Radio signal is weak](#).
4. Check for firmware updates for your access point on the manufacturer's Web site.
 - a. Update the firmware on the access point.
 - b. Run the printer software setup program again.

Printer cannot find your computer

1. Verify you have a functioning wireless network by using another wireless device.
2. Verify the printer is operational.
3. Verify the IP address and subnet mask of your printer and computer are similar (on the same network).
4. Verify the encryption settings on your access point. The same encryption key and settings must be used on both the access point and the printer.

For more information, see [Solving problems that occur during installation](#).

Computer is unable to discover device

1. Print a configuration page and verify you are connecting to the correct wireless network. **To print a configuration page**, when the printer is in the Ready state, press and hold the **Go** button until the Ready light starts blinking. For more information, see [Configuration page](#).
2. If you have a firewall, grant access permission to the printer.
3. Try temporarily disabling the firewall to determine whether the firewall is preventing the printer from accessing your computer.

Solving ad-hoc mode problems

This section contains solutions to problems that might occur if the printer is connecting to a wireless network that communicates using the ad-hoc mode. For more information, see [Channels and communication modes](#).

Printer cannot find your computer

1. Verify you have a functioning wireless ad-hoc network by using another wireless device.
2. Verify the printer is operational. For more information, see [Solving problems that occur during installation](#).
3. Verify the IP address and subnet mask of your printer and computer are similar (on the same network).
4. Verify your computer's wireless adapter is broadcasting its network name (SSID), which can be found on the configuration page. **To print a configuration page**, when the printer is in the Ready state, press and hold the **Go** button until the Ready light starts blinking. For more information, see [Configuration page](#).
5. Verify the encryption settings on your access point. The same encryption key and settings must be used on both the access point and the printer. For more information, see [Solving problems that occur during installation](#).
6. Check for firmware updates for your wireless adapter on the manufacturer's Web site.
 - a. Update the firmware.
 - b. Run the printer software setup program again.

Solving general wireless networking problems

For most wireless printing problems, the first step is to try printing a configuration page. **To print a configuration page**, when the printer is in the Ready state, press and hold the **Go** button until the Ready light starts blinking. For more information, see [Configuration page](#).

If the configuration page *does not* print, verify the following:

- Printer is set up and powered on
- Print cartridges are installed correctly
- Printer is on and the paper tray is loaded
- Printer is free of paper jams
- Network connections are secure
- Cable connections are secure
- Printer covers are closed

If any of the above are problems, see the *HP LaserJet 1022 Series Printer User Guide*.

If the configuration page *does* print, you can begin to solve the problem by checking the Wireless light, as described below.

Check the Wireless light

Look at the printer's Wireless light. If the Wireless light is off, wireless networking has been disabled. Verify the printer's network settings match the network settings (see [Printer has the wrong wireless network settings](#).) Then, verify the following:

- An Ethernet cable is not connected to the printer. Connecting an Ethernet cable to the printer automatically turns off the wireless radio. Unplug the cable.

If the Wireless light is on, try reprinting the document, then look at the printer's Ready light.

If the Ready light is flashing, the printer's wireless communications feature is working correctly.

If the Wireless light is on steadily, the wireless radio is functioning, but the printer and the computer cannot communicate.

- The printer's network settings do not match the settings for your network. See [Printer has the wrong wireless network settings](#).
- The computer might be set to the wrong wireless profile. See [Computer's wireless card is set to the wrong wireless profile](#).
- A personal software firewall might block communication between the printer and the computer. See [Radio signal is weak](#).

Printer has the wrong wireless network settings

The printer's wireless network settings must match those of your network, which includes the following:

- Communication mode
 - Network Name (SSID)
 - Channel (ad-hoc networks only)
 - Authentication type
1. Reconnect the cable.
 2. Compare the network settings to those that appear on the printer's configuration page. **To print a configuration page**, when the printer is in the Ready state, press and hold the **Go** button until the Ready light starts blinking. For more information, see [Configuration page](#).
 3. Do one of the following to find the settings for your network:
 - If the printer is communicating with the network using the infrastructure mode, open the Wireless Access Point's (WAP) configuration utility.
 - If the printer is communicating with the network using the ad-hoc mode, open the configuration utility for the network card installed in your computer.
 4. Compare the settings and note any settings that are different. Possible problems include:
 - The WAP filters hardware addresses (MAC addresses). See [Wireless access point \(WAP\) filters MAC addresses](#).
 - One of these settings in the printer might be incorrect: communication mode, network name (SSID), channel (ad-hoc networks only), or security settings. See [Printer has the wrong wireless network settings](#).
 5. Reprint the configuration page.

To change the printer's network settings:

1. Open the printer's embedded Web server.
2. Click the **Networking** tab. For wireless settings, click **Wireless**. For IP settings, click **IP Configuration**.
3. Change the printer's settings to match the settings of the network, then click **Finish**.
4. Close the printer's EWS, then disconnect the Ethernet cable from the printer.
5. The control panel lights will cycle.

If the printer is still not working, verify the computer's wireless profile. Then, as a last option, reset the network settings to the factory defaults and use the printer software CD to reinstall the printer software.

To reset the network settings to the factory defaults, when the printer is turned off, press and hold the **Go** and **CANCEL** buttons. Turn on the printer, and continue to hold the **Go** and **CANCEL** buttons until all lights are blinking in unison.

NOTE

If you reset the network settings, you will have to reconfigure all the network settings.

Computer's wireless card is set to the wrong wireless profile

A wireless profile is a set of network settings unique to a given network. A single wireless card might have several wireless profiles (for example, one for home and one for the office).

Open the configuration utility for the network card installed on your computer and verify that the profile selected is the profile for the printer's network. If not, select the correct profile.

Radio signal is weak

If the printer is printing slowly, then the radio signal might be weak. Follow these guidelines for reducing interference in a wireless network:

- Keep the wireless devices away from large metal objects, such as filing cabinets, and other electromagnetic devices, such as microwaves and cordless telephones, as these objects can disrupt radio signals.
- Keep the wireless devices away from large masonry structures and other building structures as these objects can absorb radio waves and lower signal strength.
- For an infrastructure network, position the WAP in a central location in line of sight with the wireless devices on the network.
- Keep all wireless devices on the network within range of one another.

Wireless access point (WAP) filters MAC addresses

MAC filtering is a security feature in which a Wireless Access Point (WAP) is configured with a list of MAC addresses (also called hardware addresses) of devices that are allowed to gain access to the network through the WAP.

If the WAP does not have the hardware address of a device attempting to access the network, the WAP denies the device access to the network. If the WAP filters MAC addresses, then the printer's MAC address must be added to the WAP's list of accepted MAC addresses.

1. Print a configuration page. **To print a configuration page**, when the printer is in the Ready state, press and hold the **Go** button until the Ready light starts blinking. For more information, see [Configuration page](#).
2. Find the printer's hardware address on the configuration page.

Open the WAP's configuration utility, then add the printer's hardware address to the list of accepted MAC addresses.

A

Regulatory information

USA Federal Communications Commission (FCC) compliance

CAUTION

Based on Section 15.21 of the FCC rules, changes or modifications to the operation of this product without the expressed approval by Hewlett-Packard Company may invalidate its authorized use.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against interference when the equipment is operated in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if it is not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase separation between the equipment and receiver.
- Connect equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult your dealer or an experienced radio/TV technician for help.

This device complies with Part 15 of FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Exposure to radio frequency radiation

CAUTION

The radiated output power of this device is far below the FCC radio frequency exposure limits. Nevertheless, the device shall be used in such a manner that the potential for human contact during normal operation is minimized.

In order to avoid the possibility of exceeding the FCC radio frequency exposure limits, human proximity to the antenna shall not be less than 20 cm (8 inches) during normal operation.

Declaration of Conformity

Declaration of Conformity

according to ISO/IEC Guide 22 and EN 45014

Manufacturer's Name: Hewlett-Packard Company
Manufacturer's Address: 11311 Chinden Boulevard,
Boise, Idaho 83714-1021, USA

declares that the product

Product Name: HP LaserJet 1022nw
Regulatory Model ³⁾: BOISB-0405-01
Product Options: ALL
Toner Cartridge: Q2612A

conforms to the following Product Specifications:

Safety: IEC 60950-1:2001 / EN60950-1:2001 +A11
IEC 60825-1:1993 +A1:1997 +A2:2001 / EN 60825-1:1994 +A1:2002 +A2:2001
(Class 1 Laser/LED Product)

EMC: CISPR 22:1997 / EN 55022:1998 Class B¹⁾
EN 61000-3-2:2000
EN 61000-3-3:1995 /A1:2001
EN 55024:1998/A1:2001
FCC Title 47 CFR, Part 15 Class B²⁾ / ICES-003, Issue 4
Radio⁴⁾:
EN 301 489-1:2002 / EN 301 489-17:2002
EN 300 328 V1.4.1: (2003-04)



FCC Title 47 CFR, Part 15 Subpart C (Section 15.247) / IC: RSS-210

Supplementary Information:

The product herewith complies with the requirements of the R&TTE Directive 1999/5/EC Annex IV, EMC Directive 89/336/EEC and the Low Voltage Directive 73/23/EEC, and carries the CE-Marking accordingly

- 1) The product was tested in a typical configuration with Hewlett-Packard Personal Computer Systems. Compliance testing of product to standard with exception of clause 9.5, which is not yet in effect.
- 2) This Device complies with Part 15 of the FCC Rules. Operation is subject to the following two Conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.
- 3) For regulatory purposes, this product is assigned a Regulatory model number. This number should not be confused with the product name or the product number(s).
- 4) This product uses a Radio Module Device which Regulatory Model Number is: BOISB-0410-00

Boise, Idaho 83714, USA

10 February 2005

For Regulatory Topics ONLY, contact:

Australia Contact: Product Regulations Manager, Hewlett-Packard Australia Ltd. 31-41 Joseph Street, Blackburn, Victoria 3130, Australia
European Contact: Your Local Hewlett-Packard Sales and Service Office or Hewlett-Packard GmbH, Department HQ-TRE / Standards Europe Herrenberger Straße 140, D-71034 Böblingen, Germany (FAX: +49-7031-14-3143)
USA Contact: Product Regulations Manager, Hewlett-Packard Company PO Box 15, Mail Stop 160, Boise, Idaho 83707-0015, USA (Phone: 208-396-6000)

Regulatory statements

Laser safety statement

The Center for Devices and Radiological Health (CDRH) of the U.S. Food and Drug Administration has implemented regulations for laser products manufactured since August 1, 1976. Compliance is mandatory for products marketed in the United States. The printer is certified as a “Class 1” laser product under the U.S. Department of Health and Human Services (DHHS) Radiation Performance Standard according to the Radiation Control for Health and Safety Act of 1968.

Since radiation emitted inside the printer is completely confined within protective housings and external covers, the laser beam cannot escape during any phase of normal user operation.

WARNING!

Using controls, making adjustments, or performing procedures other than those specified in this user guide could result in exposure to hazardous radiation.

Canadian regulations

For Indoor Use. This digital apparatus does not exceed the Class B limits for radio noise emissions from digital apparatus as set out in the radio interference regulations of the Canadian Department of Communications. The internal wireless radio complies with RSS 210 of Industry Canada.

Pour L'Usage D'intérieur. Le présent appareil numérique n'émet pas de bruits radioélectriques dépassant les limites applicables aux appareils numériques de Classe B prescrites dans le règlement sur le brouillage radioélectrique édicté par le Ministère des Communications du Canada. Le composant RF interne est conforme à la norme CNR-210 d'Industrie Canada.

European Union regulatory notice

Radio Product for Indoor use in Home and Office environment operating in the 2.4 GHz band.

Radio product with the marking



complies with the R&TTE Directive (1999/5/EC) issued by the Commission of the European Community.

Declaration of conformity

The Declaration of Conformity complies with ISO/IEC Guide 22 and EN45014. It identifies the product, manufacturer's name and address, and applicable specifications recognized in the European community.

Selected EU, EU candidate and EFTA countries/regions

The radio functionality of this equipment (IEEE 802.11b/g wireless LAN) may be used in the following EU, EU candidate and EFTA countries/regions:

Austria, Belgium, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia (1 May 2004), Liechtenstein, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland (1 May 2004), Portugal, Slovak Republic, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

Notice for use in France and Italy

Italy:

License required for use. Verify with your dealer or directly with General Direction for Frequency Planning and Management (Direzione Generale Pianificazione e Gestione Frequenze).

E' necessaria una concessione ministeriale anche per l'uso del prodotto. Verifici per favore con il proprio distributore o direttamente presso la Direzione Generale Pianificazione e Gestione Frequenze.

France: For 2.4 GHz Wireless LAN operation of this product certain restrictions apply: This equipment may be used indoor for the entire 2400-2483.5 MHz frequency band (channels 1-13). For outdoor use, only 2454-2483.5 MHz frequency band (channels 10-13) may be used. For the latest requirements, see <http://www.art-telecom.fr>.

Laser statement for Finland

LASERTURVALLISUUS

LUOKAN 1 LASERLAITE

KLASS 1 LASER APPARAT

HP LaserJet HP LaserJet 1022nw -laserkirjoitin on käyttäjän kannalta turvallinen luokan 1 laserlaite. Normaalisissa käytössä kirjoittimen suojakotelointi estää lasersäteiden pääsyn laitteen ulkopuolelle.

Laitteen turvallisuusluokka on määritetty standardin EN 60825-1 (1994) mukaisesti.

VAROITUS!

Laitteen käyttäminen muulla kuin käyttöohjeessa mainitulla tavalla saattaa altistaa käyttäjän turvallisuusluokan 1 ylittävälle näkymättömälle lasersäteilylle.

VARNING!

Om apparaten används på annat sätt än i bruksanvisning specificerats, kan användaren utsättas för osynlig laserstrålning, som överskrider gränsen för laserklass 1.

HUOLTO

HP LaserJet 1022nw -kirjoittimen sisällä ei ole käyttäjän huollettavissa olevia kohteita. Laitteen saa avata ja huoltaa ainoastaan sen huoltamiseen koulutettu henkilö. Tällaiseksi huoltotoimenpiteeksi ei katsota väriainekasetin vaihtamista, paperiradan puhdistusta tai muita käyttäjän käsikirjassa lueteltuja, käyttäjän tehtäväksi tarkoitettuja ylläpitotoimia, jotka voidaan suorittaa ilman erikoistyökaluja.

VARO!

Mikäli kirjoittimen suojakotelo avataan, olet alttiina näkymättömälle lasersäteilylle laitteen ollessa toiminnassa. Älä katso säteeseen.

WARNING!

Om laserprinterns skyddshölje öppnas då apparaten är i funktion, utsätts användaren för osynlig laserstrålning. Betrakta ej strålen.

Tiedot laitteessa käytettävän laserdiodin säteilyominaisuuksista:

Aallonpituus 785-800 nm

Teho 5 mW

Luokan 3B laser

Environmental product stewardship program

Protecting the environment

Hewlett-Packard Company is committed to providing quality products in an environmentally sound manner. This product has been designed with several attributes to minimize the impact on our environment.

Ozone production

This product generates no appreciable ozone gas (O₃).

Power consumption

Power usage drops significantly while in PowerSave/Sleep mode, which saves natural resources and saves money without affecting the high performance of this product. This product qualifies for ENERGY STAR® (Version 3.0), which is a voluntary program to encourage the development of energy-efficient office products.



ENERGY STAR and the ENERGY STAR mark are U.S. registered marks. As an ENERGY STAR partner, Hewlett-Packard Company has determined that this product meets ENERGY STAR guidelines for energy efficiency. For more information, see <http://www.energystar.gov/>.

Toner consumption

Economode uses significantly less toner, which might extend the life of the print cartridge.

Paper use

This product's manual duplex (two-sided printing) and N-up printing (multiple pages printed on one page) features can reduce paper usage and the resulting demands on natural resources.

Plastics

Plastic parts over 25 grams (0.9 ounces) are marked according to international standards that enhance the ability to identify plastics for recycling purposes at the end of the product's life.

HP LaserJet printing supplies

It is easy to return and recycle your empty HP LaserJet print cartridges—free of charge—with HP Planet Partners. HP is committed to providing inventive, high-quality products and services that are environmentally sound, from product design and manufacturing to distribution, operation and recycling processes. We ensure your returned HP LaserJet print cartridges are recycled properly, processing them to recover valuable plastics and metals for new products and diverting millions of tons of waste from landfills. Since this cartridge is being recycled and used in new materials, it will not be returned to you. Your empty HP LaserJet print cartridges are recycled responsibly when you participate in the HP Planet Partners program. Thank you for being environmentally responsible!

In many countries/regions, this product's printing supplies (for example, print cartridge, drum) can be returned to HP through the HP Printing Supplies Returns and Recycling Program. An easy-to-use and free take back program is available in more than 35 countries/regions. Multi-lingual program information and instructions are included in every new HP LaserJet print cartridge and supplies package.

HP printing supplies returns and recycling program information

Since 1992, HP has offered HP LaserJet supplies return and recycling free of charge. In 2004, HP Planet Partners for LaserJet Supplies was available in 85% of the world market where HP LaserJet supplies are sold. Postage-paid and pre-addressed labels are included within the instruction guide in most HP LaserJet print cartridge boxes. Labels and bulk boxes are also available through the Web site: <http://www.hp.com/recycle>.

Use the label to return empty, original HP LaserJet print cartridges only. Please do not use this label for, non-HP cartridges, refilled or remanufactured cartridges or warranty returns. Printing supplies or other objects inadvertently sent to the HP Planet Partners program cannot be returned.

More than 10 million HP LaserJet print cartridges were recycled globally in 2004 through the HP Planet Partners supplies recycling program. This record number represents 26 million pounds of print cartridge materials diverted from landfills. Worldwide, in 2004, HP recycled an average of 59% of the print cartridge by weight consisting primarily of plastic and metals. Plastics and metals are used to make new products such as HP products, plastic trays and spools. The remaining materials are disposed of in an environmentally responsible manner.

U.S. returns

For a more environmentally responsible return of used cartridges and supplies, HP encourages the use of bulk returns. Simply bundle two or more cartridges together and use the single, pre-paid, pre-addressed UPS label that is supplied in the package. For more information in the U.S., call 800-340-2445 or visit the HP Web site at <http://www.hp.com/recycle>.

Non-U.S. returns

Non-US customers should visit the <http://www.hp.com/recycle> Web site for further information regarding availability of the HP Supplies Returns and Recycling program.

Paper

This product is capable of using recycled papers when the paper meets the guidelines outlined in the *Print Media Guide*. See the *HP LaserJet 1022 Series Printer User Guide* for ordering information. This product is suitable for the use of recycled paper according to EN12281:2002.

Material restrictions

This product does not contain added mercury.

This HP product does not contain batteries.

For more information

For more information on the following HP environmental programs:

- Product environmental profile sheet for this and many related HP products
- HP's commitment to the environment
- HP's environmental management system
- HP's end-of-life product return and recycling program
- Material safety data sheets

Visit: <http://www.hp.com/go/environment> or <http://www.hp.com/hpinfo/community/environment/productinfo/safety>.

Material safety data sheet

Material Safety Data Sheets (MSDS) for supplies containing chemical substances (for example, toner) can be obtained by contacting the HP Web site at: <http://www.hp.com/go/msds> or <http://www.hp.com/hpinfo/community/environment/productinfo/safety>.

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This product includes cryptographic software written by Eric Young (eay@cryptsoft.com).
This product includes software written by Tim Hudson (tjh@cryptsoft.com).

Original SSLeay License

Copyright© 1995-1998 Eric Young (eay@cryptsoft.com). All rights reserved.

This package is an SSL implementation written by Eric Young (eay@cryptsoft.com). The implementation was written so as to conform with Netscape's SSL.

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Glossary

10/100 Base-T

A technical term for Ethernet. 10/100 refers to the speed at which the Ethernet network functions. 10 indicates 10 megabits per second (Mb/s) for normal Ethernet, and 100 indicates 100 Mb/s for Fast Ethernet.

802.11a

A type of wireless networking that provides up to 54 Mb/s transmission in the 5 GHz band.

802.11b

A type of wireless networking that provides up to 11 Mb/s transmission (with a fallback to 5.5, 2 and 1 Mb/s) in the 2.4 GHz band.

802.11g

A type of wireless networking that provides up to 54 Mb/s transmission in the 2.4 GHz band.

Ad-hoc network

A type of wireless network in which devices directly communicate with each other rather than through a Wireless Access Point (WAP). Also referred to as peer-to-peer. Ad-hoc networks are typically small and simple, for example, a wireless PC and a wireless printer. Ad-hoc networks are independent basic service stations (IBSS), or direct-connect wireless networks.

Authentication

Authentication is a wireless network security strategy. On a network with authentication, devices use a shared key as a password and communicate only with devices that know the key. Unlike WEP, authentication does not encrypt the data sent between wireless devices. However, authentication can be used in conjunction with WEP. Authentication keys and WEP keys can be identical.

AutoIP

A process by which a device on a network automatically assigns an IP address to itself.

BOOTP

Bootstrap Protocol (BOOTP) is an Internet protocol that enables a device to discover its own IP address, the IP address of a BOOTP server on the network, and a file to be loaded into memory to boot the machine. This enables the device to boot without requiring a hard or floppy disk drive.

Broadcast packet

A packet sent from one device on a network to all devices on the network.

Channel

One of several pre-set frequencies at which 802.11b/g-enabled devices communicate in order to reduce interference. The number of channels available varies by country/region.

DHCP (Dynamic Host Configuration Protocol)

A protocol used to automatically assign an IP address to each device on a network.

DHCP server

This server dynamically manages a pool of IP addresses for use on a network or the Internet. When a user logs in, the server “loans” the user an IP address for the duration of the network connection. When a user logs off, the IP address is returned to the pool for use by another device.

Digital Certificate

An electronic means of proving the identity of a network user or device. Certificates contain detailed information about the user's device in a standard format. Digital certificates are typically issued by a trusted third-party Certificate Authority (CA). Locally administered, or self-signed, certificates are valid in some instances.

EAP

Extensible Authentication Protocol (EAP) is a general protocol for authentication that also supports multiple authentication methods, such as token cards, one-time passwords, certificates, and public key authentication.

Encryption keys

A sequence of characters or digits that a wireless device uses to encode data. Encryption keys can be static (as they are in WEP) or dynamic (as they are in WPA).

Encryption

A network security that encodes the data sent across a wireless network making the data unintelligible to unauthorized users. The printer supports WEP and WPA.

Ethernet cable

There are two types of Ethernet cables. A straight-through cable is the most common and is used to connect devices on a network to a hub or router. A crossover cable is used to connect two devices that have Ethernet ports but that are not hubs or routers. Use a CAT-5 straight-through cable with an RJ-45 plug to connect the printer to an Ethernet network.

Ethernet

A popular form of wired computer networking for Local Area Networks.

EWS (embedded Web server)

A server that is completely contained within a device. An EWS provides management information about the device. This is helpful for managing single devices on a small network. By using a Web browser to access an EWS, network users can perform such operations as obtaining network printer status updates, simple troubleshooting, and changing device configuration setting.

Firewall

A combination of hardware and software tools that protects a network from unwanted entry.

Gateway

A dedicated device (router or computer) that connects two different networks. For example, a computer on an Ethernet network may act as a gateway between the network and the Internet.

Host Name

The name by which the printer identifies itself on the network. The printer's host name appears on the configuration page. Use the host name to open the printer's embedded Web server (EWS).

Hub

A simple device that acts as the center of an Ethernet network. Other devices on the network are connected to the hub.

ICS (Internet Connection Sharing)

A Windows program that allows a computer to act as a gateway between the Internet and a network. ICS uses DHCP to assign IP addresses. See Windows documentation for more information about ICS.

Infrastructure network

A type of wireless network in which devices communicate with each other through a Wireless Access Point (WAP), such as a wireless network hub, router, or gateway.

Internet Sharing

A Macintosh OS X program that allows a computer to act as a gateway between the Internet and a network. See Macintosh documentation for more information about Internet Sharing.

IP address (Internet Protocol address)

Each computer that connects to a network or the Internet, must have a unique address. A connection to the Internet provided by an Internet Service Provider (ISP) uses a standard protocol called Internet Protocol (IP). This protocol is also used on internal networks. IP address numbers are in the form x.x.x.x—for example, 169.254.100.2. Most networks use DHCP or AutoIP to dynamically assign IP addresses. However, a device can be manually assigned a static IP address.

LAN (Local Area Network)

A high-speed type of computer network that connects devices that are a relatively short distance from one another. An Ethernet network is one type of LAN.

MAC address (Media Access Control address)

The hardware address for a device on a network. The printer's MAC address appears on the configuration page.

Mb/s (megabits per second)

The measure for the rate at which a network functions. For example, 1 Mb/s equals 1,000,000 bits per second (or 125,000 bytes per second).

mDNS

As an alternative to a Domain Name Server, a device issues a Multicast Domain Name Server (mDNS) notification to provide information regarding its service. The notification includes the type of service (such as printing), the name of the service (such as "your printer"), IP and port addresses, and other necessary information. Each device on the network receives the notification and stores the information in a personal DNS server.

Network name

A network name is an alphanumeric, case-sensitive character string that provides basic access control to a wireless network. A network name is also known as a Service Set Identifier (SSID).

Node

A network connection point, typically a computer.

Packet

A message sent from one device on a network to other devices on the network.

Peer-to-peer

See Ad-hoc network.

Protocol

A language that devices on a network use to communicate with each other. A popular network protocol is TCP/IP.

Proxy server

A proxy server acts as a security gate (such as a Web proxy) that restricts traffic going through a network. The proxy intercepts requests to the network to see if it can fulfill the requests itself. If not, it forwards the request to another server. Proxy servers have two main purposes: improve performance and filter requests.

Rendezvous

Apple's configuration technology that automatically discovers and connects devices over Ethernet and wireless networks. Rendezvous is integrated into the Mac OS X version 10.2 operating system.

RJ-45

The type of plug at the end of an Ethernet cable.

Router

A complex networking device that directs packets from one network to another network. A router can act as a gateway between a LAN and the Internet.

Server

A computer on a network that manages network resources. A network might have a number of different server types. For example, a print server manages one or more printers, a file server stores and manages files, and a network server manages network traffic.

SSID (Service Set Identifier)

A unique identifier (up to 32 characters) attached to the header of packets sent over a wireless LAN. An SSID provides basic access control to a wireless network. It can also be used to logically segment a wireless subgroup of users and devices. An SSID prevents access by any client device that does not have the SSID. By default, an access point broadcasts its SSID in its beacon. An SSID is also referred to as a Network Name because it is a name that identifies a wireless network.

Static IP address

An IP address that is manually assigned to a device on a network. A static IP address remains fixed until changed manually. Alternative methods for assigning IP addresses are DHCP and AutoIP.

Subnet mask

A number that identifies the IP addresses that belong to a subnet.

Subnet

A small network that acts as part of a large network. It is recommended that the printer and the computers that use the printer all be on the same subnet.

Switch

A network device that manages network traffic in order to minimize collisions and maximize speed.

TCP/IP

Transmission Control Protocol/Internet Protocol (TCP/IP) is the network communication protocol used on the Internet. The printer's built-in networking feature supports LANs that use TCP/IP.

TKIP

See WPA. Temporal Key Integrity Protocol (TKIP).

Unicast packet

A packet sent from one device on a network to another device on the network.

WEP key

A WEP key, or encryption key, is a sequence of alphanumeric characters or hexadecimal digits. After creating a WEP key, you must remember it or store it in a secure location. You may not be able to retrieve the WEP key if you lose it. A WEP key is either 64 or 128 bits long. The first 24 bits of the key are provided automatically. When creating the WEP key, the person creating the key provides the remaining bits (40 bits in the case of a 64-bit key, or 104 bits in the case of a 128-bit key).

WEP

Wired Equivalent Privacy (WEP) provides security by encrypting data sent over radio waves from one wireless device to another wireless device. WEP encodes the data sent across the network making the data unintelligible to unauthorized users. Only devices that share the same WEP settings as the printer will be able to communicate with the printer. WEP depends on encryption keys that are static and provides less security than WPA (TKIP).

WiFi (Wireless Fidelity)

A term used generically when referring to any type of 802.11 network, whether 802.11b/g, 802.11a, dual-band, or other. Any products tested and approved as "Wi-Fi Certified" are certified as interoperable with each other, even if they are from different manufacturers. Typically, however, any Wi-Fi product using the same radio frequency (2.4 GHz for 802.11b or 11g; 5 GHz for 802.11a) will work with any other Wi-Fi product, even if not Wi-Fi Certified.

Wireless Access Point (WAP)

A Wireless Access Point (WAP) is a device through which devices (for example, computers and printers) on an infrastructure wireless network communicate with one another. A WAP is also called a base station.

Wireless network adapter

Each node (computer or device) on the WLAN uses a wireless network adapter into which a wireless transceiver, with a small, integrated antenna, is built. Wireless network adapters might be internal (inserted in a computer or device), external (housed in a separate case), or built-in.

Wireless profile

A wireless profile is a collection of wireless network settings that applies to a particular wireless network. For example, a wireless LAN card can have one profile for a home network and another profile for an office network. When installing a device on a network, be sure to select the appropriate profile.

WPA

WPA (Wi-Fi protected access) provides security by encrypting data sent over radio waves from one wireless device to another wireless device and by controlling access to network resources through authentication protocols. Only devices that share the same WPA settings as the printer will be able to communicate with the printer. WPA uses encryption keys that change frequently. WPA provides better security than WEP. WPA is also called TKIP.

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Q5914-90904