



MarkNet™ N8050 Internal Wireless Print Server

User's Guide

May 2005

www.lexmark.com

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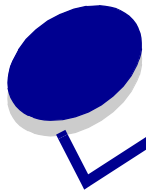
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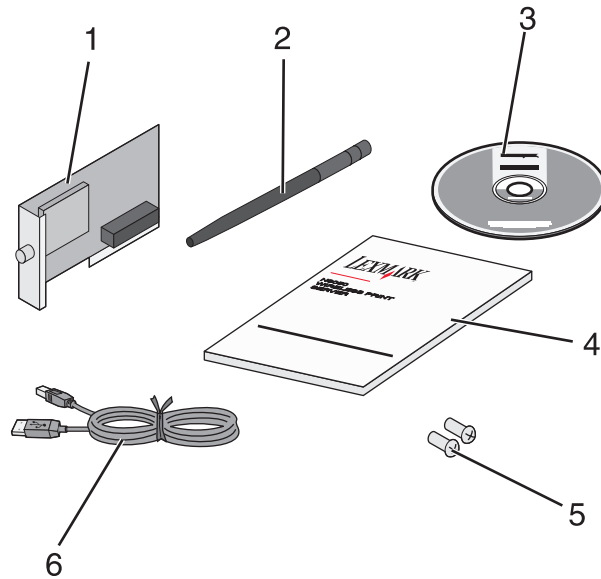
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1 Getting started

Unpacking your print server



Number	Description
1	MarkNet N8050 Internal Wireless Print Server
2	Antenna
3	MarkNet N8050 Setup Utility CD
4	Setup Guide
5	Installation screws
6	USB cable

Installing the internal wireless print server in your printer

Before installing the wireless print server, make sure the printer has been set up correctly.

- The toner or print cartridges are installed.
- Paper is loaded.

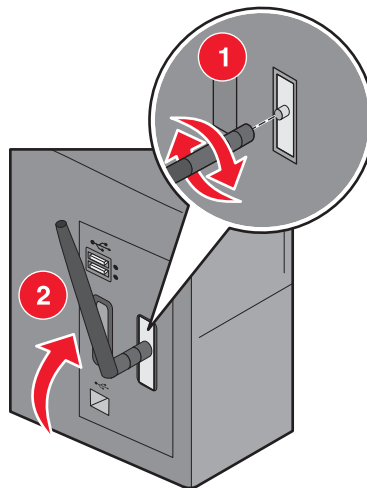
- The printer is powered off.

Note: The process used for installing the internal wireless print server in your printer may vary between different printers. See the *Installing Options* section of the printer documentation for information on installing wireless print server option cards.

Attaching the wireless print server antenna

Once the print server is installed, attach the antenna to the option card and bend the joint until it is pointing up.

Note: Some printer configurations create space restrictions that may require the antenna be attached before installing the option card.



Safety information

- Make sure that the printer is powered off before attempting an installation of the wireless print server option card in the printer.
- Refer service or repairs, other than those described in the user documentation, to a professional service person.

CAUTION: Do not set up this product or make any electrical or cabling connections during a lightning storm.

Minimum requirements for setup

- The MarkNet N8050 Internal Wireless Print Server
- An existing wireless network
- A supported printer
- The drivers or printer software CD that came with your printer

When configuring the print server with the Lexmark Wireless Setup Utility (recommended)

- A USB cable
- The *Lexmark Wireless Setup Utility* CD
- A computer that utilizes one of the following operating systems:
 - Windows 2000
 - Windows XP
 - Windows XP Professional x64 edition
 - Windows 2000 Server, Windows Advanced Server, Windows DataCenter Server
 - Windows Server 2003
 - Windows Server standard 2003 x64 edition

Note: Use of the print server is not restricted to these operating systems. See your printer documentation for a list of supported operating systems.

Wireless network settings

Some wireless network settings may be needed in order to configure the wireless print server that has been installed in the printer. Here are some of the settings that may be needed:

- Network Name, also known as SSID (Service Set ID)
- BSS (Basic Service Set) Type (the type of wireless network you use – Ad-Hoc or Infrastructure)
- Wireless Channel Number
- Network authentication and encryption type
- Security Key(s)
- Signed Certificate or CA Certificate

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Configuring the internal wireless print server

Configuration overview

After the internal wireless print server has been installed in a printer, there are two ways the print server can be configured for use on a wireless network: Configuring the print server using the Wireless Setup Utility, or by manual configuration.

Configuring the print server using the Lexmark Wireless Setup Utility involves connecting the printer in which the internal wireless print server has been installed to a computer by USB cable and launching the MarkNet N8050 *Setup Utility* CD. The Lexmark Wireless Setup Utility then provides both a Wizard mode and an Advanced mode of operation. The Wizard mode steps the user through the configuration process. The Advanced mode provides an interface through which the user can directly enter and apply the appropriate wireless configuration settings for the wireless network that the printer will be used on.

Note: When configuring with the Lexmark Wireless Setup Utility, 802.1x —RADIUS authentication is only available through the Advanced mode of operation.

Manual configuration is intended for advanced users and involves communicating with the print server over an Ad-Hoc wireless connection without the use of the Lexmark Wireless Setup Utility or a direct USB connection. Users who prefer to perform the manual configuration method require an in-depth understanding of the wireless settings for the network. For instructions on manually configuring the internal wireless print server, see [Manual configuration](#).

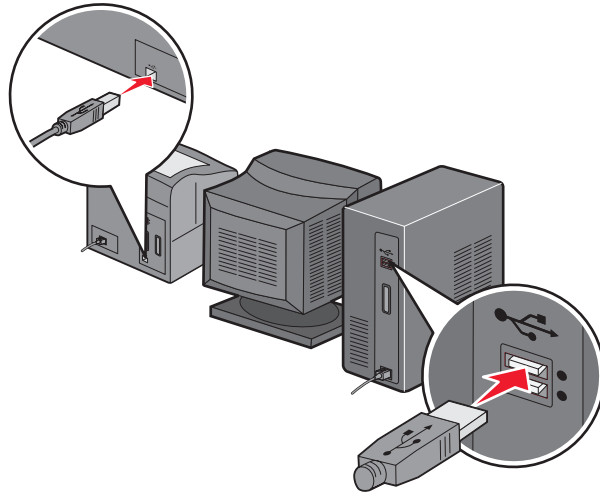
Before configuring the wireless print server, make sure your printer has been set up correctly

- The internal wireless print server option card has been installed correctly in the printer.
- All access panels and printer doors have been replaced or closed.
- The toner or print cartridges are installed correctly.
- Paper has been loaded into the printer.
- The printer is turned on and ready to be installed.

For help setting up your printer see your printer documentation.

Using the Wireless Setup Utility

- 1 Make sure the printer is turned on and has power.
- 2 Connect the printer to your computer using a USB cable.



- 3 When the New Hardware Wizard appears, click **Cancel**.
- 4 Insert the *MarkNet N8050 Setup Utility* CD. The CD launches automatically.
- 5 Click **Install MarkNet N8050 Utilities**.
- 6 Click **Agree** to accept the license agreement.
- 7 Click **Finish** to install the files and launch the setup utility.
- 8 Select either **Wizard Mode** or **Advanced Mode**.
- 9 Click **Next**, and follow the instructions for either **Wizard Mode** or **Advanced Mode**.

For Wizard Mode

In Wizard mode, the Lexmark Wireless Setup Utility gathers wireless information from the computer the printer is connected to. The results of this query determine the process for selecting the correct SSID.

- 1 Select the appropriate Network Name (SSID).

Wireless Configurations Found on Your Computer

- If existing wireless configurations are found on the computer, select the appropriate **Network Name (SSID)** from the list, click **Next**, and go to step 2.
- If the correct network name is not in the list, select the **I want to enter a different configuration** radio button, click **Next**, and go to **Wireless Networks Found in Your Area**.

Wireless Networks Found in Your Area

- If existing wireless configurations are not found on the computer, the setup utility scans for available wireless networks. Select the appropriate **Network Name (SSID)** from the list, click **Next**, and go to step 2.
 - If the correct network name is not in the list, select the **I want to enter a different network name** radio button, click **Next**, and go to step 3 under **Entering alternate network settings**.
- 2 Select the appropriate security method, and then click **Next**. If no security was detected, go to step 8.
 - 3 Enter the appropriate security key(s) for the network, and then click **Next**.
 - 4 Check each network attribute on the summary screen to make sure that the settings are correct. If the settings are correct, click **Next** to apply these settings to the print server.

Note: Clicking **Next** will prompt the setup utility to attempt to communicate with the printer using a wireless connection. This verification process can take up to 120 seconds. If you are sure that the wireless settings displayed on the screen are correct, and you do not want to initiate the wireless verification process, or you are configuring the print server for use on a network that is not immediately available, click the **Do not verify the print server can join the network** check box to skip the wireless verification test and go to step 6.

- 5 Verify that the print server can communicate over the network.
 - If the print server was successfully configured and is available on the network, click **Finish** to close the Setup Utility.
 - If the print server was not able to join the wireless network, click **View Settings** to verify that the wireless settings are correct, select the appropriate option, and click **Next**.
- 6 Disconnect the USB cable from both the computer and the printer.
- 7 Remove the *Setup Utility* CD from your computer, insert your printer drivers CD or printer software CD, and proceed to **Installing the printer on the network**.

Entering alternate network settings

Once the Wireless Setup Utility has collected and displayed the existing wireless settings, if the network configuration you want to use is not available, you have the option to enter a different network configuration.

- 1** After the Setup Wizard performs the site survey, select the option to enter a different configuration.
 - If wireless network configurations were found on your computer:
From the Wireless Configurations Found on your Computer screen, Select the **I want to enter a different configuration** radio button, and then click **Next**.
 - If no wireless network configurations were found on your computer:
From the Wireless Networks Found in Your Area screen, select the **I want to enter a different network name** radio button, click **Next**, and then skip to step 3.
- 2** From the Wireless Networks Found in Your Area screen, select the **I want to enter a different network name** radio button, and then click **Next**.
- 3** Select the wireless mode for your network (Infrastructure or Ad-Hoc mode).
- 4** Enter the Network Name (SSID) of the network that you want to use.

Note: The SSID must be entered exactly as it is used on the network. SSID's are case-sensitive, so if the SSID is entered incorrectly, the print server will not be able to communicate on the network, and the configuration process must be repeated.

- 5** Select the appropriate channel for the network (if applicable).
- 6** Click **Next**.
- 7** Select the type of security that your network uses, and then click **Next**.
- 8** If security was selected, enter the appropriate security key(s), and then click **Next**. If no security was selected, proceed to step 9.
- 9** Check each network attribute on the summary screen to make sure that the settings are correct. If the settings are correct, click **Next** to apply these settings to your print server.

Note: Clicking **Next** will prompt the setup utility to attempt to communicate with the printer using a wireless connection. This verification process can take up to 120 seconds. If you are sure that the wireless settings displayed on the screen are correct, and you do not want to initiate the wireless verification process, or you are configuring the print server for use on a network that is not immediately available, click the **Do not verify the print server can join the network** check box to skip the wireless verification test and go to step 11.

- 10 Verify that the print server can communicate over the network.
 - If the print server was successfully configured and is available on the network, click **Finish** to close the Setup Utility.
 - If the print server was not able to join the wireless network, click **View Settings** to verify that the wireless settings are correct, select the appropriate option, and click **Next**.
- 11 Disconnect the USB cable from both the computer and the print server.
- 12 Remove the *Setup Utility* CD from the computer, insert the printer drivers CD or printer software CD, and proceed to **Installing the printer on the network**.

For Advanced Mode

The Advanced Mode home screen provides additional options for using the Lexmark Wireless Setup Utility. Clicking **Wizard Mode** will revert the Wireless Setup Utility to Wizard Mode. Clicking **Options** provides the following management options:

- Select either **Wizard Mode** or **Advanced Mode** as the default startup mode for the Utility.
 - Select the **Do not verify the print server can join the network** check box to bypass the wireless communication verification process. The verification process can take up to 120 seconds. If you are configuring the print server remotely (away from the wireless network that the printer will be used on) or simply do not want to verify wireless communication with the printer, select this check box and go to step 1.
- 1 Select the wireless mode that the network uses (Infrastructure or Ad-Hoc mode).
 - 2 Enter the Network Name (SSID) of the network for which the printer will be used.

Note: The SSID must be entered exactly as it is used on the network. SSID's are case-sensitive, so if the SSID is entered incorrectly, the print server will not be able to communicate on the network, and the configuration process must be repeated.
 - 3 Select the appropriate channel for the network.
 - 4 Select the appropriate authentication type for the network. The authentication type options are dependent on the wireless mode that was selected in step 1, and will determine the types of encryption that will be available.

For Infrastructure mode:

- Open
- Shared
- WPA™ —Personal
- 802.1x —RADIUS

For Ad-Hoc mode:

- Open

- 5 Select the appropriate encryption for the network. The type of encryption that can be used is dependent on the authentication type that was selected in step 4.

For Open:

- No Encryption
- WEP

For Shared:

- WEP

For WPA Personal:

- TKIP

For 802.1x —RADIUS:

- No Encryption
- WEP (dynamic keys)
- WEP (static keys)
- WPA-TKIP

- 6 If 802.1x —RADIUS using EAP-TLS is the intended authentication type, a certificate request is needed to obtain a signed certificate for the device. For instructions on requesting a new signed certificate, see [Creating a certificate request](#). If a different 802.1x —RADIUS authentication mechanism is used, skip to step 7.

- 7 Configure authentication and encryption. If none of the following options are selected, continue to step 8.

If 802.1x —RADIUS was selected as the authentication type, click **Configure Authentication**, and follow the [Configuring the authentication mechanism](#) instructions.

If **WPA Personal** was selected as the encryption type, click **Configure Encryption**, and follow the [Configuring WPA Personal encryption](#) instructions.

If **WEP** or **WEP (static keys)** was selected as the encryption type, click **Configure Encryption**, and follow the [Configuring WEP encryption](#) instructions.

- 8 Click **Apply**.

- 9 Click **OK**.

- 10 Click **OK** to close the utility.

Configuring the authentication mechanism

- If **EAP-MD5**, **MSCHAPv2**, or **LEAP** is selected as the authentication mechanism:
 - 1 Enter an appropriate username and password for the 802.1x —RADIUS authentication server.
 - 2 Confirm the password.

- 3 Click **OK** to return to the Advanced Mode home screen, and continue with step 7 of the advanced mode instructions.
- If **PEAP** is selected as the authentication mechanism:
 - 1 Enter an appropriate username and password for the 802.1x —RADIUS authentication server.
 - 2 Confirm the password.
 - 3 Click **Install CA Certificate**.
 - 4 Enter the path to the correct CA Certificate, or click **Browse** to select the certificate. Click **OK** to install the certificate, or click **Cancel** to cancel the action.
 - 5 Click **OK** to return to the Advanced Mode home screen, and continue with step 7 of the advanced mode instructions.
 - If **EAP-TLS** is selected as the authentication mechanism:
 - 1 Enter an appropriate username for the 802.1x —RADIUS authentication server.
 - 2 Click **Install Signed Certificate**.
 - 3 Enter the path to the correct signed certificate, or click **Browse** to select the certificate. Click **OK** to install the certificate, or click **Cancel** to cancel the action.
 - 4 Click **Install CA Certificate**.
 - 5 Enter the path to the correct CA Certificate, or click **Browse** to select the certificate. Click **OK** to install the certificate, or click **Cancel** to cancel the action.
 - 6 Click **OK** to return to the Advanced Mode home screen, and continue with step 7 of the advanced mode instructions.
 - If **EAP-TTLS** is selected as the authentication mechanism:
 - 1 Select the appropriate Inner Authentication to be used in conjunction with EAP-TTLS.
 - 2 Enter an appropriate username and password for the 802.1x —RADIUS authentication server.
 - 3 Confirm the password.
 - 4 Click **Install CA Certificate**.
 - 5 Enter the path to the correct CA Certificate, or click **Browse** to select the certificate. Click **OK** to install the certificate, or click **Cancel** to exit the certificate dialog.
 - 6 Click **OK** to return to the Advanced Mode home screen, and continue with step 7 of the advanced mode instructions.

Configuring WEP encryption

- 1 Enter the appropriate WEP key(s). WEP encryption requires at least one WEP key, but can include up to four.
- 2 Select the default WEP transmit key.
- 3 Click **OK** to return to the Advanced Mode home screen, and proceed to step 8 of the advanced mode instructions.

Configuring WPA Personal encryption

- 1 Enter the appropriate Pre-Shared key.
- 2 Click **OK** to return to the Advanced Mode home screen, and proceed to step 8 of the advanced mode instructions.

Creating a certificate request

Some authentication mechanisms require certificates to work properly. In situations in which a signed certificate is required, a certificate request must be initiated in order to create a new signed certificate.

To create a certificate request

- 1 Go to **Certificates** → **Create Certificate Request**.
- 2 Enter the appropriate certificate information.
- 3 Click **Browse** to navigate to the location where the certificate is to be saved.
- 4 Click **OK** to return to the Advanced Mode home screen, and proceed to step 7 of the advanced mode instructions.

Installing the printer on the network

Once the print server has been configured, use the printer drivers or printer software CD that came with the printer to install the network printer on the network.

- Make sure that your printer drivers CD or printer software CD is inserted into the computer you want to install the printer on.
- When installing the printer, follow the **Suggested** → **Network** installation path. This process can vary between different printers.

For more information on installing the printer on the network, see the printer documentation.

Installing a network printer on additional network computers

If you are installing the network printer for use with multiple computers on the network, repeat the **Installing the printer on the network** process for each computer that will have access to the printer. The wireless print server does not need to be reconfigured for each successive installation.

3

Changing the wireless print server settings

The easiest way to change settings in the wireless print server is through the embedded Web server. For this to work, the printer must be successfully installed on the network.

- 1 Enter the IP address of the printer in a browser window. The embedded Web page for the print server appears.

For information on locating the IP address of the printer, see [Finding the network printer IP address](#).

- 2 Select the settings you want to change, such as IP address.
- 3 Enter the changes, and then click **Submit**.

Finding the network printer IP address

The network printer IP address can be found by either accessing the IP Setup Utility or by printing a network setup page.

Using the IP Setup Utility

The IP Setup Utility is installed in addition to the N8050 Wireless Setup Utility Wizard when you run the *Setup Utility* CD. You can use this utility to find the IP address of your print server.

- 1 Launch the IP Setup Utility. For example:

In Windows operating systems go to **Start** → **Programs** → **Lexmark** → **IP Setup Utility**.

The IP Setup Utility discovers all Lexmark printers and print servers on the network. A list of printers, including their MAC and IP addresses, appears.

- 2 Select the printer from the list.
- 3 Click **Launch Web Page**.

Printing a network setup page

The process for printing a network setup page can vary between different printers. For information on printing a network setup page, see the printer documentation.

Note: If you have not successfully completed the installation of this product on the wireless network, the IP address may not be listed on the network setup page.

4

Troubleshooting

Use this section to solve problems you may have while setting up the internal wireless print server.

The Setup Utility CD does not launch automatically

- 1 Close all open software programs.
- 2 Reinsert the *Setup Utility* CD. If the setup utility screen appears, continue your setup instructions.

If the setup utility screen does not appear, do the following:

- a From your desktop, double-click **My Computer**.
- b Double-click the CD-ROM drive icon.
- c If necessary, double-click **setup.exe**.

The Wireless Setup Utility was not able to communicate with the printer

- Verify that the printer has power.
- Verify that the USB cable is properly connected to both the computer and the printer.
- Connect the printer to a different USB port on your computer.

The network key was invalid

A network key is like a password and should follow this criteria:

- WEP key
 - Exactly 5 or 13 ASCII characters
 - Or
 - Exactly 10 or 26 Hexadecimal characters (using A —F and 0 —9 only)
- Pre-Shared key (for infrastructure mode only)
 - Between 8 and 63 ASCII characters

The printer was unable to join the network

There are many factors that can prevent the print server from joining the network. Here are some of the most common troubleshooting options:

- Verify that the wireless settings match those used by your wireless network.
- Verify that the printer is within range of the network.
- Verify that the network is working.
- If the network uses MAC address filtering, provide the MAC address for the printer to your network. The MAC address can be found on the network setup page. See the printer documentation for information on printing a network setup page.

If the print server was configured remotely (away from the wireless network the printer will be used on), and the **Do not verify the print server can join the network** check box was not selected during the configuration process, the Connection Failed screen will appear.

The Connection Failed screen provides three management options:

- Select the **Verify the print server is available on the network** radio button to re-verify wireless communication.
- Select the **Accept the current settings even though the print server was unable to join the network** radio button to keep the current settings.
- Select the **Reconfigure the wireless print server** radio button to start the configuration process over.

The internal print server was configured with the correct settings, but cannot be found on the network

- Verify that the printer has power and that the power indicator light is on.
- Verify that the printer is within range of the wireless network.
- Verify that the printer is located away from other electronic devices that may interfere with the wireless signal.
- Verify that your wireless network is using a unique network name (SSID). If not, it is possible that the printer is communicating over a different, nearby network that uses the same network name.
- Verify that the printer has a valid IP address on the network.

My network printer does not print

- Make sure the printer power is on.
- Check the printer status.

- Make sure the network is operating properly.

See the network documentation, or contact your network support person if you are not sure that your network is operating correctly.

- Make sure the printer driver is installed on the computer from which you are sending the print job.

Note: The printer driver must be installed on each computer that uses the network printer.

- Make sure the correct printer port is selected.
- Restart the computer.
- Uninstall and then reinstall the printer software.

If the printer still does not print, see the printer documentation for help.

- Make sure there is not a problem with the printer itself.

Attach the printer directly to the computer with a USB cable, and perform a local printer installation. If you are able to print when the printer is directly attached, there may be a problem with the network. See the network documentation, or contact your network support person.

5

Manual configuration

The N8050 internal wireless print server is shipped with default settings that let you configure it in Ad-Hoc mode by accessing the embedded Web page of the print server.

Because this configuration method does not use the Wireless Setup Utility or a direct USB connection to the computer, several of the wireless settings on both the computer and the network will need to be accessed. As a result, extensive knowledge of wireless network and computer settings will be needed to complete the configuration process.

Note: To configure the wireless print server by this method, the computer that is used to facilitate the configuration process must have a wireless network card.

Before configuring the wireless print server, make sure your printer has been set up correctly

- The internal wireless print server option card has been installed correctly in the printer.
- The toner or print cartridges are installed correctly.
- Paper has been loaded into the printer.
- The printer is turned on and ready to be installed.

For help setting up your printer, see your printer documentation.

Configuring the print server in Ad-Hoc mode

- 1 Make sure the printer power light is on.
- 2 Access and record the computer's current wireless network parameters.

For information on accessing the current wireless network parameters, see the wireless network documentation, or contact your network support person.

- 3 Change the current wireless network parameters to the following values:

Wireless network parameter	Set to
SSID (Network Name or Service Set ID)	print server
Basic Service Set Type (BSST)	Ad-Hoc
Data Encryption Mode	None
WEP Key	None

- 4 Check the IP address of the printer.

The printer will be assigned an IP address through the AutoIP method. This address should be in the range of 169.254. Access the printer IP address by one of the following methods:

- Print a network setup page. For more information on printing a network setup page, see [Printing a network setup page](#) or see the printer documentation.
- Use the IP Setup Utility located on the N8050 *Setup Utility* CD to display the print server IP address.

- 5 Make sure the PC has assigned itself an IP address that is different than the printer, but is still within the same IP range. For example:

Device	IP address
Computer	169.254.10.40
Print server	169.254.10.41

If the computer IP address is not within the same range as the print server, the IP address will need to be changed so that it is within the appropriate range.

For information on locating and changing the computer IP address, see the computer or operating system documentation.

- 6 Open a Web browser, and enter the print server IP address as the URL to access the embedded Web page of the print server.
- 7 Click **Configuration** on the left side of the Web page.
- 8 Under Other Settings, click **Network/Ports**.
- 9 Under Network/Ports, click **Wireless**.

10 Change the listed network settings to match the wireless network that the printer will be used on, including:

- SSID
- BSS type
- Channel Number (Ad-Hoc only)
- Wireless Security Mode
- Encryption Mode (If applicable)

The SSID must be entered exactly as it is used on the network. SSIDs are case-sensitive, so if the SSID is entered incorrectly, the print server will not be able to communicate on the network, and the configuration process must be repeated.

Note: If WEP is selected as the security mode, click Advanced Settings for the option to enter additional WEP security keys.

11 If 802.1x RADIUS was selected as the Wireless Security Mode, and a Signed Certificate and/or CA Certificate is required for the selected authentication method, see **Certificate management**, and then continue to step 12.

If 802.1x RADIUS was not selected as the Wireless Security mode, or neither a Signed Certificate or CA Certificate is not required for the selected authentication mechanism, go to step 12.

12 Click **Submit**.

13 Restore the computer's wireless network settings back to the original values that were recorded in step 3.

Certificate management

Some authentication mechanisms associated with the 802.1x RADIUS Wireless Security mode require the use of either a CA Certificate (PEAP and EAP-TTLS), or both a Signed Certificate and a CA Certificate (EAP-TLS).

To manage certificates for use with 802.1x RADIUS

- 1** From the print server embedded Web page, click **Configuration** on the left side of the page.
- 2** Click **Certificate Management**.
- 3** Complete the appropriate management option(s).
- 4** Continue with step 12 of the **Configuring the print server in Ad-Hoc mode** instructions.

To install a new CA Certificate

- 1** Under Certificate Configuration, click **Install A New Certificate Authority Certificate**.
- 2** Browse to the correct certificate location, and click **Submit**.

To request and install a new Signed Certificate

- 1 Under Certificate Configuration, click **Update The Certificate Signing Request**.
- 2 Enter the appropriate certificate information.
- 3 Click **Update Certificate Signing Request**.
- 4 Under Certificate Signing Request, click **Download The Certificate Signing Request**.
- 5 Use your certificate authority to sign the Certificate. For more information on signed certificates, see the 802.1x RADIUS documentation.
- 6 Under Certificate Configuration, click **Install New Certificate**.

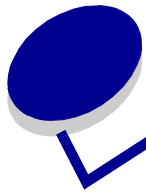
Installing the printer on the network

Once the print server has been configured, use the printer drivers CD or printer software CD that came with your printer to install the printer on the computers attached to the network.

- Make sure that the printer drivers CD or printer software CD is inserted into the computer the printer is being installed on.
- When installing the printer, follow the **Suggested** → **Network** installation path. This process may vary between different printers.

Installing your network printer on additional network computers

If you are installing your network printer for use with multiple computers on the network, you will need to repeat the **Installing your printer on the network** process for each computer you want to have access to the printer. The wireless print server does not need to be reconfigured for each successive installation.



Glossary

802.1x —RADIUS. A user authentication protocol used in conjunction with a RADIUS authentication server.

Ad-Hoc network. A stand-alone or peer-to-peer network in which wireless devices communicate directly with one another without using a wireless access point or base station.

ASCII. A standard character set consisting of 96 uppercase and lowercase letters, plus 32 nonprinting control characters.

Authentication. The process of verifying the identity of a user or device in a network environment through the use of passwords, certificates, or tokens.

Authentication mechanism. The method or mechanism through which an authentication protocol is carried out or performed. 802.1x —RADIUS authentication uses the following authentication mechanisms:

- EAP-MD5
- EAP-TLS
- EAP-TTLS
- LEAP
- MSCHAPv2
- PEAP

BSS Type. Basic Service Set, the type of wireless network that you are using. The BSS type can be one of the following:

- Infrastructure network
- Ad-Hoc network

CA Certificate. Certificate Authority Certificate, a file that is used by a client to verify authentication over a network.

Channel number. A number associated with the radio frequency at which an 802.11 device operates. The channel numbers available vary by geographical region.

Data Encryption mode. The security protocol that is used to protect data that is transferred across your wireless network and provide network authentication. You can use one of the following protocols for data encryption:

- None
- Shared– WEP (Wired Equivalency Protocol)
- WPA-Personal (TKIP:PSK)– WPA (Wi-Fi Protected Access) in PSK (Pre-Shared Key) mode

DHCP. Dynamic Host Configuration Protocol, a protocol for assigning dynamic IP addresses to devices on a network. With dynamic addressing, a device can automatically request an IP address every time it connects to the network. This means that a new device can be added to a network without having to manually assign a unique IP address.

Dynamic key. A security key that is randomly generated and assigned to a device or user by a server for security purposes.

Encryption. the conversion of data into a specific code to protect it from being compromised while being transmitted over a network.

Hexadecimal. A numbering system that is used as a representation of binary numbers using a base of 16 digits.

Infrastructure network. A network in which your wireless devices communicate through a central wireless access point or base station. An infrastructure network can contain multiple wireless access points.

IP address. A number that identifies each device connected to the network. For example, 192.168.0.1.

MAC address. A 12-character identifier that is unique for each network hardware device. For example, 0002001008e8.

Network authentication type. The data encryption mode that is used on your network to prevent unauthorized users or devices from connecting to or accessing your wireless network. You can use one of the following protocols for network authentication:

- None
- WEP
- WPA (Infrastructure mode networks only)

network-capable printer. A printing device that does not need to be locally attached to a computer.

Option card. An optional piece of hardware that can be installed in another device to provide additional functionality.

printer port. Windows terminology for a physical or logical connection to a printer. For example:

- LPT1 indicates the printer is attached to a physical parallel port with a parallel cable.
- USB001 indicates the printer is attached to a physical USB port with a USB cable.
- Print_Server_E320_0020000035D0 indicates a logical connection to the printer across your network.

PSK. Pre-Shared Key, a permanent security key or password that a user enters to establish security keys in a WPA environment.

Security key. A security key is like a password used with either WPA or WEP security protocols and must meet the following criteria:

- For WPA keys, if using Hexadecimal characters, valid keys are at least 24 characters long; if using ASCII, valid keys are between 8 and 63 characters long. WPA authentication is not supported for Ad-Hoc configurations.
- For WEP keys, if using Hex characters, valid keys are either 10 or 26 characters long; if using ASCII, valid keys are either 5 or 13 characters long.

Signed Certificate. A certificate that is issued by a certificate authority that guarantees the authenticity of the certificate holder.

Static key. A pre-determined security key that is assigned to a device or user for authentication purposes.

subnet. A portion of a network that shares a common address component. On TCP/IP networks, subnets are defined as all devices whose IP addresses have the same prefix. For example, all devices with IP addresses that start with 192.168.0. would typically be part of the same subnet.

SSID. Service Set ID, also known as Network name, is a unique identifier used to distinguish one wireless network from another. Wireless devices must use the same SSID to communicate. SSIDs are up to 32 characters long, and are case-sensitive.

TCP/IP. The Transmission Control Protocol (TCP) and the Internet Protocol (IP) are protocols that let different types of computers communicate with each other. The Internet is based on this suite of protocols.

TKIP. Temporal Key Integrity Protocol, a protocol used with the WPA data encryption mode that scrambles security keys using a hashing algorithm and adds an integrity-checking feature that ensures the keys haven't been tampered with.

WEP. Wired Equivalency Protocol, a security protocol defined in the original 802.11b specification that is used to provide data encryption and user authentication.

WPA. Wi-Fi Protected Access, a security protocol for wireless networks defined by the Wi-Fi Alliance that was designed to improve upon the WEP security protocol through improved data encryption and user authentication.