brother

Multi-Protocol On-board Ethernet Print Server and Wireless Print Server

NETWORK USER'S GUIDE

This Network User's Guide provides useful information of network settings using your Brother printer. You can also find supported protocol information and detailed troubleshooting tips.

To download the latest manual, please visit the Brother support website at (support.brother.com). You can also download the latest drivers and utilities for your printer, read FAQs and troubleshooting tips or learn about special printing solutions from the Brother support website.

Version D

ENG

Applicable models

This User's Guide applies to the following models.

RJ-4040

Definitions of notes

We use the following icons throughout this User's Guide:

IMPORTANT	IMPORTANT indicates a potentially hazardous situation which, if not avoided, may result in damage to property or loss of product functionality.
Note	Notes tell you how you should respond to a situation that may arise or give tips about how the operation works with other features.

Compilation and publication notice

Under the supervision of Brother Industries, Ltd., this manual has been compiled and published, covering the latest product's descriptions and specifications.

The contents of this manual and the specifications of this product are subject to change without notice.

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IMPORTANT NOTE

■ This product is approved for use in the country of purchase only. Do not use this product outside the country of purchase as it may violate the wireless telecommunication and power regulations of that country.

■ Windows XP in this document represents Windows XP Professional, and Windows XP Home Edition. In addition, Windows XP in this document does not represent Windows XP x64 Edition.

■ Windows Vista in this document represents all editions of Windows Vista.

■ Windows 7 in this document represents all editions of Windows 7.

■ Windows Server 2003 in this document does not represent Windows Server 2003 x64 Edition.

■ Windows Server 2008 in this document represents Windows Server 2008 and Windows Server 2008 R2.

■ Not all models are available in all countries.

Table of Contents

1 Introduction

Network features

Your Brother printer can be shared on an IEEE 802.11b/g/n wireless Ethernet network using the internal network print server. The print server supports various functions and methods of connection depending on the operating system you are running on a network supporting TCP/IP. The following chart shows what network features and connections are supported by each operating system.

Operating Systems	Windows XP Windows Vista Windows 7	Windows Server 2003/2008
BRAdmin Light See page 2.	✔	✔
BRAdmin Professional [1] See page 4.	✔	✔
Status Monitor	✔	✔
Driver Deployment Wizard	✔	✔
Network Setting Tool	✔	✔

[1] BRAdmin Professional is available as a download from support.brother.com.

2 Changing your printer's network settings

Changing your printer's network settings (IP address, Subnet mask and Gateway)

Using the BRAdmin Light utility

The BRAdmin Light utility is designed for initial setup of Brother network connected devices. It also can search for Brother products in a TCP/IP environment, view the status and configure basic network settings, such as IP address.

Installing BRAdmin Light

① Please make sure that your printer is on.

② Turn on your computer. Close any running applications before configuration.

③ Insert the supplied CD-ROM into your CD-ROM drive. The opening screen will appear automatically. If the model name screen appears, choose your printer. If the language screen appears, choose your language.

④ The CD-ROM main menu will appear. Click **Utility Installation**.

⑤ Click **BRAdmin Light** and follow the on-screen instructions.

> **Note**
> • You can download the latest Brother BRAdmin Light utility version from support.brother.com. This utility is only available for Windows users.
>
> • If you require more advanced printer management, use the latest Brother BRAdmin Professional utility that is available as a download from support.brother.com. This utility is only available for Windows users.
>
> • If you are using firewall, anti-spyware, or antivirus software, temporarily disable them. Once you are sure that you can print, enable them again.
>
> • The node name appears in the current BRAdmin Light window. The default node name of the print server in the printer is "BRNxxxxxxxxxxxx" or "BRWxxxxxxxxxxxx". ("xxxxxxxxxxxx" is based on your printer's MAC Address / Ethernet Address.)
>
> • The default password for Brother print servers is `access`.

Setting the IP address, Subnet Mask and Gateway using BRAdmin Light

① Start the BRAdmin Light utility.
Click **Start** / **All Programs** / **Brother** / **BRAdmin Light** / **BRAdmin Light**.

② BRAdmin Light will search for new devices automatically.

3 Double-click the unconfigured device.
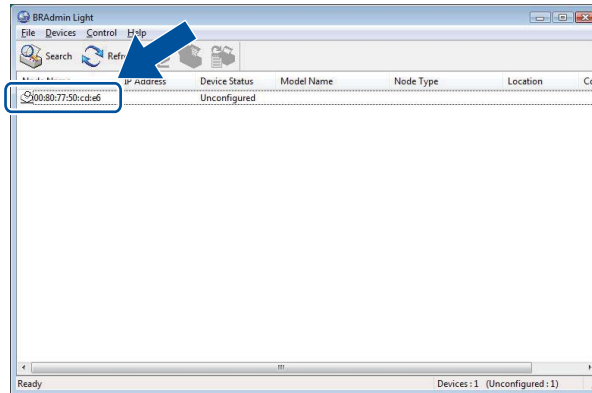
📝 Note
- If you don't use a DHCP/BOOTP/RARP server, the device will appear as **Unconfigured** in the BRAdmin Light utility screen.

- You can find the node name and MAC Address by printing the Printer Settings. (See *Printing the Printer Set-up Information* ▶▶ page 10.)

4 Choose **STATIC** from **Boot Method**. Enter the **IP Address**, **Subnet Mask** and **Gateway** (if needed) for your print server.
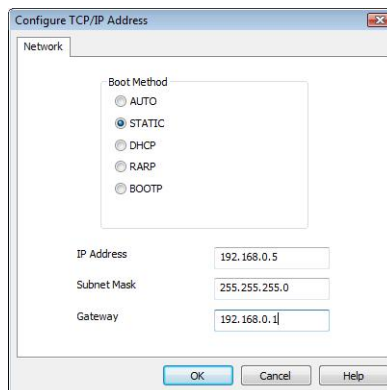
5 Click **OK**.

6 With the correctly programmed IP address, you will see the Brother print server in the device list.

Other Management Utilities

Your Brother printer can be used with the following management utilities in addition to the BRAdmin Light utility. You can change your network settings using these utilities.

BRAdmin Professional utility (Windows)

BRAdmin Professional is a utility for a more advanced management of network connected Brother devices. This utility can search for Brother products on your network and view the device status from an easy to read Explorer style window that changes color identifying the status of each device. You can configure network and device settings along with the ability to update device firmware from a Windows computer on your LAN. BRAdmin Professional can also log activity of Brother devices on your network and export the log data in an HTML, CSV, TXT or SQL format.

For more information and downloading, visit us at support.brother.com.

Note

• Please use the latest version of the BRAdmin Professional utility that is available as a download from support.brother.com. This utility is only available for Windows users.

• If you are using firewall, anti-spyware, or antivirus software, temporarily disable them. Once you are sure that you can print, enable them again.

• The node name appears in the current BRAdmin Professional window. The default node name is "BRNxxxxxxxxxxxx" or "BRWxxxxxxxxxxxx". ("xxxxxxxxxxxx" is based on your printer's MAC Address / Ethernet Address.)

3

Configuring your printer for a wireless network

Overview

To connect your printer to your wireless network, see the installation procedure in the User's Guide. Configuration using the CD-ROM installer and a USB cable is the recommended method for users. By using this method, you can easily connect your printer to your wireless network.

For additional wireless configuration methods please read this chapter for more details on how to configure the wireless network settings. For information on TCP/IP settings, see *Changing your printer's network settings (IP address, Subnet mask and Gateway)* ▶▶ page 2.

Note

• To achieve optimum results with normal every day document printing, use the Brother printer as close to the WLAN access point/router as possible with minimal obstructions. Large objects and walls between the two devices as well as interference from other electronic devices can affect the data transfer speed of your documents.

Due to these factors, wireless may not be the best method of connection for all types of documents and applications. You can use USB for the fastest throughput speed.

• Before configuring wireless settings, you will need to know your SSID and Network Key.

Confirm your network environment

Connected to a computer with a WLAN access point/router in the network (Infrastructure mode)
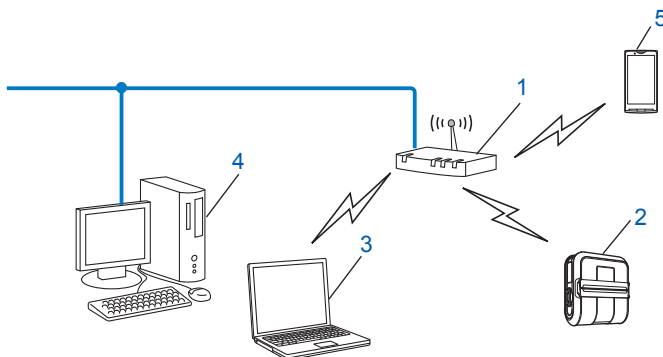
1 WLAN access point/router [1]

[1] If your computer supports Intel® My WiFi Technology (Intel® MWT), you can use your computer as a Wi-Fi Protected Setup supported access point.

2 Wireless network printer (your printer)

3 Wireless capable computer connected to the WLAN access point/router

4 Wired computer (which is not wireless capable) connected to the WLAN access point/router with an Ethernet cable

5 Smartphone

Install method

The following instructions will offer the methods for installing your Brother printer in a wireless network environment. Choose the method you prefer for your environment.

■ Wireless configuration temporarily using a USB cable (Recommended)

See *Wireless configuration temporarily using a USB cable (Recommended)* >> page 8.

■ One-push wireless configuration using WPS

See *One-push configuration using Wi-Fi Protected Setup* >> page 9.

Connected to a wireless capable computer without a WLAN access point/router in the network (Ad-hoc mode)

This type of network does not have a central WLAN access point/router. Each wireless client communicates directly with each other. When the Brother wireless printer (your printer) is part of this network, it receives all print jobs directly from the computer sending the print data.
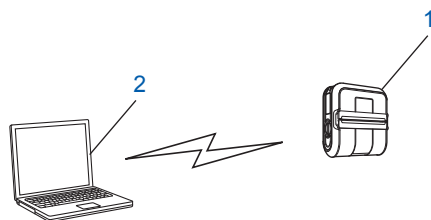
1 Wireless network printer (your printer)

2 Wireless capable computer

We cannot guarantee wireless network connection with Windows Server products in Ad-hoc mode.

For Apple Mobile Device Users:
Depending on your device's model and OS version, you may not be able to connect to your printer in Ad-Hoc Mode. For more information about your printer's compatibility with Apple devices, visit the Brother support website at support.brother.com.

Wireless configuration temporarily using a USB cable (Recommended)

It is recommended that you use a PC wirelessly connected to your network for this method.

You can remotely configure the printer from the computer on the network using a USB cable (A) [1].
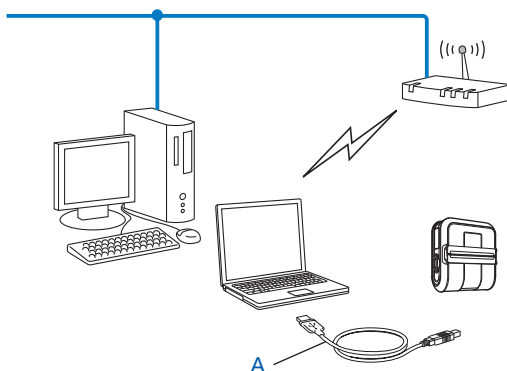
[1]   You can configure the wireless settings of the printer using a USB cable temporarily connected to a wired or wireless computer.

See the installation procedure in the User's Guide.

One-push configuration using Wi-Fi Protected Setup

You can use WPS to configure your wireless network settings easily if your WLAN access point/router (A) supports Wi-Fi Protected Setup (PBC [1]).
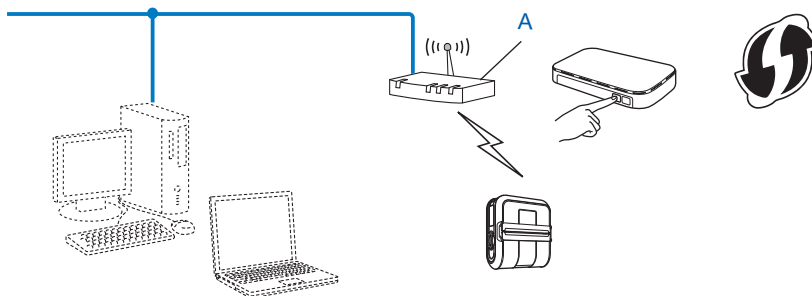
[1]   Push Button Configuration

See the installation procedure in the User's Guide.

4

Printing the Printer Set-up Information

Printing the Printer Set-up Information

You can use the ⊥ (Feed) button to print a report that lists the following printer settings:

■ Program version

■ Printer usage history

■ Missing dot test pattern

■ Utility setting information

■ List of transferred data

■ Network setting information

■ Wi-Fi setting information

Note

• You can use the utility to set in advance which items will be printed.

• The node name appears in the Printer Settings. The default node name is "BRNxxxxxxxxxxxx" or "BRWxxxxxxxxxxxx". ("xxxxxxxxxxxx" is based on your printer's MAC Address / Ethernet Address.)

1 Make sure that a roll of 4" (101.6 mm) receipt paper has been loaded and the RD Roll compartment cover is closed.

2 Turn on the printer.

3 Press and hold the ⊥ (Feed) button until the POWER indicator starts blinking in green.
The settings will be printed.

Note

• To print the Printer Settings, we recommend to use 4" (101.6 mm) receipt paper or continuous length label.

• This operation can also be performed using RJ Utility. See the User's Guide for more details about RJ Utility.

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Web Based Management

Overview

You can use a standard web browser to manage a printer on your network using HTTP. When using Web Based Management, the following are possible:

- Display printer status information
- Change network settings such as TCP/IP information
- Display software version information of the printer and print server
- Change network and printer configuration details

Note

We recommend Microsoft® Internet Explorer® 7.0/8.0 or Firefox® 3.6 for Windows. Please also make sure that JavaScript and cookies are always enabled in whichever browser you use.

In order to use Web Based Management, your network must use TCP/IP, and the printer and computer must have a valid IP address.

Configuring the printer settings using Web Based Management (web browser)

A standard web browser can be used to change your print server settings using the HTTP (Hyper Text Transfer Protocol).

1. Type `http://printer_ip_address/` into your browser. (Where `printer_ip_address` is the IP address or the print server name.)

   ■ For example:

   `http://192.168.1.2/` (if the printer's IP address is 192.168.1.2.).

Note

If you have edited the hosts file on your computer or are using a Domain Name System, you can also enter the DNS name of the print server. As the print server supports TCP/IP and NetBIOS, you can also enter the NetBIOS name of the print server. The NetBIOS name can be seen on the printer settings page. The NetBIOS name assigned is the first 15 characters of the node name and by default it will appear as "BRNxxxxxxxxxxxx" where "`xxxxxxxxxxxx`" is the Ethernet address.

2. Click **Network Configuration**.

3. Enter a user name and a password. The User Name is `admin` and the default Password is `access`.

4. Click **OK**.

5. You can now change the print server settings.

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Troubleshooting

Overview

This chapter explains how to resolve typical network problems you may encounter when using your Brother printer. If, after reading this chapter, you are unable to resolve your problem, please visit the Brother support website at: support.brother.com.

Make sure that the following items are configured before reading this chapter.

First check the following:
The power cord is connected properly and the Brother printer is turned on.
The access point (for wireless configurations) is turned on and its link light is blinking.
All protective packaging has been removed from the printer.
The front and back covers are fully closed.
The roll is inserted properly in the Roll compartment.

I cannot complete the wireless network setup configuration.

Question	Solution

Are your security settings (SSID/Network Key) correct?	■ Reconfirm and choose the correct security settings.
	  • The manufacturer's name or model no. of the WLAN access point/router may be used as the default security settings.
	  • See the instructions supplied with your WLAN access point/router for information on how to find the security settings.
	  • Ask the manufacturer of your WLAN access point/router or ask your Internet provider or network administrator.

Are you using MAC address filtering?	Confirm that the MAC address of the Brother printer is allowed in the filter. You can find the MAC address from the Network Setting Tool. See the User's Guide for more details about the Network Setting Tool.
Is your WLAN access point/router in stealth mode? (not broadcasting the SSID)	■ You should type the correct SSID name or Network Key by hand. ■ Check the SSID name or the Network Key in the instructions supplied with your WLAN access point/router and reconfigure the wireless network setup.
I have checked and tried all of the above, but still cannot complete the wireless configuration. Is there anything else I can do?	Use the Network Setting Tool.
Is your Brother printer properly connected to the WLAN access point/router?	If the Wi-Fi indicator is lit, the network is properly connected. If the Wi-Fi indicator is blinking, the network is not connected properly, and the wireless network setup must be reconfigured.

The Brother printer is not found on the network during the RJ-4040 installation.

Question	Solution
Are you using security software?	■ Confirm your settings in the installer dialog. ■ Allow access when the alert message of the security software appears during the RJ-4040 installation.
Is your Brother printer placed too far from the WLAN access point/router?	Place your Brother printer within about 3.3 feet (1 meter) from the WLAN access point/router when you configure the wireless network settings.
Are there any obstructions (walls or furniture, for example) between your printer and the WLAN access point/router?	Move your Brother printer to an obstruction-free area, or closer to the WLAN access point/router.
Is there a wireless computer, Bluetooth supported device, microwave oven or digital cordless phone near the Brother printer or the WLAN access point/router?	Move all devices away from the Brother printer or WLAN access point/router.

The Brother printer cannot print via the wireless network.
The Brother printer is not found on the network even after successful installation.

Question	Solution
Are you using security software?	See *I'm using security software.* ▶▶ page 15.
Is your Brother printer assigned with an available IP address?	■ Confirm the IP address and the Subnet Mask. Verify that both the IP addresses and Subnet Masks of your computer and the Brother printer are correct and located on the same network. For more information on how to verify the IP address and the Subnet Mask, ask the network administrator. ■ Confirm the IP address and the Subnet Mask using the Network Setting Tool. ■ Confirm your settings using the Network Setting Tool. See the User's Guide for more details about the Network Setting Tool.

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The Brother printer cannot print via the wireless network.
The Brother printer is not found on the network even after successful installation. (continued)

Question	Solution
Did your previous printing job fail?	■ If the failed print job is still in your computer's print queue, delete it. ■ Double-click the printer icon in the following folder and then choose **Cancel All Documents** in the **Printer** menu: (Windows XP) **Start** and **Printers and Faxes**. (Windows Vista) , **Control Panel**, **Hardware and Sound** and then **Printers**. (Windows 7) , **Control Panel**, **Hardware and Sound**, **Devices and Printers** and then **Printers and Faxes**.
Are you connecting the Brother printer to the network wirelessly?	■ Print the Printer settings. (For how to print, see *Printing the Printer Set-up Information* ▶▶ page 10.) ■ See *The Brother printer is not found on the network during the RJ-4040 installation.* ▶▶ page 14.
I have checked and tried all of above, however the Brother printer does not print. Is there anything else I can do?	Uninstall the RJ-4040 installer and reinstall it.

I'm using security software.

Question	Solution
Did you choose to accept the security alert dialog during the standard installation or BRAdmin Light installation or when using the printing features?	If you did not choose to accept the security alert dialog, the firewall function of your security software may be rejecting access. Some security software might block access without showing a security alert dialog. To allow access, see the instructions of your security software or ask the manufacturer.
I want to know the necessary port number for the security software settings.	The following port numbers are used for Brother network features: ■ BRAdmin Light → Port number 161 / Protocol UDP For details on how to open the port, see the instructions of the security software or ask the manufacturer.

I want to check that my network devices are working properly.

Question	Solution
Is your Brother printer, access point/router or network hub turned on?	Make sure you have confirmed all instructions in *Make sure that the following items are configured before reading this chapter.* ▶▶ page 13.
Where can I find the Brother printer's network settings, such as IP address?	Print the Printer settings. (For how to print, see *Printing the Printer Set-up Information* ▶▶ page 10.)
Check the **Link Status** in the Network Configuration Report.	Print the Network Configuration Report and check that **Wireless Link Status** is showing **Link OK**.
	If the Link Status shows **Link DOWN** or **Failed To Associate**, start again from the *Make sure that the following items are configured before reading this chapter.* ▶▶ page 13.
Can you ping the Brother printer from your computer?	Ping the Brother printer from your computer using the IP address or the node name.
	■ Successful → Your Brother printer is working correctly and connected to the same network as your computer.
	■ Unsuccessful → Your Brother printer is not connected to the same network as your computer.
	Ask the network administrator and use the Network Setting Tool.
Is the Brother printer connected to the wireless network?	Print the Printer Settings to confirm the state of a wireless connection. (For how to print, see *Printing the Printer Set-up Information* ▶▶ page 10.)

6

A Appendix A

Supported protocols and security features

Interface	Wireless	IEEE 802.11b/g/n (Infrastructure Mode / Ad-hoc Mode)
Network	Protocol (IPv4)	ARP, RARP, BOOTP, DHCP, APIPA (Auto IP), WINS/NetBIOS name resolution, DNS Resolver, mDNS, LLMNR responder, LPR/LPD, Custom Raw Port/Port9100, FTP Server, TFTP server, SNTP client, SNMPv1/v2c, ICMP
Network (Security)	Wireless	SSID (32 chr), WEP 64/128 bit, WPA-PSK (TKIP/AES), WPA2-PSK (AES), LEAP, EAP-FAST, PEAP*, EAP-TLS*, EAP-TTLS*
		* If your printer's firmware version is 1.09 or lower, update the firmware to the latest version. To download the latest firmware, please visit the Brother support website at <u>support.brother.com</u>

B Appendix B

In this section, you will find basic information about advanced network features of the Brother printer along general networking and common terms.

The supported protocols and the network features differ depending on the model you are using.

Types of network connections and protocols

Types of network connections

Wired network connection example

Peer-to-Peer printing using TCP/IP

In a Peer-to-Peer environment, each computer directly sends and receives data to each device. There is no central server controlling file access or printer sharing.

TCP/IP   TCP/IP   Network printer
(your printer)
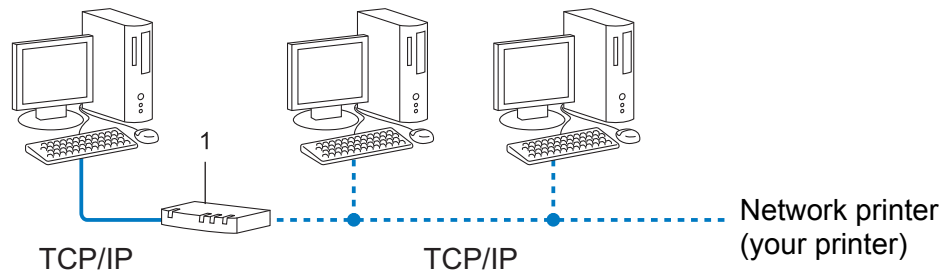
1 Router

■ In a smaller network of 2 or 3 computers, we recommend the Peer-to-Peer printing method as it is easier to configure than the Network Shared printing method. See *Network Shared printing* ▶▶ page 19.

■ Each computer must use the TCP/IP Protocol.

■ The Brother printer needs an appropriate IP address configuration.

■ If you are using a router, the Gateway address must be configured on the computers and the Brother printer.

Network Shared printing

In a Network Shared environment, each computer sends data via a centrally controlled computer. This type of computer is often called a "Server" or a "Print Server". Its job is to control the printing of all print jobs.
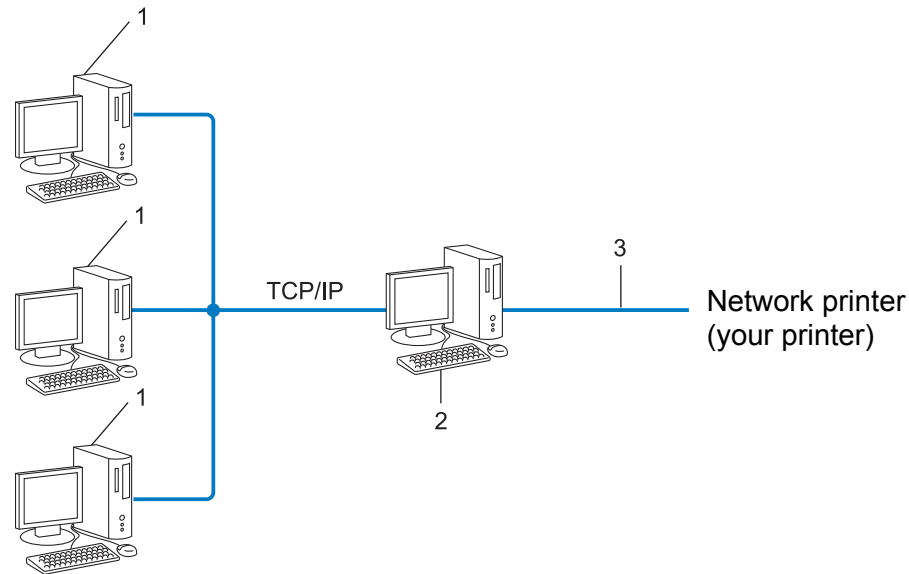
1 **Client computer**

2 **Also known as "Server" or "Print server"**

3 **TCP/IP or USB**

■ In a larger network, we recommend a Network Shared printing environment.

■ The "server" or the "print server" must use the TCP/IP print protocol.

■ The Brother printer needs to have an appropriate IP address configuration unless the printer is connected via the USB or the serial interface at the server.

Protocols

TCP/IP protocols and functions

Protocols are the standardized sets of rules for transmitting data on a network. Protocols allow users to gain access to network connected resources.

The print server used on the Brother printer supports the TCP/IP (Transmission Control Protocol/Internet Protocol) protocol.

TCP/IP is the most popular set of protocols used for communication such as Internet and E-mail. This protocol can be used in almost all operating systems such as Windows, Windows Server, Mac OS X and Linux®. The following TCP/IP protocols are available on the Brother printer.

📝**Note**

- You can configure the protocol settings by using the HTTP interface (web browser). (See *Configuring the printer settings using Web Based Management (web browser)* ▶▶ page 12.)
- To find what protocols your Brother printer supports, see *Supported protocols and security features* ▶▶ page 17.

DHCP/BOOTP/RARP

By using the DHCP/BOOTP/RARP protocols, the IP address can be automatically configured.

📝**Note**

To use the DHCP/BOOTP/RARP protocols, please contact your network administrator.

APIPA

If you do not assign an IP address manually (using the BRAdmin software) or automatically (using a DHCP/BOOTP/RARP server), the Automatic Private IP Addressing (APIPA) protocol will automatically assign an IP address from the range 169.254.1.0 to 169.254.254.255.

ARP

Address Resolution Protocol performs mapping of an IP address to a MAC address in a TCP/IP network.

DNS client

The Brother print server supports the Domain Name System (DNS) client function. This function allows the print server to communicate with other devices by using its DNS name.

NetBIOS name resolution

Network Basic Input/Output System name resolution enables you to obtain the IP address of the other device using its NetBIOS name during the network connection.

WINS

Windows Internet Name Service is a service providing information for NetBIOS name resolution, by consolidating an IP address and a NetBIOS name that is on the local network.

LPR/LPD

Commonly used printing protocols on a TCP/IP network.

Custom Raw Port (Default is Port 9100)

Another commonly used printing protocol on a TCP/IP network. It enables interactive data transmission.

mDNS

mDNS allows the Brother print server to automatically configure itself to work in a Mac OS X Simple Network Configured system.

SNMP

The Simple Network Management Protocol (SNMP) is used to manage network devices including computers, routers and Brother network ready printers. The Brother print server supports SNMPv1 and SNMPv2.

LLMNR

The Link-Local Multicast Name Resolution protocol (LLMNR) resolves the names of neighboring computers if the network does not have a Domain Name System (DNS) server. The LLMNR Responder function works in both the IPv4 or IPv6 environment when using a computer that has the LLMNR Sender function such as Windows Vista and Windows 7.

B

Configuring your printer for a network

IP addresses, subnet masks and gateways

To use the printer in a networked TCP/IP environment, you need to configure its IP address and subnet mask. The IP address you assign to the print server must be on the same logical network as your host computers. If it is not, you must properly configure the subnet mask and the gateway address.

IP address

An IP address is a series of numbers that identifies each device connected to a network. An IP address consists of four numbers separated by dots. Each number is between 0 and 255.

■ Example: In a small network, you would normally change the final number.

- `192.168.1.1`
- `192.168.1.2`
- `192.168.1.3`

How the IP address is assigned to your print server:

If you have a DHCP/BOOTP/RARP server on your network the print server will automatically obtain its IP address from that server.

Note

On smaller networks, the DHCP server may also be the Router.

For more information on DHCP, BOOTP and RARP, see:
Using DHCP to configure the IP address ▶▶ page 30.
Using BOOTP to configure the IP address ▶▶ page 31.
Using RARP to configure the IP address ▶▶ page 30.

If you do not have a DHCP/BOOTP/RARP server, the Automatic Private IP Addressing (APIPA) protocol will automatically assign an IP address from the range 169.254.1.0 to 169.254.254.255. For more information on APIPA, see *Using APIPA to configure the IP address* ▶▶ page 31.

B

Subnet mask

Subnet masks restrict network communication.

■ Example: Computer 1 can talk to Computer 2

- Computer 1

  IP Address: 192.168. 1. 2

  Subnet Mask: 255.255.255.0

- Computer 2

  IP Address: 192.168. 1. 3

  Subnet Mask: 255.255.255.0

Where the 0 is in the Subnet mask, there is no limit to communication at this part of the address. What this means in the above example is, we can communicate with any device that has an IP address that begins with 192.168.1.x. (where x. are numbers between 0 and 255).

Gateway (and router)

A gateway is a network point that acts as an entrance to another network and sends data transmitted via the network to an exact destination. The router knows where to direct data that arrives at the gateway. If a destination is located on an external network, the router transmits data to the external network. If your network communicates with other networks, you may need to configure the Gateway IP address. If you do not know the Gateway IP address then contact your Network Administrator.

B

Wireless network terms and concepts

Specifying your network

SSID (Service Set Identifier) and channels

You need to configure the SSID and a channel to specify the wireless network you want to connect to.

■ SSID

Each wireless network has its own unique network name which is technically referred to as an SSID or ESSID (Extended Service Set Identifier). The SSID is a 32-byte or less value and is assigned to the access point. The wireless network devices you want to associate to the wireless network should match the access point. The access point and wireless network devices regularly send wireless packets (referred to as a beacon) which has the SSID information. When your wireless network device receives a beacon, you can identify the wireless network that is close enough for the radio waves to reach your device.

■ Channels

Wireless networks use channels. Each wireless channel is on a different frequency. There are up to 14 different channels that can be used when using a wireless network. However, in many countries the number of channels available are restricted.

Security terms

Authentication and encryption

Most wireless networks use some kind of security settings. These security settings define the authentication (how the device identifies itself to the network) and encryption (how the data is encrypted as it is sent on the network). **If you do not correctly specify these options when you are configuring your Brother wireless printer, it will not be able to connect to the wireless network.** Therefore care must be taken when configuring these options.

B

Authentication and Encryption methods for a personal wireless network

A personal wireless network is a small network, for example using your printer in a wireless network at home, without IEEE 802.1x support.

If you want to use your printer in an IEEE 802.1x supported wireless network, see *Authentication and Encryption methods for an enterprise wireless network* ▶▶ page 27.

Authentication methods

■ Open system

Wireless devices are allowed to access the network without any authentication.

■ Shared key

A secret pre-determined key is shared by all devices that will access the wireless network.

The Brother wireless printer uses a WEP key as the pre-determined key.

■ WPA-PSK

Enables a Wi-Fi Protected Access Pre-shared key (WPA-PSK), which enables the Brother wireless printer to associate with access points using TKIP or AES for WPA-PSK.

■ WPA2-PSK

Enables a Wi-Fi Protected Access Pre-shared key (WPA2-PSK), which enables the Brother wireless printer to associate with access points using AES for WPA2-PSK (WPA-Personal).

■ WPA-PSK/WPA2-PSK

Enables a Wi-Fi Protected Access Pre-shared key (WPA-PSK/WPA2-PSK), which enables the Brother wireless printer to associate with access points using TKIP for WPA-PSK, or AES for WPA-PSK and WPA2-PSK (WPA-Personal).

Encryption methods

■ None

No encryption method is used.

■ WEP

When using WEP (Wired Equivalent Privacy), the data is transmitted and received with a secure key.

■ TKIP

TKIP (Temporal Key Integrity Protocol) provides per-packet key mixing, a message integrity check and rekeying mechanism.

■ AES

AES (Advanced Encryption Standard) is the Wi-Fi® authorized strong encryption standard.

When [Communication Mode] is set to [Ad-hoc]

Authentication Method	Encryption Mode
Open System	None
	WEP

When [Communication Mode] is set to [Infrastructure]

Authentication Method	Encryption Mode
Open System	None
	WEP
Public Key Authentication	WEP
WPA-PSK	TKIP
	AES
WPA2-PSK	AES
WPA/WPA2-PSK	TKIP
	AES

Network key

■ Open system/Shared key with WEP

This key is a 64-bit or 128-bit value that must be entered in an ASCII or hexadecimal format.

- 64 (40) bit ASCII:

  Uses 5 text characters. e.g. "WSLAN" (this is case sensitive)

- 64 (40) bit hexadecimal:

  Uses 10 digits of hexadecimal data. e.g. "71f2234aba"

- 128 (104) bit ASCII:

  Uses 13 text characters. e.g. "Wirelesscomms" (this is case sensitive)

- 128 (104) bit hexadecimal:

  Uses 26 digits of hexadecimal data. e.g. "71f2234ab56cd709e5412aa2ba"

■ WPA-PSK/WPA2-PSK and TKIP or AES

Uses a Pre-Shared Key (PSK) that is 8 or more characters in length, up to a maximum of 63 characters.

Authentication and Encryption methods for an enterprise wireless network

Enterprise wireless network is a large network with IEEE802.1x support. If you configure your printer in an IEEE802.1x supported wireless network, you can use following authentication and encryption methods.

Authentication methods

■ LEAP (For wireless network)

Cisco LEAP (Light Extensible Authentication Protocol) has been developed by Cisco Systems, Inc. which uses a user ID and password for authentication.

■ EAP-FAST

EAP-FAST (Extensible Authentication Protocol-Flexible Authentication via Secured Tunnel) has been developed by Cisco Systems, Inc. which uses a user ID and password for authentication, and symmetric key algorithms to achieve a tunnelled authentication process.

The Brother printer supports the following inner authentications:

- EAP-FAST/NONE
- EAP-FAST/MS-CHAPv2
- EAP-FAST/GTC

■ PEAP

PEAP (Protected Extensible Authentication Protocol) has been developed by Microsoft Corporation, Cisco Systems and RSA Security. PEAP creates an encrypted SSL (Secure Sockets Layer)/TLS (Transport Layer Security) tunnel between a client and an authentication server, for sending a user ID and password. PEAP provides mutual authentication between the server and the client.

The Brother printer supports the following inner authentications:

- PEAP/MS-CHAPv2
- PEAP/GTC

■ EAP-TTLS

EAP-TTLS (Extensible Authentication Protocol Tunnelled Transport Layer Security) has been developed by Funk Software and Certicom. EAP-TTLS creates a similar encrypt SSL tunnel to PEAP, between a client and an authentication server, for sending a user ID and password. EAP-TTLS provides mutual authentication between the server and the client.

The Brother printer supports the following inner authentications:

- EAP-TTLS/CHAP
- EAP-TTLS/MS-CHAP
- EAP-TTLS/MS-CHAPv2
- EAP-TTLS/PAP

■ EAP-TLS

EAP-TLS (Extensible Authentication Protocol Transport Layer Security) requires digital certificate authentication both at a client and an authentication server.

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Encryption methods

■ TKIP

TKIP (Temporal Key Integrity Protocol) provides a per-packet key mixing a message integrity check and rekeying mechanism.

■ AES

AES (Advanced Encryption Standard) is the Wi-Fi$^®$ authorized strong encryption standard.

■ CKIP

The original Key Integrity Protocol for LEAP by Cisco Systems, Inc.

When [Communication Mode] is set to [Infrastructure]

Authentication Method	Encryption Mode
LEAP	CKIP
EAP-FAST/NONE	TKIP
	AES
EAP-FAST/MS-CHAPv2	TKIP
	AES
EAP-FAST/GTC	TKIP
	AES
PEAP/MS-CHAPv2	TKIP
	AES
PEAP/GTC	TKIP
	AES
EAP-TTLS/CHAP	TKIP
	AES
EAP-TTLS/MS-CHAP	TKIP
	AES
EAP-TTLS/MS-CHAPv2	TKIP
	AES
EAP-TTLS/PAP	TKIP
	AES
EAP-TLS	TKIP
	AES

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User ID and password

The following security methods support a user ID less than 64 characters and the password less than 32 characters in length.

- LEAP
- EAP-FAST
- PEAP
- EAP-TTLS
- EAP-TLS (For user ID)

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Other ways to set the IP address (for advanced users and administrators)

Using DHCP to configure the IP address

The Dynamic Host Configuration Protocol (DHCP) is one of several automated mechanisms for IP address allocation. If you have a DHCP server on your network, the print server will automatically obtain its IP address from the DHCP server and register its name with any RFC 1001 and 1002-compliant dynamic name services.

Note

If you do not want your print server configured via DHCP, BOOTP or RARP, you must set the Boot Method to static so that the print server has a static IP address. This will prevent the print server from trying to obtain an IP address from any of these systems. To change the Boot Method, use the BRAdmin applications or Web Based Management (web browser).

Using RARP to configure the IP address

The Brother print server's IP address can be configured using the Reverse ARP (RARP) facility on your host computer. This is done by editing the `/etc/ethers` file (if this file does not exist, you can create it) with an entry similar to the following:

`00:80:77:31:01:07    BRN008077310107` (or `BRW008077310107` for a wireless network)

Where the first entry is the MAC Address (Ethernet Address) of the print server and the second entry is the name of the print server (the name must be the same as the one you put in the `/etc/hosts` file).

If the RARP daemon is not already running, start it (depending on the system the command can be `rarpd`, `rarpd -a`, `in.rarpd -a` or something else; type `man rarpd` or refer to your system documentation for additional information).

The Brother print server will get the IP address from the RARP daemon when the printer is powered on.

Using BOOTP to configure the IP address

BOOTP is an alternative to RARP that has the advantage of allowing configuration of the subnet mask and gateway. In order to use BOOTP to configure the IP address make sure that BOOTP is installed and running on your host computer (it should appear in the `/etc/services` file on your host as a real service; type `man bootpd` or refer to your system documentation for information). BOOTP is usually started up via the `/etc/inetd.conf` file, so you may need to enable it by removing the "#" in front of the bootp entry in that file. For example, a typical bootp entry in the /etc/inetd.conf file would be:

`#bootp dgram udp wait /usr/etc/bootpd bootpd -i`

Depending on the system, this entry might be called "bootps" instead of "bootp".

Note

In order to enable BOOTP, simply use an editor to delete the "#" (if there is no "#", then BOOTP is already enabled). Then edit the BOOTP configuration file (usually `/etc/bootptab`) and enter the name, network type (1 for Ethernet), MAC Address (Ethernet Address) and the IP address, subnet mask and gateway of the print server. Unfortunately, the exact format for doing this is not standardized, so you will need to refer to your system documentation to determine how to enter this information. Some examples of typical `/etc/bootptab` entries include: ("BRN" below is "BRW" for a wireless network.)

`BRN310107 1  00:80:77:31:01:07 192.168.1.2`

and:

`BRN310107:ht=ethernet:ha=008077310107:\ip=192.168.1.2:`

Certain BOOTP host software implementations will not respond to BOOTP requests if you have not included a download filename in the configuration file. If this is the case, simply create a null file on the host and specify the name of this file and its path in the configuration file.

As with RARP, the print server will load its IP address from the BOOTP server when the printer is powered on.

Using APIPA to configure the IP address

The Brother print server supports the Automatic Private IP Addressing (APIPA) protocol. With APIPA, DHCP clients automatically configure an IP address and subnet mask when a DHCP server is not available. The device chooses it's own IP address in the range 169.254.1.0 through to 169.254.254.255. The subnet mask is automatically set to 255.255.0.0 and the gateway address is set to 0.0.0.0.

By default, the APIPA protocol is enabled. If you want to disable the APIPA protocol, you can disable it using BRAdmin Light or Web Based Management (web browser).

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Using ARP to configure the IP address

If you are unable to use the BRAdmin application and your network does not use a DHCP server, you can also use the ARP command. The ARP command is available on Windows systems that have TCP/IP installed. To use ARP enter the following command at the command prompt:

```
arp -s ipaddress ethernetaddress
```

```
ping ipaddress
```

Where `ethernetaddress` is the MAC Address (Ethernet Address) of the print server and `ipaddress` is the IP address of the print server. For example:

■ **Windows systems**

Windows systems require the dash "-" character between each digit of the MAC Address (Ethernet Address).

```
arp -s 192.168.1.2 00-80-77-31-01-07
```

```
ping 192.168.1.2
```

Note

You must be on the same Ethernet segment (that is, there cannot be a router between the print server and operating system) to use the arp -s command.

If there is a router, you may use BOOTP or other methods described in this chapter to enter the IP address. If your administrator has configured the system to deliver IP addresses using BOOTP, DHCP or RARP your Brother print server can receive an IP address from any one of these IP address allocation systems. In which case, you will not need to use the ARP command. The ARP command only works once. For security reasons, once you have successfully configured the IP address of a Brother print server using the ARP command, you cannot use the ARP command again to change the address. The print server will ignore any attempts to do this. If you wish to change the IP address again, use a Web Based Management (web browser), TELNET (using the SET IP ADDRESS command) or factory reset the print server (which will then allow you to use the ARP command again).

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