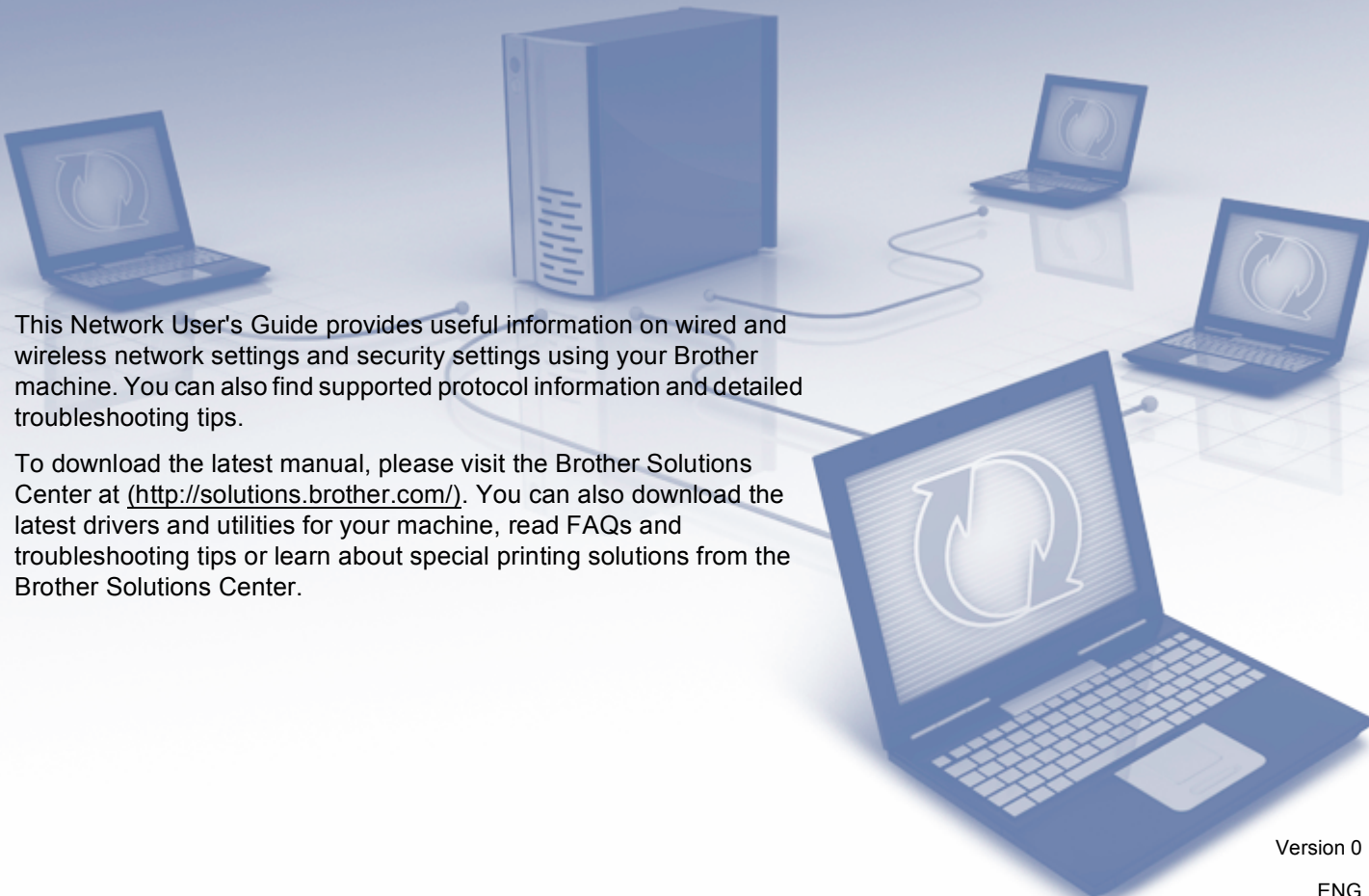


Network User's Guide

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

A blue-tinted illustration of a network setup. In the center is a server tower. To its left and right are several laptops. Some laptops are connected to the server tower by cables. The background is a light blue gradient with a subtle grid pattern.

This Network User's Guide provides useful information on wired and wireless network settings and security settings using your Brother machine. You can also find supported protocol information and detailed troubleshooting tips.

To download the latest manual, please visit the Brother Solutions Center at (<http://solutions.brother.com/>). You can also download the latest drivers and utilities for your machine, read FAQs and troubleshooting tips or learn about special printing solutions from the Brother Solutions Center.



Applicable models

This User's Guide applies to the following models.

HL-5450DN(T)/5470DW(T)/6180DW(T)

Definitions of notes

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

 Important	<u>Important</u> 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.

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, Windows[®] XP Professional x64 Edition and Windows[®] XP Home Edition.
- Windows Server[®] 2003 in this document represents Windows Server[®] 2003 and Windows Server[®] 2003 x64 Edition.
- Windows Server[®] 2008 in this document represents Windows Server[®] 2008 and Windows Server[®] 2008 R2.
- Windows Vista[®] in this document represents all editions of Windows Vista[®].
- Windows[®] 7 in this document represents all editions of Windows[®] 7.
- Please go to the Brother Solutions Center at <http://solutions.brother.com/> and click Manuals on your model page to download the other manuals.
- Not all models are available in all countries.

Table of Contents

Section I Network Operation

1	Introduction	2
	Network features.....	2
	Other Network features	3
2	Changing your machine's network settings	4
	How to change your machine's network settings (IP address, Subnet mask and Gateway).....	4
	Using the control panel (For HL-5470DW(T) and HL-6180DW(T))	4
	Using the BRAdmin Light utility	4
	Other Management Utilities	7
	Web Based Management (web browser)	7
	BRAdmin Professional 3 utility (Windows®)	7
	BRPrint Auditor (Windows®).....	8
3	Configuring your machine for a wireless network (For HL-5470DW(T) and HL-6180DW(T))	9
	Overview.....	9
	Confirm your network environment.....	10
	Connected to a computer with a WLAN access point/router in the network (Infrastructure mode)...	10
	Connected to a wireless capable computer without a WLAN access point/router in the network (Ad-hoc mode).....	11
	Wireless configuration temporarily using a USB cable (Recommended for Windows®)	12
	Configuration using the machine's control panel Setup Wizard	17
	Manual configuration from the control panel	18
	Configuring your machine when the SSID is not broadcast	20
	Configuring your machine for an enterprise wireless network.....	23
	One push configuration using WPS (Wi-Fi Protected Setup) or AOSS™	27
	Configuration using the PIN Method of WPS (Wi-Fi Protected Setup).....	29
	Configuration in Ad-hoc mode (For IEEE 802.11b).....	32
	Using configured SSID	32
	Using a New SSID.....	33
4	Control panel setup	35
	Overview.....	35
	Network menu (For HL-5470DW(T) and HL-6180DW(T)).....	36
	TCP/IP	36
	Ethernet (wired network only).....	38
	Wired Status	38
	Setup Wizard (wireless network only)	38
	WPS (Wi-Fi Protected Setup)/AOSS™ (wireless network only).....	38
	WPS (Wi-Fi Protected Setup) w/PIN Code (wireless network only).....	38
	WLAN Status (wireless network only)	38

MAC Address	39
Set to Default	39
Wired Enable	39
WLAN Enable	39
Reset the network settings to the factory default.....	40
Printing the Printer Settings Page (For HL-5450DN(T))	41
Printing the Network Configuration Report (For HL-5470DW(T) and HL-6180DW(T))	41
Printing the WLAN report (For HL-5470DW(T) and HL-6180DW(T))	42
Function table and default factory settings	43
HL-5470DW(T) and HL-6180DW(T).....	43

5 Web Based Management 46

Overview.....	46
How to configure the machine settings using Web Based Management (web browser).....	46
Setting a password	47
Gigabit Ethernet (wired network only) (For HL-6180DW(T))	48
How to configure the Gigabit Ethernet and Jumbo Frame settings using Web Based Management (web browser).....	48
Secure Function Lock 2.0	49
How to configure the Secure Function Lock 2.0 settings using Web Based Management (web browser).....	49
How to configure the SNTP protocol using Web Based Management	51
Store Print Log to Network.....	53
How to configure the Store Print Log to Network settings using Web Based Management (web browser).....	53
Error Detection Setting	55
Understanding Error Messages.....	56

6 Security features 57

Overview.....	57
Managing your network machine securely using SSL/TLS	58
Secure Management using Web Based Management (web browser)	58
Secure Management using BRAdmin Professional 3 (Windows®).....	60
To use the BRAdmin Professional 3 utility securely, you need to follow the points below	60
Printing documents securely using SSL/TLS.....	61
Sending an E-mail securely.....	62
Configuration using Web Based Management (web browser)	62
Sending an E-mail with user authentication	62
Sending an E-mail securely using SSL/TLS.....	63
Using IEEE 802.1x authentication	64
IEEE 802.1x authentication configuration using Web Based Management (web browser).....	64
Using Certificates for device security.....	66
Configure certificate using Web Based Management	68
Creating and installing a certificate.....	69
Import and export the certificate and private key.....	75
Managing multiple certificates	76
Import and export a CA certificate	77

7	Troubleshooting	78
	Overview.....	78
	Identifying your problem	78

Section II Network Glossary

8	Types of network connections and protocols	86
	Types of network connections	86
	Wired network connection example.....	86
	Protocols.....	88
	TCP/IP protocols and functions	88
9	Configuring your machine for a network	92
	IP addresses, subnet masks and gateways	92
	IP address	92
	Subnet mask.....	93
	Gateway (and router).....	93
	IEEE 802.1x Authentication	94
10	Wireless network terms and concepts (For HL-5470DW(T) and HL-6180DW(T))	96
	Specifying your network.....	96
	SSID (Service Set Identifier) and channels	96
	Security terms.....	96
	Authentication and encryption	96
	Authentication and Encryption methods for a personal wireless network	97
	Authentication and Encryption methods for an enterprise wireless network	98
11	Additional network settings from Windows®	100
	Types of additional network settings.....	100
	Installing drivers used for printing via Web Services (Windows Vista® and Windows® 7)	100
	Uninstalling drivers used for printing via Web Services (Windows Vista® and Windows® 7).....	101
	Network printing installation for Infrastructure mode when using Vertical Pairing (Windows® 7).....	102
12	Security terms and concepts	103
	Security features.....	103
	Security terms.....	103
	Security protocols	104
	Security methods for E-mail Sending	105

Section III Appendixes

A	Appendix A	107
	Supported protocols and security features	107
B	Appendix B	108
	Using services	108
	Other ways to set the IP address (for advanced users and administrators)	108
	Using DHCP to configure the IP address	108
	Using RARP to configure the IP address	109
	Using BOOTP to configure the IP address	110
	Using APIPA to configure the IP address	110
	Using ARP to configure the IP address	111
	Using the TELNET console to configure the IP address	112
C	Index	113



Network Operation

Introduction	2
Changing your machine's network settings	4
Configuring your machine for a wireless network (For HL-5470DW(T) and HL-6180DW(T))	9
Control panel setup	35
Web Based Management	46
Security features	57
Troubleshooting	78

Network features

Your Brother machine can be shared on a 10/100 MB or 1GB (For HL-6180DW(T)) wired, or IEEE 802.11b/g/n wireless (For wireless models) 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.



Note

Although the Brother machine can be used in both a wired and wireless network, only one connection method can be used at a time.

Operating Systems	Windows® XP Windows Vista® Windows® 7	Windows Server® 2003/2008	Mac OS X 10.5.8 - 10.7.x
Printing	✓	✓	✓
BRAdmin Light ¹ See page 4.	✓	✓	✓
BRAdmin Professional 3 ² See page 7.	✓	✓	
Web Based Management (web browser) See page 46.	✓	✓	✓
Status Monitor ➤➤ User's Guide	✓	✓	✓
Driver Deployment Wizard	✓	✓	
Vertical Pairing See page 102.	✓ ³		

¹ BRAdmin Light for Macintosh is available as a download from <http://solutions.brother.com/>.

² BRAdmin Professional 3 is available as a download from <http://solutions.brother.com/>.

³ Windows® 7 only.

Other Network features

Security

Your Brother machine employs some of the latest network security and encryption protocols available. (See *Security features* >> page 57.)

Secure Function Lock 2.0

Secure Function Lock 2.0 increases security by restricting the use of functions. (See *Secure Function Lock 2.0* >> page 49.)

Store Print Log to Network

The Store Print Log to Network feature allows you to save the print log file from your Brother machine to a network server using CIFS. (See *Store Print Log to Network* >> page 53.)

How to change your machine's network settings (IP address, Subnet mask and Gateway)

The machine's network settings can be changed using the control panel, BRAdmin Light, Web Based Management, and BRAdmin Professional 3. Please read this chapter for details.

Using the control panel (For HL-5470DW(T) and HL-6180DW(T))

You can configure your machine for a network using the Network control panel menu. (See *Control panel setup* >> page 35.)

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 for Windows®

- 1 Please make sure that your machine is ON.
- 2 Turn on your computer. Close any applications running before configuration.
- 3 Put the installer CD-ROM into your CD-ROM drive. The opening screen will appear automatically. If the model name screen appears, choose your machine. If the language screen appears, choose your language.
- 4 The CD-ROM main menu will appear. Click **Install Other Drivers or Utilities**.
- 5 Click **BRAdmin Light** and follow the on-screen instructions.

Installing BRAdmin Light for Macintosh

You can download Brother's latest BRAdmin Light utility from <http://solutions.brother.com/>.

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



Note

- You can download Brother's latest BRAdmin Light utility from <http://solutions.brother.com/>.
 - If you require more advanced machine management, use the latest version of BRAdmin Professional 3 utility that is available as a download from <http://solutions.brother.com/>. This utility is only available for Windows® users.
 - If you are using a firewall function of anti-spyware or antivirus applications, temporarily disable them. Once you are sure that you can print, re-enable the application.
 - Node name: The Node name appears in the current BRAdmin Light window. The default node name of the print server in the machine is "BRNxxxxxxxxxxxx" for a wired network or "BRWxxxxxxxxxxxx" for a wireless network. ("xxxxxxxxxxxx" is your machine's MAC Address / Ethernet Address.)
 - No password is required by default. Enter a password if you have set one and press **OK**.
-

1 Start the BRAdmin Light utility.

■ Windows®

Click **Start / All Programs / Brother / BRAdmin Light / BRAdmin Light**.

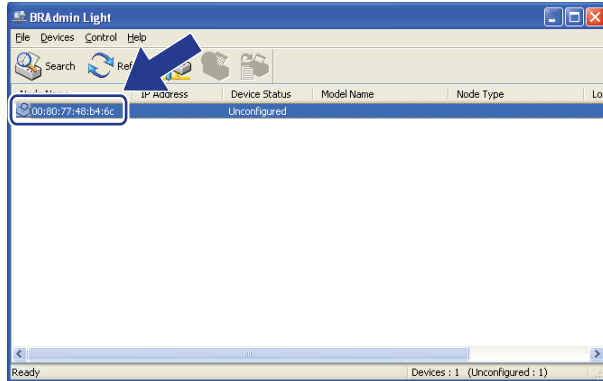
■ Macintosh

When the download has completed, double click the **BRAdmin Light.jar** file to start the BRAdmin Light utility.

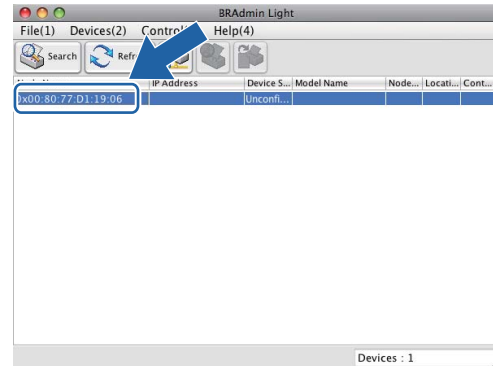
2 BRAdmin Light will search for new devices automatically.

- 3 Double-click the unconfigured device.

Windows®



Macintosh

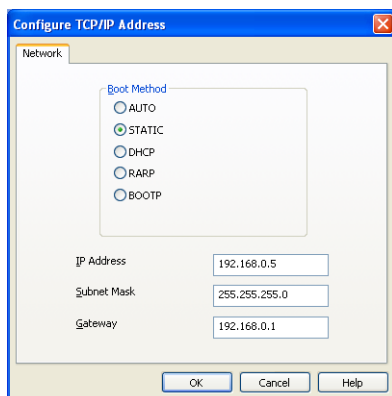


Note

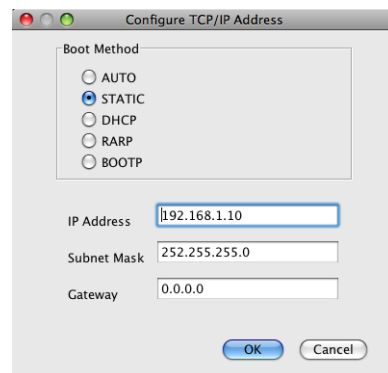
- If the print server is set to its factory default settings (if you do not use a DHCP/BOOTP/RARP server), the device will appear as **Unconfigured** in the BRAdmin Light utility screen.
- You can find the Node Name and MAC Address (Ethernet Address) by printing the Printer Setting Page (For HL-5450DN(T), see *Printing the Printer Settings Page (For HL-5450DN(T))* >> page 41 or Network Configuration Report (For HL-5470DW(T) and HL-6180DW(T), see *Printing the Network Configuration Report (For HL-5470DW(T) and HL-6180DW(T))* >> page 41). You can also find the MAC Address from the control panel (For HL-5470DW(T) and HL-6180DW(T)). (See *Chapter 4: Control panel setup.*)

- 4 Choose **STATIC** from **Boot Method**. Enter the **IP Address**, **Subnet Mask** and **Gateway** (if needed) for your machine.

Windows®



Macintosh



- 5 Click **OK**.
- 6 With the correctly programmed IP address, you will see the Brother machine in the device list.

Other Management Utilities

Your Brother machine has the following management utilities other than the BRAdmin Light utility. You can change your network settings using these utilities.

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) or HTTPS (Hyper Text Transfer Protocol over Secure Socket Layer). (See *How to configure the machine settings using Web Based Management (web browser)* >> page 46.)

BRAdmin Professional 3 utility (Windows®)

BRAdmin Professional 3 is a utility for 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 3 can also log activity of Brother devices on your network and export the log data in an HTML, CSV, TXT or SQL format.

For users who want to monitor locally connected machines, install the Print Auditor Client software on the client PC. This utility allows you to monitor machines that are connected to a client PC via the USB or parallel interface from BRAdmin Professional 3.

For more information and to download the software, visit us at <http://solutions.brother.com/>.



Note

- Please use the latest version of the BRAdmin Professional 3 utility that is available as a download from <http://solutions.brother.com/>. This utility is only available for Windows® users.
 - If you are using a firewall function of anti-spyware or antivirus applications, temporarily disable them. Once you are sure that you can print, configure the software settings following the instructions.
 - Node name: The Node name for each Brother device on the network appears in BRAdmin Professional 3. The default Node name is “BRNxxxxxxxxxxxx” for a wired network or “BRWxxxxxxxxxxxx” for a wireless network. (“xxxxxxxxxxxx” is your machine’s MAC Address / Ethernet Address.)
-

BRPrint Auditor (Windows®)

The BRPrint Auditor software brings the monitoring power of Brother network management tools to locally connected machines. This utility allows a client computer to collect usage and status information from a Brother machine connected via the parallel or USB interface. The BRPrint Auditor can then pass this information to another computer on the network running BRAdmin Professional 3. This allows the administrator to check items such as page counts, toner and drum status and the firmware version. In addition to reporting to Brother network management applications this utility can E-mail the usage and status information directly to a predefined E-mail address in a CSV or XML file format (SMTP Mail support required). The BRPrint Auditor utility also supports E-mail notification for reporting warning and error conditions.

Configuring your machine for a wireless network (For HL-5470DW(T) and HL-6180DW(T))

Overview

To connect your machine to your wireless network, we recommend following one of the setup methods outlined in the Quick Setup Guide.

The wireless setup method using the installer CD-ROM and a USB cable is the easiest method for setup.

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 *How to change your machine's network settings (IP address, Subnet mask and Gateway)* >> page 4.



Note

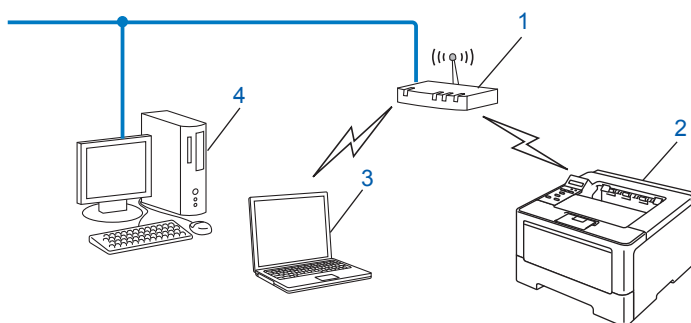
- To achieve optimum results with normal everyday document printing, place the Brother machine as close to the WLAN access point/router as possible with minimal obstructions. Large objects and walls between the two devices as well as interference from other electronic devices can affect the data transfer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

Due to these factors, wireless may not be the best method of connection for all types of documents and applications. If you are printing large files, such as multi-page documents with mixed text and large graphics, you may want to consider choosing wired Ethernet for a faster data transfer, or USB for the fastest throughput speed.

- Although the Brother machine can be used in both a wired and wireless network, only one connection method can be used at a time.
- Before configuring wireless settings, you will need to know your Network name: (SSID) and Network Key. If you are using an enterprise wireless network you also need to know the User ID and Password.

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® MWT (My WiFi Technology), you can use your computer as a WPS (Wi-Fi Protected Setup) supported access point.

2 Wireless network machine (your machine)

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 a network cable

Configuration method

The following instructions will offer four methods for configuring your Brother machine 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 for Windows®)* >> page 12.

■ Wireless configuration using the Setup Wizard from the control panel

See *Configuration using the machine's control panel Setup Wizard* >> page 17.

■ One push wireless configuration using WPS (Wi-Fi Protected Setup) or AOSS™

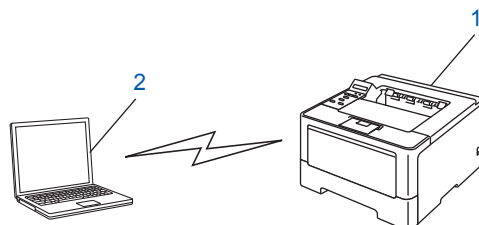
See *One push configuration using WPS (Wi-Fi Protected Setup) or AOSS™* >> page 27.

■ PIN Method wireless configuration using WPS

See *Configuration using the PIN Method of WPS (Wi-Fi Protected Setup)* >> page 29.

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 machine (your machine) is part of this network, it receives all print jobs directly from the computer sending the print data.



1 Wireless network machine (your machine)

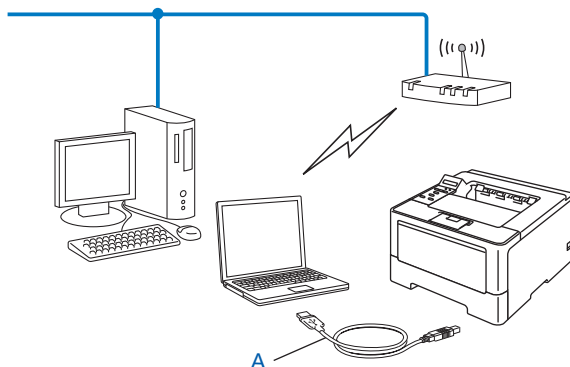
2 Wireless capable computer

We do not guarantee the wireless network connection with Windows Server[®] products in Ad-hoc mode. To set up your machine in Ad-hoc mode, see *Configuration in Ad-hoc mode (For IEEE 802.11b)* >> page 32.

Wireless configuration temporarily using a USB cable (Recommended for Windows®)

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

You can remotely configure the machine from the computer on the network using a USB cable (A) ¹.



¹ You can configure the wireless settings of the machine using a USB cable temporarily connected to a wired or wireless computer.

! Important

- The following instructions will install your Brother machine in a network environment using the Brother installer application found on the CD-ROM we have provided with the machine.
- If you have previously configured the wireless settings of the machine, you must reset the LAN settings before you can configure the wireless settings again.

To reset the LAN settings, see *Reset the network settings to the factory default* >> page 40.

- If you are using the Windows® Firewall or a firewall function of anti-spyware or antivirus applications, temporarily disable them. Once you are sure that you can print please re-enable your firewall.
- You need to temporarily use a USB cable during configuration.

- **You must know your wireless network settings before you proceed with this installation.**

If you are going to connect your Brother machine to your network, we recommend that you contact your system administrator prior to installation.

- If your router uses WEP encryption, enter the key used as the first WEP key. Your Brother machine supports the use of the first WEP key only.

- 1 Before configuring your machine we recommend you write down your wireless network settings. You will need this information before you continue with the configuration.

For a personal wireless network configuration

If you are configuring your machine for a smaller wireless network, such as your home environment, record your SSID and the Network key.

If you are using Windows® XP, Macintosh or using a network cable to connect your computer with your wireless access point/router, you need to know the SSID and Network Key of your WLAN access point/router before you proceed.

3

Network name: (SSID)	Network Key

For example:

Network name: (SSID)	Network Key
HELLO	12345678

For an enterprise wireless network configuration

If you are configuring your machine for an IEEE 802.1x supported wireless network, record your Authentication method, Encryption method, User ID and Password.

Network name: (SSID)

Communication Mode	Authentication method	Encryption mode	User ID	Password
Infrastructure	LEAP	CKIP		
	EAP-FAST/NONE	AES		
		TKIP		
	EAP-FAST/MS-CHAPv2	AES		
		TKIP		
	EAP-FAST/GTC	AES		
		TKIP		
	PEAP/MS-CHAPv2	AES		
		TKIP		
	PEAP/GTC	AES		
		TKIP		
	EAP-TTLS/CHAP	AES		
		TKIP		
	EAP-TTLS/MS-CHAP	AES		
		TKIP		
	EAP-TTLS/MS-CHAPv2	AES		
		TKIP		
	EAP-TTLS/PAP	AES		
		TKIP		
	EAP-TLS	AES		
TKIP				—

For example:

Network name: (SSID)
HELLO

Communication Mode	Authentication method	Encryption mode	User ID	Password
Infrastructure	EAP-FAST/MS-CHAPv2	AES	Brother	12345678

 **Note**

- If you configure your machine using EAP-TLS Authentication, you must install the Client Certificate issued by a CA (Certificate Authority) before you start configuration. Contact your network administrator about the Client Certificate. If you have installed more than one certificate, we recommend you write down the certificate name you want to use. For details on installing the certificate, see *Using Certificates for device security* >> page 66.
- If you verify your machine using the Common Name of the Server Certificate, we recommend you write down the Common Name before you start configuration. Contact your network administrator about the Common Name of the Server Certificate.

2 Turn on your computer and put the installer CD-ROM into your CD-ROM drive.

(Windows®)

- 1 The opening screen will appear automatically.
Choose your machine and the language.
- 2 The CD-ROM main menu will appear. Click **Install Printer Driver** and click **Yes** if you accept the license agreements. Follow the on-screen instructions.

 **Note**

- If the Brother screen does not appear automatically, go to **My Computer (Computer)**, double-click the CD-ROM icon, and then double-click **start.exe**.
- When the **User Account Control** screen appears,
(Windows Vista®) click **Allow**.
(Windows® 7) click **Yes**.

- 3 Choose **Wireless Network Connection** and then click **Next**.
- 4 Choose **Brother Peer-to-Peer Network Printer** or **Network Shared Printer**, and then click **Next**.
- 5 When you choose **Network Shared Printer**, choose your machine's queue on the **Browse for Printer** screen, and then click **OK**.
- 6 Choose the option of the Firewall setting in the **Firewall/AntiVirus detected** screen, and then click **Next**.

(Macintosh)

1 The opening screen will appear automatically. Click **Start Here OSX**. Choose your machine and click **Next**.

2 Choose **Wireless Network Connection** and then click **Next**.

3 Choose **Yes, I have a USB cable to use for installation**. and then click **Next**.

4 Follow the on-screen instructions to configure the wireless settings.



Note

- When the **Available Wireless Networks** screen appears, if your access point is set to not broadcast the SSID, you can manually add it by clicking the **Advanced** button. Follow the on-screen instructions for entering the **Name (SSID)**.
- If the wireless setup failure screen appears, click **Retry** and try again.



After you have completed the wireless setup, you can proceed to the printer driver installation. Click Next in the installation dialog and follow the on-screen instructions.

Configuration using the machine's control panel Setup Wizard

You can use the machine's control panel to configure your wireless network settings. By using the control panel `Setup Wizard` function, you can easily connect your Brother machine to your wireless network. **You must know your wireless network settings before you proceed with this installation.**

❗ Important

- If you have previously configured the wireless settings of the machine, you must reset the LAN settings before you can configure the wireless settings again.

To reset the LAN settings, see *Reset the network settings to the factory default* >> page 40.

- If your router uses WEP encryption, enter the key used as the first WEP key. Your Brother machine supports the use of the first WEP key only.

-
- If you are configuring your machine for a smaller wireless network, such as your home environment:
 - To configure your machine for an existing wireless network using the SSID and Network Key (if required), see *Manual configuration from the control panel* >> page 18.
 - If your WLAN access point/router is set to not broadcast the SSID name, see *Configuring your machine when the SSID is not broadcast* >> page 20.
 - If you are configuring your machine for Ad-hoc mode, see *Configuration in Ad-hoc mode (For IEEE 802.11b)* >> page 32.
 - If you are configuring your machine for an IEEE 802.1x supported wireless network, see *Configuring your machine for an enterprise wireless network* >> page 23.
 - If your WLAN access point/router supports WPS or AOSS™, see *One push configuration using WPS (Wi-Fi Protected Setup) or AOSS™* >> page 27.
 - If you are configuring your machine using WPS (PIN Method), see *Configuration using the PIN Method of WPS (Wi-Fi Protected Setup)* >> page 29.

Manual configuration from the control panel

- 1 Before configuring your machine we recommend you write down your wireless network settings. You will need this information before you continue with the configuration.

Check and record the current wireless network settings.

Network name: (SSID)	Network Key

For example:

Network name: (SSID)	Network Key
HELLO	12345678



Note

If your router uses WEP encryption, enter the key used as the first WEP key. Your Brother machine supports the use of the first WEP key only.

- 2 Press ▲ or ▼ to choose `Network`. Press **OK**.
- 3 Press ▲ or ▼ to choose `WLAN`. Press **OK**.
- 4 Press ▲ or ▼ to choose `Setup Wizard`. Press **OK**.
- 5 When `WLAN Enable?` is displayed, press ▲ to accept. This will start the wireless setup wizard. To cancel, press **Cancel**.
- 6 The machine will search for available SSIDs. If a list of SSIDs is displayed, use ▲ or ▼ to choose the SSID you wrote down in step 1 and then press **OK**. Do one of the following:
 - If you are using an authentication and encryption method that requires a Network Key, go to step 7.
 - If your authentication method is Open System and your encryption mode is None, go to step 9.
 - If your WLAN access point/router supports WPS, `WPS is available` appears. Press ▲. To connect your machine using the automatic wireless mode, press ▲ to choose `Yes`. (If you press ▼ to choose `No`, go to 7 to enter the Network Key.) When `Press WPS on rtr` appears, press the WPS button on your WLAN access point/router, and then press ▲ twice. Go to step 8.



Note

When the SSID is not broadcast, see *Configuring your machine when the SSID is not broadcast* >> page 20.

- 7 Enter the Network Key you wrote down in step 1. (For information on how to enter text: >> Quick Setup Guide.)
When you have entered all the characters press **OK**, and then press **▲** for **Yes** to apply your settings. Go to step 8.
- 8 Your machine will now try to connect to your wireless network using the information you have entered.
- 9 If your wireless device is connected successfully, the display shows *Connected*.
The machine will print your machine's wireless status report. If the connection failed, check the error code on the printed report and refer to >> Quick Setup Guide: *Troubleshooting*.



(Windows®)

You have completed the wireless network setup. If you would like to continue installing the printer driver, please choose Install Printer Driver from the CD-ROM menu.

(Macintosh)

You have completed the wireless network setup. If you would like to continue installing the printer driver, please choose Start Here OSX from the CD-ROM menu.

Configuring your machine when the SSID is not broadcast

- 1 Before configuring your machine we recommend you write down your wireless network settings. You will need this information before you continue with the configuration.

Check and record the current wireless network settings.

Network name: (SSID)

Communication Mode	Authentication method	Encryption mode	Network key
Infrastructure	Open system	NONE	—
		WEP	
	Shared key	WEP	
		AES	
		TKIP ¹	

¹ TKIP is supported for WPA-PSK only.

For example:

Network name: (SSID)
HELLO

Communication Mode	Authentication method	Encryption mode	Network key
Infrastructure	WPA2-PSK	AES	12345678



Note

If your router uses WEP encryption, enter the key used as the first WEP key. Your Brother machine supports the use of the first WEP key only.

- 2 Press ▲ or ▼ to choose **Network**. Press **OK**.
- 3 Press ▲ or ▼ to choose **WLAN**. Press **OK**.
- 4 Press ▲ or ▼ to choose **Setup Wizard**. Press **OK**.
- 5 When **WLAN Enable?** is displayed, press ▲ to accept. This will start the wireless setup wizard. To cancel, press **Cancel**.
- 6 The machine will search for your network and display a list of available SSIDs. Choose <New SSID> using ▲ or ▼. Press **OK**.

- 7 Enter the SSID name. (For information on how to enter text: >> Quick Setup Guide.) Press **OK**.
- 8 Using **▲** or **▼**, choose **Infrastructure** when instructed. Press **OK**.
- 9 Choose the Authentication method using **▲** or **▼**, and press **OK**.
Do one of the following:
If you chose **Open System**, go to step 10.
If you chose **Shared Key**, go to step 11.
If you chose **WPA/WPA2-PSK**, go to step 12.
- 10 Choose the Encryption type **None** or **WEP** using **▲** or **▼**, and press **OK**.
Do one of the following:
If you chose **None**, go to step 14.
If you chose **WEP**, go to step 11.
- 11 Enter the WEP key you wrote down in step 1. Press **OK**. Go to step 14. (For information on how to enter text: >> Quick Setup Guide.)
- 12 Choose the Encryption type, **TKIP** or **AES** using **▲** or **▼**. Press **OK**. Go to step 13.

- 13 Enter the WPA key you wrote down in step 1 and press **OK**. Go to step 14. (For information on how to enter text: >> Quick Setup Guide.)
- 14 To apply the settings, choose **Yes**. To cancel, choose **No**.
Do one of the following:
If you chose **Yes**, go to step 15.
If you chose **No**, go back to step 6.
- 15 The machine will attempt to connect to the wireless device you have chosen.
- 16 If your wireless device is connected successfully, the display shows **Connected**.
The machine will print your machine's wireless status report. If the connection failed, check the error code on the printed report and refer to >> Quick Setup Guide: *Troubleshooting*.



(Windows®)

You have completed the wireless network setup. If you would like to continue installing the printer driver, please choose Install Printer Driver from the CD-ROM menu.

(Macintosh)

You have completed the wireless network setup. If you would like to continue installing the printer driver, please choose Start Here OSX from the CD-ROM menu.

Configuring your machine for an enterprise wireless network

- 1 Before configuring your machine we recommend you write down your wireless network settings. You will need this information before you continue with the configuration.

Check and record the current wireless network settings.

Network name: (SSID)

3

Communication Mode	Authentication method	Encryption mode	User ID	Password
Infrastructure	LEAP	CKIP		
	EAP-FAST/NONE	AES		
		TKIP		
	EAP-FAST/MS-CHAPv2	AES		
		TKIP		
	EAP-FAST/GTC	AES		
		TKIP		
	PEAP/MS-CHAPv2	AES		
		TKIP		
	PEAP/GTC	AES		
		TKIP		
	EAP-TTLS/CHAP	AES		
		TKIP		
	EAP-TTLS/MS-CHAP	AES		
		TKIP		
	EAP-TTLS/MS-CHAPv2	AES		
		TKIP		
	EAP-TTLS/PAP	AES		
		TKIP		
	EAP-TLS	AES		
TKIP				—

For example:

Network name: (SSID)
HELLO

Communication Mode	Authentication method	Encryption mode	User ID	Password
Infrastructure	EAP-FAST/MS-CHAPv2	AES	Brother	12345678



Note

- If you configure your machine using EAP-TLS Authentication, you must install the Client Certificate issued by a CA before you start configuration. Contact your network administrator about the Client Certificate. If you have installed more than one certificate, we recommend you write down the certificate name you want to use. For details on installing the certificate, see *Using Certificates for device security* >> page 66.
- If you verify your machine using the Common Name of the Server Certificate, we recommend you write down the Common Name before you start configuration. Contact your network administrator about the Common Name of the Server Certificate.

- 2 Press ▲ or ▼ to choose `Network`.
Press **OK**.
- 3 Press ▲ or ▼ to choose `WLAN`.
Press **OK**.
- 4 Press ▲ or ▼ to choose `Setup Wizard`.
Press **OK**.
- 5 When `WLAN Enable?` is displayed, press ▲ to accept.
This will start the wireless setup wizard.
To cancel, press **Cancel**.
- 6 The machine will search for your network and display a list of available SSIDs.
You should see the SSID you wrote down earlier. If the machine finds more than one network use ▲ or ▼ key to choose your network, then press **OK**. Go to step 10.
If your access point is set to not broadcast the SSID, you will have to manually add the SSID name. Go to step 7.
- 7 Choose `<New SSID>` using ▲ or ▼.
Press **OK**. Go to step 8.
- 8 Enter the SSID name. (For information on how to enter text: >> Quick Setup Guide.)
Press **OK**. Go to step 9.
- 9 Using ▲ or ▼, choose `Infrastructure` when instructed.
Press **OK**.
- 10 Choose the Authentication method using ▲ or ▼, and press **OK**.
Do one of the following:
If you chose `LEAP`, go to step 16.
If you chose `EAP-FAST`, go to step 11.
If you chose `PEAP`, go to step 11.
If you chose `EAP-TTLS`, go to step 11.
If you chose `EAP-TLS`, go to step 12.
- 11 Choose the Inner Authentication method `NONE`, `CHAP`, `MS-CHAP`, `MS-CHAPv2`, `GTC` or `PAP` using ▲ or ▼, and press **OK**.
Go to step 12.



Note

Depending on your Authentication method, the Inner Authentication method selections differ.

- 12 Choose encryption type `TKIP` or `AES` using **▲** or **▼**, and press **OK**.
Do one of the following:
If your Authentication method is `EAP-TLS`, go to step 13.
For other Authentication methods, go to step 14.
- 13 The machine will display a list of available Client Certificates. Choose the certificate and go to step 14.
- 14 Choose the verification method `No Verification`, `CA` or `CA + Server ID` using **▲** or **▼**, and press **OK**.
Do one of the following:
If you chose `CA + Server ID`, go to step 15.
For other selections, go to step 16.



Note

If you have not imported a CA certificate in your machine, the machine will display `No Verification`. To import a CA certificate, see *Using Certificates for device security* >> page 66.

- 15 Enter the server ID. (For information on how to enter text: >> Quick Setup Guide.) Go to step 16.

- 16 Enter the user ID you wrote down in step 1. Press **OK**. (For information on how to enter text: >> Quick Setup Guide.)
Do one of the following:
If your Authentication method is EAP-TLS, go to step 18.
For other Authentication methods, go to step 17.
- 17 Enter the Password you wrote down in step 1. Press **OK**. Go to step 18.
- 18 To apply the settings, choose **Yes**. To cancel, choose **No**.
Do one of the following:
If you chose **Yes**, go to step 19.
If you chose **No**, go back to step 6.
- 19 The machine will attempt to connect to the wireless network you have chosen.
- 20 If your wireless device is connected successfully, the display shows **Connected**.
The machine will print your machine's wireless status report. If the connection failed, check the error code on the printed report and refer to >> Quick Setup Guide: *Troubleshooting*.



(Windows®)

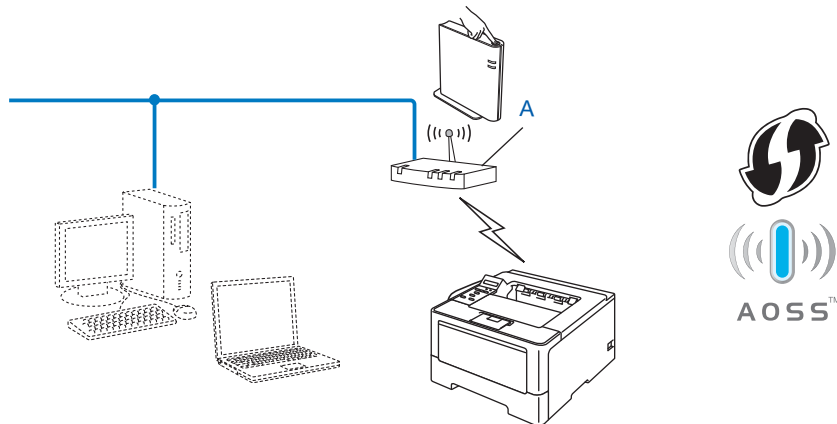
You have completed the wireless network setup. If you would like to continue installing the printer driver, please choose **Install Printer Driver from the CD-ROM menu.**

(Macintosh)

You have completed the wireless network setup. If you would like to continue installing the printer driver, please choose **Start Here OSX from the CD-ROM menu.**

One push configuration using WPS (Wi-Fi Protected Setup) or AOSS™

You can use WPS or AOSS™ from the control panel menu to configure your wireless network settings if your WLAN access point/router (A) supports either WPS (PBC¹) or AOSS™.



¹ Push Button Configuration

⚠ Important

- If you are going to connect your Brother machine to your network, we recommend that you contact your system administrator prior to installation. **You must know your wireless network settings before you proceed with this installation.**
- If you have previously configured the wireless settings of the machine, you must reset the LAN settings before you can configure the wireless settings again.

To reset the LAN settings, see *Reset the network settings to the factory default* >> page 40.

- 1 Press ▲ or ▼ to choose **Network**.
Press **OK**.
- 2 Press ▲ or ▼ to choose **WLAN**.
Press **OK**.
- 3 Press ▲ or ▼ to choose **WPS/AOSS**.
Press **OK**.

- 4 When `WLAN Enable?` is displayed, press **▲** to accept.
This will start the wireless setup wizard.
To cancel, press **Cancel**.
- 5 When the LCD shows `Press Key on rtr`, press the WPS or AOSS™ button on your wireless access point/router. See the user's guide for your wireless access point/router for instructions.
Then press **OK** and your machine will now automatically detect which mode (WPS or AOSS™) your wireless access point/router uses and try to connect to your wireless network.
- 6 If your wireless device is connected successfully, the display shows `Connected`.
The machine will print your machine's wireless status report. If the connection failed, check the error code on the printed report and refer to ►► Quick Setup Guide: *Troubleshooting*.



(Windows®)

You have completed the wireless network setup. If you would like to continue installing the printer driver, please choose `Install Printer Driver` from the CD-ROM menu.

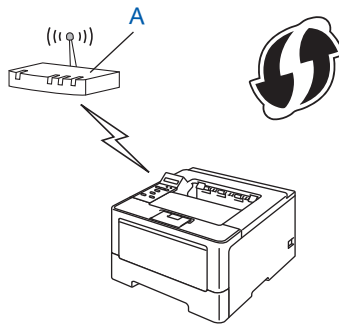
(Macintosh)

You have completed the wireless network setup. If you would like to continue installing the printer driver, please choose `Start Here OSX` from the CD-ROM menu.

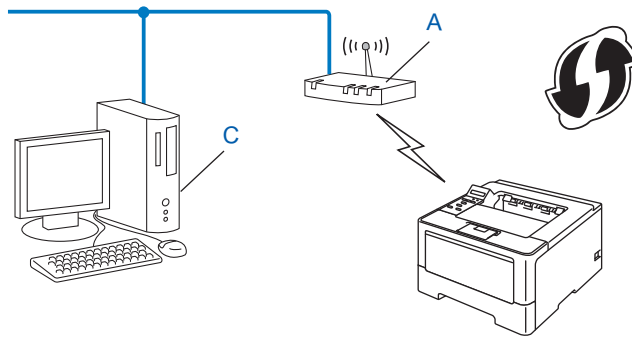
Configuration using the PIN Method of WPS (Wi-Fi Protected Setup)

If your WLAN access point/router supports WPS (PIN Method), you can configure the machine easily. The PIN (Personal Identification Number) Method is one of the connection methods developed by the Wi-Fi Alliance®. By inputting a PIN which is created by an Enrollee (your machine) to the Registrar (a device that manages the wireless LAN), you can setup the WLAN network and security settings. See the user's guide supplied with your WLAN access point/router for instructions on how to access the WPS mode.

- Connection when the WLAN access point/router (A) doubles as a Registrar ¹.



- Connection when another device (C), such as a computer is used as a Registrar ¹.



¹ The Registrar is a device that manages the wireless LAN.



Note

Routers or access points that support WPS have a symbol as shown below.



- 1 Press ▲ or ▼ to choose **Network**. Press **OK**.
- 2 Press ▲ or ▼ to choose **WLAN**. Press **OK**.
- 3 Press ▲ or ▼ to choose **WPS w/PIN Code**. Press **OK**.
- 4 When **WLAN Enable?** is displayed, press ▲ to accept.
This will start the wireless setup wizard.
To cancel, press **Cancel**.
- 5 The LCD will show an 8 digit PIN and the machine starts searching for a WLAN access point/router.
- 6 Using a computer that is on the network, type “http://access point’s IP address/” into your browser.
(Where “access point’s IP address” is the IP address of the device that is used as the Registrar¹) Go to the WPS setting page and input the PIN which the LCD shows in step 5 to the Registrar and follow the on-screen instructions.

¹ The Registrar is normally the WLAN access point/router.



Note

The setting page is different, depending on the brand of WLAN access point/router. See the instruction supplied with your WLAN access point/router.



Windows Vista®/Windows® 7

If you are using your computer as a Registrar, follow these steps:



Note

- To use a Windows Vista® or Windows® 7 computer as a Registrar, you need to register it to your network in advance. See the instruction supplied with your WLAN access point/router.
- If you use Windows® 7 as a Registrar, you can install the printer driver after the wireless configuration by following the on-screen instructions. If you want to install the full driver and software package, follow the steps ➤➤ Quick Setup Guide for installation.

- 1 (Windows Vista®)
Click the  button and then **Network**.
(Windows® 7)
Click the  button and then **Devices and Printers**.
- 2 (Windows Vista®)
Click **Add a wireless device**.
(Windows® 7)
Click **Add a device**.
- 3 Choose your machine and click **Next**.
- 4 Input the PIN which the LCD shows in step ⑤ and then click **Next**.
- 5 Choose your network that you want to connect to, and then click **Next**.
- 6 Click **Close**.

7 If your wireless device is connected successfully, the display shows *Connected*. The machine will print your machine's wireless status report. If the connection failed, check the error code on the printed report and refer to >> Quick Setup Guide: *Troubleshooting*.



(Windows®)

You have completed the wireless network setup. If you would like to continue installing the printer driver, please choose Install Printer Driver from the CD-ROM menu.

(Macintosh)

You have completed the wireless network setup. If you would like to continue installing the printer driver, please choose Start Here OSX from the CD-ROM menu.

Configuration in Ad-hoc mode (For IEEE 802.11b)

Using configured SSID

If you are trying to pair the machine to a computer that is already in Ad-hoc mode with a configured SSID, you will need to complete the following steps:

- 1 Before configuring your machine we recommend you write down your wireless network settings. You will need this information before you continue with the configuration.

Check and record the current wireless network settings of your computer you are connecting with.



Note

The wireless network settings of the computer you are connecting with must be set to Ad-hoc mode with a SSID already configured. For instructions on how to configure your computer to Ad-hoc mode please see the information included with your computer or contact your network administrator.

Network name: (SSID)

Communication Mode	Encryption mode	Network key
Ad-hoc	NONE	—
	WEP	

For example:

Network name: (SSID)
HELLO

Communication Mode	Encryption mode	Network key
Ad-hoc	WEP	12345



Note

Your Brother machine supports the use of the first WEP key only.

- 2 Press ▲ or ▼ to choose **Network**. Press **OK**.
- 3 Press ▲ or ▼ to choose **WLAN**. Press **OK**.
- 4 Press ▲ or ▼ to choose **Setup Wizard**. Press **OK**.
- 5 When **WLAN Enable?** is displayed, press ▲ to accept. This will start the wireless setup wizard. To cancel, press **Cancel**.

- 6 The machine will search for your network and display a list of available SSIDs.
If a list of SSIDs is displayed, press ▲ or ▼ to choose the SSID you wrote down in step 1. Select the SSID you want to connect with.
Press **OK**.
Do one of the following:
If you chose *None*, go to step 9.
If you chose *WEP*, go to step 7.
- 7 Enter the WEP key you wrote down in step 1. Press **OK**. Go to step 8. (For information on how to enter text: >> Quick Setup Guide.)
- 8 To apply the settings, choose *Yes*. To cancel, choose *No*.
Do one of the following:
If you chose *Yes*, go to step 9.
If you chose *No*, go back to step 6.
- 9 The machine will attempt to connect to the wireless device you have chosen.
- 10 If your wireless device is connected successfully, the display shows *Connected*.
The machine will print your machine's wireless status report. If the connection failed, check the error code on the printed report and refer to >> Quick Setup Guide: *Troubleshooting*.



(Windows®)

You have completed the wireless network setup. If you would like to continue installing the printer driver, please choose *Install Printer Driver* from the CD-ROM menu.

(Macintosh)

You have completed the wireless network setup. If you would like to continue installing the printer driver, please choose *Start Here OSX* from the CD-ROM menu.

Using a New SSID

If you are using a new SSID then all other devices will connect using the SSID that you assign to the machine in the following steps. You will need to connect to this SSID from your computer when it is placed in Ad-hoc mode.

- 1 Press ▲ or ▼ to choose *Network*.
Press **OK**.
- 2 Press ▲ or ▼ to choose *WLAN*.
Press **OK**.
- 3 Press ▲ or ▼ to choose *Setup Wizard*.
Press **OK**.
- 4 When *WLAN Enable?* is displayed, press ▲ to accept.
This will start the wireless setup wizard.
To cancel, press **Cancel**.

- 5 The machine will search for your network and display a list of available SSIDs. Choose <New SSID> using ▲ or ▼. Press **OK**.
- 6 Enter the SSID name. (For information on how to enter text: ►► Quick Setup Guide.) Press **OK**.
- 7 Using ▲ or ▼, choose *Ad-hoc* when instructed. Press **OK**.
- 8 Choose the Encryption type *None* or *WEP* using ▲ or ▼, and press **OK**. Do one of the following:
If you chose *None*, go to step 10.
If you chose *WEP*, go to step 9.
- 9 Enter the WEP key. Press **OK**. Go to step 10. (For information on how to enter text: ►► Quick Setup Guide.)



Note

Your Brother machine supports the use of the first WEP key only.

- 10 To apply the settings, choose *Yes*. To cancel, choose *No*. Do one of the following:
If you chose *Yes*, go to step 11.
If you chose *No*, go back to step 5.
- 11 The machine will attempt to connect to the wireless device you have chosen.
- 12 If your wireless device is connected successfully, the display shows *Connected*. The machine will print your machine's wireless status report. If the connection failed, check the error code on the printed report and refer to ►► Quick Setup Guide: *Troubleshooting*.



(Windows®)

You have completed the wireless network setup. If you would like to continue installing the printer driver, please choose *Install Printer Driver* from the CD-ROM menu.

(Macintosh)

You have completed the wireless network setup. If you would like to continue installing the printer driver, please choose *Start Here OSX* from the CD-ROM menu.

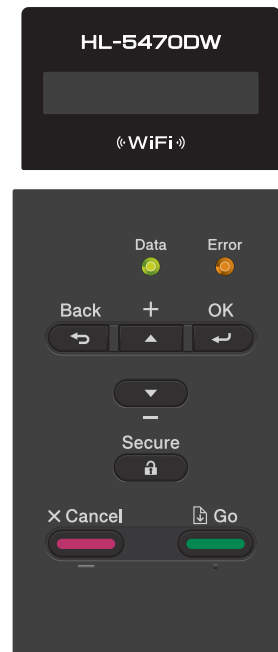
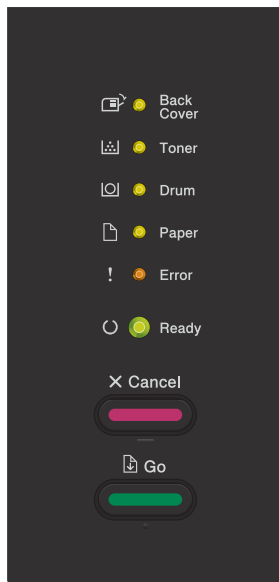
4

Control panel setup

Overview

HL-5450DN(T) have six LEDs (**Back Cover, Toner, Drum, Paper, Error** and **Ready**) and two keys (**Cancel** and **Go**) on the control panel.

HL-5470DW(T) and HL-6180DW(T) one back lit Liquid Crystal Display (LCD), seven keys and two Light Emitting Diodes (LEDs) on the control panel. The LCD is a 16 character single line display.



With the control panel you can do the following:

Change the print server settings using the control panel (For HL-5470DW(T) and HL-6180DW(T))

See *Network menu (For HL-5470DW(T) and HL-6180DW(T))* >> page 36.

Reset the network settings to the factory default

See *Reset the network settings to the factory default* >> page 40.

Print the Printer Settings Page (For HL-5450DN(T)) or Network Configuration Report (For HL-5470DW(T) and HL-6180DW(T))

See *Printing the Printer Settings Page (For HL-5450DN(T))* >> page 41.

See *Printing the Network Configuration Report (For HL-5470DW(T) and HL-6180DW(T))* >> page 41.

Printing the WLAN report (For HL-5470DW(T) and HL-6180DW(T))

See *Printing the WLAN report (For HL-5470DW(T) and HL-6180DW(T))* >> page 42.

Network menu (For HL-5470DW(T) and HL-6180DW(T))

The `Network` menu selections of the control panel allow you to set up the Brother machine for your network configuration. (For more information on how to use the control panel: >> User's Guide.) Press any of the Menu keys (**▲**, **▼**, **OK** or **Back**) to display the main menu. Then press **▲** or **▼** to choose `Network`. Proceed to the menu selection you wish to configure. (For additional information on the menu, see *Function table and default factory settings* >> page 43.)

Please note that the machine is supplied with the BRAdmin Light utility ¹ or Web Based Management applications, which also can be used to configure many aspects of the network. (See *Other Management Utilities* >> page 7.)

¹ For Macintosh users, you can download Brother's latest BRAdmin Light utility from <http://solutions.brother.com/>.

TCP/IP

If you connect the machine with a network cable to your network, use the `Wired LAN` menu selections. If you connect the machine to a wireless Ethernet network, use the `WLAN` menu selections.

Boot Method

This selection controls how the machine obtains an IP address.

Auto mode

In this mode, the machine will scan the network for a DHCP server. If it can find one, and if the DHCP server is configured to allocate an IP address to the machine, then the IP address supplied by the DHCP server will be used. If no DHCP server is available, the IP Address is set using the APIPA protocol. After the machine is initially powered ON, it may take a few minutes for the machine to scan the network for a server.

Static mode

In this mode the machine's IP address must be manually assigned. Once entered the IP address is locked to the assigned address.



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 machine's control panel, BRAdmin Light utility or Web Based Management.

IP Address

This field displays the current IP address of the machine. If you have chosen a `Boot Method` of `Static`, enter the IP address that you wish to assign to the machine (check with your network administrator for the IP address to use). If you have chosen a method other than `Static`, the machine will attempt to determine its IP address using the DHCP or BOOTP protocols. The default IP address of your machine will probably be incompatible with the IP address numbering scheme of your network. We recommend that you contact your network administrator for an IP address for the network the unit will be connected on.

Subnet Mask

This field displays the current subnet mask used by the machine. If you are not using DHCP or BOOTP to obtain the subnet mask, enter the desired subnet mask. Check with your network administrator for the subnet mask to use.

Gateway

This field displays the current gateway or router address used by the machine. If you are not using DHCP or BOOTP to obtain the gateway or router address, enter the address you wish to assign. If you do not have a gateway or router, leave this field blank. Check with your network administrator if you are unsure.

IP Boot Tries

This field displays the number of attempts the machine will try to obtain an IP address when the Boot Method is set to any setting except Static.

APIPA

The setting of **On** will cause the print server to automatically allocate a Link-Local IP address in the range (169.254.1.0 - 169.254.254.255) when the print server cannot obtain an IP address through the Boot Method you have set. (See *Boot Method* >> page 36.) Choosing **Off** means the IP address does not change, when the print server cannot obtain an IP address through the Boot Method you have set.

IPv6

This machine is compatible with IPv6, the next generation Internet protocol. If you want to use the IPv6 protocol, choose **On**. The default setting for IPv6 is **Off**. For more information on the IPv6 protocol, visit <http://solutions.brother.com/>.



Note

- If you set IPv6 to **On**, turn off the power switch and then turn it back on to enable this protocol.
- After you choose IPv6 **On**, this setting will be applied to both the wired and wireless LAN interface.

Ethernet (wired network only)

Ethernet link mode. Auto allows the print server to operate in 1000BASE-T full duplex (For HL-6180DW(T)), 100BASE-TX full or half duplex, or in 10BASE-T full or half duplex mode by auto negotiation.



Note

- If you set this value incorrectly, you may not be able to communicate with your print server.
- For details about 1000BASE-T full duplex operation, see *Gigabit Ethernet (wired network only)* (For HL-6180DW(T)) >> page 48.

Wired Status

This field displays the current wired network status.

Setup Wizard (wireless network only)

The Setup Wizard guides you through the wireless network configuration. (For more information: >> Quick Setup Guide or *Manual configuration from the control panel* >> page 18.)

WPS (Wi-Fi Protected Setup)/AOSS™ (wireless network only)

If your WLAN access point/router supports either WPS (PBC¹) or AOSS™ (Automatic Wireless mode), you can configure the machine easily. (For more information: >> Quick Setup Guide or *One push configuration using WPS (Wi-Fi Protected Setup) or AOSS™* >> page 27.)

¹ Push Button Configuration

WPS (Wi-Fi Protected Setup) w/PIN Code (wireless network only)

If your WLAN access point/router supports WPS (PIN Method), you can configure the machine easily. (For more information, see *Configuration using the PIN Method of WPS (Wi-Fi Protected Setup)* >> page 29.)

WLAN Status (wireless network only)

Status

This field displays the current wireless network status.

Signal

This field displays the current wireless network signal strength.

Channel

This field displays the current wireless network channel.

Speed

This field displays the current wireless network speed.

SSID

This field displays the current wireless network SSID. The display shows up to 32 characters of the SSID name.

Comm. Mode

This field displays the current wireless network communication mode.

MAC Address

The MAC address is a unique number assigned for the machine's network interface. You can check your machine's MAC address from the control panel.

Set to Default

The `Set to Default` allows you to reset each wired or wireless settings to the factory default. If you want to reset both wired and wireless settings, see *Reset the network settings to the factory default* >> page 40.

Wired Enable

If you want to use the wired network connection, set `Wired Enable` to `On`.

WLAN Enable

If you want to use the wireless network connection, set `WLAN Enable` to `On`.



Note

If a network cable is connected to your machine, set `Wired Enable` to `Off`.

Reset the network settings to the factory default

You can reset the print server back to its default factory settings (resetting all information such as the password and IP address information).



Note

- This function resets all wired and wireless network settings to the factory default.
- You can also reset the print server back to its factory default settings using the BRAdmin applications or Web Based Management. (For more information, see *Other Management Utilities* >> page 7.)

For HL-5450DN(T)

- 1 Turn off the machine.
- 2 Make sure that the front cover is closed and the power cord is plugged in.
- 3 Hold down **Go** as you turn on the power switch. Keep **Go** pressed down until all the LEDs light up, and then the **Ready** LED turns off.
- 4 Release **Go**. Make sure that all the LEDs turn off.
- 5 Press **Go** six times. Make sure that all the LEDs light up to indicate the print server has been reset to its factory default settings. The machine will restart.

For HL-5470DW(T) and HL-6180DW(T)

- 1 Press **▲** or **▼** to choose `Network`. Press **OK**.
- 2 Press **▲** or **▼** to choose `Network Reset`. Press **OK**.
- 3 Press **▲** to choose `Yes` for reboot.
- 4 The machine will re-start.

Printing the Printer Settings Page (For HL-5450DN(T))



Note

Node name: The Node name appears on the Network Configuration Report. The default node name is "BRNxxxxxxxxxxxx". ("xxxxxxxxxxxx" is your machine's MAC Address / Ethernet Address.)

The Printer Settings Page prints a report listing all the current printer settings including the network print server settings.

You can print the Printer Settings Page using **Go** of the machine.

- 1 Make sure that the front cover is closed and the power cord is plugged in.
- 2 Turn on the machine and wait until the machine is in the Ready state.
- 3 Press **Go** three times within 2 seconds. The machine will print the current Printer Settings Page.

Printing the Network Configuration Report (For HL-5470DW(T) and HL-6180DW(T))



Note

Node name: The Node name appears on the Network Configuration Report. The default node name is "BRNxxxxxxxxxxxx" for a wired network or "BRWxxxxxxxxxxxx" for a wireless network. ("xxxxxxxxxxxx" is your machine's MAC Address / Ethernet Address.)

The Network Configuration Report prints a report listing all the current network configuration including the network print server settings.

- 1 Press **▲** or **▼** to choose `Machine Info..`
Press **OK**.
- 2 Press **▲** or **▼** to choose `Print NetSetting`.
Press **OK**.



Note

If the **IP Address** on the Network Configuration Report shows **0.0.0.0**, wait for one minute and try again.

Printing the WLAN report (For HL-5470DW(T) and HL-6180DW(T))

The `Print WLANReport` prints your machine's wireless status report. If the wireless connection failed, check the error code on the printed report and refer to >> Quick Setup Guide: *Troubleshooting*.

- 1 Press ▲ or ▼ to choose `Machine Info..`
Press **OK**.
- 2 Press ▲ or ▼ to choose `Print WLANReport`.
Press **OK**.

Function table and default factory settings

HL-5470DW(T) and HL-6180DW(T)

Factory settings are shown in Bold with asterisk.

Main menu	Submenu	Menu Selections		Options	
Network	Wired LAN	TCP/IP	Boot Method	Auto* Static RARP BOOTP DHCP	
			IP Address	(000.000.000.000)* ¹	
			Subnet Mask	(000.000.000.000)* ¹	
			Gateway	(000.000.000.000)* ¹	
			IP Boot Tries	0/1/2/3*.../32767	
			APIPA	On* Off	
			IPv6	On Off*	
	Ethernet	—	—	Auto* 100B-FD 100B-HD 10B-FD 10B-HD	
				Active 1000B-FD (For HL-6180DW(T)) Active 100B-FD Active 100B-HD Active 10B-FD Active 10B-HD Inactive Wired OFF	
	Wired Status	—	—	MAC Address	—
				Set to Default	Restores wired network settings of the internal print server to the factory default.
				Wired Enable	— On* Off
				—	—

Main menu	Submenu	Menu Selections		Options	
Network (continued)	WLAN	TCP/IP	Boot Method	Auto* Static RARP BOOTP DHCP	
			IP Address	(000.000.000.000)* ¹	
			Subnet Mask	(000.000.000.000)* ¹	
			Gateway	(000.000.000.000)* ¹	
			IP Boot Tries	0/1/2/3*.../32767	
			APIPA	On* Off	
			IPv6	On Off*	
			Setup Wizard	—	—
		WPS/AOSS	—	—	
		WPS w/PIN Code	—	—	
		WLAN Status	Status	Active (11n) Active (11b) Active (11g) Wired LAN Active WLAN OFF AOSS Active Connection Fail	
				Signal	(Appears only when WLAN Enable is On.)
				Channel	
				Speed	
				SSID	
				Comm. Mode	Ad-hoc Infrastructure
		MAC Address	—	—	
		Set to Default	Restores wireless network settings of the internal print server to the factory default.		
		WLAN Enable	—	On Off*	

Main menu	Submenu	Menu Selections		Options	
Network (continued)	Wi-Fi Direct ²	Push Button	—	—	
		PIN Code	—	—	
		Manual	—	—	
		Group Owner	—	On Off*	
		Device Info.	Device Name	—	—
			SSID	—	—
			IP Address	—	—
		Status Info.	Status	G/O Active(**) ** = number of devices Client Active Not Connected Off Wired LAN Active	
				Signal	Strong Medium Weak None (When Group Owner is On, the signal is set to Strong.)
			Channel	—	
			Speed	—	
			I/F Enable	—	On Off*
		Network Reset	Restores all network settings of the internal print server to the factory default.		

¹ On connection to the network, the machine will automatically set the IP address and Subnet Mask to values appropriate for your network.

² For details, please see the Wi-Fi Direct™ Guide located on the Manuals download page for your model on the Brother Solutions Center (<http://solutions.brother.com/>).

Overview

A standard Web Browser can be used to manage your machine using the HTTP (Hyper Text Transfer Protocol) or HTTPS (Hyper Text Transfer Protocol over Secure Socket Layer). You can perform the function listed or get the following information from a machine on your network using a web browser.

- Machine status information
- Change network settings such as TCP/IP information
- Configure Gigabit Ethernet and Jumbo Frame (For HL-6180DW(T)) (See *Gigabit Ethernet (wired network only)* (For HL-6180DW(T)) >> page 48.)
- Configure Secure Function Lock 2.0 (See *Secure Function Lock 2.0* >> page 49.)
- Configure Store Print Log to Network (See *Store Print Log to Network* >> page 53.)
- Software version information of the machine and print server
- Change network and machine configuration details



Note

We recommend Windows® Internet Explorer® 7.0/8.0 or Firefox® 3.6 for Windows® and Safari 4.0/5.0 for Macintosh. Please also make sure that JavaScript and Cookies are always enabled in whichever browser you use. If a different web browser is used, make sure it is compatible with HTTP 1.0 and HTTP 1.1.

You must use the TCP/IP protocol on your network and have a valid IP address programmed into the print server and your computer.

How to configure the machine 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) or HTTPS (Hyper Text Transfer Protocol over Secure Socket Layer).



Note

- We recommend to use HTTPS protocol for your security when configuring the settings using Web Based Management.
- When you use the HTTPS protocol for Web Based Management configuration, your browser will display a warning dialog.

- 1 Start your web browser.
- 2 Type “http://machine’s IP address/” into your browser (where “machine’s IP address” is the machine’s IP address).
 - For example:
http://192.168.1.2/

**Note**

- If you are using a Domain Name System or enable a NetBIOS name, you can enter another name such as “SharedPrinter” instead of the IP address.

- For example:

http://SharedPrinter/

If you enable a NetBIOS name, you can also use the node name.

- For example:

http://brnxxxxxxxxxxxxx/

The NetBIOS name can be seen in the Printer Settings Page (See *Printing the Printer Settings Page (For HL-5450DN(T))* >> page 41) or Network Configuration Report (See *Printing the Network Configuration Report (For HL-5470DW(T) and HL-6180DW(T))* >> page 41).

- For Macintosh users, you can have easy access to the Web Based Management System by clicking the machine icon on the **Status Monitor** screen. For more information: >> User's Guide.



3 No password is required by default. Enter a password if you have set one and press



4 You can now change the print server settings.

**Note**

If you have changed the protocol settings, restart the machine after clicking **Submit** to activate the configuration.

Setting a password

We recommend setting a login password to prevent unauthorized access to the Web Based Management.



1 Click **Administrator**.



2 Enter the password you want to use (up to 32 characters).



3 Re-enter the password in **Confirm New Password** box.



4 Click **Submit**.

From the next time you access the Web Based Management, enter the password in the **Login** box, and then click .

After configuring the settings, logout by clicking .

**Note**

You can also set a password by clicking **Please configure the password** on the machine's web page if you are not setting a login password.

Gigabit Ethernet (wired network only) (For HL-6180DW(T))

Your machine supports 1000BASE-T Gigabit Ethernet. To connect to a 1000BASE-T Gigabit Ethernet Network, you must set the machine's Ethernet link mode to `Auto` from the machine's control panel or **Auto** from Web Based Management (web browser). 1000BASE-T Gigabit Ethernet Network also allows you to use the Jumbo Frame feature.

Jumbo frames are the data frames that are larger than the standard Ethernet frame size (maximum 1,518 byte). The Jumbo Frame feature offers the faster data transfer compared to the standard Ethernet frame. You can configure the machine's frame size by using Web Based Management (web browser) or BRAdmin Professional 3.



Note

- Use a straight-through Category 5e (or greater) Shielded Twisted-Pair (STP) cable for 10BASE-T, 100BASE-TX Fast Ethernet Network or 1000BASE-T Gigabit Ethernet Network. When you connect the machine to a Gigabit Ethernet Network, use the network devices complying with 1000BASE-T.
- To use the Jumbo Frame feature, you must confirm all of your devices on your network, including your computer, have been configured to use Jumbo Frame.

5

How to configure the Gigabit Ethernet and Jumbo Frame settings using Web Based Management (web browser)

- 1 Click **Network** on the machine's web page and choose **Wired**.
- 2 Click **Ethernet**.
- 3 Choose **Auto** from **Ethernet Mode**.
- 4 Choose **Enabled** for **Jumbo Frame**. (The default setting is **Disabled**.)
- 5 Enter your frame size in the **Frame Size** field. (The default setting is **1,518 byte**.)



Note

- You must set the frame size correctly.
- Make sure all the devices on your network have been configured to an appropriate frame size. If you are not sure about the frame size, contact your network administrator.

- 6 Click **Submit**.
To enable the settings, you need to restart your machine.



Note

You can confirm your settings by printing the Network Configuration Report. See *Printing the Network Configuration Report (For HL-5470DW(T) and HL-6180DW(T))* >> page 41.

Secure Function Lock 2.0

Secure Function Lock 2.0 from Brother helps you to save money and increase security by restricting the functions available on your Brother machine.

Secure Function Lock allows you to configure passwords for selected users, granting them access to some, or all, of these functions, or limiting them to a page limit. This means that only authorized people can use them.

You can configure and change the following Secure Function Lock 2.0 settings using Web Based Management, or BRAdmin Professional 3 (Windows® only) .

- **Print**^{1 2}
- **Page Limit**
- **Page Counter**

¹ **Print** includes print jobs sent via Google Cloud Print and Brother iPrint&Scan.

² If you register the PC user login names, you can restrict PC print without the user entering a password. For more detail, see *Restricting PC print by PC user login name* >> page 50.

How to configure the Secure Function Lock 2.0 settings using Web Based Management (web browser)

Basic configuration

- 1 Click **Administrator** on the machine's web page, and then click **Secure Function Lock**.
- 2 Choose **On** from **Function Lock**.
- 3 Enter an up to 15 digit alphanumeric group name or user name in the **ID Number/Name** box and then enter a four-digit password in the **PIN** box.
- 4 Uncheck the functions that you want to restrict in the **Print** box. If you want to configure the maximum page count, check the **On** box in **Page Limit**, and then enter the number in the **Max.** box. Then click **Submit**.



Note

If you want to restrict the PC printing by PC user login name, click **PC Print Restriction by Login Name** and configure the settings. (See *Restricting PC print by PC user login name* >> page 50.)

Setting up public mode

You can set up the public mode to restrict what functions are available for public users. Public users do not need to enter a password to access the features made available through this setting.



Note

Public mode includes print jobs sent via Google Cloud Print and Brother iPrint&Scan.

- 1 Uncheck the check box for the function that you want to restrict in the **Public Mode** box.
- 2 Click **Submit**.

Restricting PC print by PC user login name

By configuring this setting, the machine can authenticate by PC user login name to allow a print job from a registered computer.

- 1 Click **PC Print Restriction by Login Name**.
- 2 Choose **On** from **PC Print Restriction**.
- 3 Choose the ID Number you set in the **ID Number/Name** in step 3. See *Basic configuration* >> page 49 from the **ID Number** pull-down list for each Login Name and then enter the PC user login name in the **Login Name** box.
- 4 Click **Submit**.



Note

- If you want to restrict PC print per group, choose the same ID Number for each PC login name you want in the group.
- If you are using the PC login name feature you must also make sure that the **Use PC Login Name** box in the printer driver is checked. For more information about the printer driver: >> User's Guide.
- The Secure Function Lock feature does not support the BR-Script3 driver for printing.

Other features

You can set up the following features in Secure Function Lock 2.0:

■ All Counter Reset

You can reset the page counter by clicking **All Counter Reset**.

■ Export to CSV file

You can export the current page counter including **ID Number/Name** information as a CSV file.

■ Last Counter Record

The machine retains the page count after the counter has been reset.

How to configure the SNTP protocol using Web Based Management

SNTP is the protocol used to synchronize the time used by the machine for authentication with the SNTP time server.

- 1 Click **Network**, and then click **Protocol**.
- 2 Select the **SNTP** check box to activate the setting.
- 3 Click **Advanced Setting**.

■ Status

Displays whether the SNTP server settings are enabled or disabled.

■ SNTP Server Method

Choose **AUTO** or **STATIC**.

• AUTO

If you have a DHCP server in your network, the SNTP server will automatically obtain the address from that server.

• STATIC

Enter the address you want to use.

■ Primary SNTP Server Address, Secondary SNTP Server Address

Enter the server address (up to 64 characters).

The Secondary SNTP server address is used as a backup to the Primary SNTP server address. If the Primary server is unavailable, the machine will contact the Secondary SNTP server. If you have a primary SNTP server, but no secondary SNTP server, simply leave this field blank.

■ Primary SNTP Server Port, Secondary SNTP Server Port

Enter the Port number (1 to 65535).

The Secondary SNTP server port is used as a backup to the Primary SNTP server port. If the Primary port is unavailable, the machine will contact the Secondary SNTP port. If you have a primary SNTP port, but no secondary SNTP port, simply leave this field blank.

- **Synchronization Interval**

Enter the number of hours between server synchronization attempts (1 to 168 hours).

- **Synchronization Status**

You can confirm the latest synchronization status.

- 4 Click **Submit** to apply the settings.

Store Print Log to Network

The Store Print Log to Network feature allows you to save the print log file from your Brother machine to a network server using CIFS¹. You can record the ID, type of print job, job name, user name, date, time and the number of printed pages for every print job.

¹ CIFS is the Common Internet File System protocol that runs over TCP/IP allowing computers on a network to share files over an intranet or the Internet.

The following print functions are recorded in the print log:

- Print jobs from your computer



Note

- The Store Print Log to Network feature supports **Kerberos** Authentication and **NTLMv2** Authentication. You must configure the SNTP protocol (network time server) for Authentication. (For information about setting SNTP, see *How to configure the SNTP protocol using Web Based Management* >> page 51.)
- You can set the file type to **TXT** or **CSV** when storing a file to the server.

How to configure the Store Print Log to Network settings using Web Based Management (web browser)

- 1 Click **Administrator** on the machine's web page, and then click **Store Print Log to Network**.
- 2 Choose **On** from **Print Log**.
- 3 You can configure the following settings using a web browser.

■ Host Address

The Host Address is the Host name of the CIFS server. Enter the Host Address (for example: mypc.example.com) (up to 64 characters) or the IP address (for example: 192.168.56.189).

■ Store Directory

Enter the destination folder where your log will be stored on the CIFS server (for example: brother\abc) (up to 60 characters).

■ File Name

Enter the file name you want to use for the print log up to 15 characters.

■ File Type

Choose the file type for the print log **TXT** or **CSV**.

■ Auth. Method

Choose the authentication method required for access to the CIFS server **Auto**, **Kerberos**¹ or **NTLMv2**².

¹ Kerberos is an authentication protocol which allows devices or individuals to securely prove their identity to network servers using a single sign-on.

² NTLMv2 is the authentication method used by Windows to log into servers.

- **Auto:** If you choose Auto, the machine will initially search for a Kerberos server. If the Kerberos server is not detected, NTLMv2 will be used for the authentication method.
- **Kerberos:** Choose Kerberos, to use Kerberos Authentication only.
- **NTLMv2:** Choose NTLMv2, to use NTLMv2 Authentication only.

For Kerberos and NTLMv2 Authentication you must also configure the SNTP protocol (network time server).

For configuring the SNTP settings, see *How to configure the SNTP protocol using Web Based Management* >> page 51.

■ **Username**

Enter the Username for the authentication up to 96 characters.



Note

If the username is part of a domain, please input the username in one of the following styles: user@domain or domain\user.

■ **Password**

Enter the password for the authentication up to 32 characters.

■ **Kerberos Server Address** (if needed)

Enter the KDC Host Address (for example: mypc.example.com) (up to 64 characters) or the IP address (for example: 192.168.56.189).

- 4 In the **Connection Status**, you can confirm the last log status. For more information, see *Understanding Error Messages* >> page 56.
- 5 Click **Submit** to apply your settings.

Error Detection Setting

You can choose what action is taken when the print log cannot be stored to the server due to a network error.

- 1 Choose **Cancel Print** or **Ignore Log & Print** in the **Error Detection Setting** of **Store Print Log to Network**.

- **Cancel Print**

If you choose **Cancel Print**, the print jobs are canceled when the print log cannot be stored to the server.

- **Ignore Log & Print**

If you choose **Ignore Log & Print**, the machine prints the document even if the print log cannot be stored to the server.

When the store print log function has recovered, the print log is recorded as follows:

- If the log cannot be stored at the end of printing, the print log except the number of printed pages will be recorded. (1)
- If the Print Log cannot be stored at the beginning and the end of printing, the print log of the job will not be recorded. When the function has recovered, the occurrence of an error is shown in the log. (2)

Example of the print log:

```

Id, Type, Job Name, User Name, Date, Time, Print Pages
1, Print(xxxxxxx), "Document01.doc", "user01", 03/03/20xx, 14:01:32, 52
2, Print(xxxxxxx), "Document02.doc", "user01", 03/03/20xx, 14:45:30, ? (1)
3, <Error>, ?, ?, ?, ?, ? (2)
4, Print(xxxxxxx), "Report01.xls", "user02", 03/03/20xx, 19:30:40, 4
    
```

- 2 Click **Submit** to apply your settings.

Understanding Error Messages

You can confirm the error status on the LCD of your machine or **Connection Status** in Web Based Management.

■ **Server Timeout**, contact your administrator.

This message will appear when you cannot connect to the server.

Make sure that:

- Your server address is correct.
- Your server is connected to the network.
- The machine is connected to the network.

■ **Authentication Error**, contact your administrator.

The message will appear when your **Authentication Setting** is not correct.

Make sure that:

- The Username ¹ and Password in Authentication Setting are correct.

¹ If the username is part of a domain, please input the username in one of the following styles: user@domain or domainuser.

- The time of the log file server matches the time from the SNTP server settings.
- The SNTP time server settings are configured correctly so the time matches the time used for authentication by Kerberos or NTLMv2.

■ **File Access Error**, contact your administrator.

This message will appear when you cannot access the destination folder.

Make sure that:

- The store directory name is correct.
- The store directory is write-enabled.
- The File is not locked.

■ **Wrong Date&Time**, contact your administrator.

This message will appear when your machine does not obtain the time from the SNTP time server. Using Web Based Management, confirm that the settings to access the SNTP time server are correctly configured.



Note

If you choose the **Cancel Print** option in Web Based Management the `Log Access Error` message will remain on the LCD for about 30 seconds.

Overview

In today's world there are many security threats to your network and the data that travels over it. Your Brother machine employs some of the latest network security and encryption protocols available today. These network features can be integrated into your overall network security plan to help protect your data and prevent unauthorized access to the machine. This chapter explains how to configure them.

You can configure the following security features:

- Managing your network machine securely using SSL/TLS (See *Managing your network machine securely using SSL/TLS* >> page 58.)
- Managing your network machine securely using SNMPv3 protocol (See *Secure Management using Web Based Management (web browser)* >> page 58 or *Secure Management using BRAdmin Professional 3 (Windows®)* >> page 60.)
- Secure Management using BRAdmin Professional 3 (Windows®) (See *Secure Management using BRAdmin Professional 3 (Windows®)* >> page 60.)
- Printing documents securely using SSL/TLS (See *Printing documents securely using SSL/TLS* >> page 61.)
- Sending an E-mail securely (See *Sending an E-mail securely* >> page 62.)
- Using IEEE 802.1x authentication (See *Using IEEE 802.1x authentication* >> page 64.)
- Certificate for secure management (See *Using Certificates for device security* >> page 66.)
- Managing multiple certificates (See *Managing multiple certificates* >> page 76.)



Note

We recommend to disable the Telnet, FTP and TFTP protocols. Accessing the machine using these protocols is not secure. (For how to configure the protocol settings, see *How to configure the machine settings using Web Based Management (web browser)* >> page 46.)

Managing your network machine securely using SSL/TLS

To manage your network machine securely, you need to use the management utilities with security protocols.

Secure Management using Web Based Management (web browser)


We recommend to use HTTPS and SNMPv3 protocol for secure management. To use these protocols, the following machine settings are required.



Note

The HTTPS protocol is enabled by default.

You can change the HTTPS protocol settings on the Web Based Management screen, by clicking **Network, Protocol** and then **HTTP Server Settings**.

- 1 Start your web browser.
- 2 Type “https://Common Name/” into your browser. (Where “Common Name” is the Common Name that you assigned for the certificate, such as an IP address, node name or domain name. For how to assign a Common Name for the certificate, see *Using Certificates for device security* >> page 66.)
 - For example:
https://192.168.1.2/ (if the Common Name is the machine’s IP address)
- 3 No password is required by default. Enter a password if you have set one and press .
- 4 You can now access the machine using HTTPS.
If you use the SNMPv3 protocol, follow the steps below.




Note

You can also change the SNMP settings by using BRAdmin Professional 3.

- 5 Click **Network**.
- 6 Click **Protocol**.

- 7 Make sure that the **SNMP** setting is enabled, and then click **Advanced Setting** of **SNMP**.
- 8 You can configure the SNMP settings from the screen below.

SNMP 

Status Enabled

SNMP Mode of Operation

SNMP v1/v2c read-write access

SNMPv3 read-write access and v1/v2c read-only access

SNMPv3 read-write access

SNMP v1/v2c Mode Settings

Enable network management with older versions of BRAdmin

We have three SNMP connection modes of operation.

■ **SNMP v1/v2c read-write access**

In this mode the print server uses version 1 and version 2c of the SNMP protocol. You can use all Brother applications under this mode. However, it is not secure since it will not authenticate the user and the data will not be encrypted.

■ **SNMPv3 read-write access and v1/v2c read-only access**

In this mode the print server uses the read-write access of version 3 and the read-only access of version 1 and version 2c of the SNMP protocol.

 **Note**

When you use the **SNMPv3 read-write access and v1/v2c read-only access** mode, some Brother applications (e.g. BRAdmin Light) that access to the print server do not work properly since they authorize the read-only access of version 1 and version 2c. If you want to use all applications, use the **SNMP v1/v2c read-write access** mode.

■ SNMPv3 read-write access

With this mode the print server uses version 3 of the SNMP protocol. If you want to manage the print server securely, use this mode.



Note

- When you use the **SNMPv3 read-write access** mode, please note the following.
 - You can manage the print server by using BRAdmin Professional 3 or Web Based Management only.
 - Except for BRAdmin Professional 3, all applications that use SNMPv1/v2c will be restricted. To allow the use of SNMPv1/v2c applications, use **SNMPv3 read-write access and v1/v2c read-only access** or **SNMP v1/v2c read-write access** mode.
- For more information, see the Help text in Web Based Management.

Secure Management using BRAdmin Professional 3 (Windows[®])

To use the BRAdmin Professional 3 utility securely, you need to follow the points below

- We strongly recommend to use the latest version of the BRAdmin Professional 3 utility that is available as a download from <http://solutions.brother.com/>. If you use an older version of BRAdmin ¹ to manage your Brother machines the user authentication will not be secure.
- If you want to avoid access to your machine from older versions of BRAdmin ¹, you need to disable the access from older versions of BRAdmin ¹ from **Advanced Setting** of **SNMP** on **Protocol** page using Web Based Management. (See *Secure Management using Web Based Management (web browser)* >> page 58.)
- If you use BRAdmin Professional 3 and Web Based Management together, use Web Based Management with the HTTPS protocol. (See *Secure Management using Web Based Management (web browser)* >> page 58.)
- If you are managing a mixed group of older print servers ² and print servers with BRAdmin Professional 3, we recommend using a different password in each group. This will ensure security is maintained on the new print servers.

¹ BRAdmin Professional older than Ver. 2.80, BRAdmin Light for Macintosh older than Ver. 1.10

² NC-2000 series, NC-2100p, NC-3100h, NC-3100s, NC-4100h, NC-5100h, NC-5200h, NC-6100h, NC-6200h, NC-6300h, NC-6400h, NC-8000, NC-100h, NC-110h, NC-120w, NC-130h, NC-140w, NC-8100h, NC-9100h, NC-7100w, NC-7200w, NC-2200w

Printing documents securely using SSL/TLS

To print documents securely with IPP protocol, you can use the IPPS protocol.




Note

- The IPPS protocol is enabled by default.
You can change the IPPS protocol settings on the Web Based Management screen, by clicking **Network, Protocol** and then **HTTP Server Settings**.
 - Communication using IPPS cannot prevent unauthorized access to the print server.
 - IPPS is available for Windows[®] XP, Windows Vista[®], Windows[®] 7 and Windows Server[®] 2003/2008.
-

Sending an E-mail securely

Configuration using Web Based Management (web browser)

You can configure secured E-mail sending with user authentication or E-mail sending using SSL/TLS on the Web Based Management screen.

- 1 Start your web browser.
- 2 Type “http://machine’s IP address/” into your browser (where “machine’s IP address” is the machine’s IP address).
 - For example:
http://192.168.1.2/
- 3 No password is required by default. Enter a password if you have set one and press .
- 4 Click **Network**.
- 5 Click **Protocol**.
- 6 Click **Advanced Setting** of **POP3/SMTP** and make sure that the status of **POP3/SMTP** is **Enabled**.
- 7 You can configure the **POP3/SMTP** settings on this page.



Note

- For more information, see the Help text in Web Based Management.
- You can also confirm whether the E-mail settings are correct after configuration by sending a test E-mail.
- If you do not know the POP3/SMTP server settings, please contact your system administrator or ISP (Internet Service Provider) for details.

- 8 After configuring, click **Submit**. The Test E-mail Send Configuration dialog appears.
- 9 Follow the instructions on-screen if you want to test with the current settings.

Sending an E-mail with user authentication

This machine supports POP before SMTP and SMTP-AUTH methods to send an E-mail via an E-mail server that requires user authentication. These methods prevent an unauthorized user from accessing the E-mail server. You can use Web Based Management or BRAdmin Professional 3 to configure these settings. You can use POP before SMTP and SMTP-AUTH methods for E-mail Notification.

E-mail server settings

You need to match the settings of SMTP authentication method with the method used by your E-mail server. Contact your network administrator or your ISP (Internet Service Provider) about the E-mail server configuration.

You will also need to check **SMTP-AUTH** of **SMTP Server Authentication Method** to enable the SMTP server authentication.

SMTP settings

- You can change the SMTP port number using Web Based Management. This is useful if your ISP (Internet Service Provider) implements the “Outbound Port 25 Blocking (OP25B)” service.
- By changing the SMTP port number to a specific number which your ISP is using for the SMTP server (for example, port 587), you would then be able to send an E-mail via the SMTP server.
- If you can use both POP before SMTP and SMTP-AUTH, we recommend choosing SMTP-AUTH.
- If you choose POP before SMTP for the SMTP Server Authentication Method, you need to configure the POP3 settings. You can also use the APOP method if needed.

Sending an E-mail securely using SSL/TLS

This machine supports SSL/TLS methods to send an E-mail via an E-mail server that requires secure SSL/TLS communication. To send E-mail via an E-mail server that is using SSL/TLS communication, you must configure SMTP over SSL/TLS or POP3 over SSL/TLS correctly.

Verifying Server Certificate

- If you choose SSL or TLS for **SMTP over SSL/TLS** or **POP3 over SSL/TLS**, the **Verify Server Certificate** check box will be automatically checked to verify the Server Certificate.
 - Before you verify the Server Certificate, you must import the CA certificate that has been issued by the CA that signed the Server Certificate. Contact your network administrator or your ISP (Internet Service Provider) to confirm whether a CA certificate import is necessary. For importing the certificate, see *Import and export a CA certificate* >> page 77.
 - If you do not need to verify the Server Certificate, uncheck **Verify Server Certificate**.

Port Number

- If you choose SSL or TLS, the **SMTP Port** or **POP3 Port** value will be changed to match the protocol. If you want to change the port number manually, enter the port number after you choose **SMTP over SSL/TLS** or **POP3 over SSL/TLS**.
- You must configure the POP3/SMTP communication method to match the E-mail server. For details of the E-mail server settings, contact your network administrator or ISP (Internet Service Provider).

In most cases, the secured webmail services require the following settings:

(SMTP)

SMTP Port: 587

SMTP Server Authentication Method: SMTP-AUTH

SMTP over SSL/TLS: TLS

(POP3)

POP3 Port: 995

POP3 over SSL/TLS: SSL

Using IEEE 802.1x authentication

You can configure IEEE 802.1x authentication for a wired or a wireless network.

IEEE 802.1x authentication configuration using Web Based Management (web browser)

If you are configuring IEEE 802.1x authentication for a wired or a wireless network using Web Based Management, follow the instructions.

You can also configure IEEE 802.1x authentication using:

(Wired network)

- BRAdmin Professional 3

(Wireless network)

- Wireless setup wizard from the control panel (For details, see *Configuring your machine for an enterprise wireless network* >> page 23.)
- Wireless setup wizard on the CD-ROM (For details, see *Wireless configuration temporarily using a USB cable (Recommended for Windows®)* >> page 12.)
- BRAdmin Professional 3



Note

- If you configure your machine using EAP-TLS Authentication, you must install the Client Certificate issued by a CA before you start configuration. Contact your network administrator about the Client Certificate. If you have installed more than one certificate, we recommend you write down the certificate you want to use. For details on installing the certificate, see *Using Certificates for device security* >> page 66.
 - Before you verify the Server Certificate, you must import the CA certificate that has been issued by the CA that signed the Server Certificate. Contact your network administrator or your ISP (Internet Service Provider) to confirm whether a CA certificate import is necessary. For details on importing the certificate, see *Import and export a CA certificate* >> page 77.
 - For the details of each certificate, see *Using Certificates for device security* >> page 66.
-

- 1 Start your web browser.
- 2 Type “http://machine’s IP address/” into your browser (where “machine’s IP address” is the machine’s IP address).
 - For example:
http://192.168.1.2/

**Note**

- If you are using a Domain Name System or enable a NetBIOS name, you can enter another name such as “SharedPrinter” instead of the IP address.

- For example:

http://SharedPrinter/

If you enable a NetBIOS name, you can also use the node name.

- For example:

http://brnxxxxxxxxxxxxx/

The NetBIOS name can be seen in the Printer Settings Page (See *Printing the Printer Settings Page (For HL-5450DN(T))* >> page 41) or Network Configuration Report (See *Printing the Network Configuration Report (For HL-5470DW(T) and HL-6180DW(T))* >> page 41).

- For Macintosh users, you can have easy access to the Web Based Management System by clicking the machine icon on the **Status Monitor** screen. For more information: >> User's Guide.

3 No password is required by default. Enter a password if you have set one and press

4 Click **Network**.

5 (Wired) Click **Wired** and then choose **Wired 802.1x Authentication**.
(Wireless) Click **Wireless** and then choose **Wireless (Enterprise)**.

6 Now you can configure the IEEE 802.1x authentication settings.

- If you want to enable IEEE 802.1x authentication for wired network, check **Enabled** for **Wired 802.1x status** on the **Wired 802.1x Authentication** page.
- For the details of IEEE 802.1x authentication and the inner authentication methods, see *IEEE 802.1x Authentication* >> page 94.
- If you are using EAP-TLS authentication, you must choose the Client Certificate that has been installed (shown with Certificate Name) for verification from the **Client Certificate** pull-down list.
- If you choose EAP-FAST, PEAP, EAP-TTLS or EAP-TLS authentication, you can choose the verification method from the **Server Certificate Verification** pull-down list. You can verify the Server Certificate by using the CA certificate, imported to the machine in advance, that has been issued by the CA that signed the Server Certificate.

You can choose one of the following verification methods from the **Server Certificate Verification** pull-down list.

- **No Verification**

The Server Certificate can always be trusted. The verification is not performed.

- **CA Cert.**

The verification method to check the CA reliability of the Server Certificate, using the CA certificate that has been issued by the CA that signed the Server Certificate.

- **CA Cert. + ServerID**

The verification method to check the Common Name ¹ value of the Server Certificate, in addition to the CA reliability of the Server Certificate.

¹ The Common Name verification compares the Common Name of the Server Certificate to the character string configured for the **Server ID**. Before you use this method, contact your system administrator about the Server Certificate's Common Name and then configure **Server ID**.

7 After configuring, click **Submit**.

(Wired)

After configuring, connect your machine to the IEEE 802.1x supported network. After a few minutes, print the Printer Settings Page or Network Configuration Report to check the **<Wired IEEE 802.1x> Status**. (See *Printing the Printer Settings Page (For HL-5450DN(T))* >> page 41 or *Printing the Network Configuration Report (For HL-5470DW(T) and HL-6180DW(T))* >> page 41.)

■ Success

The wired IEEE 802.1x function is enabled and the authentication was successful.

■ Failed

The wired IEEE 802.1x function is enabled, however, the authentication failed.

■ Off

The wired IEEE 802.1x function is not available.

(Wireless)

Shortly after configuring, WLAN report will be printed automatically. Check your wireless configuration on the report. See *Printing the WLAN report (For HL-5470DW(T) and HL-6180DW(T))* >> page 42.

Using Certificates for device security

Your Brother machine supports the use of multiple security certificates allowing secure management, authentication and communication with the machine. The following security certificate features can be used with the machine.

- SSL/TLS communication
- IEEE 802.1x authentication
- SSL communication for SMTP/POP3

The Brother machine supports the following certificates.

■ Pre-installed certificate

Your machine has a pre-installed certificate.

Using this certificate, you can easily use the SSL/TLS communication without creating or installing a certificate.

■ Self-signed certificate

This print server issues its own certificate. Using this certificate, you can easily use the SSL/TLS communication without having a certificate from a CA. (See *Creating and installing a certificate* >> page 69.)

■ Certificate from a CA

There are two methods for installing a certificate from a CA. If you already have a CA or if you want to use a certificate from an external trusted CA:

- When using a CSR (Certificate Signing Request) from this print server. (See *How to create a CSR* >> page 74.)
- When importing a certificate and a private key. (See *Import and export the certificate and private key* >> page 75.)

■ CA certificate

If you use a CA certificate that identifies the CA (Certificate Authority) itself and owns its private key, you must import a CA certificate from the CA, prior to the configuration. (See *Import and export a CA certificate* >> page 77.)




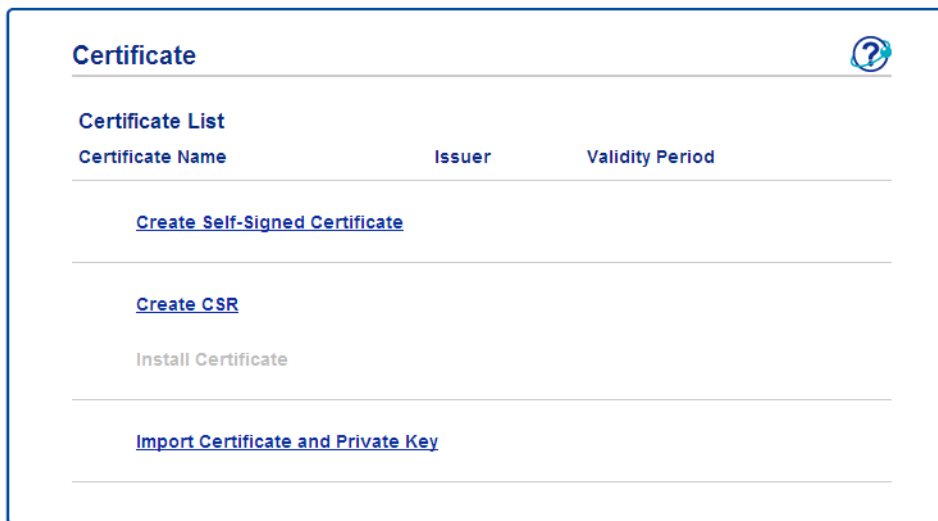
Note

- If you are going to use SSL/TLS communication, we recommend that you contact your system administrator first.
- When you reset the print server back to its default factory settings, the certificate and the private key that are installed will be deleted. If you want to keep the same certificate and the private key after resetting the print server, export them before resetting and re-install them. (See *How to export the self-signed certificate, the certificate issued by a CA, and the private key* >> page 76.)

Configure certificate using Web Based Management

This feature can be configured using Web Based Management only. Follow these steps to access the configure certificate page using Web Based Management.

- 1 Start your web browser.
- 2 Type “http://machine’s IP address/” into your browser (where “machine’s IP address” is the machine’s IP address).
 - For example:
http://192.168.1.2/
- 3 Click **Network**.
- 4 No password is required by default. Enter a password if you have set one and press .
- 5 Click **Security**.
- 6 Click **Certificate**.
- 7 You can configure the certificate settings from the screen below.

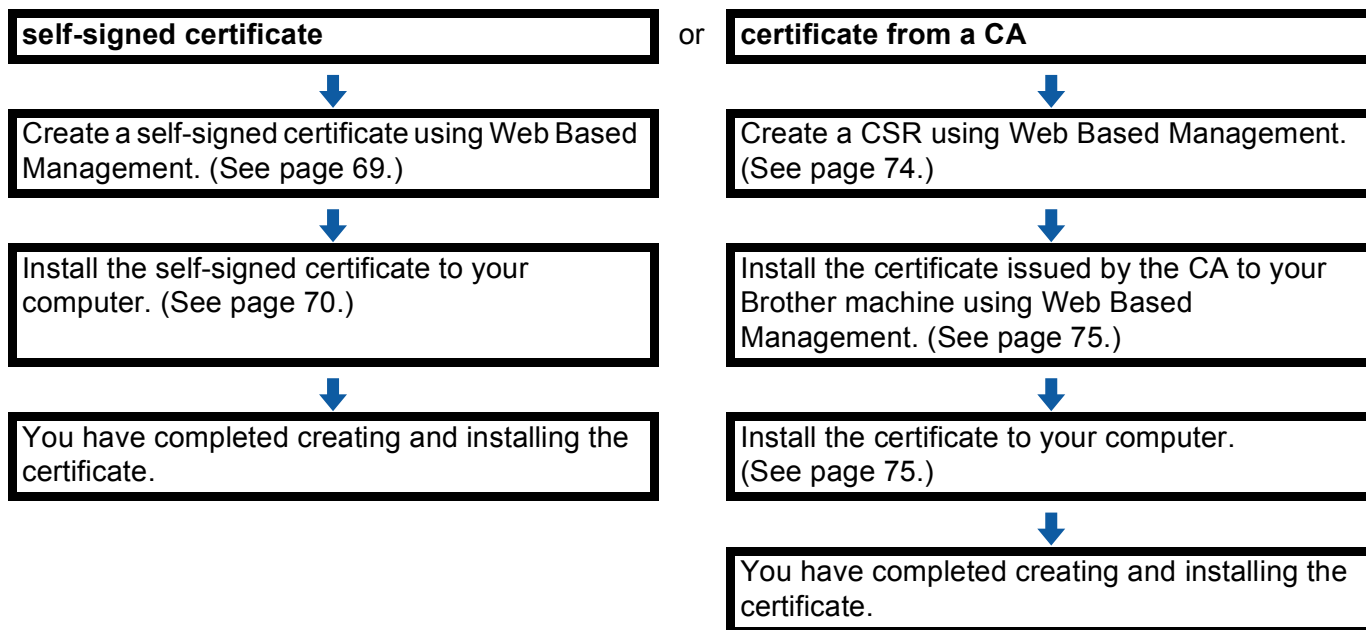


Note

- The functions that are grayed and unlinked indicate they are not available.
- For more information on configuration, see the Help text in the Web Based Management.

Creating and installing a certificate

Step by step chart for creating and installing a certificate



How to create and install a self-signed certificate

- 1 Click **Create Self-Signed Certificate** on the **Certificate** page.
- 2 Enter a **Common Name** and a **Valid Date**.

Note

- The length of the **Common Name** is less than 64 byte. Enter an identifier such as an IP address, node name or domain name to use when accessing this machine through SSL/TLS communication. The node name is displayed by default.
- A warning will pop-up if you use the IPPS or HTTPS protocol and enter a different name in the URL than the **Common Name** that was used for the self-signed certificate.


- 3 You can choose the **Public Key Algorithm** and **Digest Algorithm** settings from the pull-down list. The default settings are **RSA(2048bit)** for **Public Key Algorithm** and **SHA256** for **Digest Algorithm**.
- 4 Click **Submit**.
- 5 The self-signed certificate is created and saved in your machine's memory successfully. To use SSL/TLS communication, the self-signed certificate also needs to be installed on your computer. Proceed to the next section.

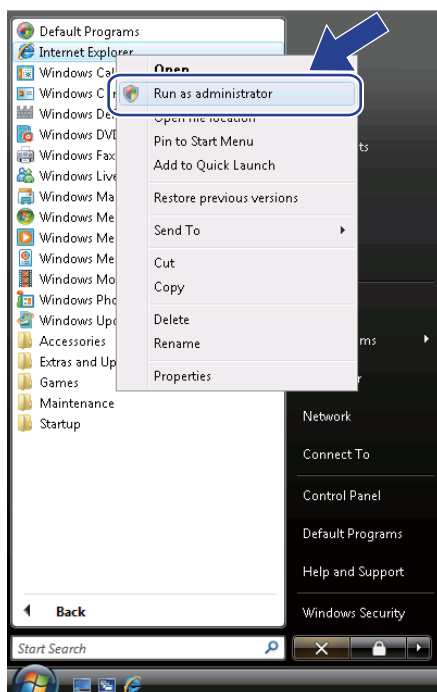
How to install the self-signed certificate on your computer

Note

The following steps are for Windows® Internet Explorer®. If you use another web browser, follow the help text of the web browser itself.

For Windows Vista®, Windows® 7 and Windows Server® 2008 users that have administrator rights

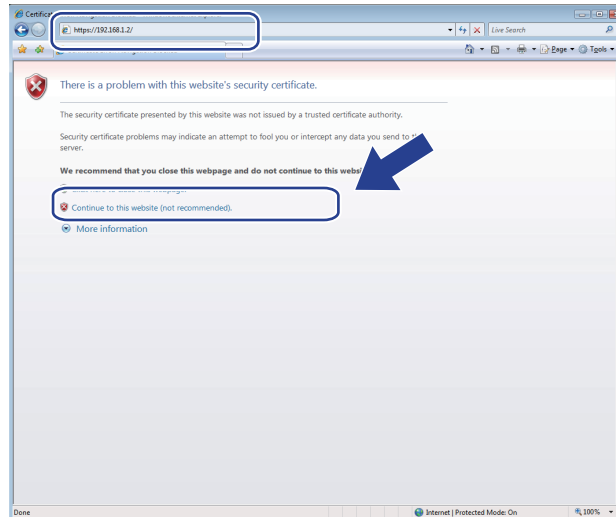
- 1 Click the  button and **All Programs**.
- 2 Right-click **Internet Explorer**, and then click **Run as administrator**.



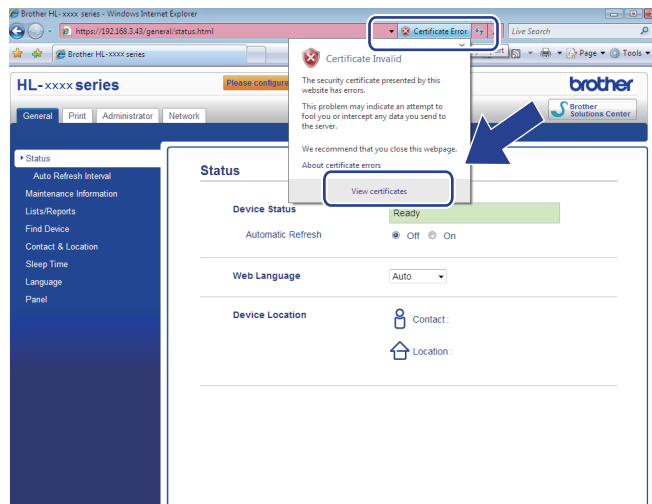
Note

If the **User Account Control** screen appears,
(Windows Vista®) Click **Continue (Allow)**.
(Windows® 7) Click **Yes**.

- 3 Type “https://machine’s IP address/” into your browser to access your machine (where “machine’s IP address” is the machine’s IP address or the node name that you assigned for the certificate). Then, click **Continue to this website (not recommended)**..



- 4 Click **Certificate Error**, and then click **View certificates**. For the rest of the instructions, follow the steps from step 4 in *For Windows® XP and Windows Server® 2003 users* >>> page 72.

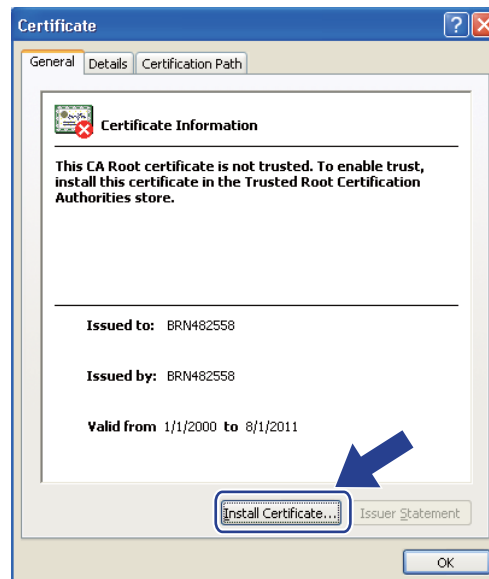


For Windows® XP and Windows Server® 2003 users

- 1 Start your web browser.
- 2 Type “https://machine’s IP address/” into your browser to access your machine (where “machine’s IP address” is the IP address or the node name that you assigned for the certificate).
- 3 When the following dialog appears, click **View Certificate**.

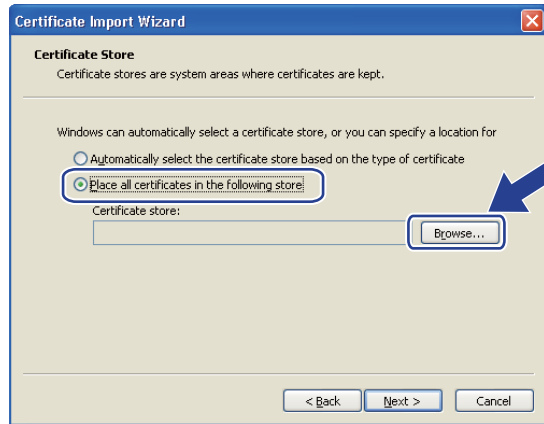


- 4 Click **Install Certificate...** from the **General** tab.



- 5 When the **Certificate Import Wizard** appears, click **Next**.

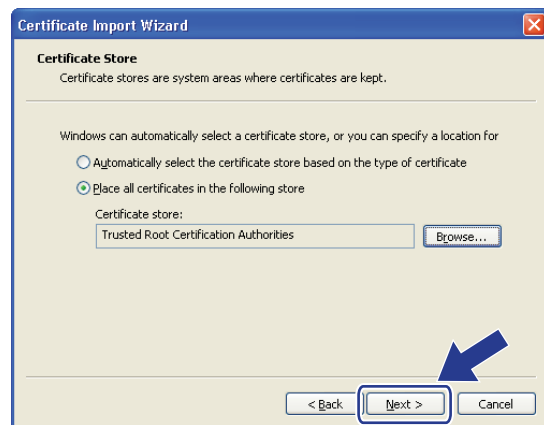
- 6 Choose **Place all certificates in the following store** and then click **Browse...**



- 7 Choose **Trusted Root Certification Authorities** and then click **OK**.

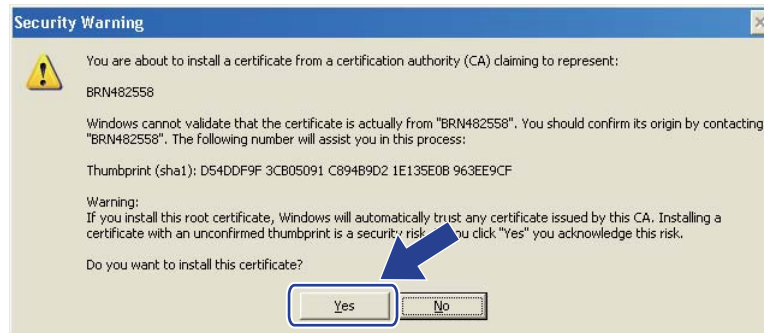


- 8 Click **Next**.



- 9 Click **Finish**.

- 10 Click **Yes**, if the fingerprint (thumbprint) is correct.



Note

The fingerprint (thumbprint) is printed on the Printer Settings Page (See *Printing the Printer Settings Page (For HL-5450DN(T))* >> page 41) or Network Configuration Report (See *Printing the Network Configuration Report (For HL-5470DW(T) and HL-6180DW(T))* >> page 41).

- 11 Click **OK**.
- 12 The self-signed certificate is now installed on your computer, and SSL/TLS communication is available.

How to create a CSR

- 1 Click **Create CSR** on the **Certificate** page.
- 2 Enter a **Common Name** and your information, such as **Organization**.



Note

- We recommend that the Root Certificate from the CA be installed on your computer before creating the CSR.
 - The length of the **Common Name** is less than 64 byte. Enter an identifier such as an IP address, node name or domain name to use when accessing this printer through SSL/TLS communication. The node name is displayed by default. The **Common Name** is required.
 - A warning will pop-up if you enter a different name in the URL than the Common Name that was used for the certificate.
 - The length of the **Organization**, the **Organization Unit**, the **City/Locality** and the **State/Province** is less than 64 byte.
 - The **Country/Region** should be an ISO 3166 country code composed of two characters.
 - If you are configuring X.509v3 certificate extension, choose the **Configure extended partition** check box and then choose **Auto (Register IPv4)** or **Manual**.
- 3 You can choose the **Public Key Algorithm** and **Digest Algorithm** settings from the pull-down list. The default settings are **RSA(2048bit)** for **Public Key Algorithm** and **SHA256** for **Digest Algorithm**.
- 4 Click **Submit**.
- 5 When the contents of the CSR appear, click **Save** to save the CSR file to your computer.

- 6 The CSR is created.



Note

- Follow your CA policy regarding the method to send a CSR to your CA.
- If you are using Enterprise root CA of Windows Server® 2003/2008, we recommend using the **Web Server** for the certificate template when creating the Client Certificate for secure management. If you are creating a Client Certificate for an IEEE 802.1x environment with EAP-TLS authentication, we recommend using **User** for the certificate template. For more information, see the SSL communication page from the top page for your model at <http://solutions.brother.com/>.

How to install the certificate to your machine

When you receive the certificate from a CA, follow the steps below to install it into the print server.



Note

Only a certificate issued with this machine's CSR can be installed. When you want to create another CSR, make sure that the certificate is installed before creating another CSR. Create another CSR after installing the certificate to the machine. Otherwise the CSR you have made before installing will be invalid.

- 1 Click **Install Certificate** on the **Certificate** page.
- 2 Specify the file of the certificate that has been issued by a CA, and then click **Submit**.
- 3 Now the certificate is created and saved in your machine memory successfully.
To use SSL/TLS communication, the Root Certificate from the CA needs to be installed on your computer. Contact your network administrator about installation.

Import and export the certificate and private key

You can store the certificate and private key on the machine and manage them by importing and exporting.

How to import the self-signed certificate, the certificate issued by a CA, and the private key

- 1 Click **Import Certificate and Private Key** on the **Certificate** page.
- 2 Specify the file that you want to import.
- 3 Enter the password if the file is encrypted, and then click **Submit**.
- 4 Now the certificate and private key are imported to your machine successfully.
To use SSL/TLS communication, the Root Certificate from the CA needs to also be installed on your computer. Contact your network administrator about the installation.

How to export the self-signed certificate, the certificate issued by a CA, and the private key

- 1 Click **Export** shown with **Certificate List** on the **Certificate** page.
- 2 Enter the password if you want to encrypt the file.

**Note**

If a blank password is used, the output is not encrypted.

- 3 Enter the password again for confirmation, and then click **Submit**.
- 4 Specify the location where you want to save the file.
- 5 Now the certificate and private key are exported to your computer.

**Note**

You can import the file that you exported.

Managing multiple certificates

This multiple certificate feature allows you to manage each certificate that you have installed using Web Based Management. After installing certificates, you can view what certificates are installed from the **Certificate** page and then view each certificate's content, delete or export the certificate. For information on how to access the **Certificate** page, see *Configure certificate using Web Based Management* >> page 68. The Brother machine allows you to store up to three self-signed certificates or up to three certificates issued by a CA. You can use the stored certificates for using the HTTPS/IPPS protocol or IEEE 802.1x authentication.

You can also store up to four CA certificates for using IEEE 802.1x authentication and SSL for SMTP/POP3.

We recommend you store one certificate less and keep the last free to deal with certificate expiration. For example, if you want to store a CA certificate, store three certificates and leave one storage as a backup. In the case of re-issuing the certificate, such as when the certificate is expired, you can import a new certificate to the backup and then you can delete the expired certificate, to avoid configuration failure.

**Note**

When you use HTTPS/IPPS protocol or IEEE 802.1x, you must choose which certificate you are using.

Import and export a CA certificate

You can store a CA certificate on the machine by importing and exporting.

How to import a CA certificate

- 1 Click **CA Certificate** on the **Security** page.
- 2 Click **Import CA Certificate** and choose the certificate. Click **Submit**.

How to export a CA certificate

- 1 Click **CA Certificate** on the **Security** page.
- 2 Choose the certificate you want to export and click **Export**. Click **Submit**.

Overview

This chapter explains how to resolve typical network problems you may encounter when using the Brother machine. If, after reading this chapter, you are unable to resolve your problem, please visit the Brother Solutions Center at: <http://solutions.brother.com/>.

Please go to the Brother Solutions Center at <http://solutions.brother.com/> and click Manuals on your model page to download the other manuals.

Identifying your problem

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 machine is turned on.
The access point (for wireless), router or hub are turned on and its link button is blinking.
All protective packaging has been removed from the machine.
The toner cartridges and drum unit are installed properly.
The front and back covers are fully closed.
Paper is inserted properly in the paper tray.
(For wired networks) A network cable is securely connected to the Brother machine and the router or hub.

Go to the page for your solution from the lists below

- I cannot complete the wireless network setup configuration. (See page 79.)
- The Brother machine is not found on the network during the printer driver installation. (See page 79.)
- The Brother machine cannot print over the network. (See page 80.)
- The Brother machine is not found on the network even after successful installation. (See page 80.)
- I'm using security software. (See page 82.)
- I want to check that my network devices are working properly. (See page 83.)

I cannot complete the wireless network setup configuration.

Question	Interface	Solution
My machine does not connect during wireless setup?	wireless	Turn your wireless router Off and back On. Then try and configure the wireless settings again.
Are your security settings (SSID/Network Key) correct?	wireless	<ul style="list-style-type: none"> ■ Reconfirm and choose the correct security settings. <ul style="list-style-type: none"> • 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. ■ For information on what the SSID and Network Key are, see <i>Wireless network terms and concepts (For HL-5470DW(T) and HL-6180DW(T))</i> >> page 96.
Are you using MAC address filtering?	wireless	Confirm the MAC address of the Brother machine is allowed in the filter. You can find the MAC address from the Brother machine's control panel. (See <i>Function table and default factory settings</i> >> page 43.)
Is your WLAN access point/router in a stealth mode? (not broadcasting the SSID)	wireless	<ul style="list-style-type: none"> ■ 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. (For more information, see <i>Configuring your machine when the SSID is not broadcast</i> >> page 20.)
I have checked and tried all of the above, but still cannot complete the wireless configuration. Is there anything else I can do?	wireless	Use the Network Connection Repair Tool. See <i>The Brother machine cannot print over the network. The Brother machine is not found on the network even after successful installation.</i> >> page 80.

7

The Brother machine is not found on the network during the printer driver installation.


Question	Interface	Solution
Is your machine connected to the network and does it have a valid IP address?	wired/ wireless	<p>Print the Printer Settings Page or Network Configuration Report and check that Ethernet Link Status or Wireless Link Status is Link OK. See <i>Printing the Printer Settings Page (For HL-5450DN(T))</i> >> page 41 or <i>Printing the Network Configuration Report (For HL-5470DW(T) and HL-6180DW(T))</i> >> page 41.</p> <p>If the report shows Failed To Associate or Link DOWN, ask your network administrator whether your IP address is valid or not.</p>
Are you using security software?	wired/ wireless	<ul style="list-style-type: none"> ■ Choose to search for the Brother machine again on the installer dialog. ■ Allow access when the alert message of the security software appears during the printer driver installation. ■ For more information about security software, see <i>I'm using security software.</i> >> page 82.

The Brother machine is not found on the network during the printer driver installation. (continued)

Question	Interface	Solution
Is your Brother machine placed too far from the WLAN access point/router?	wireless	Place your Brother machine 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 machine and the WLAN access point/router?	wireless	Move your Brother machine 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 machine or the WLAN access point/router?	wireless	Move all the devices away from the Brother machine or WLAN access point/router.




The Brother machine cannot print over the network.

The Brother machine is not found on the network even after successful installation.

Question	Interface	Solution
Are you using security software?	wired/ wireless	See <i>I'm using security software.</i> >> page 82.
Is your Brother machine assigned with an available IP address?	wired/ wireless	<ul style="list-style-type: none"> ■ Confirm the IP address and the Subnet Mask Verify that both the IP addresses and Subnet Masks of your computer and the Brother machine 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 or visit the Brother Solutions Center at http://solutions.brother.com/. ■ (Windows®) Confirm the IP address and the Subnet Mask using the Network Connection Repair Tool. Use the Network Connection Repair Tool to fix the Brother machine's network settings. It will assign the correct IP address and the Subnet Mask. To use the Network Connection Repair Tool, ask the network administrator for the details and then follow the steps below: <p> Note</p> <ul style="list-style-type: none"> • (Windows® XP/XP Professional x64 Edition/Windows Vista®/Windows® 7) You must log on with Administrator rights. • Make sure that the Brother machine is turned on and is connected to the same network as your computer.



The Brother machine cannot print over the network.

The Brother machine is not found on the network even after successful installation. (continued)

Question	Interface	Solution
<p>Is your Brother machine assigned with an available IP address? (continued)</p>	<p>wired/ wireless</p>	<p>1 (Windows® XP, Windows Server® 2003/2008) Click the Start button, All Programs, Accessories and Windows Explorer, and then My Computer (Computer). (Windows Vista®/Windows® 7) Click the  button and Computer.</p> <p>2 Double-click Local Disk (C:), Program Files or Program Files (x86) for 64-bit OS users, Browny02, Brother, BrotherNetTool.exe to run the program.</p> <p> Note</p> <hr/> <p>If the User Account Control screen appears, (Windows Vista®) Click Continue. (Windows® 7) Click Yes. (Windows Server® 2008) Type password and then click OK.</p> <hr/> <p>3 Follow the on-screen instructions.</p> <p>4 Check the diagnosis by printing the Printer Settings Page or Network Configuration Report. See <i>Printing the Printer Settings Page (For HL-5450DN(T))</i> >> page 41 or <i>Printing the Network Configuration Report (For HL-5470DW(T) and HL-6180DW(T))</i> >> page 41.</p> <p> Note</p> <hr/> <p>The Network Connection Repair Tool will start automatically if you check the Enable Connection Repair Tool box using Status Monitor. Right-click on the Status Monitor screen, click Options, Details and then click the Diagnostic tab. This is not recommended when your network administrator has set the IP address to static, since it will automatically change the IP address.</p> <hr/> <p>If the correct IP address and the Subnet mask are still not assigned even after using the Network Connection Repair Tool, ask the network administrator for this information, or visit the Brother Solutions Center at http://solutions.brother.com/.</p>

The Brother machine cannot print over the network.

The Brother machine is not found on the network even after successful installation. (continued)

Question	Interface	Solution
Did your previous printing job fail?	wired/ wireless	<ul style="list-style-type: none"> ■ If the failed printing job is still in the print queue of your computer, delete it. ■ Double-click the printer icon in the following folder and then choose the Cancel All Documents in the Printer menu: (Windows® XP/Windows Server® 2003) Start and Printers and Faxes. (Windows Vista®)  Control Panel, Hardware and Sound and then Printers. (Windows® 7)  Devices and Printers and then Printers and Faxes. (Windows Server® 2008) Start, Control Panel and Printers.
Are you connecting the Brother machine to the network using wireless capabilities?	wireless	<ul style="list-style-type: none"> ■ Print the WLAN report to confirm the state of the wireless connection. (For how to print, see <i>Printing the WLAN report (For HL-5470DW(T) and HL-6180DW(T))</i> >> page 42.) If there is an error code on the printed WLAN report: >> Quick Setup Guide: <i>Troubleshooting</i>. ■ See <i>The Brother machine is not found on the network during the printer driver installation.</i> >> page 79.
I have checked and tried all of above, however the Brother machine does not print. Is there anything else I can do?	wired/ wireless	Uninstall the printer driver and reinstall it.

I'm using security software.

Question	Interface	Solution
Did you choose to accept the security alert dialog during the printer driver installation, applications' start-up process or when using the printing features?	wired/ wireless	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'm using security software. (continued)

Question	Interface	Solution
I want to know the necessary port number for the security software settings.	wired/ wireless	<p>The following port numbers are used for Brother network features:</p> <ul style="list-style-type: none"> ■ Network printing ¹ → Port number 161 and 137/ Protocol UDP ■ BRAdmin Light ¹ → Port number 161 / Protocol UDP <p>¹ Windows® only.</p> <p>For details on how to open the port, see the instructions of the security software or ask the manufacturer.</p>

I want to check my network devices are working properly.

Question	Interface	Solution
Is your Brother machine, access point/router or network hub turned on?	wired/ wireless	Make sure you have confirmed all instructions in <i>First check the following:</i> >> page 78.
Where can I find my Brother machine's network settings, such as IP address?	wired/ wireless	Print the Printer Settings Page or Network Configuration Report. See <i>Printing the Printer Settings Page (For HL-5450DN(T))</i> >> page 41 or <i>Printing the Network Configuration Report (For HL-5470DW(T) and HL-6180DW(T))</i> >> page 41.
How can I check the link status of my Brother machine?	wired/ wireless	<p>Print the Printer Settings Page or Network Configuration Report and check that Ethernet Link Status or Wireless Link Status is Link OK. See <i>Printing the Printer Settings Page (For HL-5450DN(T))</i> >> page 41 or <i>Printing the Network Configuration Report (For HL-5470DW(T) and HL-6180DW(T))</i> >> page 41.</p> <p>If the Link Status shows Link DOWN or Failed To Associate, start over again from the <i>First check the following:</i> >> page 78.</p>
Can you “ping” the Brother machine from your computer?	wired/ wireless	<p>Ping the Brother machine from your computer using the IP address or the node name.</p> <ul style="list-style-type: none"> ■ Successful – Your Brother machine is working correctly and connected to the same network as your computer. ■ Unsuccessful – Your Brother machine is not connected to the same network as your computer. <p>(Windows®) Ask the network administrator and use the Network Connection Repair Tool to fix the IP address and the subnet mask automatically. For the detail of the Network Connection Repair Tool, see (Windows®) <i>Confirm the IP address and the Subnet Mask using the Network Connection Repair Tool.</i> in <i>Is your Brother machine assigned with an available IP address?</i> >> page 80.</p> <p>(Macintosh) Confirm the IP address and the Subnet Mask are set correctly. See <i>Confirm the IP address and the Subnet Mask</i> in <i>Is your Brother machine assigned with an available IP address?</i> >> page 80.</p>

I want to check my network devices are working properly. (continued)

Question	Interface	Solution
Is the Brother machine connecting to the wireless network?	wireless	Print the WLAN report to confirm the state of the wireless connection. For how to print, see <i>Printing the WLAN report (For HL-5470DW(T) and HL-6180DW(T))</i> >> page 42. If there is an error code on the printed WLAN report: >> Quick Setup Guide: <i>Troubleshooting</i> .
I have checked and tried all of the above, however, I'm still having problems. Is there anything else I can do?	wired/ wireless	See the instructions supplied with your WLAN access point/router to find the SSID and the Network Key information and set them correctly. For details of the SSID and the Network Key, See <i>Are your security settings (SSID/Network Key) correct?</i> in <i>I cannot complete the wireless network setup configuration.</i> >> page 79.



Network Glossary

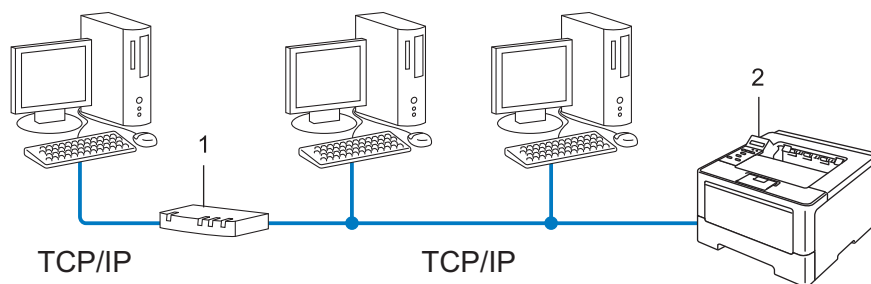
Types of network connections and protocols	86
Configuring your machine for a network	92
Wireless network terms and concepts (For HL-5470DW(T) and HL-6180DW(T))	96
Additional network settings from Windows®	100
Security terms and concepts	103

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 machine sharing.



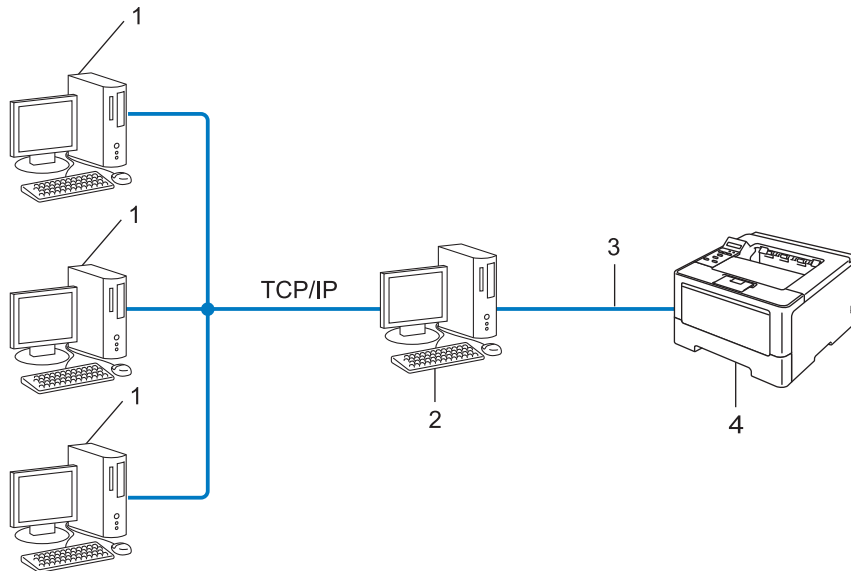
1 Router

2 Network machine (your machine)

- 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 87.
- Each computer must use the TCP/IP Protocol.
- The Brother machine needs an appropriate IP address configuration.
- If you are using a router, the Gateway address must be configured on the computers and the Brother machine.

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, USB or parallel (where available)
- 4 Network machine (your machine)

- 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 machine needs to have an appropriate IP address configuration unless the machine is connected via the USB or the parallel 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 machine 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 machine.



Note

- You can configure the protocol settings by using the HTTP interface (web browser). (See *How to configure the machine settings using Web Based Management (web browser)* >> page 46.)
- To find what protocols your Brother machine supports, see *Supported protocols and security features* >> page 107.
- For information about supported security protocols, see *Security protocols* >> page 104.

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 control panel (for LCD models) of the machine or 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 an information providing service for the NetBIOS name resolution by consolidating an IP address and a NetBIOS name that is in the local network.

LPR/LPD

Commonly used printing protocols on a TCP/IP network.

SMTP client

Simple Mail Transfer Protocol (SMTP) client is used to send E-mails via the Internet or Intranet.

Custom Raw Port (Default is Port 9100)

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

IPP

The Internet Printing Protocol (IPP Version 1.0) allows you to print documents directly to any accessible machine via the internet.



Note

For details of the IPPS protocol, see *Security protocols* >> page 104.

mDNS

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

TELNET

The TELNET protocol allows you to control the remote network devices on a TCP/IP network from your computer.

SNMP

The Simple Network Management Protocol (SNMP) is used to manage network devices including computers, routers and Brother network ready machines. The Brother print server supports SNMPv1, SNMPv2c and SNMPv3.



Note

For details of the SNMPv3 protocol, see *Security protocols* >> page 104.

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.

Web Services

The Web Services protocol enables Windows Vista® or Windows® 7 users to install the drivers used for printing by right-clicking the machine icon from the **Network** folder. (See *Installing drivers used for printing via Web Services (Windows Vista® and Windows® 7)* >> page 100.) The Web Services also lets you check the current status of the machine from your computer.

HTTP

The HTTP protocol is used to transmit the data between a web server and a web browser.



Note

For details of the HTTPS protocol, see *Security protocols* >> page 104.

SNTP

The Simple Network Time Protocol is used to synchronize computer clocks on a TCP/IP network. You can configure the SNTP settings using Web Based Management (web browser). (For the details, see *How to configure the SNTP protocol using Web Based Management* >> page 51.)

CIFS

The Common Internet File System is the standard way that computer users share files and printers in Windows®.

IPv6

IPv6 is the next generation internet protocol. For more information on the IPv6 protocol, visit the model page for the machine you are using at <http://solutions.brother.com/>.

IP addresses, subnet masks and gateways

To use the machine 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 in 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 108.

Using BOOTP to configure the IP address >> page 110.

Using RARP to configure the IP address >> page 109.

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 110.

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: 255.255.255.000

- Computer 2

IP Address: 192.168. 1. 3

Subnet Mask: 255.255.255.000

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.

IEEE 802.1x Authentication

IEEE 802.1x is an IEEE standard for wired and wireless networks that limits access from unauthorized network devices. Your Brother machine (supplicant) sends an authentication request to a RADIUS server (Authentication server) through your access point (authenticator). After your request has been verified by the RADIUS server, your machine can access the network.

Authentication methods

■ LEAP (For wireless network)

Cisco LEAP (Lightweight 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 Tunneling) has been developed by Cisco Systems, Inc. which uses a user ID and password for authentication, and symmetric key algorithms to achieve a tunneled authentication process.

The Brother machine supports the following inner authentication methods:

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

■ EAP-MD5 (For wired network)

EAP-MD5 (Extensible Authentication Protocol-Message Digest Algorithm 5) uses a user ID and password for challenge-response authentication.

■ 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 machine supports the following inner authentications:

- PEAP/MS-CHAPv2
- PEAP/GTC

■ EAP-TTLS

EAP-TTLS (Extensible Authentication Protocol-Tunneled Transport Layer Security) has been developed by Funk Software and Certicom. EAP-TTLS creates a similar encrypted 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 machine 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.

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 and it is technically referred to as SSID. 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 is 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 machine, it will not be able to connect to the wireless network.** Therefore care must be taken when configuring these options. Please see *Supported protocols and security features* >> page 107 for which authentication and encryption methods your Brother wireless machine supports.

Authentication and Encryption methods for a personal wireless network

A personal wireless network is a small network, such as a home wireless network, without IEEE 802.1x support.

If you want to use your machine in an IEEE 802.1x supported wireless network, see *Authentication and Encryption methods for an enterprise wireless network* >> page 98.

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 machine uses the WEP key as the pre-determined key.

■ WPA-PSK/WPA2-PSK

Enables a Wi-Fi Protected Access Pre-shared key (WPA-PSK/WPA2-PSK), which enables the Brother wireless machine 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) provides stronger data protection by using a symmetric-key encryption.



Note

- IEEE 802.11n does not support WEP or TKIP for the encryption method.
 - If you want to connect to your wireless network using IEEE 802.11n, we recommend to choose 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. “WLAN” (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

An enterprise wireless network is a large network, for example using your machine in a business enterprise wireless network, with IEEE 802.1x support. If you configure your machine in an IEEE 802.1x supported wireless network, you can use the following authentication and encryption methods.

Authentication methods

■ LEAP

For LEAP, see *LEAP (For wireless network)* >> page 94.

■ EAP-FAST

For EAP-FAST, see *EAP-FAST* >> page 94.

■ PEAP

For PEAP, see *PEAP* >> page 94.

■ EAP-TTLS

For EAP-TTLS, see *EAP-TTLS* >> page 95.

■ EAP-TLS

For EAP-TLS, see *EAP-TLS* >> page 95.

Encryption methods

- TKIP

For TKIP, see *TKIP* >> page 97.

- AES

For AES, see *AES* >> page 97.

- CKIP

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

User ID and password

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

- LEAP

- EAP-FAST

- PEAP

- EAP-TTLS

- EAP-TLS (For user ID)

Types of additional network settings

The following features are available to use if you want to configure additional network settings.

- Web Services for printing (Windows Vista® and Windows® 7)
- Vertical Pairing (Windows® 7)



Note

Verify the host computer and the machine are either on the same subnet, or that the router is properly configured to pass data between the two devices.

Installing drivers used for printing via Web Services (Windows Vista® and Windows® 7)

The Web Services feature allows you to monitor machines on the network. This also simplifies the driver installation process. Drivers used for printing via Web Services can be installed by right-clicking the printer icon on the computer, and the computer's Web Services port (WSD port) will be created automatically.



Note

- You must configure the IP address on your machine before you configure this setting.
- For Windows Server® 2008, you must install Print Services.

- 1 Insert the installer CD-ROM.
- 2 Choose your CD-ROM drive/**install/driver/gdi/32** or **64**.
- 3 Double-click **DPInst.exe**.





Note

If the **User Account Control** screen appears,

(Windows Vista®) Click **Allow**.

(Windows® 7) Click **Yes**.

- 4 (Windows Vista®)
Click , then choose **Network**.
(Windows® 7)
Click , **Control Panel, Network and Internet**, and then **View network computers and devices**.
- 5 The machine's Web Services Name will be shown with the printer icon. Right-click the machine you want to install.





Note

The Web Services Name for the Brother machine is your model name and the MAC Address (Ethernet Address) of your machine (e.g. Brother HL-XXXX (model name) [XXXXXXXXXXXX] (MAC Address / Ethernet Address)).

- 6 From the pull down menu, click **Install**.

Uninstalling drivers used for printing via Web Services (Windows Vista® and Windows® 7)

To uninstall Web Services from a computer, follow the instructions below.

- 1 (Windows Vista®)
Click , then choose **Network**.
(Windows® 7)
Click , **Control Panel, Network and Internet** and then **View network computers and devices**.
- 2 The machine's Web Services Name will be shown with the printer icon. Right-click the machine you want to uninstall.
- 3 From the pull down menu, click **Uninstall**.

Network printing installation for Infrastructure mode when using Vertical Pairing (Windows® 7)


Windows® Vertical Pairing is a technology to allow your Vertical Pairing supported wireless machine to connect to your Infrastructure network using the PIN Method of WPS and the Web Services feature. This also enables the printer driver installation from the printer icon that is in the **Add a device** screen.

If you are in Infrastructure mode, you can connect your machine to the wireless network and then install the printer driver using this feature. Follow the steps below:



Note

- If you have set your machine's Web Services feature to Off, you must set it back to On. The default setting of the Web Services for the Brother machine is On. You can change the Web Services setting by using Web Based Management (web browser) or BRAdmin Professional 3.
- Make sure your WLAN access point/router includes the Windows® 7 compatibility logo. If you are not sure about the compatibility logo, contact your access point/router manufacturer.
- Make sure your computer includes the Windows® 7 compatibility logo. If you are not sure about the compatibility logo, contact your computer manufacturer.
- If you are configuring your wireless network using an external wireless NIC (Network Interface Card), make sure the wireless NIC includes the Windows® 7 compatibility logo. For more information, contact your wireless NIC manufacturer.
- To use a Windows® 7 computer as a Registrar, you need to register it to your network in advance. See the instruction supplied with your WLAN access point/router.

- 1 Turn on your machine.
- 2 Set your machine in WPS mode (PIN Method).
For how to configure your machine to use the PIN Method
See *Configuration using the PIN Method of WPS (Wi-Fi Protected Setup)* >> page 29.
- 3 Click the  button and then **Devices and Printers**.
- 4 Choose **Add a device** on the **Devices and Printers** dialog.
- 5 Choose your machine and input the PIN which your machine has indicated.
- 6 Choose the Infrastructure network that you want to connect to, and then click **Next**.
- 7 When your machine appears in the **Devices and Printers** dialog, the wireless configuration and the printer driver installation are successfully completed.

Security features

Security terms

■ CA (Certificate Authority)

A CA is an entity that issues digital certificates (especially X.509 certificates) and vouches for the binding between the data items in a certificate.

■ CSR (Certificate Signing Request)

A CSR is a message sent from an applicant to a CA in order to apply for issue of a certificate. The CSR contains information identifying the applicant, the public key generated by the applicant and the digital signature of the applicant.

■ Certificate

A Certificate is the information that binds together a public key with an identity. The certificate can be used to verify that a public key belongs to an individual. The format is defined by the x.509 standard.

■ CA Certificate

A CA Certificate is the certification that identifies the CA (Certificate Authority) itself and owns its private key. It verifies a certificate issued by the CA.

■ Digital signature

A Digital signature is a value computed with a cryptographic algorithm and appended to a data object in such a way that any recipient of the data can use the signature to verify the data's origin and integrity.

■ Public key cryptosystem

A Public key cryptosystem is a modern branch of cryptography in which the algorithms employ a pair of keys (a public key and a private key) and use a different component of the pair for different steps of the algorithm.

■ Shared key cryptosystem

A Shared key cryptosystem is a branch of cryptography involving algorithms that use the same key for two different steps of the algorithm (such as encryption and decryption).

Security protocols

SSL (Secure Socket Layer) / TLS (Transport Layer Security)

These security communication protocols encrypt data to prevent security threats.

HTTPS

The version of the internet protocol Hyper text Transfer Protocol (HTTP) that uses SSL.

IPPS

The version of the printing protocol Internet Printing Protocol (IPP Version 1.0) that uses SSL.

SNMPv3

The Simple Network Management Protocol version 3 (SNMPv3) provides user authentication and data encryption to manage network devices securely.

Security methods for E-mail Sending



Note

You can configure the security methods settings using Web Based Management (web browser). For the details, see *How to configure the machine settings using Web Based Management (web browser)* >> page 46.

POP before SMTP (PbS)

The user authentication method for sending E-mail from a client. The client is given permission to use the SMTP server by accessing the POP3 server before sending the E-mail.

SMTP-AUTH (SMTP Authentication)

SMTP-AUTH expands SMTP (the Internet E-mail sending protocol) to include an authentication method that ensures the true identity of the sender is known.

APOP (Authenticated Post Office Protocol)

APOP expands POP3 (the Internet receiving protocol) to include an authentication method that encrypts the password when the client receives E-mail.

SMTP over SSL

SMTP over SSL feature enables sending encrypted E-mail using SSL.

POP over SSL

POP over SSL feature enables receiving encrypted E-mail using SSL.



Appendixes

Appendix A

107

Appendix B

108

Supported protocols and security features

Interface	Ethernet	10/100BASE-TX, 1000BASE-T ¹
	Wireless ²	IEEE 802.11b/g/n (Infrastructure mode) IEEE 802.11b (Ad-hoc mode)
Network (common)	Protocol (IPv4)	ARP, RARP, BOOTP, DHCP, APIPA (Auto IP), WINS/NetBIOS name resolution, DNS Resolver, mDNS, LLMNR responder, LPR/LPD, Custom Raw Port/Port9100, IPP/IPPS, FTP Server, TELNET Server, HTTP/HTTPS server, TFTP client and server, SMTP Client, SNMPv1/v2c/v3, ICMP, Web Services (Print), CIFS client, SNTTP client
	Protocol (IPv6)	NDP, RA, DNS resolver, mDNS, LLMNR responder, LPR/LPD, Custom Raw Port/Port9100, IPP/IPPS, FTP Server, TELNET Server, HTTP/HTTPS server, TFTP client and server, SMTP Client, SNMPv1/v2c/v3, ICMPv6, Web Services (Print), CIFS Client, SNTTP Client
Network (Security)	Wired	SSL/TLS (IPPS, HTTPS), SNMP v3, 802.1x (EAP-MD5, EAP-FAST, PEAP, EAP-TLS, EAP-TTLS), Kerberos
	Wireless ²	WEP 64/128 bit, WPA-PSK (TKIP/AES), WPA2-PSK (AES), SSL/TLS (IPPS, HTTPS), SNMP v3, 802.1x (LEAP, EAP-FAST, PEAP, EAP-TLS, EAP-TTLS), Kerberos
E-mail (Security)	Wired and Wireless ²	APOP, POP before SMTP, SMTP-AUTH, SSL/TLS (SMTP/POP)
Network (Wireless) ²	Wireless Certification	Wi-Fi Certification Mark License (WPA™/WPA2™ - Enterprise, Personal), Wi-Fi Protected Setup™ (WPS) Identifier Mark License, AOSS Logo, Wi-Fi CERTIFIED Wi-Fi Direct™

¹ For HL-6180DW(T)

² For HL-5470DW(T) and HL-6180DW(T)

Using services

A service is a resource that can be accessed by computers that wish to print to the Brother print server. The Brother print server provides the following predefined services (do a `SHOW SERVICE` command in the Brother print server remote console to see a list of available services): Enter `HELP` at the command prompt for a list of supported commands.

Service (Example)	Definition
BINARY_P1	TCP/IP binary
TEXT_P1	TCP/IP text service (adds carriage return after each line feed)
PCL_P1	PCL service (switches PJL-compatible machine to PCL mode)
BRNxxxxxxxxxxxx	TCP/IP binary
BRNxxxxxxxxxxxx_AT	PostScript® service for Macintosh
POSTSCRIPT_P1	PostScript® service (switches PJL-compatible machine to PostScript® mode)

Where “xxxxxxxxxxxx” is your machine’s MAC Address (Ethernet Address).

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, 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 machine’s control panel Network menu (for LCD models), BRAdmin applications or Web Based Management (web browser).

Using RARP to configure the IP address

Before you configure the IP address using RARP, you must set the machine's Boot Method to RARP. To change the Boot Method, use the machine's control panel Network menu (for LCD models), BRAdmin applications or Web Based Management (web browser).

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 another command; type `man rarpd` or refer to your system documentation for additional information). To verify that the RARP daemon is running on a Berkeley UNIX based system, type the following command:

```
ps -ax | grep -v grep | grep rarpd
```

For AT&T UNIX-based systems, type:

```
ps -ef | grep -v grep | grep rarpd
```

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

Using BOOTP to configure the IP address

Before you configure the IP address using BOOTP, you must set the machine's Boot Method to BOOTP. To change the Boot Method, use the machine's control panel Network menu (for LCD models), BRAdmin applications or Web Based Management (web browser).

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 (many UNIX systems also have template examples in the `bootptab` file that you can use for reference). 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 machine 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 its 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 the control panel of the machine (for LCD models), BRAdmin Light or Web Based Management (web browser).

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 as well as UNIX systems. 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
```

■ UNIX/Linux systems

Typically, UNIX and Linux systems require the colon “:” 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).

Using the TELNET console to configure the IP address

You can also use the TELNET command to change the IP address.

TELNET is an effective method to change the machine's IP address. But a valid IP address must already be programmed into the print server.

Type `TELNET <command line>` at the command prompt of the system prompt, where `<command line>` is the IP address of the print server. When you are connected, push the Return or Enter key to get the “#” prompt. Enter the password “**access**” (the password will not appear on the screen).

You will be prompted for a user name. Enter anything in response to this prompt.

You will then get the `Local>` prompt. Type `SET IP ADDRESS ipaddress`, where `ipaddress` is the desired IP address you wish to assign to the print server (check with your network administrator for the IP address to use). For example:

```
Local> SET IP ADDRESS 192.168.1.3
```

You will now need to set the subnet mask by typing `SET IP SUBNET subnet mask`, where `subnet mask` is the desired subnet mask you wish to assign to the print server (check with your network administrator for the subnet mask to use). For example:

```
Local> SET IP SUBNET 255.255.255.0
```

If you do not have any subnets, use one of the following default subnet masks:

255.0.0.0 for class A networks

255.255.0.0 for class B networks

255.255.255.0 for class C networks

The leftmost group of digits in your IP address can identify the type of network you have. The value of this group ranges from 1 through 127 for Class A networks (e.g. 13.27.7.1), 128 through 191 for Class B networks (e.g. 128.10.1.30), and 192 through 255 for Class C networks (e.g. 192.168.1.4).

If you have a gateway (router), enter its address with the command `SET IP ROUTER routeraddress`, where `routeraddress` is the desired IP address of the gateway you wish to assign to the print server. For example:

```
Local> SET IP ROUTER 192.168.1.4
```

Type `SET IP METHOD STATIC` to set the method of IP access configuration to static.

To verify that you have entered the IP information correctly, type `SHOW IP`.

Type `EXIT` or `Ctrl-D` (i.e. hold down the control key and type “D”) to end the remote console session.

A

Ad-hoc mode	11, 32
AES	97
AOSS™	27, 38
APIPA	37, 88, 110
APOP	105
ARP	88, 111
Authentication	97

B

BINARY_P1	108
BOOTP	88, 110
BRAdmin Light	2, 4
BRAdmin Professional 3	2, 7, 60
BRNxxxxxxxxxxxx	108
BRNxxxxxxxxxxxx_AT	108
BRPrint Auditor	8

C

CA	103
CA Certificate	103
Certificate	66, 103
Channels	96
CIFS	91
CKIP	99
Control Panel	35
CSR	103
Custom Raw Port	89

D

DHCP	88, 108
Digital signature	103
DNS client	89
Driver Deployment Wizard	2

E

EAP-FAST	94
EAP-MD5	94
EAP-TLS	95
EAP-TTLS	95
Encryption	97
Ethernet	38

F

Factory default	40
-----------------------	----

G

Gateway	37
---------------	----

H

HTTP	46, 90
HTTPS	58, 104

I

IEEE 802.1x	14, 17, 94
Infrastructure mode	10
IP address	36, 92
IP Boot Tries	37
IPP	89
IPPS	61, 104
IPv6	37, 91

L

LEAP	94
LLMNR	90
LPR/LPD	89

M

MAC Address	5, 6, 7, 39, 41, 101, 108, 109, 110, 111
mDNS	89

N

NetBIOS name resolution	89
Network Configuration Report	41
Network Connection Repair Tool	80
Network Key	98
Network shared printing	87

O

Open system	97
-------------------	----

P

PBC	27, 38
PCL_P1	108
PEAP	94
Peer-to-Peer	86
PIN Method	29, 38
POP before SMTP	62, 105
POP over SSL	105
Port 9100	89
POSTSCRIPT_P1	108
Printer Settings Page	41
Protocol	88
Public key cryptosystem	103

R

RARP	88, 109
Reset the network settings	40
RFC 1001	108

S

Security terms	103
Service	108
Shared key	97
Shared key cryptosystem	103
SMTP client	89
SMTP over SSL	105
SMTP-AUTH	62, 105
SNMP	90
SNMPv3	58, 104
SNTIP	91
SSID	96
SSL/TLS	66, 104
Status Monitor	2
Subnet mask	37, 93
Supported protocols and security features	107

T

TCP/IP	36, 43, 44, 88
TELNET	90, 112
TEXT_P1	108
TKIP	97

V

Vertical Pairing	2, 100
------------------------	--------

W

Web Based Management (web browser)	2, 7, 58
Web Services	90, 100, 101
WEP	97
WINS	89
Wireless network	9, 96
WLAN report	42, 82, 84
WPA-PSK/WPA2-PSK	97
WPS (Wi-Fi Protected Setup)	27, 29, 38