

BELKIN®

Wireless G Universal Range Extender

BELKIN®

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BELKIN®

Wireless G Universal Range Extender

Increase your wireless coverage



User Manual

Share



802.11g

F5D7132

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Introduction

Thank you for purchasing the Belkin Wireless G Universal Range Extender (WURE) and welcome to the world of wireless networking. Now you can take advantage of this new high-speed wireless technology and gain the freedom to connect to your home or office network without using cables. This product acts as a wireless range extender and access point. The easy installation and setup will have you networking wirelessly in minutes. Please be sure to read through this User Manual completely, and pay special attention to the section entitled “Placement of your Wireless Networking Hardware for Optimal Performance” on the next page. By following our simple setup instructions, you will be able to use your Belkin Home Network to:

- Share one high-speed Internet connection with all the computers in your home
- Share resources, such as files, and hard drives among all the connected computers in your home
- Share a single printer among the entire family
- Share documents, music, video, and digital pictures
- Store, retrieve, and copy files from one computer to another
- Simultaneously play games online, check Internet email, and chat

Advantages of a Wireless Network

- **Mobility** – you no longer need a dedicated “computer room”—now you can work on a networked laptop or desktop computer anywhere within your wireless range
- **Easy installation** – Belkin Easy Installation Wizards make setup simple
- **Flexibility** – set up and access printers, computers, and other networking devices from anywhere in your home
- **Easy expansion** – the wide range of Belkin networking products let you expand your network to include devices such as printers and gaming consoles
- **No cabling required** – you can spare the expense and hassle of retrofitting Ethernet cabling throughout the home or office
- **Widespread industry acceptance** – choose from a wide range of interoperable networking products

Placement of your Wireless Networking Hardware for Optimal Performance

Your wireless connection will be stronger the closer your computer is to your wireless router (or access point). Typical indoor operating range for your wireless devices is between 100 and 200 feet. In the same way, your wireless connection and performance will degrade somewhat as the distance between your wireless router (or access point) and connected devices increases. This may or may not be noticeable to you. As you move farther from your wireless router (or access point), connection speed may decrease. Factors that can weaken signals simply by getting in the way of your network's radio waves are metal appliances or obstructions, and walls.

If you have concerns about your network's performance that might be related to range or obstruction factors, try moving the computer to a position between five and 10 feet from the wireless router (or access point) in order to see if distance is the problem. If difficulties persist even at close range, please contact Belkin Technical Support.

Note: While some of the items listed below can affect network performance, they will not prohibit your wireless network from functioning. If you are concerned that your network is not operating at its maximum effectiveness, this checklist may help.

1. Wireless Router (or Access Point) Placement

Place your wireless router (or access point), the central connection point of your network, as close as possible to the center of your wireless network devices.

To achieve the best wireless network coverage for your "wireless clients" (i.e., computers enabled by Belkin Wireless Notebook Network Cards, Wireless Desktop Network Cards, and Wireless USB Adapters):

- Ensure that your wireless router's (or access point's) networking antennas are parallel to each other, and are positioned vertically (toward the ceiling). If your wireless router (or access point) itself is positioned vertically, point the antennas as much as possible in an upward direction.
- In multistory homes, place the wireless router (or access point) on a floor that is as close to the center of the home as possible. This may mean placing the wireless router (or access point) on an upper floor.
- Try not to place the wireless router (or access point) near a cordless 2.4GHz phone.

2. Avoid Obstacles and Interference

Avoid placing your wireless router (or access point) near devices that may emit radio “noise,” such as microwave ovens. Dense objects that can inhibit wireless communication include:

- Refrigerators
- Washers and/or dryers
- Metal cabinets
- Large aquariums
- Metallic-based, UV-tinted windows

If your wireless signal seems weak in some spots, make sure that objects such as these are not blocking the signal’s path (between your computers and wireless router or access point).

3. Cordless Phone Placement

If the performance of your wireless network is impaired after attending to the above issues, and you have a cordless phone:

- Try moving cordless phones away from wireless routers (or access points) and your wireless-enabled computers.
- Unplug and remove the battery from any cordless phone that operates on the 2.4GHz band (check the manufacturer’s information). If this fixes the problem, your phone may be interfering.
- If your phone supports channel selection, change the channel on the phone to the farthest channel from your wireless network. For example, change the phone to channel 1 and move your wireless router (or access point) to channel 11. See your phone’s user manual for detailed instructions.
- If necessary, consider switching to a 900MHz or 5GHz cordless phone.

4. Choose the “quietest” channel for your wireless network

In locations where homes or offices are close together, such as apartment buildings or office complexes, there may be wireless networks nearby that can conflict with yours.

Use the Site Survey capabilities found in the Wireless LAN Utility of your wireless adapter to locate any other wireless networks that are available (see your wireless adapter’s manual), and move your

Introduction

wireless router (or access point) and computers to a channel as far away from other networks as possible.

Experiment with more than one of the available channels in order to find the clearest connection and avoid interference from neighboring cordless phones or other wireless devices. For Belkin wireless networking products, use the detailed Site Survey and wireless channel information included in your User Manual. These guidelines should allow you to cover the maximum possible area with your wireless router (or access point).

5. Secure Connections, VPNs, and AOL

Secure connections typically require a user name and password, and are used where security is important. Secure connections include:

- Virtual Private Network (VPN) connections, often used to connect remotely to an office network
- The “Bring Your Own Access” program from America Online (AOL), which lets you use AOL through broadband provided by another cable or DSL service
- Most online banking websites
- Many commercial websites that require a user name and password to access your account

Secure connections can be interrupted by a computer’s power management setting, which causes the computer to “go to sleep.”

The simplest solution to avoid this is to simply reconnect by re-running the VPN or AOL software, or by re-logging into the secure website. A second alternative is to change your computer’s power management settings so it does not go to sleep; however, this may not be appropriate for portable computers. To change your power management setting under Windows, see the “Power Options” item in the Control Panel. If you continue to have difficulty with Secure Connections, VPNs, and AOL, please review the steps above to be sure you have addressed these issues.

For more information regarding our networking products, visit our website at **www.belkin.com/networking** or call Belkin Technical Support at:

**US: 877-736-5771
310-898-1100 ext. 2263**

Europe: 00 800 223 55 460

Australia: 1800 235 546

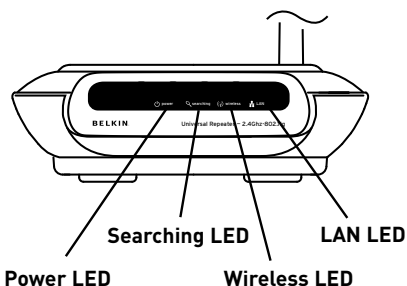
New Zealand: 0800 235 546

Singapore: 800 616 1790

Overview

The WURE is designed to be positioned horizontally on a desktop, or wall-mounted. All of the cables exit from the rear of the WURE for better organization and utility. The LED indicators are easily visible on the front of the WURE to provide you with information about network activity and status.

Front Panel



Power LED 	
OFF	WURE power off
Solid Green	WURE power on

Searching LED 	
Solid Red	Error
Blinking Red	Searching

Wireless LED 	
OFF	No wireless connection available
Blinking Green	Receiving/transmitting data
Solid Green	WURE is ready

LAN LED 	
OFF	No network is linked to the port
Blinking Green	Receiving/transmitting data
Solid Green	Linked to network

1

2

3

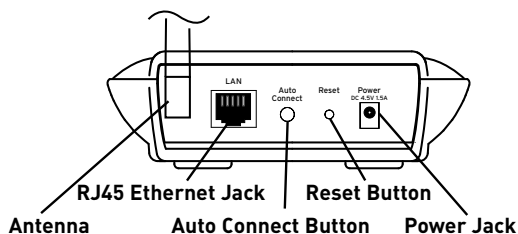
4

5

6

7

section



Back Panel

Power Jack

Connect the included 4.5V DC power supply to this jack.

RJ45 Ethernet Jack

Connect an Ethernet cable to this socket, and connect to an open RJ45 10Base-T or 100Base-Tx port on a switch, hub, or router.

Auto Connect Button

The “Auto Connect” button will automatically connect and set up your WURE to a wireless network. It is as simple as pushing a button.

Reset Button

The “Reset” button is to be used in the unlikely event that your WURE malfunctions. Resetting the WURE restores its normal operation while maintaining the programmed “settings”. You can also restore the factory default settings by using the “Reset” button. Use the restore option if, for example, you have forgotten your password.

a. Resetting the WURE

Push and release the “Reset” button. The lights on the WURE will momentarily flash. The “Power/Ready” light will begin to blink. When the “Power/Ready” light becomes solid again, the reset is complete.

b. Restoring the Factory Defaults

Press and hold the “Reset” button for 10 seconds, then release it. The lights on the WURE will momentarily flash. The “Power/Ready” light will begin to blink. When the “Power/Ready” light becomes solid again, the restore is complete.

Rotatable Dipole Antenna

An omnidirectional dipole antenna is located on the back of the WURE. The antennas can rotate 180 degrees. The antenna should be oriented in the vertical position for best performance.

Package Contents

- Belkin Wireless G Wireless Universal Range Extender
- Detachable Antenna
- Power Supply
- User Manual
- Quick Installation Guide
- Ethernet Cable
- Easy Installation Wizard Software CD-ROM

System Requirements

- At least one computer with an installed 802.11g or 802.11b-compliant wireless Ethernet adapter
- TCP/IP networking protocol installed on each computer
- CAT5 networking cable (or better)
- Microsoft® Internet Explorer 4.0 or later, or Netscape® 4.0 or later

Specifications

Wireless:

Radio Technology Direct Sequence Spread Spectrum (DSSS)

- IEEE 802.3, IEEE 802.3u 10/100Base-Tx, auto-negotiation, auto-MDIX

802.11g:

- Network Standard IEEE 802.11b (Wi-Fi) and IEEE 802.11g compliance
- OFDM; 802.11b: CCK (11Mbps, 5.5Mbps), DQPSK (2Mbps), DBPSK (1Mbps)
- Operating Frequencies: 2.412–2.497GHz
- Operating Channels 802.11g: 11 for North America, 13 for Europe (ETSI), 14 for Japan

802.11b:

11 for North America, 14 for Japan, 13 for Europe (ETSI)

Security:

- WEP (64- and 128-bit keys) Open, Shared Authentication
- WPA-PSK (TKIP, AES)
- WPA2-PSK (AES)

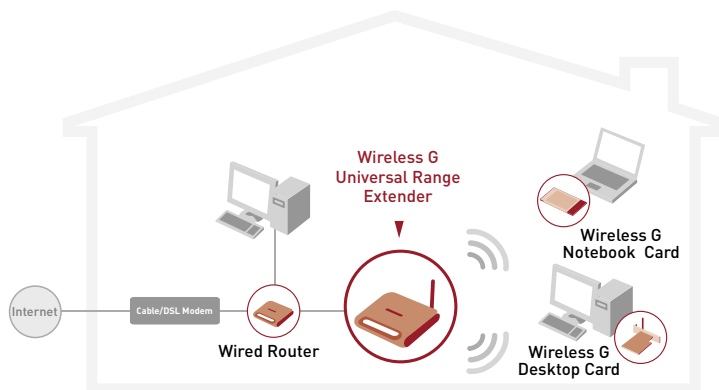
Management: Browser-based

Maximum User s: 32 (WLAN)

Ports: 1 10/100Base-Tx RJ45 port (LAN)
1 power jack
1 reset button
1 Auto Connect button

LEDs: Power, Searching, LAN, Wireless

Configuring the WURE



Configuring as a Wireless Access Point

1. Connect

Connecting as a Wireless Access Point

The WURE can add wireless-enabled computers to an existing wired network. The access point acts as a bridge between your existing wired network and your wireless-equipped computers. Please be sure to follow the steps below carefully.

- 1.1 Select a suitable place for your WURE.
- 1.2 Connect a CAT5 cable between the WURE and your router's LAN port, or an Ethernet switch or hub.



- 1.3 Connect the power supply to the WURE by plugging the round DC connector into the DC jack on the WURE. Plug the power supply into the wall. Verify that the "Power" LED and the "LAN" LED are illuminated. If both LEDs are illuminated, the WURE is connected properly.

Configuring the WURE

2. Install

Running the Easy Install Wizard Software

- 2.1 Shut down any programs that are running on your computer at this time. Turn off any firewall or Internet-connection-sharing software on your computer.
- 2.2 Insert the Wireless Range Extender Management Utility software CD into your CD-ROM drive. The Utility wizard will automatically appear within 15 seconds.

NOTE: If the Utility wizard does not start up automatically, select your CD-ROM drive from “My Computer” and double-click on the file named “Setup.exe” on the CD-ROM.

- 2.3 You will now see the first of a series of progress screens that will install the Wireless Range Extender Management Utility. It is recommended to take the default settings.
- 2.4 Once installation is complete, you may run the Utility program by double-clicking the shortcut icon.

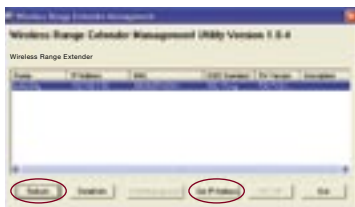


NOTE: Both your PC and WURE must be wired into your network for this Utility to work.

3. Configure

Running the Wireless Range Extender Management Utility

- 3.1 To start your Wireless Range Extender Management Utility, double-click the “Belkin Range Extender Utility” icon. You will see the following screen.

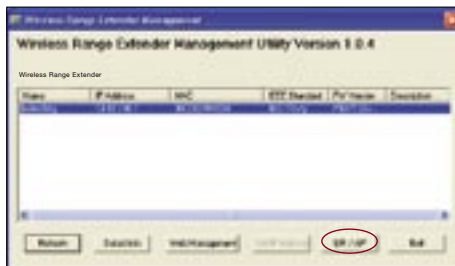


Configuring the WURE

- 3.2** Click the “Refresh” button. The Utility will detect the WURE(s) connected to your network. Select the WURE you wish to configure.
- 3.3** If your WURE’s IP address is not in the same subnet as your network, the “Set IP Address” button will be enabled. Click the “Set IP Address” button. A pop-up screen will appear.



- 3.4** Set the IP address of your WURE to be within the same subnet as your network. For example, if your router’s IP address is 192.168.1.1, set your WURE to 192.168.1.xx (xx would be any number between 2–254). Be careful of duplicate IP addresses on your network. Then set the subnet mask to be the same as your network’s subnet mask.
- 3.5** Click the “UR/AP” button.



NOTE: If the “UR/AP” button is grayed out, click the “Refresh” button.

- 3.6** The “UR/AP mode switch” window will appear. Select the AP radio button.



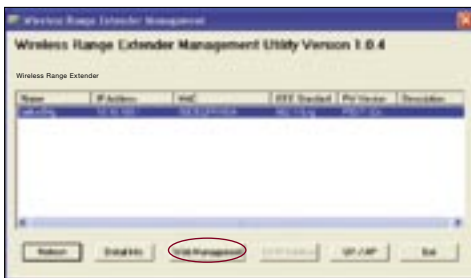
Congratulations. Your WURE is now set up for access point mode.



4. Advanced Configuration

Configuring your WURE through the Web-Based Advanced User Interface

- 4.1** If you wish to use the Web-Based Advanced User Interface, click the “Web Management” button.



- 4.2** For more details, see the “Understanding the Web-Based Advanced User Interface” section.

Configuring the WURE

Configuring as a Wireless G Universal Range Extender

Auto Connect Button

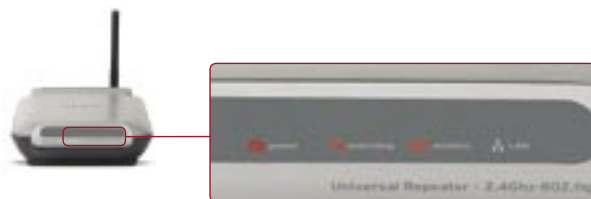
Auto Connect is a quick and easy method to automatically set up your WURE to your wireless network. It is designed to remove the need for users to set the correct SSID and channel. It is as simple as pushing a button.

Note: Auto Connect will work only if the wireless router (or access point) has security disabled.

1. Connect

Connecting the WURE

- 1.1 Locate and position the WURE next to the router to which you wish to expand the coverage area.
- 1.2 Connect the power supply to the WURE. Plug the power supply into the wall.
- 1.3 Verify that the “Power” LED and the “Wireless” LED are illuminated. The “Searching” LED should be blinking (red).



2. Configure

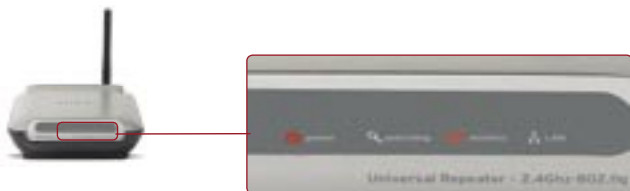
Configuring with One-Touch Setup

- 2.1 Push and hold the “Auto Connect” button for 10 seconds.

Configuring the WURE



- 2.2 Release the “Auto Connect” button; the WURE will automatically associate to the wireless router (or access point) with the strongest signal. In most cases, this will be the router to which you positioned the WURE closest.
- 2.3 Once the WURE has associated to your router (or access point), the “Searching” light (red) will not illuminate.



- 2.4 The configuration of your WURE is now complete. The SSID of your WURE will automatically match the SSID of the wireless router (or access point) to which it is associated.

3. Reposition

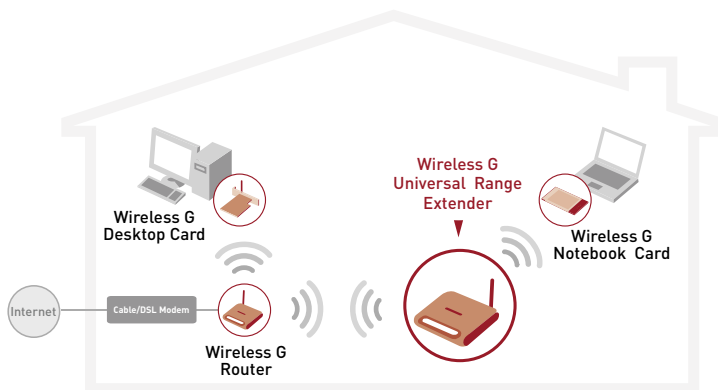
Repositioning the WURE in a Weak Signal Area or Dead Spot

- 3.1 Reposition the WURE between the wireless router and the new coverage area.
- 3.2 Reconnect the power to the WURE and it will automatically reassociate itself with the last wireless router (or access point) to which you successfully connected.

Note: Auto Connect will work only if the wireless router (or access point) has security disabled.

Using the Web-Based Advanced User Interface

The most convenient way to access the WURE's Web-Based Advanced User Interface is to connect the unit to the wireless router through the included cable. Once you finish configuring the device, you can disconnect the cable.



If you wish to connect a computer directly to the WURE to configure it, you must set your client to match the settings of the WURE before you can access the Web-Based Advanced User Interface. Perform the following steps from the computer from which you wish to configure your WURE.

Note: You must undo these steps once you have completed configuring your WURE.

Windows 98SE, Me, 2000, and XP

1. Go to the Windows Control Panel and double-click on the "Network" icon or the "Network Connections" icon.
2. Right-click on the "Local Area Connection" for your wireless adapter and select "Properties".
3. In the "General" tab, select the Internet Protocol TCP/IP settings for your wireless adapter and click on the "Properties" button.
4. Select the "Use the following IP address" radio button.
5. Enter an IP address in the same subnet as the WURE. For example, 192.168.2.200.
6. Enter the following subnet mask: 255.255.255.0. Then click "OK".

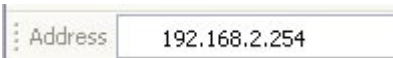
Using the Web-Based Advanced User Interface



Note: Once you have completed configuring your WURE, repeat steps 1 through 3. Then select “Obtain an IP automatically” or set a valid IP for your computer on the same subnet as the network to which you are connecting.

Logging into the WURE

Using your Internet browser, you can access the WURE’s Web-Based Advanced User Interface. In your browser, type “192.168.2.254” (do not type in anything else such as “http://” or “www”). Then, press the “Enter” key.



You will see the WURE’s home page in your browser window. The home page is visible to any user who wants to see it. To make any changes to the WURE’s settings, you have to log in. Clicking the “Login” button or clicking on any one of the links on the home page will take you to the login screen. The WURE ships with no password entered. In the login screen, leave the password blank and click the “Submit” button to log in.

Note: An IP address conflict can occur if you use a CAT5 cable to try to manage the WURE while it already has a wireless connection to the same router. To resolve this issue you need to disconnect one of the connections to the WURE (wired or wireless).

1. (Wired) Disconnect the CAT5 cable; manage the WURE wirelessly.
2. (Wireless) Reset your WURE; manage the WURE though a CAT5 cable.

(2) Home Button

The home button is available in every page of the UI. Pressing this button will take you back to the home page.

(3) Help Button

The “Help” button gives you access to the WURE’s help pages. Help is also available on many pages by clicking “more info” next to certain sections of each page.

(4) Login/Logout Button

This button enables you to log in and out of the WURE with the press of one button. When you are logged in, this button will change to read “Logout”. Logging into the WURE will take you to a separate login page where you must enter a password. When you are logged in, you can make changes to the settings. When you are finished making changes, you can log out by clicking the “Logout” button. For more information about logging into the WURE, see the section called “Logging into the WURE”.

(5) Version Info

Shows the firmware version, boot-code version, hardware version, and serial number of the WURE.

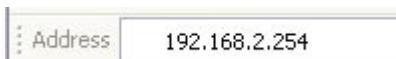
(6) LAN Settings

Shows you the settings of the Local Area Network (LAN) side of the WURE. Changes can be made to the settings by clicking on any one of the links (IP Address, Subnet Mask) or by clicking the “LAN” Quick Navigation link on the left side of the screen.

(7) Features

Shows the status of the WURE’s wireless setting. Changes can be made to the settings by clicking on any one of the links or by clicking the “Quick Navigation” links on the left side of the screen.

Using your Internet browser, you can access the WURE’s Web-Based Advanced User Interface. In your browser, type “192.168.2.254” (do not type in anything else such as “http://” or “www”). Then press the “Enter” key.



Using the Web-Based Advanced User Interface

Wireless > Basic

The “Wireless > Basic” page lets you make changes to the wireless network settings. From this page you can make changes to the wireless settings.



Changing the Wireless Network Name (SSID)

To identify your wireless network, a name called the SSID (Service Set Identifier) is used. The default SSID of the WURE is “belkin54g”. You can change this to anything you want to or you can leave it unchanged. If there are other wireless networks operating in your area, you will want to make sure that your SSID is unique (does not match that of another wireless network in the area). To change the SSID, type in the SSID that you want to use in the SSID field **(1)** and click “Apply Changes” **(2)**. The change is immediate. If you make a change to the SSID, your wireless-equipped computers must also be reconfigured to connect to your new network name. Refer to the documentation for your wireless network adapter for information on making this change.

Using the Wireless Mode Switch

Your WURE can operate in three different wireless modes: “54g-Auto”, “54g-Only”, and “54g-LRS”. The different modes are explained next.

54g-Auto Mode

In this mode, the WURE is compatible with 802.11b and 802.11g wireless clients simultaneously. This mode is the factory default and ensures full compatibility with Wi-Fi-compatible devices. Set the WURE to 54g-Auto mode if you have a mix of 802.11b and 802.11g clients in your network. This is the recommended setting for your WURE and should only be changed if you have a specific reason to do so.

54g-Only Mode

54g-Only mode is compatible with 802.11g clients only. Use this mode only if you do not have any 802.11b clients that need access to the network. To switch modes, select the desired mode from the drop-down box next to “Wireless Mode” then click “Apply Changes”.

54g-LRS Mode

It is not recommended you use this mode unless you have a very specific reason to do so. This mode exists only to solve unique problems that may occur with some 802.11b client adapters and is NOT necessary for interoperability of 802.11g and 802.11b standards.

When to Use 54g-LRS Mode

In some cases, older 802.11b clients may not be compatible with 802.11g wireless. These adapters tend to be of lesser design or use older drivers or technology. 54g-LRS (Limited Rate Support) allows these clients to be compatible with the newer 802.11g technology. Switching to this mode can solve problems that sometimes occur with these clients. If you suspect that you are using a client adapter that falls into this category of adapters, first check with the adapter vendor to see if there is a driver update. If there is no driver update available, switching to 54g-LRS mode may fix your problem.

Please note that switching to 54g-LRS mode may decrease 802.11g performance.

Changing the Wireless Channel

There are a number of operating channels you can choose from. In the United States, there are 11 channels. In the United Kingdom and most of Europe, there are 13 channels. In a small number of other countries, there are other channel requirements. Your WURE is configured to operate on the proper channels for the country you

Using the Web-Based Advanced User Interface

reside in. The default channel is 11 (unless you are in a country that does not allow channel 11). The channel can be changed if needed. If there are other wireless networks operating in your area, your network should be set to operate on a channel that is different than the other wireless networks. For best performance, use a channel that is at least five channels away from the other wireless network. For instance, if another network is operating on channel 11, then set your network to channel 6 or below. To change the channel, select the channel from the drop-down list. Click “Apply Changes”. The change is immediate.

Note: When using the WURE in “Wireless Repeater Mode,” the channel of your WURE must match the channel of your parent access point. For easy configuration, set the channel of your WURE to “Auto”. Change the channel of the parent access point. The channel or the WURE will automatically match the parent access point.



Using the Broadcast SSID Feature

Note: This advanced feature should be employed by advanced users only.

For security, you can choose not to broadcast your network's SSID. Doing so will keep your network name hidden from computers that are scanning for the presence of wireless networks. To turn off the broadcast of the SSID, remove the check mark from the box next

to “Broadcast SSID”, and then click “Apply Changes”. The change is immediate. Each computer now must be set to connect to your specific SSID; an SSID of “ANY” will no longer be accepted. Refer to the documentation of your wireless network adapter for information on making this change.

Protected Mode

As part of the 802.11g specification, Protected mode will ensure proper operation of 802.11g clients and access points when there is heavy 802.11b traffic in the operating environment. When Protected mode is ON, 802.11g will scan for other wireless network traffic before it transmits data. This method of “waiting” helps when there is very heavy traffic, but adds unnecessary delays when there is no heavy traffic.

If you are in an environment where there is no other (or very little) wireless network traffic, best performance is achieved with Protected mode OFF. If you are operating in an environment with HEAVY 802.11b traffic or interference, best performance may be achieved with Protected mode ON.



Using the Web-Based Advanced User Interface

Repeater Mode

Repeater mode allows your WURE to directly connect to a wireless router (or access point). You can use this mode to extend the range of your wireless network, or to add an extension of your network, without running cables. The WURE is compatible with most 802.11b or 802.11g wireless access points or wireless routers.

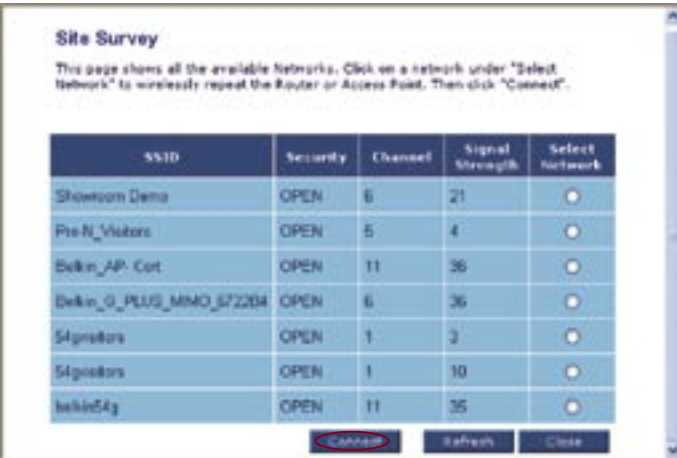
1. To enable Repeater mode, select the “Wireless Repeater Mode” radio button.



2. Click on the “Site Survey” button.

The “Site Survey” page will allow you to see a list of available wireless networks in your area. Under the “Select Network” column, you will be able to select the wireless network to which you wish to connect. Once you have selected the desired wireless network, click on the “Connect” button.

Using the Web-Based Advanced User Interface

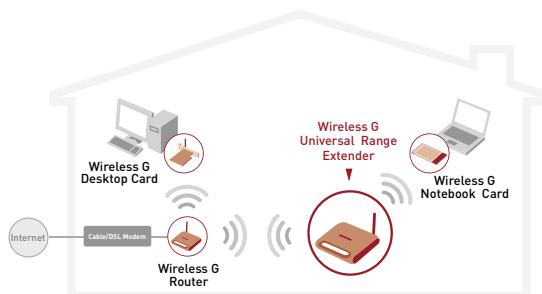


3. The status of your connection will show in the "Status" box.



Using the Web-Based Advanced User Interface

The example below illustrates using Repeater mode to extend the range of your wireless network. In this example, the WURE is set up to connect to the wireless router located in another area.



Note: Laptops can roam or move between the two wireless coverage areas if the SSID and the parent access point's SSID match.

Securing your Wi-Fi® Network

Here are a few different ways you can maximize the security of your wireless network and protect your data from prying eyes and ears. This section is intended for the home, home-office, and small-office user. At the time of this manual's publication, there are four encryption methods available.

Name	64-bit Wired Equivalent Privacy	128-bit Wired Equivalent Privacy	Wi-Fi Protected Access-TKIP	With Protected Access
Acronym	64-bit WEP	128-bit WEP	WPA-TKIP	WPA2-AES
Security	Good	Better	Best	Best
Features	Static keys	Static keys	Dynamic key encryption and mutual authentication	Dynamic key encryption and mutual authentication
	Encryption keys based on RC4 algorithm (typically 40-bit keys)	More secure than 64-bit WEP using a key length of 104 bits plus 24 additional bits of system-generated data	TKIP (temporal key integrity protocol) added so that keys are rotated and encryption is strengthened	AES (Advanced Encryption Standard) does not cause any throughput loss

WEP (Wired Equivalent Privacy)

WEP is a common protocol that adds security to all Wi-Fi-compliant wireless products. WEP was designed to give wireless networks the equivalent level of privacy protection as a comparable wired network.

64-Bit WEP

64-bit WEP was first introduced with 64-bit encryption, which includes a key length of 40 bits plus 24 additional bits of system-generated data (64 bits total). Some hardware manufacturers refer to 64-bit as 40-bit encryption. Shortly after the technology was introduced, researchers found that 64-bit encryption was too easy to decode.

128-Bit WEP

As a result of 64-bit WEP's potential security weaknesses, a more secure method of 128-bit encryption was developed. 128-bit encryption includes a key length of 104 bits plus 24 additional bits of system-generated data (128 bits total). Some hardware manufacturers refer to 128-bit as 104-bit encryption.

Most of the new wireless equipment in the market today supports both 64-bit and 128-bit WEP encryption, but you might have older equipment that only supports 64-bit WEP. All Belkin wireless products will support both 64-bit and 128-bit WEP.

Encryption Keys

After selecting either the 64-bit or 128-bit WEP encryption mode, it is critical that you generate an encryption key. If the encryption key is not consistent throughout the entire wireless network, your wireless networking devices will be unable to communicate with one another on your network and you will not be able to successfully communicate within your network.

You can enter your key by typing in the hex key manually, or you can type in a passphrase in the "Passphrase" field and click "Generate" to create a key. A hex (hexadecimal) key is a combination of numbers and letters from A–F and 0–9. For 64-bit WEP, you need to enter 10 hex characters. For 128-bit WEP, you need to enter 26 hex characters.

For instance:

AF 0F 4B C3 D4 = 64-bit WEP key

C3 03 0F AF 0F 4B B2 C3 D4 4B C3 D4 E7 = 128-bit WEP key

Using the Web-Based Advanced User Interface

The WEP passphrase is **NOT** the same as a WEP key. Your router uses this passphrase to generate your WEP keys, but different hardware manufacturers might have different methods on generating the keys. If you have multiple vendors' equipments in your network, the easiest thing to do is to use the hex WEP key from your router (or access point) and enter it manually into the hex WEP key table in your router's configuration screen.

WPA (Wi-Fi Protected Access)

WPA is a new Wi-Fi standard that was designed to improve upon the security features of WEP. To use WPA security, the drivers and software of your wireless equipment must be upgraded to support WPA. These updates will be found on the wireless vendor's website. There are two types of WPA security: WPA-PSK (no server) and WPA (with radius server).

WPA-PSK (no server) uses what is known as a pre-shared key as the network key. A network key is basically a password that is between eight and 63 characters long. It can be a combination of letters, numbers, or characters. Each client uses the same network key to access the network. Typically, this is the mode that will be used in a home environment.

WPA (with radius server) is a system where a radius server distributes the network key to the clients automatically. This is typically found in a business environment. (For a list of Belkin wireless products that support WPA, please visit our website at www.belkin.com/networking.)

Sharing the Same Network Keys

Most Wi-Fi products ship with security turned off. So once you have your network working, you need to activate WEP or WPA and make sure your wireless networking devices are sharing the same network key.

Using the Web-Based Advanced User Interface

Wireless > Security

Security Mode: 128-bit WEP

Key 1: AF 0F 4B C3 D4
Key 2:
Key 3:
Key 4:
(One digit pairs)

NOTE: To automatically generate hex pairs using a PassPhrase, input it here

PassPhrase:
[Generate]

[Cancel Changes] [Apply Changes]

Using a Hexadecimal Key

A hexadecimal key is a combination of numbers and letters from A–F and 0–9. 64-bit keys are five two-digit numbers. 128-bit keys are 13 two-digit numbers.

For instance: **AF 0F 4B C3 D4 = 64-bit key; C3 03 0F AF 0F 4B B2 C3 D4 4B C3 D4 E7 = 128-bit key**

In the boxes below, create your key by writing in two characters between A–F and 0–9 in each box. You will use this key to program the encryption settings on your router and your wireless computers.

Wireless > Security

Security Mode: 128-bit WEP

Key 1: C3 03 0F AF 0F 4B B2 C3 D4 4B C3 D4 E7
Key 2:
Key 3:
Key 4:
(13 two digit pairs)

NOTE: To automatically generate hex pairs using a PassPhrase, input it here

PassPhrase:
[Generate]

[Cancel Changes] [Apply Changes]

Using the Web-Based Advanced User Interface

Note to Mac® users: Original Apple® AirPort® products support 64-bit encryption only. Apple AirPort 2 products can support 64-bit or 128-bit encryption. Please verify which version you are using. If you cannot configure your network with 128-bit encryption, try 64-bit encryption.

WEP Setup

64-Bit WEP Encryption

1. Select “64-bit WEP” from the drop-down menu.
2. After selecting your WEP encryption mode, you can enter your key by typing in the hex key manually, or you can type in a passphrase in the “Passphrase” field and click “Generate” to create a key. A hex (hexadecimal) key is a combination of numbers and letters from A–F and 0–9. For 64-bit WEP, you need to enter 10 hex characters.

For instance:

AF 0F 4B C3 D4 = 64-bit WEP key



- C3 03 0F AF 0F 4B B2 C3 D4 4B C3 D4 E7 = 128-bit WEP key**



Using the Web-Based Advanced User Interface

3. Click “Apply Changes” to finish. Encryption in the router is now set. Each of your computers on your wireless network will now need to be configured with the same security settings.

WARNING: If you are configuring the wireless router (or access point) from a computer with a wireless client, you will need to ensure that security is turned ON for this wireless client. If this is not done, you will lose your wireless connection.

Changing the Wireless Security Settings

Your router is equipped with WPA (Wireless Protected Access), the latest wireless security standard. It also supports the legacy security standard, WEP (Wired Equivalent Privacy). By default, wireless security is disabled. To enable security, you must first determine which standard you want to use. To access the security settings, click “Security” on the “Wireless” tab.

WPA Setup

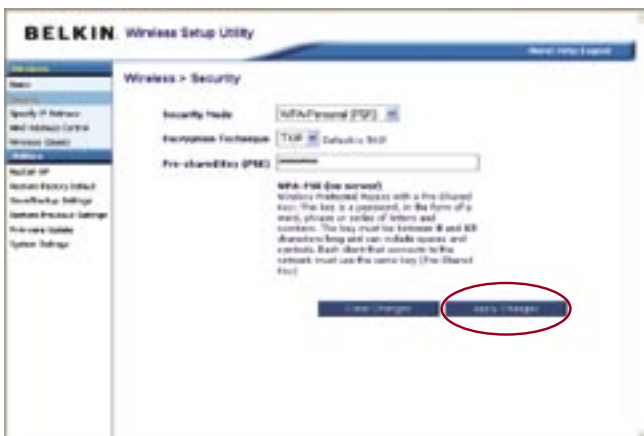
Note: To use WPA security, all your clients must be upgraded to drivers and software that support it. At the time of this manual’s publication, a security patch download is available, for free, from Microsoft. This patch works only with the Windows XP operating system. You also need to download the latest driver for your Belkin Wireless G Desktop or Notebook Network Card from the Belkin support site. Other operating systems are not supported at this time. Microsoft’s patch only supports devices with WPA-enabled drivers such as Belkin 802.11g products. There are two types of WPA security: WPA-PSK (no server) and WPA (with radius server). WPA-PSK (no server) uses a so-called Pre-Shared key as the security key. A Pre-Shared key is a password that is between 8 and 63 characters long. It can be a combination of letters, numbers, and other characters. Each client uses the same key to access the network. Typically, this mode will be used in a home environment. WPA (with radius server) is a configuration in which a radius server distributes the keys to the clients automatically. This is typically used in a business environment.

Setting WPA-Personal (PSK)

1. From the “Security Mode” drop-down menu, select “WPA-Personal (PSK)”.
2. For “Encryption Technique”, select “TKIP” or “AES”. This setting will have to be identical on the clients that you set up.

Using the Web-Based Advanced User Interface

3. Enter your pre-shared key. This can be from eight to 63 characters and can be letters, numbers, or symbols. This same key must be used on all of the clients that you set up. For example, your PSK might be something like: “Smith family network key”.
4. Click “Apply Changes” to finish. You must now set all clients to match these settings.



Using the Web-Based Advanced User Interface

Setting WPA2-Personal (AES)

1. From the “Security Mode” drop-down menu, select “WPA2-Personal (AES)”.
2. For “Encryption Technique”, select “AES”. This setting will have to be identical on the clients that you set up.
3. Enter your pre-shared key. This can be from eight to 63 characters and can be letters, numbers, or symbols. This same key must be used on all of the clients that you set up. For example, your AES might be something like: “Smith family network key”.
4. Click “Apply Changes” to finish. You must now set all clients to match these settings.



MAC Address Control

Setting MAC Address Filtering

The MAC address filter is a powerful security feature that allows you to specify which computers are allowed or denied access to the network. When setting an “Allow” list, any computer **NOT** included in the list will be denied access to the network. When setting a “Deny” list, any computer **THAT IS** included in the list will be denied access and all others will be allowed access.

To Enable an “Allow” List

1. Click the “Allow” radio button (1).
2. Enter the MAC addresses of all computers that you want to allow access to the network. When finished, click “Apply Changes”.



To Enable a Deny List

1. Click the “Deny” radio button (2).
2. Enter the MAC address of the computers that you want to deny access to the network. When finished, click “Apply Changes”.

Changing System Settings

The “System Settings” page is where you can enter a new administrator password.

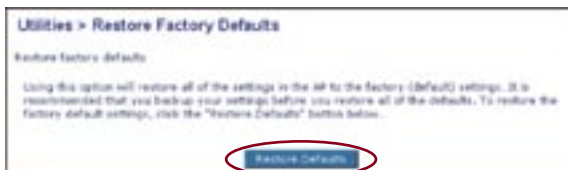
Setting or Changing the Administrator Password

The WURE ships with NO password entered. If you wish to add a password for greater security, you can set a password here. Write down your password and keep it in a safe place, as you will need it in order to log into the WURE in the future.



Restoring Factory Default Settings

This option restores all of the settings in the WURE to the factory (default) settings. We recommend that you back up your settings before you restore all of the defaults.



1. Click the “Restore Defaults” button.
2. The following message will appear. Click “OK”.



Changing System Settings

3. The following message will appear. Restoring the defaults includes restarting the WURE. It can take up to 60 seconds. It is important not to turn the power off on the WURE during the restart.



4. A 60-second countdown will appear on the screen. When the countdown reaches zero, the WURE's defaults will be restored. The WURE home page should appear automatically. If it does not, type in the WURE's address (default =192.168.2.254) into the navigation bar of your browser.

Saving a Current Configuration

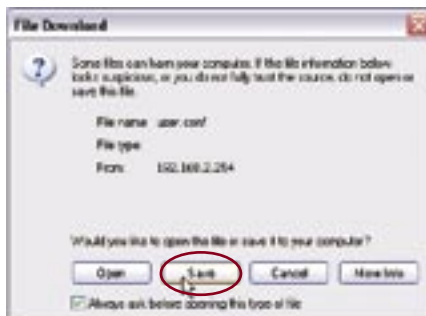
You can save your current configuration by using this feature. Saving your configuration allows you to restore it later if your settings are lost or changed. We recommend that you back up your current configuration before performing a firmware update.

Utilities > Save/Backup current settings

You can save your current configuration by using this feature. Saving your configuration will allow you to restore it later if your settings are lost or changed. It is recommended that you backup your current configuration before performing a firmware update.

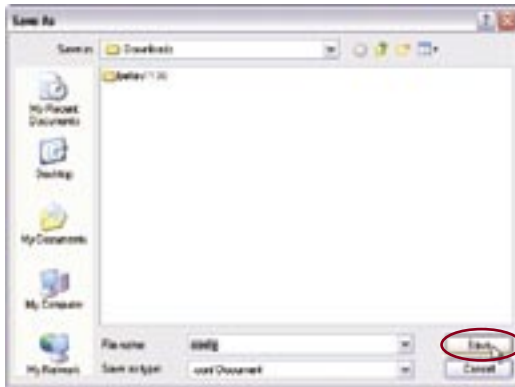


1. Click "Save". A window called "File Download" will open. Click "Save".



Changing System Settings

2. A window will open in which you can select the location where you want to save the configuration file. Select a location. You can name the file anything you want, or use the default name "Config". Be sure to name the file so you can locate it yourself later. When you have selected the location and name of the file, click "Save".



3. When the save is complete, you will see the window below. Click "Close".



The configuration is now saved!

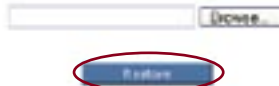
Changing System Settings

Restoring a Previous Configuration

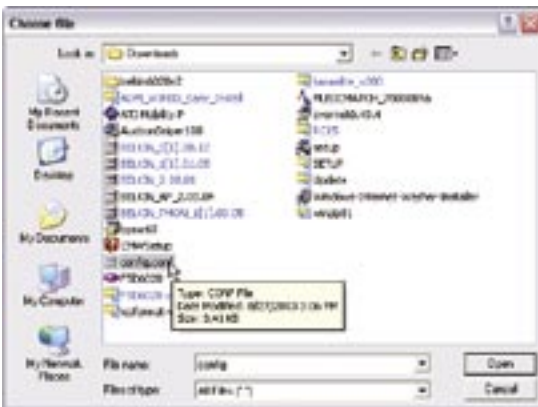
This option will allow you to restore a previously saved configuration.

Utilities > Restore Previous Settings

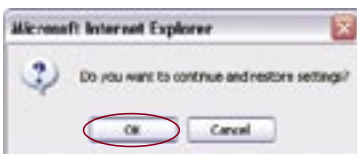
This option will allow you to restore a previously saved configuration.



1. Click "Browse". A window will open that allows you to select the location of the configuration file. All configuration files end with a ".cfg". Locate the configuration file you want to restore and double-click on it.

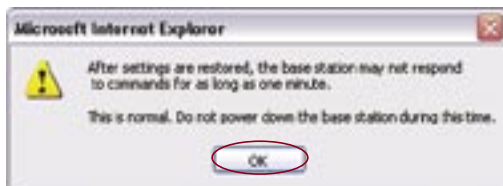


2. You will be asked if you want to continue. Click "OK".



Changing System Settings

3. A reminder window will appear. It will take up to 30 seconds for the configuration restoration to complete. Click “OK”.



4. A 30-second countdown will appear on the screen. When the countdown reaches zero, the WURE's configuration will be restored. The WURE home page should appear automatically. If not, type in the WURE's address (default = 192.168.2.254) into the navigation bar of your browser.

Updating Firmware

From time to time, Belkin may release new versions of the WURE's firmware. Firmware updates contain feature improvements and fixes, if any. When Belkin releases new firmware, you can download it from the Belkin update website and update your WURE's firmware to the latest version.



Checking for a New Version of Firmware

The “Check Firmware” (1) button allows you to instantly check for a new version of firmware. When you click the button, a new browser window will appear informing you that either no new firmware is available or that there is a new version available. If a new version is available, you will have the option to download it.

Changing System Settings

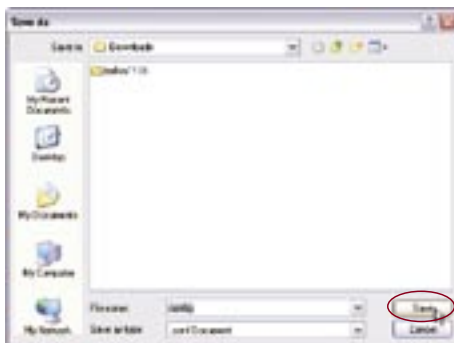
Downloading a New Version of Firmware

If you click the “Check Firmware” button and a new version of firmware is available, you will see a screen such as the following.



1. To download the new version of firmware, click “Download”.

2. A window will open that allows you to select the location where you want to save the firmware file. Select a location. You can name the file anything you want, or use the default name. Be sure to locate the file in a place where you can locate it yourself later. When you have selected the location, click “Save”.



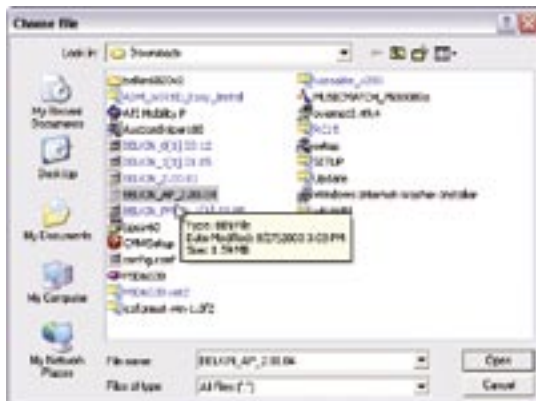
3. When the save is complete, you will see the following window. Click “Close”. The download of the firmware is complete. To update the firmware, follow the next steps in “Updating the WURE’s Firmware”.



Changing System Settings

Updating the WURE's Firmware

1. In the “Firmware Update” page, click “Browse”. A window will open that allows you to select the location of the firmware update file. All firmware files end with a “.bin”.



2. Browse to the firmware file you downloaded. Select the file by double-clicking on the file name.
3. The “Firmware Update” box will now display the location and name of the firmware file you just selected. Click “Update”.

Utilities > Firmware Update

From time to time, Belsin may release new versions of the AP's firmware. Firmware updates contain improvements and fixes to problems that may have existed. Click the box below to see if there is a new firmware update available for this AP.

NOTE: Please backup your current settings before updating to a new version of firmware. Click here to go to the Save/Backup current settings page.

Check For New Firmware Version >

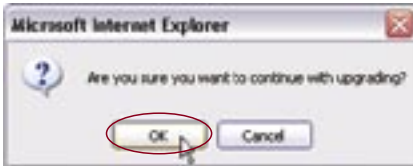
Check Firmware

Update Firmware >

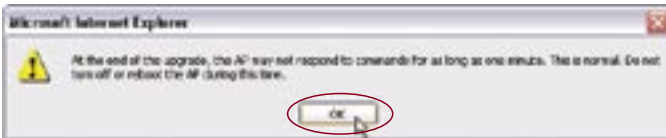
Update

Changing System Settings

4. You will be asked if you are sure you want to continue. Click "OK".



5. You will see one more message. This message tells you that the WURE may not respond for as long as one minute as the firmware is loaded and the WURE is rebooted. Click "OK".



A 30-second countdown will appear on the screen. When the countdown reaches zero, the WURE firmware update will be complete. The WURE home page should appear automatically. If not, type in the WURE's address (default = 192.168.2.254) into the navigation bar of your browser.

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Troubleshooting

Problem:

Power LED does not come ON; WURE is not working.

Check your physical connections. If the LED indicators do not light, the WURE may not be connected properly.

Solution:

Verify that the WURE is plugged into a power source. Check to see that the cables are connected to the correct ports and that they are secure.

Note: The WURE can be configured to extend the range of the Belkin Wireless Router and is not guaranteed to be compatible with other manufacturers' devices.

Problem:

I can't connect to the Internet wirelessly.

Solution:

If you are unable to connect to the Internet from a wireless computer, please check the following items:

1. Look at the lights on your router. If you're using a Belkin Router, the lights should be as follows:
 - The "Power" light should be on.
 - The "Connected" light should be on, and not blinking.
 - The "WAN" light should be either on or blinking.
2. Open your wireless utility software by clicking on the icon in the system tray at the bottom right-hand corner of the screen. If you're using a Belkin Wireless Card, the tray icon should look like this (the icon may be red or green).



3. The exact window that opens will vary depending on the model of wireless card you have; however, any of the utilities should have a list of available networks—those wireless networks it can connect to.

Does the name of your wireless network appear in the results?

Yes, my network name is listed – go to the troubleshooting solution titled "I can't connect to the Internet wirelessly, but my network name is listed".

Troubleshooting

No, my network name is not listed - go to the troubleshooting solution titled “I can’t connect to the Internet wirelessly, and my network name is not listed”.

Problem:

I can’t connect to the Internet wirelessly, but my network name is listed.

Solution:

If the name of your network is listed in the “Available Networks” list, please follow the steps below to connect wirelessly:

1. Click on the correct network name in the “Available Networks” list.
2. If the network has security (encryption) enabled, you will need to enter the network key.
3. Within a few seconds, the tray icon in the lower left-hand corner of your screen should turn green, indicating a successful connection to the network.

Problem:

I can’t connect to the Internet wirelessly, and my network name is not listed.

Solution:

If the correct network name is not listed under “Available Networks” in the wireless utility, please attempt the following troubleshooting steps:

1. Temporarily move computer, if possible, from five to 10 feet away from the router. Close the wireless utility, and reopen it. If the correct network name now appears under “Available Networks”, you may have a range or interference problem. Please see the suggestions discussed in the section titled “Placement of your Wireless Networking Hardware for Optimal Performance” in this User Manual.
2. Using a computer that is connected to the router via a network cable (as opposed to wirelessly), ensure that “Broadcast SSID” is enabled. This setting is found on the router’s wireless “Channel and SSID” configuration page. If you are still unable to access the Internet after completing these steps, please contact Belkin Technical Support.

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Troubleshooting

Problem:

My wireless network performance is inconsistent.

Data transfer is sometimes slow.

Signal strength is poor.

Difficulty establishing and/or maintaining a Virtual Private Network (VPN) connection.

Solution:

Wireless technology is radio-based, which means connectivity and the throughput performance between devices decreases when the distance between devices increases. Other factors that will cause signal degradation (metal is generally the worst culprit) are obstructions such as walls and metal appliances. As a result, the typical indoor range of your wireless devices will be between 100 to 200 feet. Note also that connection speed may decrease as you move farther from the router (or access point).

In order to determine if wireless issues are related to range, we suggest temporarily moving the computer, if possible, from five to 10 feet away from the router.

Changing the wireless channel - Depending on local wireless traffic and interference, switching the wireless channel of your network can improve performance and reliability. The default channel the router is shipped with is channel 11; you may choose from several other channels depending on your region. See “Changing the Wireless Channel” on page 19 for instructions on how to choose other channels.

Limiting the wireless transmit rate - Limiting the wireless transmit rate can help improve the maximum wireless range, and connection stability. Most wireless cards have the ability to limit the transmission rate. To change this property, go to the Windows Control Panel, open “Network Connections”, and double-click on your wireless card’s connection. In the “Properties” dialog, select the “Configure” button on the “General” tab (Windows 98 users will have to select the wireless card in the list box and then click “Properties”), then choose the “Advanced” tab and select the rate property. Wireless client cards are usually set to automatically adjust the wireless transmit rate for you, but doing so can cause periodic disconnects when the wireless signal is too weak; as a rule, slower transmission rates are more stable. Experiment with different connection rates until you find the best one for your environment; note that all available transmission rates should be acceptable for browsing the Internet. For more assistance, see your wireless card’s user manual.

Problem:

How do I extend the range of my wireless network?

Solution:

Belkin recommends using one of the following products to extend wireless network coverage throughout large homes or offices:

- The WURE can double the coverage area of your wireless network. The WURE is typically placed in the area not currently covered by your wireless router, and connected to the router using either an Ethernet cable, or through your home's power lines using two Powerline Ethernet adapters.

Problem:

I am having difficulty setting up Wired Equivalent Privacy (WEP) security on a Belkin Router (or Belkin Access Point).

Solution:

1. Log into your Wireless Router (or Access Point). Open your web browser and type in the IP address of the Wireless Router (or Access Point). (The Router's default is 192.168.2.1 and the 802.11g Access Point's default is 192.168.2.254). Log into your Router by clicking on the "Login" button in the top, right-hand corner of the screen. You will be asked to enter your password. If you never set a password, leave the password field blank and click "Submit".

Click the "Wireless" tab on the left of your screen. Select the "Encryption" or "Security" tab to get to the security settings page.

2. Select "128-bit WEP" from the drop-down menu.
3. After selecting your WEP encryption mode, you can type in your hex WEP key manually, or you can type in a passphrase in the "Passphrase" field and click "Generate" to create a WEP key from the passphrase. Click "Apply Changes" to finish. You must now set all of your clients to match these settings. A hex (hexadecimal) key is a combination of numbers and letters from A-F and 0-9. For 128-bit WEP, you need to enter 26 hex characters.

For example:

C3 03 0F AF 4B B2 C3 D4 4B C3 D4 E7 E4 = 128-bit key

Troubleshooting

4. Click “Apply Changes” to finish. Encryption in the Wireless Router is now set. Each of your computers on your wireless network will now need to be configured with the same security settings.

WARNING: If you are configuring the Wireless Router (or Access Point) from a computer with a wireless client, you will need to ensure that security is turned on for this wireless client. If this is not done, you will lose your wireless connection.

Note to Mac users: Original Apple AirPort products support 64-bit encryption only. Apple AirPort 2 products can support 64-bit or 128-bit encryption. Please check your Apple AirPort product to see which version you are using. If you cannot configure your network with 128-bit encryption, try 64-bit encryption.

Problem:

I am having difficulty setting up Wired Equivalent Privacy (WEP) security on a Belkin client card.

Solution:

The client card must use the same key as the wireless router (or access point). For instance, if your wireless router (or access point) uses the key 00112233445566778899AABBCC, then the client card must be set to the exact same key.

1. Double-click the “Signal Indicator” icon to bring up the “Wireless Network” screen. The “Advanced” button will allow you to view and configure more options of your card.
2. The “Advanced” button will allow you to view and configure more options of the card.
3. Once the “Advanced” button is clicked, the Belkin Wireless LAN Utility will appear. This Utility will allow you to manage all the advanced features of the Belkin wireless card.
4. Under the “Wireless Network Properties” tab, select a network name from the “Available networks” list and click the “Properties” button.
5. Under “Data Encryption” select “WEP”.
6. Ensure the check box “The key is provided for me automatically” at the bottom is unchecked. If you are using this computer to connect to a corporate network, please consult your network administrator if this box needs to be checked.

7. Type your WEP key in the “Network key” box.

Important: A WEP key is a combination of numbers and letters from A–F and 0–9. For 128-bit WEP, you need to enter 26 characters. This network key needs to match the key you assign to your wireless router (or access point).

For example:

C3 03 0F AF 4B B2 C3 D4 4B C3 D4 E7 E4 = 128-bit key

8. Click “OK”, and then “Apply” to save the settings.

If you are **NOT** using a Belkin wireless client card, please consult the manufacturer’s user manual for that wireless client card.

Problem:

Do Belkin products support WPA?

Solution:

To use WPA security, all your clients must be upgraded to drivers and software that support it. At the time of this FAQ publication, a security patch download is available, for free, from Microsoft. This patch works only with the Windows XP operating system.

Download the patch here:

<http://www.microsoft.com/downloads/details.aspx?FamilyID=009d8425-ce2b-47a4-abec-274845dc9e91&displaylang=en>

You also need to download the latest driver for your Belkin Wireless G Desktop or Notebook Network Card from the Belkin support site. Other operating systems are not supported at this time. The Microsoft patch only supports devices with WPA-enabled drivers such as Belkin 802.11g products.

Download the latest driver at <http://web.belkin.com/support> for the following products:

F5D7000, F5D7001, F5D7010, F5D7011, F5D7230-4, F5D7231-4, F5D7130

Problem:

I am having difficulty setting up Wi-Fi Protected Access (WPA) security on a Belkin Wireless Router or Belkin Access Point for a home network.

Solution:

1. From the “Security Mode” drop-down menu, select “WPA-PSK (no server)”.

Troubleshooting

2. For “Encryption Technique”, select “TKIP” or “AES”. This setting will have to be identical on the clients that you set up.
3. Enter your pre-shared key. This can be from eight to 63 characters and can be letters, numbers, symbols, or spaces. This same key must be used on all of the clients that you set up. For example, your PSK might be something like: “Smith family network key”.
4. Click “Apply Changes” to finish. You must now set all clients to match these settings.

Problem:

I am having difficulty setting up Wi-Fi Protected Access (WPA) security on a Belkin Wireless Router or Belkin Access Point for a business.

Solution:

If your network uses a radius server to distribute keys to the clients, use this setting. This is typically used in a business environment.

1. From the “Security Mode” drop-down menu, select “WPA (with server)”.
2. For “Encryption Technique”, select “TKIP” or “AES”. This setting will have to be identical on the clients that you set up.
3. Enter the IP address of the radius server into the “Radius Server” fields.
4. Enter the radius key into the “Radius Key” field.
5. Enter the key interval. Key interval is how often the keys are distributed (in packets).
6. Click “Apply Changes” to finish. You must now set all clients to match these settings.

Problem:

I am having difficulty setting up Wi-Fi Protected Access (WPA) security on a Belkin wireless client card for a business.

Solution:

1. Double-click the “Signal Indicator” icon to bring up the “Wireless Network” screen. The “Advanced” button will allow you to view and configure more options of your card.
2. Once the “Advanced” button is clicked, the Belkin Wireless LAN

Utility will appear. This Utility will allow you to manage all the advanced features of the Belkin wireless card.

3. Under the “Wireless Network Properties” tab, select a network name from the “Available networks” list and click the “Properties” button.
4. Under “Network Authentication” select “WPA”.
5. In the “Authentication” tab, select the settings that are indicated by your network administrator.
6. Click “OK, then “Apply” to save the settings.

Problem:

I am NOT using a Belkin client card and I am having difficulty setting up Wi-Fi Protected Access (WPA) security for a home network.

Solution:

If you are **NOT** using a Belkin Wireless Desktop or Wireless Notebook Network Card and it is not equipped with WPA-enabled software, a file from Microsoft called “Windows XP Support Patch for Wireless Protected Access” is available for free download:

www.microsoft.com/downloads/details.aspx?FamilyID=009d8425-ce2b-47a4-abcc-2748dc9e91&displaylang=en

Note: The file that Microsoft has made available works only with Windows XP. Other operating systems are not supported at this time. You also need to ensure that the wireless card manufacturer supports WPA and that you have downloaded and installed the latest driver from their support site.

Supported Operating Systems:

- Windows XP Professional
- Windows XP Home Edition

Enabling WPA-PSK (no server):

1. Under Windows XP, click “Start > Control Panel > Network Connections”.
2. Right-click on the “Wireless Networks” tab. Ensure the “Use Windows to configure my wireless network settings” check box is selected.
3. Under the “Wireless Networks” tab, click the “Configure” button.
4. For a home or small business user, select “WPA-PSK” under “Network Administration”.

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Note: Select “WPA (with radius server)” if you are using this computer to connect to a corporate network that supports an authentication server such as a radius server. Please consult your network administrator for further information.

5. Select “TKIP” or “AES” under “Data Encryption”. This setting will have to be identical to the wireless router (or access point) that you set up.

6. Type in your encryption key in the “Network Key” box.

Important: Enter your pre-shared key. This can be from eight to 63 characters and can be letters, numbers, or symbols. This same key must be used on all of the clients that you set up.

7. Click “OK” to apply settings.

What’s the difference between 802.11b, 802.11g, 802.11a, and 802.11n?

Currently there are four levels of wireless networking standards, which transmit data at very different maximum speeds. Each is based on the designation 802.11(x), so named by the IEEE, the board that is responsible for certifying networking standards. The most common wireless networking standard, 802.11b, transmits information at 11Mbps; 802.11a and 802.11g work at 54Mbps; and G Plus MIMO and Pre-N work at 108Mbps, which utilizes MIMO (Multiple Input Multiple Output) technology from the 802.11n proposals, to enhance 802.11g networks. See the following chart for more detailed information.

Wireless Comparison Chart

Wireless Technology	802.11b	802.11g	802.11a	Belkin Pre-N
Speed	11Mbps	54Mbps	54Mbps	600% faster than standard 802.11g*
Frequency	Common household devices such as cordless phones and microwave ovens may interfere with the unlicensed band 2.4GHz	Common household devices such as cordless phones and microwave ovens may interfere with the unlicensed band 2.4GHz	5GHz—uncrowded band	Common household devices such as cordless phones and microwave ovens may interfere with the unlicensed band 2.4GHz
Compatibility	Compatible with 802.11g	Compatible with 802.11b	Incompatible with 802.11b or 802.11g	Compatible with 802.11g or 802.11b
Coverage*	Depends on interference—typically 100–200 ft. indoors	Depends on interference—typically 100–200 ft. indoors	Interference range is typically 50–100 ft.	Up to 800% wider coverage than standard 802.11g*
Advantage	Mature—legacy technology	Common—widespread use for Internet sharing	Less interference—great for multimedia application	Leading edge—best coverage and throughput

*Distance and connection speeds will vary depending on your networking environment.

Technical Support

You can find technical support information at: <http://www.belkin.com/networking> or www.belkin.com through the tech support area. If you want to contact technical support by phone, please call:

**US: 877-736-5771 or
310-898-1100 ext. 2263**

Europe: 00 800 223 55 460

Australia: 1800 235 546

New Zealand: 0800 235 546

Singapore: 800 616 1790

Information

FCC Statement

DECLARATION OF CONFORMITY WITH FCC RULES FOR ELECTROMAGNETIC COMPATIBILITY

We, Belkin Corporation, of 501 West Walnut Street,
Compton, CA 90220, declare under our sole
responsibility that the product,

F5D7132

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

Caution: Exposure to Radio Frequency Radiation.

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

When connecting an external antenna to the device, the antenna shall be placed in such a manner to minimize the potential for human contact during normal operation. In order to avoid the possibility of exceeding the FCC radio frequency exposure limits, human proximity to the antenna shall not be less than 20cm (8 inches) during normal operation.

Federal Communications Commission Notice

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation.

This equipment generates, uses, and can radiate radio frequency energy. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try and correct the interference by one or more of the following measures:

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

Modifications

The FCC requires the user to be notified that any changes or modifications to this device that are not expressly approved by Belkin Corporation may void the user's authority to operate the equipment.

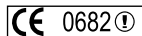
Canada-Industry Canada (IC)

The wireless radio of this device complies with RSS 139 & RSS 210 Industry Canada. This Class B digital apparatus complies with Canadian ICES-003.

Cet appareil numérique de la classe B conforme à la norme NMB-003 du Canada.

Europe-European Union Notice

Radio products with the CE 0682 or CE alert marking comply with the R&TTE Directive (1995/5/EC) issued by the Commission of the European Community.



Compliance with this directive implies conformity to the following European Norms (in brackets are the equivalent international standards).

- EN 60950 (IEC60950) – Product Safety
- EN 300 328 Technical requirement for radio equipment
- ETS 300 826 General EMC requirements for radio equipment.



To determine the type of transmitter, check the identification label on your Belkin product.

Products with the CE marking comply with the EMC Directive (89/336/EEC) and the Low Voltage Directive (72/23/EEC) issued by the Commission of the European Community. Compliance with these directives implies conformity to the following European Norms (in brackets are the equivalent international standards).

- EN 55022 (CISPR 22) – Electromagnetic Interference
- EN 55024 (IEC61000-4-2,3,4,5,6,8,11) – Electromagnetic Immunity
- EN 61000-3-2 (IEC610000-3-2) – Power Line Harmonics
- EN 61000-3-3 (IEC610000) – Power Line Flicker
- EN 60950 (IEC60950) – Product Safety



Products that contain the radio transmitter are labeled with CE 0682 or CE alert marking and may also carry the CE logo.

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section

Belkin Corporation Limited Lifetime Product Warranty

Belkin Corporation warrants this product against defects in materials and workmanship for its lifetime. If a defect is discovered, Belkin will, at its option, repair or replace the product at no charge provided it is returned during the warranty period, with transportation charges prepaid, to the authorized Belkin dealer from whom you purchased the product. Proof of purchase may be required.

This warranty does not apply if the product has been damaged by accident, abuse, misuse, or misapplication; if the product has been modified without the written permission of Belkin; or if any Belkin serial number has been removed or defaced.

THE WARRANTY AND REMEDIES SET FORTH ABOVE ARE EXCLUSIVE IN LIEU OF ALL OTHERS, WHETHER ORAL OR WRITTEN, EXPRESSED OR IMPLIED. BELKIN SPECIFICALLY DISCLAIMS ANY AND ALL IMPLIED WARRANTIES, INCLUDING, WITHOUT LIMITATION, WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.

No Belkin dealer, agent, or employee is authorized to make any modification, extension, or addition to this warranty.

BELKIN IS NOT RESPONSIBLE FOR SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES RESULTING FROM ANY BREACH OF WARRANTY, OR UNDER ANY OTHER LEGAL THEORY, INCLUDING BUT NOT LIMITED TO, LOST PROFITS, DOWNTIME, GOODWILL, DAMAGE TO OR REPROGRAMMING OR REPRODUCING ANY PROGRAM OR DATA STORED IN, OR USED WITH, BELKIN PRODUCTS.

Some states do not allow the exclusion or limitation of incidental or consequential damages or exclusions of implied warranties, so the above limitations or exclusions may not apply to you. This warranty gives you specific legal rights, and you may also have other rights that vary from state to state.

Regulatory Approvals

FCC Statement

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation.

This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one of the following measures:

- Reorient or relocate the receiving antenna.

- Increase the separation between the equipment and receiver.

- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

- Consult the dealer or an experienced radio/TV technician for help.

To assure continued compliance, any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment. (Example - use only shielded interface cables when connecting to computer or peripheral devices).

FCC Radiation Exposure Statement

This equipment complies with FCC RF radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with a minimum distance of 20 centimeters between the radiator and your body.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

- (1) This device may not cause harmful interference, and
- (2) This device must accept any interference received, including interference that may cause undesired operation.

This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

The antennas used for this transmitter must be installed to provide a separation distance of at least 20 cm from all persons and must not be co-located or operating in conjunction with any other antenna or transmitter.

Channel

The Wireless Channel sets the radio frequency used for communication.

- Access Points use a fixed Channel. You can select the Channel used. This allows you to choose a Channel which provides the least interference and best performance. In the USA and Canada, 11 channels are available. If using multiple Access Points, it is better if adjacent Access Points use different Channels to reduce interference.
- In "Infrastructure" mode, Wireless Stations normally scan all Channels, looking for an Access Point. If more than one Access Point can be used, the one with the strongest signal is used. (This can only happen within an ESS.)
- If using "Ad-hoc" mode (no Access Point), all Wireless stations should be set to use the same Channel. However, most Wireless stations will still scan all Channels to see if there is an existing "Ad-hoc" group they can join.

CAUTION:

- 1) To comply with FCC RF exposure compliance requirements, a separation distance of at least 20 cm must be maintained between the antenna of this device and all persons.
- 2) This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.