BELKIN®

Wireless G Range Extender/ Access Point

Range Extender:
Increase your wireless coverage area

Access Point:
Add wireless access to your wired network

User Manual

54g™

((G)) 802.11g | **54** Mbps 2.4GHz • Wireless

F5D7130uk

Table of Contents

Introduction

Thank you for purchasing the Belkin Wireless G Range Extender/Access Point (WRE/AP) 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, access point, and bridge. 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 e-mail, 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

Introduction

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. Your wireless connection speed and performance will degrade somewhat as the distance between your Wireless Router (or Access Point) connected devices increases. This may or may not be noticeable to you. Factors that can weaken signals simply by getting in the way of your network's radio waves are metal appliances or obstructions, and walls.

To test whether performance issues are related to range or obstruction factors, try moving the computer to a position between five and ten feet from the Wireless Router or Access Point. If difficulties persist even at close range, please contact Belkin Technical Support.

Note: While some of the factors suggested below can affect network performance negatively, they will not prohibit your wireless network from functioning. In fact, you may not notice any problem at all. 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 (pointing 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.

Introduction

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 can 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 manufacturers 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 furthest channel from your wireless network, as possible. 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 of your Wireless LAN Utility to locate any other wireless networks, and move your 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 more Belkin wireless networking products, use the detailed Site Survey and wireless channel information included in your User Guide.

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

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:

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 Connection, VPNs, and AOL, please review the steps above to be sure you have addressed these issues.
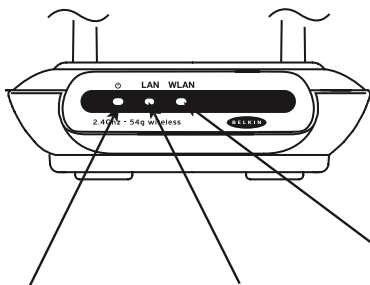
Overview

Front Panel

Power/Ready LED   **LAN (Network) LED**   **Wireless LAN LED**

Power/Ready LED	
Indicates that the WRE/AP is receiving power	
OFF	WRE/AP is OFF
Blinking Green	WRE/AP is booting up
Solid Green	WRE/AP is ready

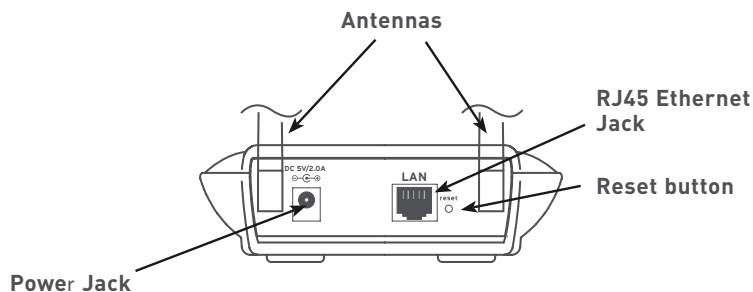| **Wireless LAN LED**	
OFF	Wireless Network is OFF
Blinking Green	Wireless Network is booting up
Solid Green	Indicates wireless activity is ready

LAN (Network) LED	
OFF	No network is linked to the port
Green	10Base-Tx device connected
Orange	100Base-Tx device connected
Blinking (Orange or Green)	Port activity

Overview

Antennas

RJ45 Ethernet Jack

Reset button

Power Jack

Power Jack

Connect the included 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 WRE/AP.

Reset Button

The "Reset" button is to be used in the unlikely event that your WRE/AP malfunctions. Resetting the WRE/AP 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 WRE/AP

Push and release the Reset button. The lights on the WRE/AP 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 WRE/AP will momentarily flash. The Power/Ready light will begin to blink. When the Power/Ready light becomes solid again, the restore is complete.

Rotatable Dual Dipole Antennas

Two unidirectional dipole antennas are located on the side of the WRE/AP. The antennas can rotate 180 degrees. The antennas should be oriented in the vertical position for best performance.

Overview

Package Contents

- Belkin Wireless G Range Extender/Access Point
- Power Supply
- User Manual
- Quick Installation Guide
- Registration Card

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
- Ethernet networking cable (or better)
- Microsoft® Internet Explorer 4.0 or later, or Netscape® 4.0 or later

Product Specifications

Wireless:

Radio Technology	Direct Sequence Spread Spectrum (DSSS)
Data Rate	802.11b: 11, 5.5, 2, 1Mbps 802.11g: 54, 48, 36, 24, 18, 12, 9, 6Mbps
Modulation	802.11b: CCK, DQPSK, DBPSK 802.11g: OFDM
Operating Frequency	2.412-2.497GHz ISM band
Operating Channels	802.11b: 11 for North America, 14 for Japan, 13 for Europe 802.11g: 13 for North America, 13 for Japan, 13 for Europe
Security	64-/128-bit WEP, WPA
Protocol Supported:	CSMA/CD, TCP, IP, UDP
Management:	Browser-based
Maximum Users:	32 (WLAN)
Ports:	1 10/100Base-Tx RJ45 port 1 power jack 1 reset button
LEDs:	Power LAN activity WLAN activity

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Configuring the WRE/AP

You can configure your Wireless G Range Extender/Access Point (WRE/AP) in three modes, for three applications:

Wireless Range Extender Mode—widens the coverage area of your wireless network

Wireless Network Access Point Mode—adds wireless-equipped computers to an existing wired network

Wireless Bridge Mode—joins two wireless network segments together

Note: The Wireless Range Extender feature works with the following models only:
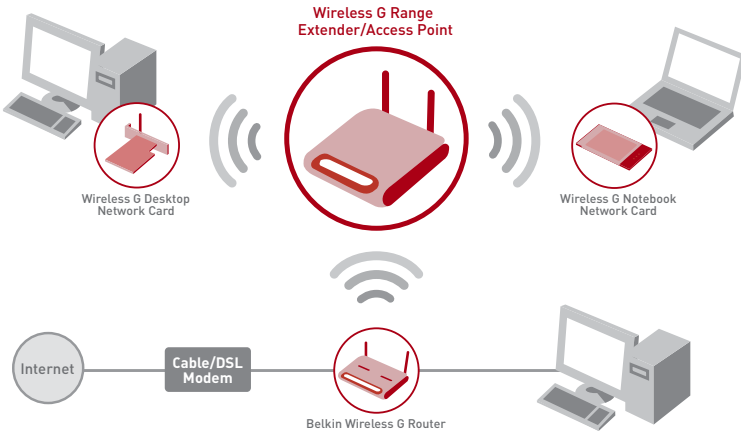
Belkin Wireless G Router (F5D7230-4)

Belkin Wireless G Range Extender/Access Point (F5D7130)

Configuring the WRE/AP

Configuring as a Wireless Range Extender

The WRE/AP can widen your home or office network's wireless coverage area. The example below illustrates the use of range extension mode. In this example, the Wireless Router is set up to connect to a WRE/AP located in another area. Laptops can roam or move between the two wireless coverage areas.

Note: This mode does not operate when using WPA.

Wireless G Range
Extender/Access Point

Wireless G Desktop
Network Card

Wireless G Notebook
Network Card

Internet

Cable/DSL
Modem

Belkin Wireless G Router

Make sure you have the latest version firmware (can be downloaded from www.belkin.com/networking) on the Wireless Range Extender/Access Point and the Wireless G Router for proper operation.

You can extend the range of your wireless network by entering the MAC address of the WRE/AP into the Wireless Router's Web-Based User Interface. Please be sure to follow the steps below carefully:

Configuring the WRE/AP

1. Ensure your WRE/AP and the Wireless Router share the same channel and security settings. By default, the Wireless Router and WRE/AP channels are set to channel 11 with no security. If you have never changed the channel or security settings, you can go to the next step. If not, please see the "Using the Web-Based User Interface" section in your User Manual, for instructions.

2. Find the MAC address on the bottom label of the WRE/AP. There are two MAC addresses on the bottom label. You will need the MAC address named "WLAN MAC Address".

Product Label

> For reference, write the MAC address in the following diagram, "Secondary WRE/AP MAC Address". Next, you must add the WRE/AP's WLAN MAC Address into your Belkin Wireless G Router. See the next step.

**3.** To enter the WRE/AP's Mac address into the router, do the following:

From a computer already connected to your network, access the Wireless Router's advanced Setup Utility by opening your browser. In the address bar, type in "192.168.2.1" (do not type in "www" or "http://" before the number).

Secondary WRE/AP MAC Address

Belkin Wireless
G Router

Wireless G Range
Extender/Access Point
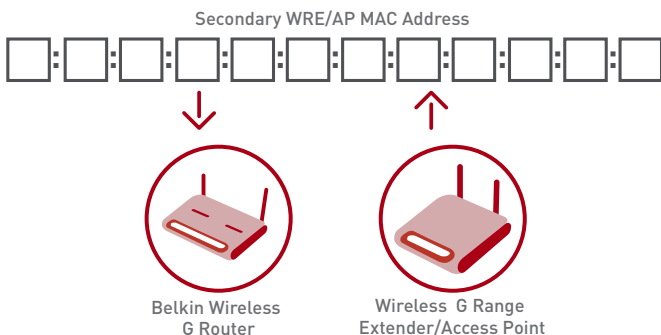
NOTE: If you have changed your WRE/AP's IP address, use that IP address.

4. To make any changes to the Wireless Router'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.

5. You will see the Wireless Router's user interface in the browser window. Click "Wireless Bridge" (1) on the left-hand side of the screen. You will see the screen below.

6. Check the box that says "Enable ONLY specific Access Points to connect" (2).

7. In the field named AP1 (3), type in the WLAN MAC address of your WRE/AP (see step 2 from the previous page). When you have typed in the address, click "Apply Changes" (4).
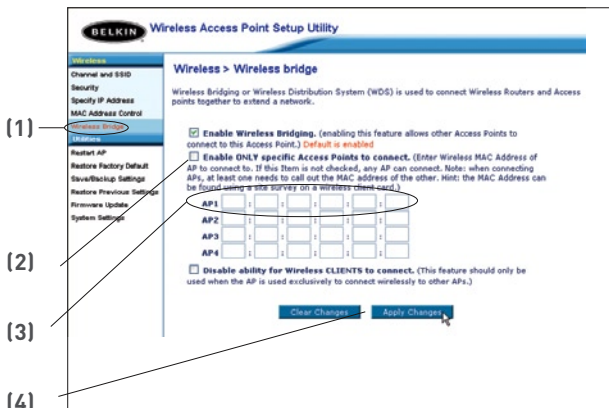
8. Place your secondary WRE/AP within range of your Wireless Router and near the area where you want it to extend the range or add the network segment. Distance will vary depending on your networking environment.

9. Connect power to your WRE/AP.

**Your wireless range is now extended!**

Configuring the WRE/AP

Configuring as a Wireless Access Point

The WRE/AP 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.　Select a suitable place for your WRE/AP.

2.　Connect an Ethernet cable between the WRE/AP and your cable/DSL router's LAN port, Ethernet switch, or hub.

Router, Ethernet switch, or hub
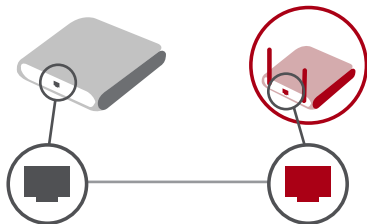
Wireless Range Extender/Access Point

3.　Connect the power supply to the WRE/AP by plugging the round DC connector into the DC jack on the WRE/AP. Plug the power supply into the wall. Verify that the Power LED and the Link LED are illuminated. If both LEDs are illuminated, the WRE/AP is connected properly.

4.　Place the WRE/AP on a desktop or mount it to a wall in the location that you have chosen. Next, swivel the antennas so they are both pointing up.

**Connection and placement of your Wireless Access Point is now complete!**

Configuring as a Wireless Bridge

Bridging Mode: Adding Another Network Segment Wirelessly

Bridging the WRE/AP to your Wireless Router allows you to add another network segment without running wires to the area where the new segment is located. Connect a network switch or hub to the WRE/AP's RJ45 jack to give computers connected to the switch access to the rest of the network.
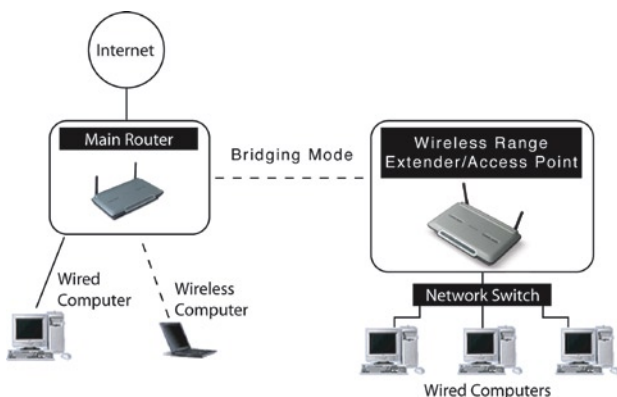
Note: WPA is not supported if the Wireless G Range Extender/Access point is in Range Extension Mode. WPA works in Access Point Mode only.

Configuring the WRE/AP

## Setting up Wireless Bridging

Important:

- Wireless Bridging work with the following models only:

  F5D7230-4 Wireless G Router

  F5D7130 Wireless G Range Extender/Access Point

- The following firmware version must be installed on the WRE/AP and the Wireless Router for proper operation:

  F5D7230-4: Version 1.01.08 or higher

  F5D7130: Version 1.01.08 or higher

- These modes do not operate when using WPA.

You can Bridge your WRE/AP to a Wireless Router by entering the MAC address of the WRE/AP in the Wireless Router's Web-Based Advanced User Interface. Please be sure to follow the steps below carefully.

1. Ensure that your WRE/AP and the Wireless Router share the same channel and security settings. By default the Wireless Router and WRE/AP channels are set to channel 11 with no security. If you have never changed the channel or security settings, you can go to the next step. If not, please see the "Using the Web-Based Advanced User Interface" section for instructions on how to change channel or security settings.

2. Find the MAC address on the bottom label of the WRE/AP. There are two MAC addresses on the bottom label. You will need the MAC address named "WLAN MAC Address". The MAC address starts with 0030BD and is followed by six other numbers or letters. (0030BD-XXXXXX). Write the MAC address below. Go to the next step.
Enter the WRE/AP's MAC address into the Wireless Router by doing the following:

Secondary AP MAC Address

Main Router

Wireless Range Extender/Access Point
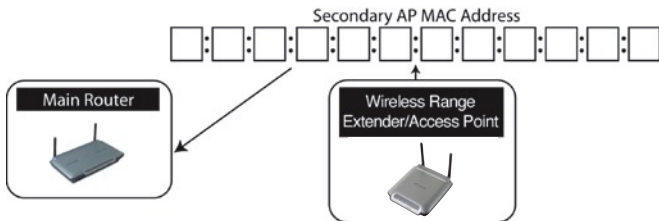
Enter the Secondary AP's MAC address into the Router

3. Place your secondary WRE/AP within range of your Wireless Router and near the area where you want to extend the range or add the network segment. Typically, your indoor range should be between 50 and 150 feet.

4. Connect power to your WRE/AP. Ensure that it is powered ON and prceed to the next step.

5. From a computer already connected to your network, access the Wireless Router's advanced setup utility by opening your browser. In the address bar, type in "192.168.2.1" (do not type in "www" or "http://" before the number).

Note: If you have changed your WRE/AP's IP address, use that IP address.

6. To make any changes to the Wireless Router's settings, you have to log in. Clicking the "Login" button or any of the links on the home page takes you to the login screen.

7. You will see the Wireless Router's user interface in the browser window. Click "Wireless Bridge" (2) on the left-hand side of the screen. You will see the following screen.

8. Check the box that says "Enable ONLY specific Access Points to connect." (1)

9. In the field named AP1 (3), type in the WLAN MAC address of your WRE/AP. When you have typed in the address, click "Apply Changes".

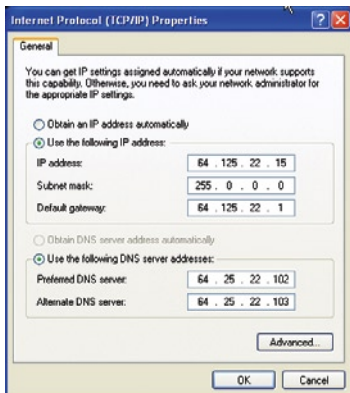10. Wireless Bridging is now set up.

Using the Web-Based User Interface

In order to access the Web-based User interface, you must first set your computer to the same IP address range as your Wireless G Range Extender/Access Point.

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 access point (for example, 192.168.2.200).

6. Enter the following subnet mask: 255.255.255.0 then click "OK".

Note: Once you have completed configuring your WRE/AP, 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 you are connecting to.

Using the Web-Based User Interface

Accessing the Web-Based Setup

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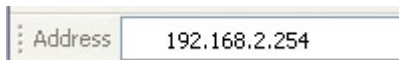
You will see the WRE/AP's home page in your browser window. The home page is visible to any user who wants to see it. To make any changes to the WRE/AP's settings, you have to log in. Clicking the "Login" button or clicking on any one of the links on the home page will take you to the login screen. The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

Logging Out of the Web-Based Setup

One computer at a time can log into the WRE/AP in order to make changes to its settings. There are two ways to log out: 1, by clicking the "Logout" button; and 2, automatically, by allowing a preset

time-out period to elapse. The default time-out is 10 minutes; however, you can set the login period from 1 to 99 minutes. For more information, see the section in this manual titled "Changing the Login Time-Out Setting".

Understanding the Web-Based User Interface

The home page is the first page you will see when you access the Advanced User Interface (UI). The home page shows you a quick view of the WRE/AP's status and settings. All advanced setup pages can be reached from this page.

Using the Web-Based User Interface
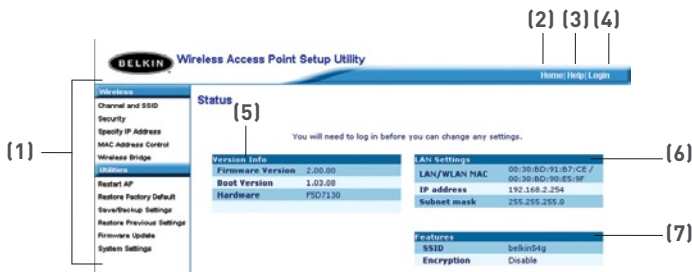
(1) Quick Navigation Links
You can go directly to any of the WRE/AP's Advanced UI pages by clicking directly on these links. The links are divided into logical categories and grouped by tabs to make finding a particular setting easier to find. Clicking on the purple header of each tab will show you a short description of the tab's function.

(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 WRE/AP'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 WRE/AP with the press of one button. When you are logged in, this button will change to read "Logout". Logging into the WRE/AP 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 WRE/AP, see the section called "Logging into the WRE/AP".

(5) Version Info
Shows the firmware version, boot-code version, hardware version, and serial number of the WRE/AP.

(6) LAN Settings
Shows you the settings of the Local Area Network (LAN) side of the WRE/AP. 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 WRE/AP'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.

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Using the Web-Based User Interface

Channel and SSID

The Wireless tab lets you make changes to the wireless network settings. From this tab you can make changes to the wireless network name (SSID), operating channel, and encryption security 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 WRE/AP 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 Web-Based User Interface

Using the Wireless Mode Switch

Your WRE/AP 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 WRE/AP 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 WRE/AP 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 WRE/AP 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.

Turbo Mode and Protected Mode

Turbo Mode

Enabling Turbo mode allows the WRE/AP to use frame bursting to get the maximum throughput from the WRE/AP to 802.11g clients. Turbo mode throughput is up to 50% faster than any standard 802.11g equipment. Turbo mode will work with 802.11g clients that support Turbo mode. Belkin 802.11g clients using the latest driver will support Turbo mode. Clients that do not support Turbo mode will operate normally if Turbo mode is enabled. By default, Turbo mode is enabled. To switch Turbo mode off, select "OFF" from the drop-down menu and click "Apply Changes".

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.

Protected Mode >   Off

NOTE: In most situations, best performance (throughput) 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.

Clear Changes   Apply Changes

Using the Web-Based User Interface

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 WRE/AP is configured to operate on the proper channels for the country you 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.
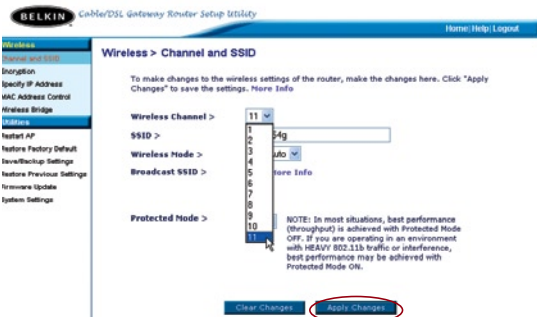
Using the Broadcast SSID Feature

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.

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 three 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	WPA-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.

Using the Web-Based User Interface

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 mixture of numbers and letters from A–F and 0–9. For 64-bit WEP, you need to enter 10 hex keys. For 128-bit WEP, you need to enter 26 hex keys.

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

The WEP passphrase is **NOT** the same as a WEP key. Your card 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 card'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).

*Note: WPA is not supported if the Wireless G Range Extender/Access point is in Range Extension or Bridging Mode. **WPA works in Access Point Mode only.**

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 8 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.)

Using the Web-Based User Interface

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.

Network key =
MyPassword

Wireless Notebook
Network Card

Network key =
MyPassword

Network key =
MyPassword

Wireless Router

Wireless Notebook
Network Card

Network key =
WRONG Password

Wireless Desktop
Network Card
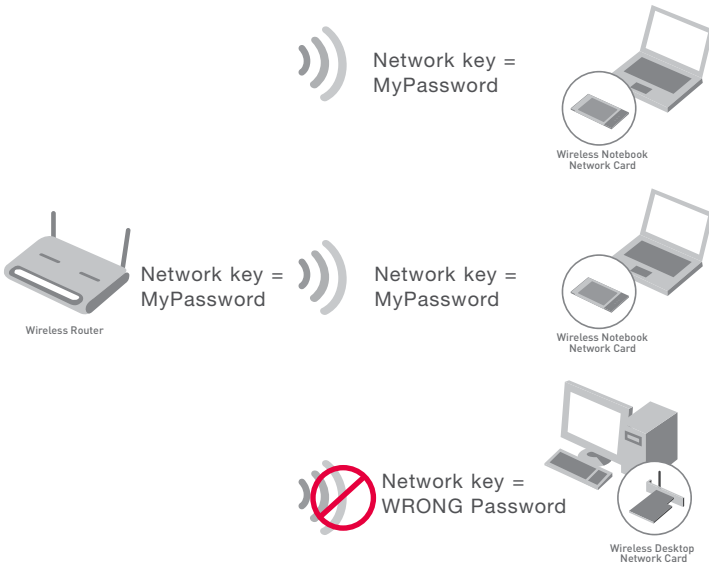
The Wireless Desktop Network Card cannot access the network because it is using a different Network key than the Network key that is configured on the Wireless Router or Access Point.

Using a Hexadecimal Key

A hexadecimal key is a mixture 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 this (refer to image 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.

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.

Using the Web-Based User Interface

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 mixture of numbers and letters from A–F and
    0–9. For 64-bit WEP, you need to enter 10 hex keys.

    For instance:

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

3. Click "Apply Changes" to finish. Encryption in the Wireless Router or
    Access Point 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.

128-Bit WEP Encryption

Note to Mac users: The Passphrase option will not operate with Apple AirPort. To configure encryption for your Mac computer, set the encryption using the manual method described in the next section.

1. Select "128-bit WEP" from the drop-down menu.

2. After selecting your WEP encryption mode, you can enter your key manually 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 mixture of numbers and letters from A–F and 0–9. For 128-bit WEP, you need to enter 26 hex keys.

    For instance:

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

3. Click "Apply Changes" to finish. Encryption in the Wireless Router or Access Point 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.

Using the Web-Based User Interface

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-PSK (no server)

1. From the "Security Mode" drop-down menu, select "WPA-PSK (no 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 your pre-shared key. This can be from 8 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.

Wireless > Security

Security Mode	WPA-PSK HOME (no server) ▾
Encryption Technique	TKIP ▾
Pre-shared Key (PSK)	••••••••••
	PSK can be a word or phrase up to 40 digits

[Clear Changes] [Apply Changes]

*Note: WPA is not supported if the Wireless G Range Extender/Access point is in Range Extension or Bridging Mode. WPA works in Access Point Mode only.

Using the Web-Based User Interface

Setting WPA (with radius server) Settings

If your network uses a radius server to distribute keys to the clients, use this setting.

1. From the "Security Mode" drop-down menu, select "WPA—Radius 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.

Using the Web-Based User Interface

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".

section

1 2 3 **4** 5 6 7

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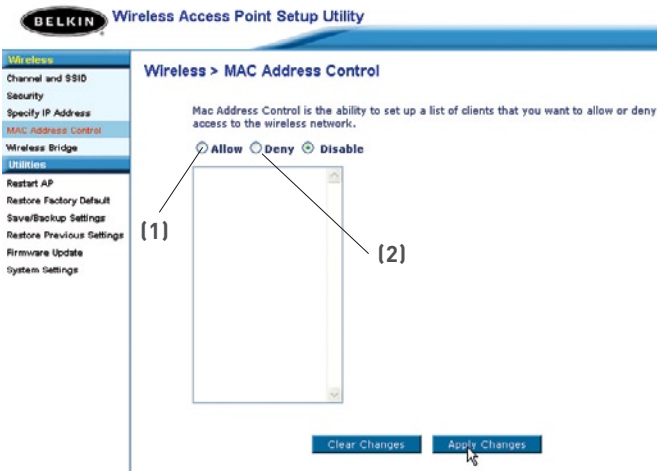
Changing System Settings

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

Setting or Changing the Administrator Password

The WRE/AP 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 WRE/AP in the future.

Utilities > System Settings

Administrator Password:
The AP ships with NO password entered. If you wish to add a password for more security, you can set a password here. More Info

- Type in current Password >
- Type in new Password >
- Confirm new Password >
- Login Timeout >   10   (1-99 minutes)

Clear Changes   Apply Changes

Restoring Factory Default Settings

This option restores all of the settings in the WRE/AP 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.

Utilities > Restore Factory Defaults

Restore factory defaults

Using this option will restore all of the settings in the AP to the factory (default) setting: recommended that you backup your settings before you restore all of the defaults. To factory default settings, click the "Restore Defaults" button below.

Restore Defaults

2. The following message will appear. Click "OK".

Microsoft Internet Explorer

? WARNING:
All Your Settings Will be Lost!
Are You Sure You want to do this?

OK   Cancel

Changing System Settings

3. The following message will appear. Restoring the defaults includes restarting the WRE/AP. It can take up to 60 seconds.
It is important not to turn the power down the WRE/AP during the restart.

4. A 60-second countdown will appear on the screen. When the countdown reaches zero, the WRE/AP's defaults will be restored. The WRE/AP home page should appear automatically. If it does not, type in the WRE/AP's address (default =192.168.2.1) 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.


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

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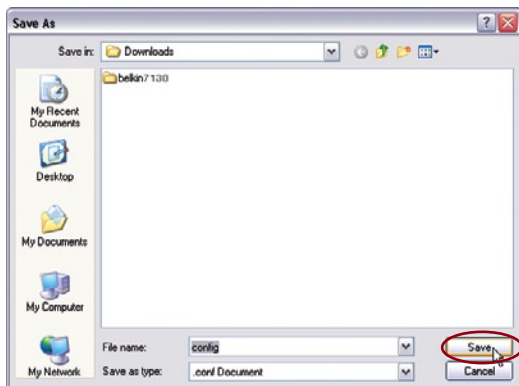
3. When the save is complete, you will see the window below.
Click "Close".

The configuration is now saved!

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.

[   ] [Browse...]

(Restore)

1. Click "Browse". A window will open that allows you to select the location of the configuration file. All configuration files end with a ".bin". Locate the configuration file you want to restore and double-click on it.
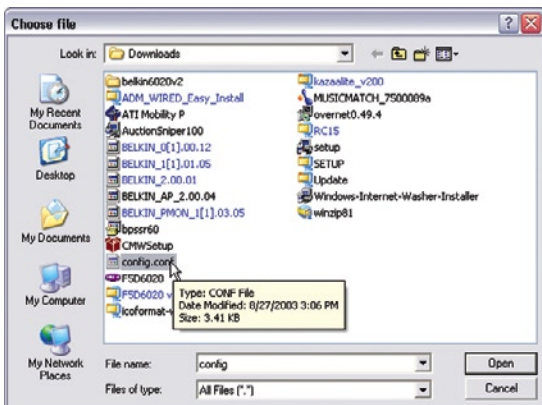
2. You will be asked if you want to continue. Click "OK".

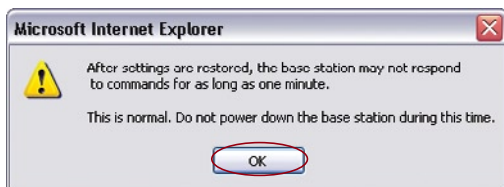**3.** A reminder window will appear. It will take up to 60 seconds for the configuration restoration to complete. Click "OK".

4. A 60-second countdown will appear on the screen. When the countdown reaches zero, the WRE/AP's configuration will be restored. The WRE/AP home page should appear automatically. If not, type in the WRE/AP's address (default = 192.168.2.1) into the navigation bar of your browser.

Updating Firmware

From time to time, Belkin may release new versions of the WRE/AP'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 WRE/AP'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.
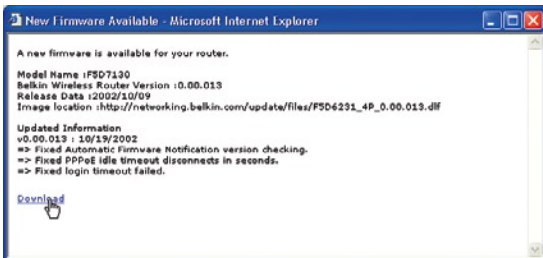
1. To download the new version of firmware, click "Download".

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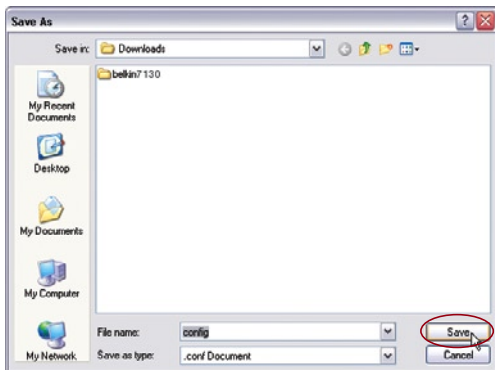
3. When the save is complete, you will see the following window. Click "Close".

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Updating the WRE/AP'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".
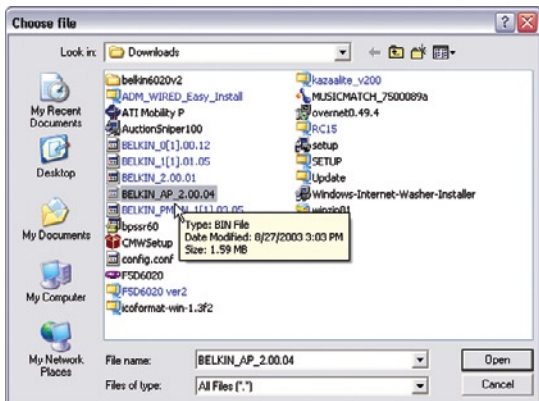
2. Browse to the firmware file you downloaded. Select the file by double-clicking on the file name.

3. The "Firmware Update" box will now display the location and name of the firmware file you just selected. Click "Update".

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
WRE/AP may not respond for as long as one minute as the firmware is
loaded and the WRE/AP is rebooted. Click "OK".

A 60-second countdown will appear on the screen. When the
countdown reaches zero, the WRE/AP firmware update will be
complete. The WRE/AP home page should appear automatically. If
not, type in the WRE/AP's address (default = 192.168.2.254) into the
navigation bar of your browser.

Troubleshooting

Power LED does not come ON; Access Point is not working

Check your physical connections. If the LED indicators do not light, the Wireless Range Extender/Access Point (WRE/AP) may not be connected properly.

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

Wireless Range Extender Mode is not working

If the Wireless Range Extender Mode on the WRE/AP is not working, it could be that the WRE/AP is not correctly configured to broadcast to the Belkin Wireless Router.

In the WRE/AP Web-Based Advanced User Interface (see "Configuring WRE/AP as a Wireless Range Extender" section of this manual), check to see that the WRE/AP is in Wireless Range Extender Mode and it is connecting to your Belkin Wireless Router by verifying that the correct MAC address is entered. Using a PC, ping "192.168.2.1" (the Router's default IP address) to check that a connection has been established between the WRE/AP and the Router.

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

I can't connect to the Internet wirelessly

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 Wireless Router. If you're using a Belkin Wireless 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.

Troubleshooting

If your Belkin Wireless Router's lights do not have the above characteristics, please contact Belkin technical support.

If you are not using a Belkin Wireless Router, consult that router manufacturer's user guide.

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 adapter, 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".

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"

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

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. For more information regarding security, see the page entitled "Setting Up Wireless Security".

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.

Troubleshooting

I can't connect to the Internet wirelessly, and my network name is NOT listed

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, five to ten feet 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" of 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.

Data transfer is sometimes slow, Signal strength is poor

Wireless network performance is inconsistent

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

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 further 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, five to ten feet from the Router.

Troubleshooting

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 22 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 the 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.

How do I extend the range of my wireless network?

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

•   Wireless Access Point: A Wireless Access Point can effectively double the coverage area of your wireless network. An Access Point 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.

These Belkin products are available at your local retailer, or can be ordered from Belkin directly.

Troubleshooting

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

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.

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

Clients must use the same key that the Wireless Router or Access Point uses. For instance if the key is "Smith Family Network Key" in the Wireless Router or Access point, the clients must also use that same key. 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. The "Advanced" button will allow you to view and configure more options of the card. 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. Under the "Wireless Network Properties" tab, select a network name from the "Available networks" list and click the "Properties" button Under "Network Authentication" select "WPA-PSK (no server)Type your WPA key in the "Network key" box

Important: WPA-PSK is a mixture of numbers and letters from A-Z and 0-9. For WPA-PSK you can enter 8 to 63 characters. This Network key needs to match the key you assign to your Wireless Router or Access Point. Click "OK, then "Apply" to save the settings

Troubleshooting

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

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 "Network Authentication" select "WPA".

6. In the "Authentication" tab, select the settings that are indicated by your network administrator.

7. Click "OK, then "Apply" to save the settings.

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

For non-Belkin WPA Wireless Desktop and Wireless Notebook Network Cards that are 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-2748dc9e91diplaylang=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".

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 "Date 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 8 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.

Troubleshooting

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

Currently there are three 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. See the following chart for more detailed information.

Wireless Comparison

Wireless Technology	802.11b	802.11g	802.11a
Speed	11Mbps	54Mbps	54Mbps
Frequency	Common household devices such as cordless phones and microwave ovens may interfere with the 2.4GHz unlicensed band	Common household devices such as cordless phones and microwave ovens may interfere with the 2.4GHz unlicensed band	5GHz - uncrowded band
Compatibility	Compatible with 802.11g	Compatible with 802.11b	Incompatible with 802.11b or 802.11g
Range	Depends on interference - typically 100–200 ft. indoors	Depends on interference - typically 100–200 ft. indoors	Less interference - range is typically 50-100 feet
Adoption	Mature - widely adopted	Expected to continue to grow in popularity	Slow adoption for consumers - more popular in business environments
Price	Inexpensive	More expensive	Most expensive

Troubleshooting

Technical Support

You can find technical support information at **www.belkin.com** or **www.belkin.com/networking**. If you want to contact technical support by phone, please call:

US: 877-736-5771

Europe: 00 800 223 55 460

Australia: 1800 666 040

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,

F5D7130

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 not installed and used in accordance with the instructions, it may 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:

Information

- 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 users 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 complies with Canadian ICES-003.

Cet appareil numérique de la classe B conforme á 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.

$$\boxed{C\epsilon \;\; 0682 \,①}$$
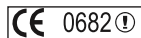
Compliance with this directive implies conformity to the following European Norms (in brackets are the equivalent international standards).

- 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.

$$\boxed{C\epsilon \;\; ①}$$

Information

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. $\mathsf{C}\mathsf{E}$

Information

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 of 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.

BELKIN®

Wireless G Range Extender/ Access Point

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