User Guide

Linksys RE1000 | Wireless-N Extender

Contents

Chapter 1: Product Overview

Thank you for choosing the Linksys RE1000 Wireless-N Extender. The Extender lets you repeat the wireless signal of any Access Point or Router to provide Internet connectivity in hard to reach areas via a wireless connection or through its Ethernet port.

Various security features help protect your data and your privacy while you are online. Security features include Wi-Fi Protected Access 2 (WPA2) security, which encrypts data on your wireless network.

Setup of the Extender is easy using Cisco Connect, shipping on the CD. Advanced configuration of the router is available through the provided browser-based utility. Alternatively, you can use WPS to add the Extender to your existing network, if your Access Point or Router supports this feature.

Front

This light indicates power or Wi-Fi Protected Setup status. After initial setup, If you have client devices, such as wireless printers, that support Wi-Fi Protected Setup, then you can use Wi-Fi Protected Setup to automatically configure wireless security for your wireless network. To use Wi-Fi Protected Setup, refer to "**Wi-Fi Protected Setup**" on page 12.

Power (white) When the Extender is powered on, resets to factory defaults, or upgrades its firmware, the light flashes slowly (every three seconds). When the Extender is ready for use, the light is continuously lit. If there is an error, the light flashes quickly (every second); disconnect the Extender from the wall mount socket, wait two seconds, and then reconnect it.

Wi-Fi Protected Setup (white) When the Wi-Fi Protected Setup process is active, the light flashes slowly (every two seconds) for two minutes. When the Wi-Fi Protected Setup is successful, the light is continuously lit. If there is an error, the light flashes quickly (every second) for two minutes; please wait and try again.

Top

Wi-Fi Protected Setup Button After initial setup, if you have client devices, such as wireless printers, that support Wi-Fi Protected Setup, then you can use Wi-Fi Protected Setup to automatically configure wireless security for your wireless network.

To use Wi-Fi Protected Setup, refer to "**Wi-Fi Protected Setup**" on page 12.

Reset This button allows you to reset the Extender to its factory defaults. Press and hold the Reset button for approximately eight seconds.

As an alternative, you can restore the defaults from the *Administration > Factory Defaults* screen in the Extender's browser-based utility (refer to "**Administration > Factory Defaults**" on page 42).

Power Switch Only featured in the European versions of the RE1000.

Bottom

Ethernet (green) Using Ethernet cables (also called network cables), this Ethernet port connects Ethernet network devices to your wireless network.

The green light turns on when an Ethernet device is connected and active on this port.

Back

The Extender can be connected to the mains using its pre-assembled AC clip for a wall mount configuration. Depending on the setup, for a desktop or table top setup, you can also remove the AC clip, place the clip cover back in place instead, then insert the AC cable.

Press the latch, and slide the AC clip away from the Extender

Locate the clip cover in the Box, and grab the AC cable. Then slide the clip cover in location, then insert the AC cable into the C7 connector

Chapter 2: Advanced Setup

After setting up the Extender with the setup software (located on the CD-ROM), the Extender will be ready for use. If you would like to change its advanced settings, use the Extender's browser-based utility. This chapter describes each web page of the utility and each page's key functions. You can access the utility via a web browser on a computer connected to the Extender.

How to Access the Browser-Based Utility

To access the browser-based utility, launch the web browser on your computer, and enter the Extender's default Internet Protocol (IP) address, **192.168.1.1**, in the *Address* field. Then press **Enter**. This works if your Extender has not yet been configured. If your Extender has been configured, log into your access point or router User Interface, look for the status page, locate the DHCP table using the user manual of your access point or router, and lookup for RE1000 in the DHCP table. When you have located the IP address , make a note of it , and then go back to your browser and enter it in the link address. Then press **Enter**

> **NOTE:** You can also access the browser-based utility on Windows computers by looking up the UPnP networked devices. Double click on the RE1000 icon. On MAC OS stations, the RE1000 will appear in the finder using Bonjour protocol.

A login screen appears. (A similar screen appears for non-Windows 7 users.)
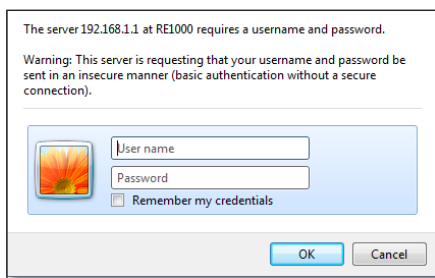
Login Screen

1. In the *User name* field, enter **admin**.

2. In the *Password* field, enter the password created by the setup software. If you did not run the setup software, then enter the default, **admin**.

> **NOTE:** You can set a new password on the *Administration > Management* screen. Refer to "" on page 10.

3. Click **OK** to continue.

> **NOTE:** You can also access the browser-based utility through Cisco Connect.

How to Use the Browser-Based Utility

Use the tabs at the top of each screen to navigate within the utility. The tabs are arranged in two levels, top-level tabs for general functions and lower-level tabs for the corresponding specific functions.
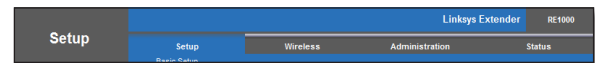
Top- and Lower-Level Tabs

The top-level tabs are: *Setup*, *Wireless*, *Administration*, and *Status*. Each of these has its own unique, lower-level tabs.

> **NOTE:** Within this User Guide, each screen is identified by its top- and lower-level tab names. For example, "Setup > Basic Setup" is the screen accessed via the Setup top-level tab, and its Basic Setup lower-level tab.

If you change any settings on a screen, you must click **Save Settings** to apply your changes, or click **Cancel Changes** to clear your changes. These controls are located at the bottom of each screen.
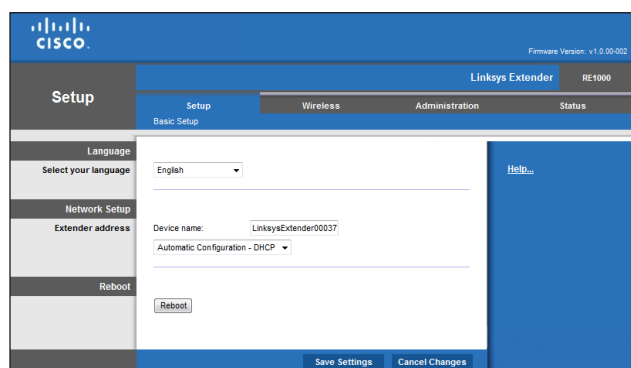
Save Settings or Cancel Settings

Click **Help** on the right side of a screen for additional information on the screen's options.
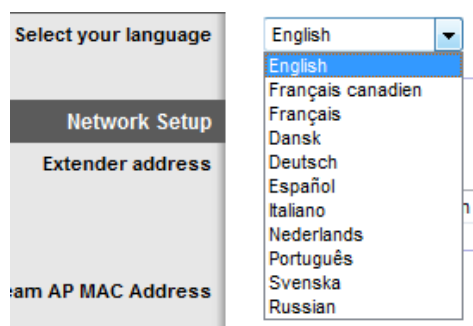
Setup > Basic Setup

The first screen that appears is the *Basic Setup* screen. This allows you to change the Extender's general settings.

Setup > Basic Setup

Language

Select your language To use a different language, select one from the drop-down menu. The language of the browser-based utility will change five seconds after you select another language.

Setup > Langages

Network Setup

Device name

This information will be used by UPnP

### Automatic Configuration - DHCP

The default Extender address Type is **Automatic Configuration - DHCP** (Dynamic Host Configuration Protocol). Keep the default if you connect using a dynamic IP address. (This option usually is the default setting s for most devices.)

Extender Address > Automatic Configuration - DHCP

Static IP

If you are required to use a fixed IP address to connect to the upstream access point or router, select **Static IP**.
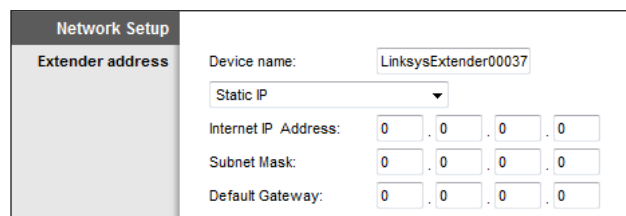

Extender Address > Static IP

IP Address This is the Extender's IP address as seen from the upstream access point or router.

Subnet Mask This is the router's subnet mask as seen from the upstream access point or router.

Default Gateway This is the IP address of your upstream AP or router

Reboot

This option is used to reboot the device from within the web UI. Once Reboot is complete, you will be brought back to the Basic Setup screen
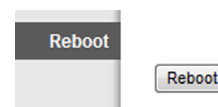
Wireless > Site Survey

The Site Survey gives a snapshot of all neighbouring access points or routers within range of the Extender.
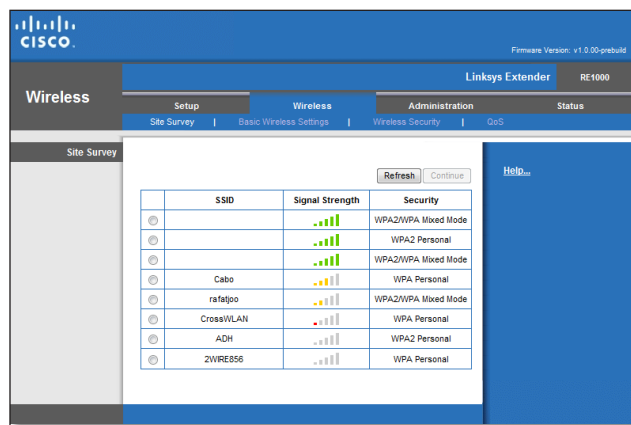
SSID

Displays the name of neighboring wireless networks.

Signal Strength

Displays the relative position of the neighboring AP's by indicating the power of the wireless signal received: 1bar= 20%, 2bars=40%, 3bars=60%, 4 bars=80%, 5bars-100%. If no bar is displayed, the Extender is located too far away from the upstream AP. Try to keep the signal strength between 60 and 100% for optimum performance. A careful site survey will help in keeping this value within acceptable range to benefit from optimum performance.
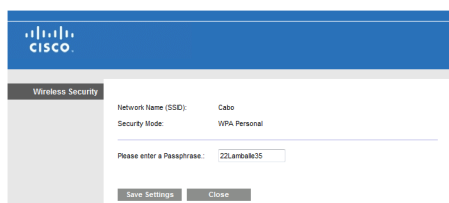
Security

Displays the mode of security in use by the neighboring AP's.

Wireless Site Survey View

To associate your Extender with your known access point or router, follow these steps:

1) Make a note of the SSID and the security passphrase that your access point or router is actually configured with. This information will be useful to carry on setup after the site survey is done.

2) You may select the network name (SSID) that you choose to repeat with your Linksys Extender by clicking the corresponding dot on the left column

3) Then, click on Connect, the following screen shows the SSID which you want to connect your Linksys Extender to, and prompts for the Passphrase used to secure your Wireless network. The type of security information required in this screen needs to match your access point or router wireless security settings


Wireless Site Survey > Security View

4) Your Extender wireless parameters should be configured. The wireless interface is going to restart, and the Extender will associate with the access point or router you have chosen. You can check the connection status between the Extender and the upstream access point or router. Goto "**Status > WLAN Statistics**" on page 14 and check the signal quality.
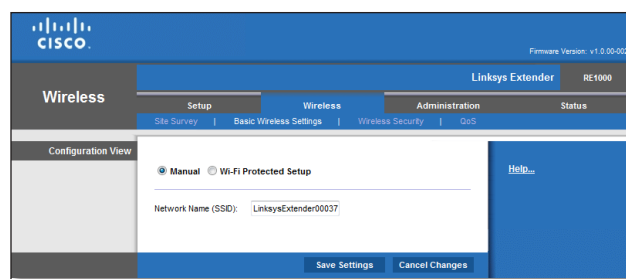
Wireless > Basic Wireless Settings

Select Manual if you wish to configure the wireless settings manually. In order to do so, you will be required to get the Wireless Network information (SSID and passphrase) from the access point or router you want the Extender to connect to.
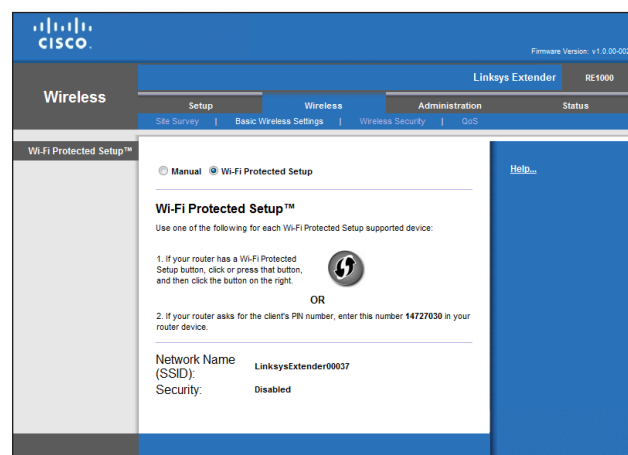
✔ **NOTE:** After you set up the wireless network, set up the wireless security settings. Go to "**Wireless > Wireless Security**" on page 8.
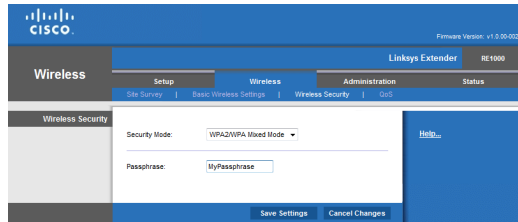
✔ **NOTE:** You can also use Wireless Protected Setup WPS method to configure your Extender automatically with your access point or router (you will not be required to provide any information on your setup). Go to "**Wi-Fi Protected Setup (Client mode for the initial setup with the access point or router**" on page 6.

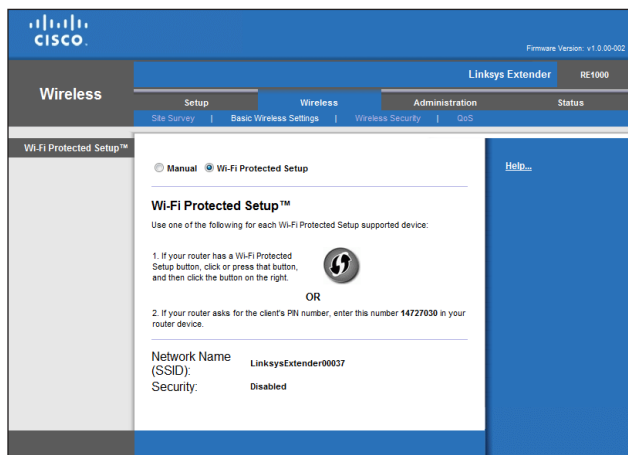Wireless > Basic Wireless Settings (Manual)

Security

Basic Wireless Settings (Manual) > Security View

Wi-Fi Protected Setup (Client mode for the initial setup with the access point or router

Wi-Fi Protected Setup is a feature that makes it easy to set up your wireless network. If your access point or router supports Wi-Fi Protected Setup, then you can use Wi-Fi Protected Setup.

Three methods of Wi-Fi Protected Setup are available. Use the method that applies to the Extender device you are configuring.

Wireless > Basic Wireless Settings (Wi-Fi Protected Setup)

> ✔ **NOTE:** Wi-Fi Protected Setup configures only device at a time.

Wi-Fi Protected Setup Light Activity

- The Cisco logo on the top panel of the Extender functions as the Wi-Fi Protected Setup light.

- When the Wi-Fi Protected Setup process is active, the light flashes slowly. When the Wi-Fi Protected Setup is successful, the light is continuously lit.

- If there is an error, the light flashes quickly for two minutes; please wait and try again.

- Wait until the light is continuously lit, before starting the next Wi-Fi Protected Setup session.

- **Wi-Fi Protected Setup Button** Use this method if your router has a Wi-Fi Protected Setup button.

Wi-Fi Protected Setup > Wi-Fi Protected Setup Button

a. Click or press the **Wi-Fi Protected Setup** button on the Extender.

b. Click the **Wi-Fi Protected Setup** button on the router's *Wi-Fi Protected Setup* screen, OR press and hold the Wi-Fi Protected Setup button on the back panel of the router for one second.

c. After the Extender has been configured, click **OK** on the Extender's *Wi-Fi Protected Setup* screen within two minutes.

- **Enter Extender PIN on Router** The Wi-Fi Protected Setup PIN (Personal Identification Number) can be found on the product label of the Extender .

Wi-Fi Protected Setup > Enter Extender PIN on Router

a. Enter the PIN from the Extender in the field on the router's *Wi-Fi Protected Setup* screen.

b. Click the **Register** button on the router's *Wi-Fi Protected Setup* screen.

c. After the Extender has been configured, click **OK** on the router's *Wi-Fi Protected Setup* screen within two minutes.

For the wireless network, the Network Name (SSID), Security, and Passphrase are displayed at the bottom of the screen.

> ✔ **NOTE:** If you have an access point or a router that do not support Wi-Fi Protected Setup, note the wireless settings, and then manually configure the Extender.

Wi-Fi Protected Setup (AP mode for adding

new wireless clients behind the Extender)

Wi-Fi Protected Setup is a feature that makes it easy to set up your wireless network. If you have client devices, such as wireless printers, that support Wi-Fi Protected Setup, then you can use Wi-Fi Protected Setup.

Three methods of Wi-Fi Protected Setup are available. Use the method that applies to the client device you are configuring.
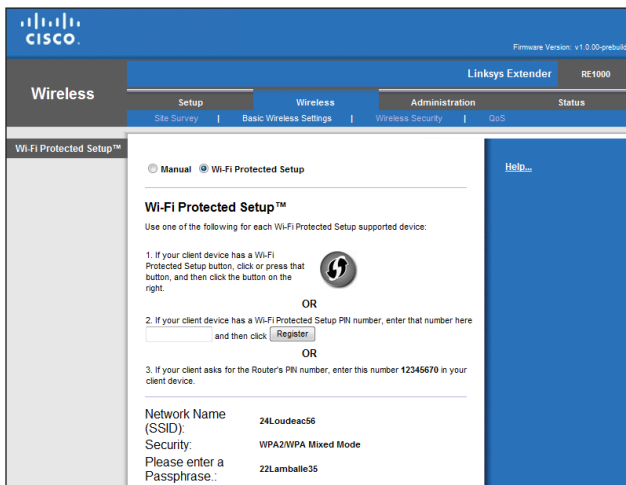
Wireless > Basic Wireless Settings (Wi-Fi Protected Setup)

> **NOTE:** Wi-Fi Protected Setup configures one client device at a time. Repeat the instructions for each client device that supports Wi-Fi Protected Setup.

Wi-Fi Protected Setup Light Activity

- The Cisco logo on the top panel of the Extender functions as the Wi-Fi Protected Setup light.

- When the Wi-Fi Protected Setup process is active, the light flashes slowly. When the Wi-Fi Protected Setup is successful, the light is continuously lit.

- If there is an error, the light flashes quickly for two minutes; please wait and try again.

- Wait until the light is continuously lit, before starting the next Wi-Fi Protected Setup session.

- **Wi-Fi Protected Setup Button** Use this method if your client device has a Wi-Fi Protected Setup button.

> **NOTE:** Make sure you configure one client device at a time.

Wi-Fi Protected Setup > Wi-Fi Protected Setup Button

 d. Click or press the **Wi-Fi Protected Setup** button on the client device.

 e. Click the **Wi-Fi Protected Setup** button on the Extennder's *Wi-Fi Protected Setup* screen, OR press and hold the Wi-Fi Protected Setup button on the top panel of the Extender for one second.

 f. After the client device has been configured, click **OK** on the Extender's *Wi-Fi Protected Setup* screen within two minutes.

- **Enter Client Device PIN on Extender** Use this method if your client device has a Wi-Fi Protected Setup PIN (Personal Identification Number).

Wi-Fi Protected Setup > Enter Client Device PIN on Extender

 a. Enter the PIN from the client device in the field on the Extender's *Wi-Fi Protected Setup* screen.

 b. Click the **Register** button on the Extender's *Wi-Fi Protected Setup* screen.

 c. After the client device has been configured, click **OK** on the Extender's *Wi-Fi Protected Setup* screen within two minutes.

- **Enter Extender PIN on Client Device** Use this method if your client device asks for the Extender's PIN.

Wi-Fi Protected Setup > Enter Extender PIN on Client Device

 a. On the client device, enter the PIN listed on the Extender's *Wi-Fi Protected Setup* screen. (It is also listed on the bottom of the Extender.)

 b. After the client device has been configured, click **OK** on the Extender's *Wi-Fi Protected Setup* screen within two minutes.

For each wireless network, the Network Name (SSID), Security, and Passphrase are displayed at the bottom of the screen.

NOTE: If you have client devices that do not support Wi-Fi Protected Setup, note the wireless settings, and then manually configure those client devices.

Wireless > Wireless Security

The wireless security settings configure the security of your wireless network(s). The Extender supports the following wireless security options: WPA2/WPA Mixed Mode, WPA2 Personal, WPA Personal and WEP. (WPA stands for Wi-Fi Protected Access. WEP stands for Wireless Equivalent Privacy.).

Wireless security is strongly recommended, and WPA2 is the strongest method available. Use WPA2 if it is supported by your Access Point or Router.

Security Options

Security Option	Strength
WPA2 Personal	Strongest
WPA2/WPA Mixed Mode	WPA2: Strongest WPA: Strong
WPA Personal	Strong
WEP	Basic

WPA2/WPA Mixed Mode

Wireless Security > WPA2/WPA Mixed Mode

Passphrase Enter a passphrase of 8-63 characters. This passphrase has to match you access point or router wireless security settings..

WPA2 Personal

Wireless Security > WPA2 Personal

Passphrase Enter a passphrase of 8-63 characters. This passphrase has to match you access point or router

wireless security settings.

WPA Personal

Wireless Security > WPA Personal

Passphrase Enter a passphrase of 8-63 characters. This passphrase has to match you access point or router wireless security settings.

WEP

WEP is a basic encryption method, which is not as secure as WPA.

Wireless Security > WEP

Encryption Select a level of WEP encryption, **(40/64-bit 10 hex digits)** or **104/128-bit (26 hex digits)**. The default is **40/64-bit (10 hex digits)**.

Passphrase Enter a passphrase to automatically generate WEP keys. Then click **Generate**.

Key 1-4 If you did not enter a passphrase, enter the WEP key(s) manually.

TX Key Select a default TX (Transmit) Key to use. The default is **1**.

Wireless > QoS

Wireless > QoS

WMM Support

Wi-Fi Multimedia (WMM) is a wireless Quality of Service feature that improves quality for audio, video, and voice applications by prioritizing wireless traffic.
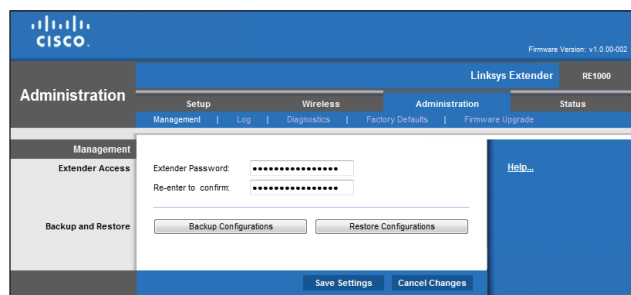
No Acknowledgement

If you want the Router to re-send data if an error occurs, keep the default, Disabled. If you do not want the Router to re-send data if an error occurs, select Enabled.

Chapter 3: Administration
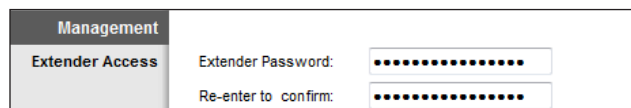
Administration > Management

The *Management* screen allows the network's administrator to manage specific Extender functions for access and security.

Administration > Management

Management

Device Access

Management > Device Access

To ensure the Extender's security, you will be asked for your password when you access the Extender's browser-based utility. The default is **admin**.

If you used the setup software for installation, the default is changed to a unique password.

Extender Password Enter a new password for the Extender.

Re-enter to confirm Enter the password again to confirm.

Back Up and Restore

Management > Back Up and Restore

Back Up Configuration To back up the Extender's configuration settings, click this option and follow the on-screen instructions.

Restore Configuration To restore the Extender's configuration settings, click this option and follow the on-screen instructions. (You must have previously backed up the Extender's configuration settings.)

Administration > Log

The Extender can keep logs of all connections and disconnections of your attached clients. It also gives an

update every 20 seconds on the signal power (RSSI) and indicates the SNR (Signal to Noise ratio). Also monitors associations/disassociations with the upstream AP.
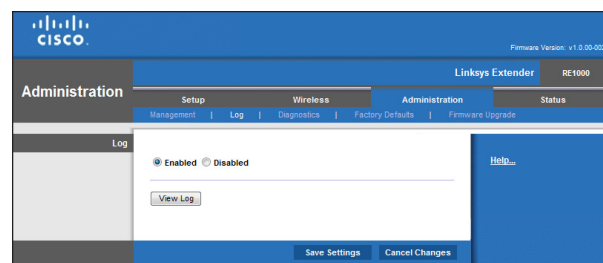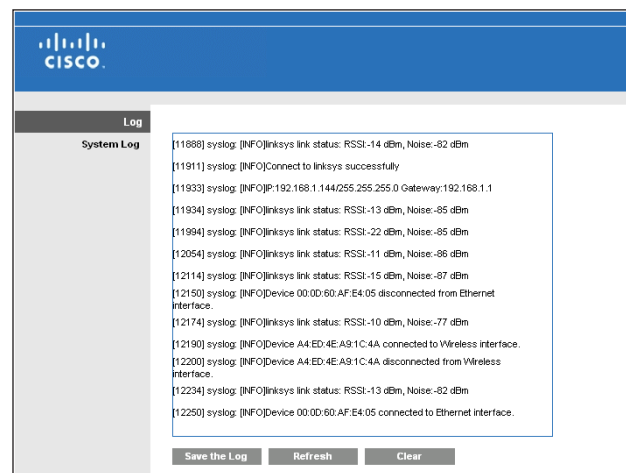

Administration > Log

Log

Enabled/Disabled To disable the Log function, select **Disabled**. To monitor traffic between the local network and the Internet, keep the default, **Enabled**. With logging enabled, you can choose to view temporary logs.

When you wish to view the logs, click **View Log**.
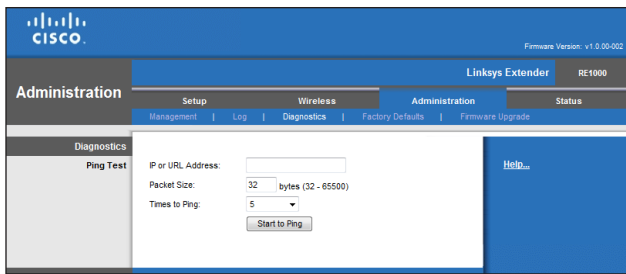
Log

Log > System Log

Click **Save the Log** to save this information to a file on your computer's hard drive. Click **Refresh** to update the log. Click **Clear** to clear all the information that is displayed.

Administration > Diagnostics

The diagnostic tests (Ping and Traceroute) allow you to check the connections of your network devices, including connection to the Internet.

Administration > Diagnostics

Diagnostics

### Ping Test

Ping checks whether the IP or URL address is reachable.

IP or URL Address Enter the IP or URL address you want to test.

Packet Size Enter the packet size you want to send. The default is **32** bytes.

Number to Ping Enter the number of times you wish to test the connection. The default is **5**.

Start Test To run the test, click this option. The *Ping* screen shows if the test is successful. Click **Close** to return to the *Diagnostics* screen. Click **Stop** to stop the test.
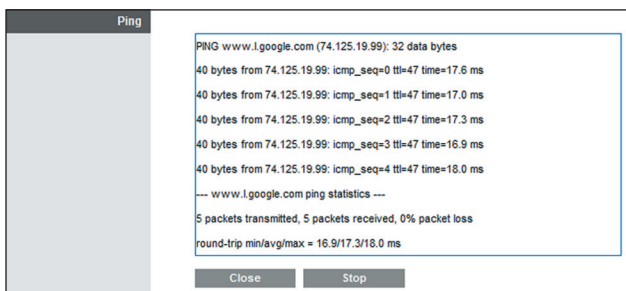

Diagnostics > Ping

Administration > Factory Defaults

The *Factory Defaults* screen allows you to restore the Extender's configuration to its factory default settings.

✓ **NOTE:** Do not restore the factory defaults unless you are having difficulties with the Extender and have exhausted all other troubleshooting measures. Once the Extender is reset, you will have to re-enter all of your configuration settings.
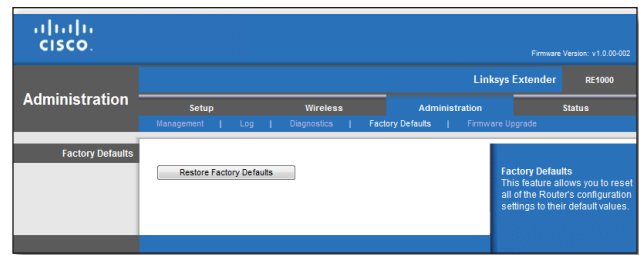

Administration > Factory Defaults

Factory Defaults

Restore Factory Defaults To reset the Extender's settings to the default values, click this option. Any settings you have saved will be lost when the default values are restored.

Administration > Firmware Upgrade

The *Firmware Upgrade* screen allows you to upgrade the Extender's firmware. Do not upgrade the firmware unless you are experiencing problems with the Extender or the new firmware has a feature you want to use.
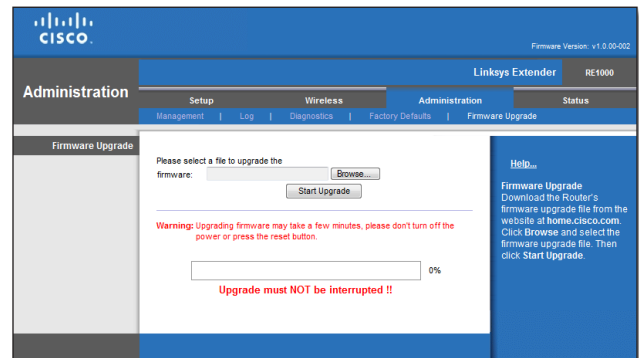
Administration > Firmware Upgrade

✓ **NOTE:** The Extender may lose the settings you have customized. Before you upgrade its firmware, write down all of your custom settings. After you upgrade its firmware, you will have to re-enter all of your configuration settings.

Firmware Upgrade

Before upgrading the firmware, download the Extender's firmware upgrade file from the website, **www.linksys.com/support**.

Please select a file to upgrade Click **Browse** and select the firmware upgrade file.

Start Upgrade After you have selected the appropriate file, click this option, and follow the on-screen instructions.
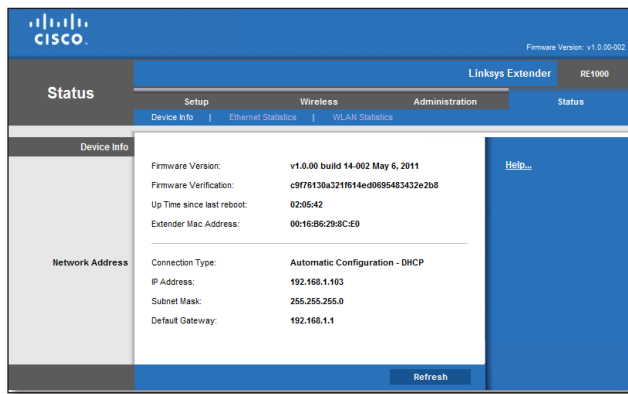
WARNING: Do not interrupt the upgrade process. You should not power off the Extender or press the Reset button during the upgrade process. Doing so may disable the Extender.

Chapter 4: Status

Status > Device Information

The *Device Information* screen displays information about the router and its current settings.

Status > Device Information

Device Information

Firmware Version The version number of the router's current firmware is displayed.

Firmware Verification The calculated checksum as unique identifier of the firmware is displayed.

Up Time since last reboot The period of activity since the last reboot is displayed.

Extender MAC Address The Extender's Ethernet port MAC address, as seen from the connected wired clients is displayed.

Device Name The Device Name is the NetBIOS name of the router. The default is **Cisco** followed by the last 5 digits of the router's serial number, which is found on the bottom of the router. If you used the setup software for installation, then the Device Name is the name of your wireless network (up to 15 characters).

Host Name The Host Name of the router is displayed.

Domain Name The Domain Name of the router is displayed.

Network Address

This section shows the current network information. The information varies depending on the Internet connection type selected on the *Setup > Basic Setup* screen.

IP Address, Subnet Mask and **Default Gateway** are **displayed**.

Click **Refresh** to update the on-screen information

Status > Ethernet Statistics

The *Ethernet Statistics* screen displays information about the local network.
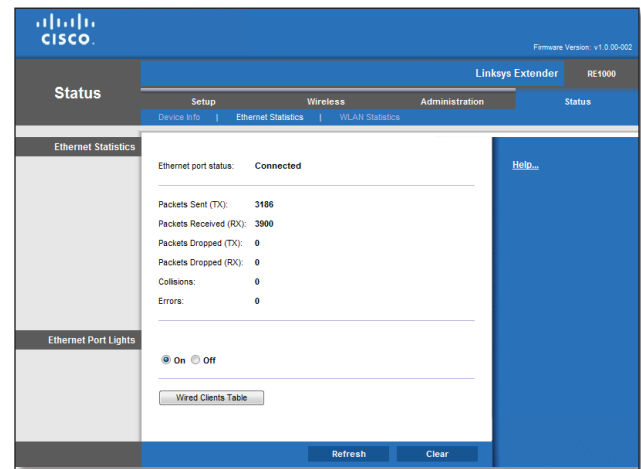
Status > Ethernet Statistics

Ethernet Statistics

Ethernet port status

The Status of the Extender's local Ethernet port is displayed.

Packet Sent (TX)

The number of packets transmitted is displayed.

Packets Received (RX)

The number of packets received is displayed.

Packets Dropped (TX)

The number of packets dropped on the transmit direction is displayed.

Packets Dropped (RX)

The number of packets dropped on the receive direction is displayed.

Collisions

The number of collisions occurring on the wire is displayed

Errors

The number of errors is displayed.
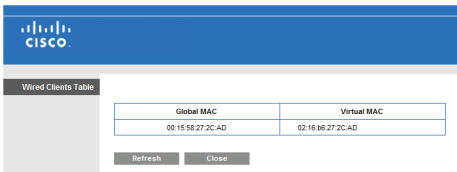
Ethernet Port Lights

Status > Ethernet Port light

On/Off

To allow the lights on the Extender's Ethernet port to light up, keep the default, On.

Click **Refresh** to update the on-screen information, or click on **Clear** to reset the counters to zero..
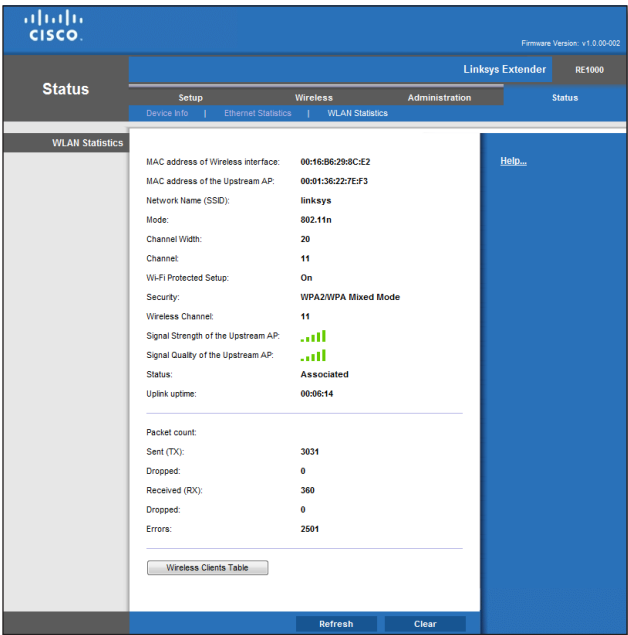
Wired Clients Table

Status> Ethernet Statistics > Wired Clients table

The global MAC address and the calculated virtual MAC address of each connected wired client is displayed.

Status > WLAN Statistics

The *WLAN Statistics* screen displays information about your wireless network.

Status > WLAN Statistics

MAC Address of Wireless Interface

The global MAC address of the Extender wireless interface is displayed.

MAC Address of the Upstream AP

The MAC address of the Upstream AP connected is displayed.

Network Name (SSID)

The name of the wireless network, also called the SSID, is displayed.

Mode

The wireless mode used by the network is displayed.

Channel Width

The radio channel width used by Wireless-N devices is displayed.

Channel

The Extender's operating radio channel is displayed. Status can be: ON, Off, In Progress.

Wi-Fi Protected Setup

The Extender's Wi-Fi Protected Setup is displayed.

Security

The wireless security method used by the wireless network is displayed.

Signal Strength of the Upstream AP

Displays the relative position of the neighboring AP's by indicating the power of the wireless signal received: 1bar= 20%, 2bars=40%, 3bars=60%, 4 bars=80%, 5bars-100%. If no bar is displayed, the Extender is located too far away from the upstream access point or router. Try to keep the signal strength between 60 and 100% for optimum performance. A careful site survey will help in keeping this value within acceptable range.Signal Quality of the Upstream access point or router:

Status

The status of the Extender wireless interface in relation to the Upstream AP: Associated, Down, Association in progress, Wrong Encryption key, Not configured, is displayed.

Uplink uptime

The duration that the Extender has been associated with the Upstream AP is displayed in seconds.
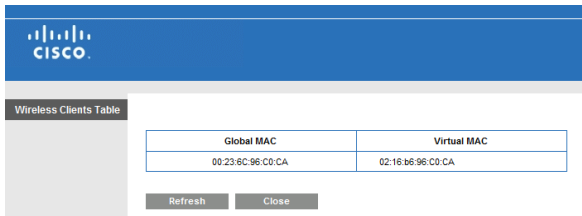
Packet Count

The number of transmitted, received, dropped and in error packets is displayed.

Packet Dropped

The number of packet dropped on the Upstream AP and on the Client sides, is displayed.

Wireless Clients Table

Status > WLAN Statistics > Wireless Client Table

The name, MAC address and Hop number information on the wireless connected clients, is displayed.

Click **Refresh** to update the on-screen information

Appendix A: Specifications

Model Name	Linksys RE1000
Model Description	Wireless-N Extender
Model Number	RE1000
Standards	IEEE 802.11n, 802.11g, 802.11b, 802.3u
Ports	Fast Ethernet, C7 connector for localized AC cable or clip
Buttons	Reset, Wi-Fi Protected Setup™
LEDs	Backlit Cisco logo, Ethernet (active, traffic)
Cabling Type	CAT 5
Antennas	2 (internal)
Detachable (y/n)	No
Transmitted Power	802.11n (40MHz) 15.5 ± 1.5 dBm @ CH6, mcs15
	802.11n (20MHz) 17.0 ± 1.5 dBm @ CH6, mcs0-4, mcs8-12
	802.11n (20MHz) 16.0 ± 1.5 dBm @ CH6, mcs5-7, mcs13-15
	802.11g 18.0 ± 1.5 dBm
	802.11b 18.0 ± 1.5 dBm
Receive Sensitivity	-91 dBm @ 1 Mbps
	-87 dBm @ 11 Mbps
	-71 dBm @ 54 Mbps
	-66 dBm @ 270 Mbps
Antenna Gain	3.5 dBi
Wireless Security	Wi-Fi Protected Access™ 2 (WPA2), WEP
Security Key Bits	Up to 128-Bit Encryption
Environmental	
Dimensions	4.92" x 3.62" x 1.29" (125 x 92 x 33 mm)
Weight	9.9 oz (280 g)
Power	Internal AC/DC power supply 100-240V, 50/60Hz, 0.5A
Certification	FCC, UL/cUL, ICES-003, RSS210, CE, Wi-Fi a/b/g/n, Wi-Fi (IEEE802.11b/g/n), WPA2™, WMM®, Wi-Fi Protected Setup™
Operating Temp.	32 to 104°F (0 to 40°C)
Storage Temp.	-4 to 140°F (-20 to 60°C)
Operating Humidity	10 to 80% Noncondensing
Storage Humidity	5 to 90% Noncondensing

Specifications are subject to change without notice.

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