

LWE120A LWE120AE LWE120UK LWE120A-KIT LWE120UK-KIT

Wireless Ethernet Extender

Quick Installation Guide



Customer Support Information Order toll-free in the U.S.: Call 877-877-BBOX (outside U.S. call 724-746-5500) FREE technical support 24 hours a day, 7 days a week: Call 724-746-5500 or fax 724-746-0746 • Mailing address: Black Box Corporation, 1000 Park Drive, Lawrence, PA 15055-1018 • Web site: www.blackbox.com • E-mail: info@blackbox.com About the Quick Installation Guide

This Quick Installation Guide is intended to guide professional installers to install and configure the Wireless Ethernet Extender. It covers procedures to assist you in avoiding unforeseen problems.

- 1. Overview
- 1.1 Introduction

The Wireless Ethernet Extender is a 2x2 outdoor access point. The LWE120A operates at 2.4-GHz band. Ideally suited for SMB or hotspot networks, this breakthrough innovation provides superior Wi-Fi network solutions at significantly lower cost.

In addition, the easy-to-install Wireless Ethernet Extender is also a high-performance last-mile broadband solution that provides reliable wireless network coverage for outdoor broadband application.



Figure 1-1. Front view.



Figure 1-2. Back view.



Figure 1-3. Inside the bottom cover.

2. Preparing for Installation

This chapter describes safety precautions and product information you have to know. Read this chapter before installing the Wireless Ethernet Extender.

Professional Installation Required

Seek assistance from a professional installer who is well trained in RF installation and knowledgeable in the local regulations.

Safety Precautions

To keep you safe and install the hardware properly, read and follow these safety precautions.

- 1. If you are installing the Wireless Ethernet Extender for the first time, for your safety as well as others', please assistance from a professional installer who has received safety training on the hazards involved.
- 2. Keep safety as well as performance in mind when selecting your installation site, especially where there are electric power and phone lines.
- 3. When installing the Wireless Ethernet Extender, note the following things:
- Do not use a metal ladder;
- Do not work on a wet or windy day;
- Wear shoes with rubber soles and heels, rubber gloves, and a long-sleeved shirt or jacket.
- 4. When the system is operational, avoid standing directly in front of it. Strong RF fields are present when the transmitter is on.

Installation Precautions

To keep the Wireless Ethernet Extender well while you are installing it, read and follow these installation precautions.

1. Users MUST use a proper and well-installed grounding and surge arrestor with the Wireless Ethernet Extender; otherwise, random lightning could easily cause fatal damage to the unit.

WARNING: EMD (Lightning) DAMAGE IS NOT COVERED UNDER WARRANTY.

2. Users MUST use the power cord and PoE injector shipped in the box with the Wireless Ethernet Extender. Using other options will damage the unit.

What's Included

Your package should contain the following items. If anything is missing or damaged, contact Black Box Technical Support at 724-746-5500 or info@blackbox.com.

The LWE120A, LWE120AE, and LWE120UK packages contain the following items:

- (1) IEEE 802.11n Wireless Ethernet Extender
- (1) pole-mounting ring
- (1) 24-VDC power cord and PoE injector
- (1) ferrite suppression core
- (1) grounding wire
- This printed quick installation guide

The LWE120A-KIT and LWE120UK-KIT packages contain two each of the items listed above for LWE120A, LWE120AE, and LWE120UK.

To download the user manual from the Web site:

- 1. Go to www.blackbox.com
- 2. Enter the part number (LWE120A) in the search box:
- 3. Click on the "Resources" tab on the product page, and select the document you wish to download.
- NOTE: Users MUST use the power cord and PoE injector shipped in the box with the Wireless Ethernet Extender. Using other options will damage the unit.



Figure 2-1. Pole-mounting ring.



Figure 2-2. Power cord and PoE injector.

3. System Installation

Connect up

1. The bottom of the Wireless Ethernet Extender is a movable cover. Grab the cover and pull it back harder to take it out as the figure shown below.



Figure 3-1. Removing the bottom cover from the extender.

2. Plug a standard Ethernet cable into the RJ-45 port.



Figure 3-2. Plugging a standard Ethernet cable into the RJ-45 port.

3. Slide the cover back and press down the lock button to seal the bottom of the Wireless Ethernet Extender.



Figure 3-3. Replacing the bottom cover.

Using the Grounding Wire

The extender is equipped with a grounding wire. Be sure to properly connect the extender, cables, and PoE injector to earth ground to protect against surges or ESD during normal use.

1. Remove the screw on the grounding point at the bottom of the Wireless Ethernet Extender.



Figure 3-4. Grounding point on the extender.

2. Put the grounding wire on the grounding point at the bottom of the Wireless Ethernet Extender. Then screw the grounding wire to tighten up.



Figure 3-5. Tighten the grounding wire.

3. Connect the grounding wire to earth ground.

Mount the AP on a Pole

- 1. Turn the Wireless Ethernet Extender over. Put the pole mounting ring through the middle hole of it.
- NOTE: Unlock the pole mounting ring with a screw driver before putting it through the device as the following right picture shows.



Figure 3-6. Installing the pole mounting ring on the extender.

2. Mount the Wireless Ethernet Extender steadily to the pole by locking the pole mounting ring tightly.



Figure 3-7. Extender mounted on a pole.

Power Up

1. Plug the power cord into the DC port of the PoE injector as the following picture shows.



Figure 3-8. Power cord plugged into the injector's DC port.

2. Use an Ethernet cable to connect the Wireless Ethernet Extender to the "POE" port of the PoE injector as shown next.



Figure 3-9. Power up the extender.

3. Connect the power plug to a power socket. The Wireless Ethernet Extender will be powered up immediately.

Connect to the Extender

To be able to configure and manage the extender, do the following:

1. Open the ferrite core by unsnapping the connector latches. The core will open, revealing a concave surface.



Figure 3-10. Open the connector latches.

2. Lay the Ethermet cable into the core, usually within 2 to 3 inches of the connector.



Figure 3-11. Putting cable into the core.

3. Loop the cable around and through the core. This helps "lock" the core in place, and may be required in circumstances withe severe interference.



Figure 3-12. Loop cable around core.

4. Close the core and snap the halves back together.



Figure 3-13. Close core.

5. Connect the Ethernet cable with suppression core to the "Data In" port of the PoE injector.



Figure 3-14. Connecting cable to data-in port.

6. Connect the other end of the Ethernet cable to a PC or a switch hub. The harware installation is complete.



Figure 3-15. Completed installation.

4. Configuration

The Wireless Ethernet Extender covers "Thin AP mode," "AC+Thin AP mode," and "FAT AP mode." The default mode is Thin AP. To allow the Wireless Ethernet Extender to manage the thin APs, you need to switch one of the Wireless Ethernet Extender to virtual controller mode first. To change the mode, do the following.

- 1. To connect the Wireless Ethernet Extender to your PC, plug one end of an Ethernet cable into the LAN port of PoE injector the other end into the LAN port of the PC. Then power on the Wireless Ethernet Extender using the PoE from PoE injector.
- 2. Assign a static IP address to your PC that should be in the same network segment with the Wireless Ethernet Extender. The default IP address of the extender is 192.168.1.1; you may choose from 192.168.1.2 to 192.168.1.254. Then click "OK."

Internet Protocol (TCP/IP) Prop	erties 🛛 🛛 🛛 🛛
General	
You can get IP settings assigned aut this capability. Otherwise, you need to the appropriate IP settings.	omatically if your network supports o ask your network administrator for
🔘 Obtain an IP address automatic	ally
── ● Use the following IP address: ──	
IP address:	192.168.1.
Subnet mask:	255 . 255 . 255 . 0
Default gateway:	
Obtain DNS server address auto	omatically
── ● Use the following DNS server a	ddresses:
Preferred DNS server:	· · · ·
Alternate DNS server:	
	Advanced
	OK Cancel

Figure 4-1. TCP/IP properties screen, general tab.

3. Open the web browser on your PC, type in the IP address (192.168.1.1) of the Wireless Ethernet Extender in the address bar, and then press "Enter."



Figure 4-2. Address bar.

- 4. You will now see the login page of the Wireless Ethernet Extender. The default "Name" and "Password" are "admin" and "password," respectively. Enter them and then click "Login."
 - NOTE: The login page (not shown) contains a space where you can enter the default Name (admin) and the default password (password).

Emter name: **admin** Enter password: **password**

Figure 4-3. Login page.

Configure the AC+Thin AP mode

To operate as AC+Thin AP mode, go to Basic Settings. From the Device Mode drop-down list, select "Virtual AC" mode. To use the extender as a virtual controller and access point concurrently, select "Virtual AC + Thin AP" mode. Then assign an IP address to the Wireless Ethernet Extender and specify subnet mask, gateway, and DNS address, respectively. Press "Apply" and wait for about 50 seconds to take effect.

Information	Basic Settings	
1 Basic Settings >	Use this page to configure the basic parameters of device.	
	Gernral Settings	
	Device Mode : Thin AP	
	Fat AP	(202000)
	Virtual AC	spaces/
	IP Settings Z Virtual AC + Thin AP	
	DHCP Client	
	Static IP	
	IP Address : 192.168.1.1	
	Subnet Mask: 255.255.255.0	
	Gateway IP Address : 3 0.0.0.0	
	0.0.0	
	DNS 2 : 0.0.0.0	
	AC Connection Mode	
	@ 1.4M	
	- memer	
	Enable 802.1Q VLAN	

Figure 4-4. Basic settings screen.

- NOTE: AC+ Thin AP mode allows the Wireless Ethernet Extender to operate as access controller and thin AP at the same time.
- NOTE: To operate the extender as a standalone Access Point, wireless client, or bridge, select FAT AP from device mode.

For Virtual Controller + Thin AP mode, if you need to configure the wireless settings for the Wireless Ethernet Extender, especially SSID and encryption method, go to Wireless Settings —> Wireless Networks and click on "#1 Wireless SSID" for configuration. Click "Save" to save the settings.

	Wi	Wireless Settings		Management		Tools
Wireless Networks > Wireless Protocol	Wi	reles	s Network	s		
Access Control		Enable	 scin 	Security	VIANID	Description
Traffic Shaping	1	endore .	Wireless (Open System	0	Profile1
RADIUS Settings	2		Wireless	Open System	0	Profile2
	3		Wireless	Open System	0	Profile3
	4		Wireless	Open System	0	Profile4
	5		Wireless	Open System	0	Profile5
	6		Wireless	Open System	0	Profile6
Wireless Protocol	Basic S	ettings				
	COID.				-	
Access Control	5510.			Wreless		
Access Control Traffic Shaping	Descr Broad	iption: lcast SSI	D:	Wireless Profile1 © Enabled O Disable	d	
Access Control Traffic Shaping RADIUS Settings	Desci Broad Wirele	iption: icast SSI iss Sepa Support	D: ration:	Wireless Profile1 © Enabled © Disable © Enabled © Disable © Enabled © Disable	id id	
Access Control Traffic Shaping RADIUS Settings	Desci Broad Wirele WMM	iption: Icast SSI ess Sepa Support Iax. Static	D: ration: in Num:	Wireless Profile1 	ed ed	
Access Control Traffic Shaping RADIUS Settings	Desci Broad Wirele WMM	iption: lcast SSII ess Sepa Support lax. Static y Settin	D: ration: in Num: 1gs	Wireless Profie1 ⊙ Enabled ○ Disable ⊙ Enabled ○ Disable ⊙ Enabled ○ Disable 32 (0-32)	id id id	
Access Control Traffic Shaping RADIUS Settings	Desci Broad Wirele WMM D M Security Netwo	iption: Icast SSI ess Sepa Support lax. Static y Settin rk Authe	D: ration: n Num: hgs ntication:	Wireless Profie1 © Enabled © Disable © Enabled © Disable 32 (0-32) Open System	id id	

Figure 4-5. Wireless Networks screen.

The wireless setting will also apply to the VAC-managed APs. A dialog message will pop up to remind you changes will also apply to other extender-managed APs. Click "Apply" to apply the configuration immediately.

Status	Wireless Settings	Management	Tools
Wireless Networks	TAP configuration contains changes App	In these changes?	
Wireless Protocol »	(If you want to synchronous local TAP, res	tart your AC.)	Delay Apply(26)

Figure 4-6. Wireless Settings screen.

To make the change on the Wireless Ethernet Extender itself take effect, you need to reboot the extender. To reboot the Wireless Ethernet Extender, go to Management —> Configuration File and click the "Reboot" button. The reboot process will take about 50 seconds.

Status	Wireless Settings	Management	Tools
AP Management	Configuration I	1 File	
System Settings	This page allows you to save was saved previously. You ma the device.	current settings to a file or load t ay also reset the current configura	he settings from the file which ation to factory default or rebool
Time Settings	Save AC Settings to File:	Save	
Firmware Upload	Save TAP Settings to File:	Save	
2 Configuration File ×	Load Settings from File:	選擇檔案	Upload
Password Settings	Reset Settings to Default:	Reset	
Syslog Settings	Reboot The Device:	8 Reboot	
System Log			

Figure 4-7. Configuration file screen.

Firmware Upgrade for Ethernet Extender in AC mode

To upgrade the firmware for the Wireless Ethernet Extender in AC mode, go to Management —> Firmware Upload and from Upgrade AC Firmware, browse the firmware file where it is placed. Press "Upload" to start the upgrade process. It will take approximately two minutes to complete the update.

Status	Wireless Settings	Management	Tools
AP Management	Upgrade Firr	1 nware	
System Settings	This page allows you up the device during the up	grade the device firmware to a new ver load because it may crash the system.	sion. Please do not power o
Time Settings	Upgrade AC Firmware: 3 Upload TAP Firmware:	選擇檔案 未選擇檔案 選擇檔案 未選擇檔案	Upload
2 Firmware Upload »	Auto Upgrade TAP Firm	ware: enabled Disabled	
Configuration File	_	Apply Cancel	
Password Settings			
Syslog Settings			
System Log			

Figure 4-8. Upgrade Firmware screen.

Install the Managed Thin AP

Install and connect the rest of managed Access Points to your network with the Ethernet cable. Power them up respectively. They will automatically discover the Wireless Ethernet Extender in AC mode and issue registration request.

To check whether the thin APs are successfully registered or not, enter the web page of the Wireless Ethernet Extender master access controller and go to Management —> AP Management. You will see "Registered" in the Status column. You can also see other information, such as MAC address, IP address, FW version, number of clients that associate to each thin AP, and upload/download speed.

Status	W	Settings	N	lana	gement	_	Tools		
AP Management »	AF	Man	agement	ed by AC.					
System Settings	_								
Time Settings	•#	• Device Name	• MAC	e IP	¢F₩	• Status	Clients	Uploaded	Downloaded
Firmware Upload	0	ap996633	00:19:70:99:66:33	192.168.1.1	1.1.1	Registered	1	24 kBytes	11 kBytes
onfiguration File	0	apeeeee	00:60:b3:ee:ee:ee	192.168.1.2	1.1.1	Registered	0	0 kBytes	0 kBytes
assword Settings	_								
Syslog Setting									

Figure 4-9. AP Management screen, Registered APs highlighted.

Moving the mouse over MAC address of each managed AP will also display relevant RF infofmation such as channel mode, current channel, antenna being used, and transmit output power.

AF This	Man	ws the APs that	t managed by AC.						
¢#	Selected	Device Name	♦ MAC	IP	¢FW	♦ Status	¢ Clients	▼ TX	¢RX
1	۲	apb1ffdd	00:19:70:b1:ff:dd (AC)	Channel M	ode:	20 MHz	C	465.8KB	0.0B
_				Channel:		5745MHz(149)		_
R	lestart	Rename Set	t IP Radio	Extension	Channel:	None	Re	fresh	
				Antenna:		Internal			
				Output Po	wer:	27dBm			

Figure 4-10. AP Management screen, RF information.

Manage the extender-managed APs

To configure and manage the managed APs:

1. Enter the web page of the Wireless Ethernet Extender in AC mode and go to Management —> AP Management. The following screen appears.

Status	W	ireless	Settings	N	lana	gement		Tools		
AP Management »	AF	P Mar	agement	ed by AC.						
System Settings	_									
Time Settings	¢#	Device Name	• MAC	♦ IP	●FW	Status	¢ Clients	• Uploaded	Downloaded	
Firmware Upload	0	ap996633	00:19:70:99:66:33	192.168.1.1	1.1.1	Registered	1	24 kBytes	11 kBytes	
onfiguration File	0	apeeeee	00:60:b3:ee:ee:ee	192.168.1.2	1.1.1	Registered	0	0 kBytes	0 kBytes	
Password Settings										
Syslog Setting	F	testart	Rename Set IP	Radio		de Selected	Upp	arade Al	Refresh	
System Log										

Figure 4-11. AP Management screen.

The Wireless Ethernet Extender AP in Virtual AC+Thin AP mode on the list is highlighted in bold font. Select it and press "Radio" to configure its radio setting, including channel bandwidth, channel, antenna, and output power.

Status	Wireless Settings	Man	Management				
AP Management »	AP Managem This page shows the APs that	ent t managed by AC.					
System Settings							
Time Settings	e# Device MA	C • IP •F	W + Status	♦Clients	♦Uploaded	Downloaded	
Firmware Upload	ap996633 00:19:70:9	9:66:33 192.168.1.1 1.1	.1 Registered	1	24 kBytes	11 kBytes	
Configuration File	O apeeeeee 00:60:b3:ee	e:ee:ee 192.168.1.2 1.1	.1 Registered	0	0 kBytes	0 kB)tes	
Password Settings							
Syslog Setting	Restart Rename	Set TD Padio Un	arada Selected		orade Al	Pafrash	
System Log			grade Delected			Kenesi	
System Alert							
AP Management » System Settings	AP Managem	ent t managed by AC.			x		
Time Settings	◆# ◆Device ◆	Channel Mode:	20 MHz 💌			ed ¢Downloade	
Firmware Upload	 ap996633 00:19:70 	Extension Channel:	2437MHz (6	s) ~		s 11 kBytes	
onfiguration File	O apeeeeee 00:60:b3	Antenna:	Internal (8	dBi) 💌		s 0 kBytes	
assword Settings		Output Power:	12dBm 💌				
Syslog Setting	Restart Rename					Refresh	
System Log	Evenue Evenue			-			
Contras Alexa							

Figure 4-12. AP Management screen, Radio button highlighted.

Besides radio setting, you may also reboot the managed AP, change its IP address, and upgrade the firmware for a managed AP.

Firmware Upgrade for the Ethernet Extender in AC mode

For firmware upgrade, you may choose to upgrade the selected managed AP by pressing "Upgrade Selected," or do the group upgrade by pressing "Upgrade All."

Before upgrading the managed AP, you need to locate the new firmware in the Wireless Ethernet Extender. Go to Management —> Firmware Upload, browse the firmware file where it is located, click "Upload" and Click "OK."

Status	Wireless Settings	Management	Tools
AP Management	Upgrade Firmwar	e	
System Settings	This page allows you upgrade the de device during the upload because it i	vice firmware to a new version. Please do may crash the system.	not power off the
Time Settings	Upload AC Firmware:	(調算)	beold
Firmware Upload »	Upload TAP Firmware:	(and)	Jpload
Configuration File			
Password Settings			
Syslog Setting			
System Log			
System Alert			

Figure 4-13. Upgrade Firmware screen.



Figure 4-14. Upload Firmware screen.

Then go back to Management > AP Management to do single or group updates.

Status	w	ireless (Settings	N	lana	gement		Tools		
AP Management »	AF	P Man	agement	ed by AC.						
System Settings	_									
Time Settings	•#	Device Name	• MAC	e IP	•FW	Status	•Clients	• Uploaded	Downloaded	
Firmware Upload	0	ap996633	00:19:70:99:66:33	192.168.1.1	1.1.1	Registered	1	24 kBytes	11 kBytes	
Configuration File	۲	apeeeee	00:60:b3:ee:ee:ee	192.168.1.2	1.1.1	Registered	0	0 kBytes	0 kBytes	
assword Settings	_									
Syslog Setting	R	lestart F	Rename Set IP	Radio	Upgra	de Selected		prade Al	Refresh	
System Log	_									
System Alert										

Figure 4-15. AP Management screen, Upgrade.

Monitor the Ethernet Extender-Managed AP

To view each managed AP's status, go to Status —> Managed APs. Besides viewing device information such as device name, MAC address, IP address, and FW version, you may also monitor the wireless clients that are currently associated with the managed APs as well as packets statistics.

Information	Mana	ned APs						
Managed APs »	This page sh	ows the APs that man	aged by AC.					
Wireless Users								
DHCP Clients	Device Name	• MAC	¢ IP	¢F₩	Status	¢Clients	Uploaded	Downloaded
	ap996633	00:19:70:99:66:33	192.168.1.1	1.1.1	Registered	1	3 kBytes	0 kBytes
	apeeeeee	00:60:b3:ee:ee:ee	192.168.1.2	1.1.1	Registered	0	0 kBytes	0 kBytes

Figure 4-16. Managed APs screen.

Configure the Fat AP mode

Fat AP mode operates as standalone AP that cannot be managed by the Wireless Ethernet Extender.

To switch from Virtual AC mode to Fat AP mode, go to Management —> System Settings. From the Device Mode drop-down list, select "Fat AP" and press "YES" to make the change take effect.

Status	Wireless Settings	Management	Tools
AP Management	System Settings	1 basic parameters of device.	
2 System Settings »	Device Settings		
Time Settings	Device Mode:	Virtual AC + Thin AP ·	
Firmware Upload	Connect Mode: 3	Fat AP	
Configuration File	Device Name:	Virtual AC + Thin AP	no spaces)
Password Settings	STP Forward Delay:	1 (1~30 seconds)	
Syslog Settings	Enable 802.1Q VLAN		
System Log	Management VLAN ID:	0 (0 means disabled)	
	IP Address Assignment		
	DHCP Client		
	Static IP		
	IP Address:	192.168.1.1	

Figure 4-17. System settings.

To switch from default mode Thin AP to Fat AP mode for the first time configuration, go to Basic Settings. From the Device Mode drop-down list, select "Fat AP" and press "YES" to make the change take effect.

Information	Pagia Catting	
Basic Settings »	Use this page to configure the	S a basic parameters of device.
	Gernral Settings	
	Device Mode:	Thin AP
	Device Name	Thin AP max. 15 characters and no spaces) AC + Thin AP
	Ethernet 2 DataRate:	Auto
	IP Settings	
	O Obtain IP Address Aut	omatically
	Use Fixed IP Address	
	IP Address	192.168.1.2
	Subnet Mask	255,255,255,0

Figure 4-18. Basic Settings screen.

The Fat AP covers "AP mode," "Wireless Client mode," "Bridge mode," and "AP Repeater mode."

AP Mode

1. Choose Wireless —> Basic Settings. The default is AP mode already. Here, you can set the parameters to optimize your application, or you can leave them as the default. Click "Apply" to save the parameters.



Figure 4-19. Wireless Basic Settings screen.

 If security is required, open Wireless —> Profile Setting and enter "VAP Profile 1 Settings" as below. You may set the parameters such as "Network Authentication" and "Data Encryption" for more secure network communication in your application. Click "Apply" to save the parameters.

Status	Syste	m	wireless 1	M	anage	ment	-	loois
Basic Settings Profile Settings »	Pr	ofile S	Settings P's attribute.					
Advanced Settings	# 0	Enabled	Profile Name 🁍 🕈	SSID	٥	Security	•	VLAN ID
Traffic Shaping	1	2	Profile1 3	Wireless		Open System		0
Access Control	2		Profile2	Wireless		Open System		0
WDS Settings	3		Profile3	Wireless		Open System		0
	4	•	Profile4	Wireless		Open System		0
	5		Profile5	Wireless		Open System		0
	6		Profile6	Wireless		Open System		0
	7		Profile7	Wireless		Open System		0
	8		Profile8	Wireless		Open System		0

Figure 4-20. VAP Profile1 Settings screen.

3. You may configure Network Authentication and Data Encryption parameters for more secure network communication in your application. After you configure these parameters, click "Apply" to save the parameters.

Profile Settings »	Define the VAP's basic setti	ngs and security settings.
Advanced Settings	Basic Settings	
Traffic Shaping	Profile Name:	Profile1
Access Control	SSID:	My network
WDS Settings	Broadcast SSID: Wireless Separation: WMM Support: IGMP Snooping:	Enabled Disabled Enabled Disabled Enabled Disabled Enabled Disabled Enabled Disabled 2 (1.22)
	Security Settings Authentication: Data Encryption: WPA Passphrase:	WPA2-P5K • AES • Iq2w3e4f

Figure 4-21. VAP1 Profile Settings screen.

4. To decrease the chances of data retransmission at long distances, the extender can automatically adjust proper ACK timeout value by specifying the distance between the nodes. Go to WIreless —> Advanced Settings and fill in the number in the Distance field. If the distance is below 3280 feet (1000 meters), do not change it.

Status	System Wireless Management Tools
	1
Basic Settings	Advanced Settings
Security Settings	These settings are only for more technically advanced users who have a sufficient knowledge
2 Advanced Settings	about wireless LANs. These settings should not be changed unless you understand the effects that such changes will cause.
Traffic Shaping	WMM Support: Enabled Disabled
Access Control	A-MPDU Aggregation: © Enabled © Disabled A-MSDU Aggregation: © Enabled ® Disabled
WDS Settings	Short Gi:
	Fragment Threshold: 2346 (256-2346)
	3 Distance: 3000 (0-15000 meter)
	Signal LED Thresholds: Weak < [-90] ≤ Medium ≤ [-74] < Strong
	Apply Cancel

Figure 4-22. Advanced settings screen specifying distance.

Wireless Client Mode

 Choose Wireless —> Basic Settings. Then you will see the "Wireless Basic Settings" page. Choose "Wireless Client" from Wireless Mode, and click "Apply" to save it. You can then change the other parameters to optimize your application before clicking "Apply."

Status	System	Wireless	Management	Tools
		1		
2 Basic Settings »	Basic Set	tinas		
Profile Settings	Use this page to d	hange the wireless mode as	well as configure any asso	ciated wireless
Advanced Settings	Disable Wire	ers.		
Traffic Shaping	Operation Mode:	Wireless CAN Interface	V Site Suprey	
Access Control	3 SSID:	Wireless1	July Survey	
WDS Settings	Locked AP MAC:			
	802.11 Mode:	802.11B/G/N	¥	
	Data Rate:	Auto	•	
	Output Power:	12	30 30 dBm	
	Enable MAC	Clone		
	Auto MAC CI	one		
	Manual MAC	Clone: 00:19:70:a2:91	1:0b	
		Apply	Cancel	

Figure 4-23. Basic Settings page.

2. Click the "Site Survey" button beside Wireless Mode. It will scan all the available access points within coverage. Select the one you prefer to connect to, and click "Selected" to establish the connection.

work parameters		well a	as configure any associated wireles
Disable Wireless L	AN Interface		
Operation Mode:	Wireless Client	•	Site Survey
SSID:	Wireless1		
Locked AP MAC:			
802.11 Mode:	802.11B/G/N	۲	
Data Rate:	Auto	۲]
Antenna Gain:	0 ©	18	0 dBi
Output Power:	12	30	30 dBm

Figure 4-24. Select the preferred extender.

elect	• SSID	Frequency/Channel	MAC Address	Wireless Mode	 Signal Strength 	Security
\bigcirc	FAE_Test	2412MHz(1)	00:19:70:5b:fe:60	802.11B/G/N	-41	WPA2
0	Cisco_1	2412MHz(1)	00:26:0a:ef:32:90	802.11B/G	-61	NONE
0	Apple Network 873e69	2412MHz(1)	10:9a:dd:87:3e:69	802.11B/G/N	-77	WPA2
0	AP2	2412MHz(1)	00:60:b3:47:9f.ce	802.11B/G	-86	WEP
0	MIS-AP1	2462MHz(11)	00:19:70:79:e8:9b	802.11B/G	-41	WPA2
0	MIS-AP1	2442MHz(7)	00:19:70:40:ff.f9	802.11B/G	-47	WPA2
0	dd-wrt_G300N	2417MHz(2)	00:24:a5:b4:cf:77	802.11B/G	-76	WPA
0	R2WAP64	2422MHz(3)	48:5b:39:bc:86:34	802.11B/G	-88	NONE
0	MIS-AP1	2447MHz(8)	00:19:70:40:ff:fe	802.11B/G	-54	WPA2
0	MIS-AP1	2452MHz(9)	00:19:70:40:ff.ff	802.11B/G	-63	WPA2

Wireless Site Survey

Th

Figure 4-25. Wireless Site Survey screen.

3. If the AP you connect to require authentication or encryption keys, click "Profile Settings" in the left column, fill out the corresponding items, and click " Apply" for data encryption.

Status	System	Wireless	Management	Tool
Basic Settings	Basic Settings			
Profile Settings	>> Profile Name:	Profile1		
Advanced Settings	Wireless Network Na (SSID): WMM Support	Wreless	abled	
Access Control		C Enabled C Dia	30160	
WDS Settings	Network Authenticatio	in: Open System	~	
	Data Encryption: Key Type: Default Tx Key: WEP Passphrase:	Open System Shared Key Legacy 802.1x WPA with Radius WPA-PSK WPA-PSK	Generate Keys	
	Encryption Key 1: Encryption Key 2:			
	Encryption Key 3:			
	Encryption Key 4:			

Figure 4-26. Basic Settings screen, Wireless tab.

4. To check whether the association with the extender has been successfully made, go to Status —> Connections. If the connection is established, it will display association information including MAC addres, wireless mode, signal strength, and connection time.

Status		System	ystem Wireless			Managemen	Tools			
1	Information									
2 Connections » Statistics		Associatio	on L	.ist	Mode	Signal Strength an	d Con	nected Time for ea	ch	
		associated device(s).		noue,	Jugital Scienger an	u com	inecced time for ea		
	ARP Table		MAC Address	¢	802.11 Mode	۰	Signal Strength	۰	Connected Time	4
		_	00:19:70:b5:7a:a	а	802.11A/N		-42 dBm		5m:11s	
	Bridge Table									_

Figure 4-27. Association list.

Bridge Mode

1. Choose Wireless —> Basic Settings. Then you will see the "Wireless Basic Settings" page. Choose "Bridge" from Wireless Mode, and click "Apply" to save it. You can change the other parameters to optimize your application before clicking "Apply."

Status	System	Wireless	Management	Tool
		1		
2 Basic Settings >>	Basic Set	tings		
Security Settings	Use this page to o	hange the wireless mode as	s well as configure any assoc	ciated wireless
Advanced Settings	Disable Wire	eless LAN Interface		
Traffic Shaping	3 Operation Mode:	Bridge	 Site Survey 	
Access Control	802.11 Mode:	802.11B/G/N	•	
WDS Settings	Channel Mode:	20 MHz	•	
	4 Channel:	2437MHz (6)		
	Extension Chann	None None	•	
	Data Rate:	Auto	¥	
	Output Power:	12	17 17 dBm	
		Apply	Cancel	
		Apply	Cancel	

Figure 4-28. Wireless Basic Settings screen.

2. Go to "WDS Settings" in "Wireless," type in the MAC address of the remote bridge to "Remote AP MAC Address 1" field and click "Apply."



Figure 4-29. WDS Settings screen.

- NOTE: The bridge uses the WDS protocol that is not defined as the standard, so compatibility issues between equipment from different vendors may arise. Moreover, Tree or Star shape network topology should be used in all WDS use-cases (i.e. if AP2 and AP3 are specified as the WDS peers of AP1, AP2 should not be specified as the WDS peer of AP3 and AP3 should not be specified as the WDS peer of AP2 in any case). Mesh and Ring network topologies are not supported by WDS, so do not use them.
- 1. Repeat the above procedures to configure the remote IEEE 802.11b/g/n Wireless Ethernet Extender.
- 2. Enter the actual distance in meters. For example, if the distance between the two VAC bridges is 3 kilometers, enter 3000 in the field.

Status	System	Wireless	Management	Tools		
		1				
Basic Settings	Advanced S	Settings				
Security Settings	These settings are onl	ly for more technically ac	dvanced users who have a s	sufficient knowledge		
2 Advanced Settings »	about wireless LANs. These settings should not be changed unless you understand the effects that such changes will cause.					
Traffic Shaping	WMM Support	Enabled	Disabled			
Access Control	A-MSDU Aggregation:	Enabled Enabled	Disabled			
WDS Settings	Short GI: BTS Threshold:	Enabled 2347 (256)	Disabled			
	Fragment Threshold: Channel Protection:	2346 (256 None	-2346) •			
	3 Distance:	3000 (0-15	5000 meter)			
	Signal LED Threshold Background Scan:	ds: Weak < -90 © Enabled ®	s Medium s -74 < Strong Disabled	g		
		Apply	Cancel			

Figure 4-30. Advanced settings screen.

- 3. Use ping to check whether the link between the two bridges is OK.
- 4. To check the wireless connectivity, go to Status —> Connections. If the connection is established, it will display association information of the remote bridge, including MAC address, wireless mode, signal strength, and connection time.



Figure 4-31. Association list screen.

AP Repeater Mode

1. Choose Wireless > Basic Settings. Choose "AP Repeater" from Wireless Mode, and click "Apply" to save it. You can also change the other parameters to optimize your application before clicking "Apply."

Status	System Wi	reless	Management	Tools	
Basic Settings »	Wireless Basic	Settings			
Profile Settings	Use this page to configure the p	arameters for wirele	ss LAN clients which may conner	t to your	
Advanced Settings	Access Point. Here you may cha	ange wireless mode a	as well as wireless network para	meters.	
Access Control	Disable Wireless LAN	Interface			
WDS Settings	Wireless Mode:	AP Repeater	Site Survey		
	Wireless Network Name (SSID):	Wireless	(more)		
	Broadcast SSID:	⊙Enabled ○0	Disabled		
	802.11 Mode:	802.118/G/N 💙			
	HT protect	O Enabled Disabled			
	Frequency/Channel:	2437MHz (6)			
	Extension Channel:	None 🛩			
	Channel Mode:	20 MHz 💌			
	Antenna:	 Internal (8 dBi) 	O External (N-Type)		
	Maximum Output Power (per	12	20 12 dPm		

Figure 4-32. Wireless Basic Settings screen.

To establish a point-to-point bridge connection, follow the procedures described in Bridge mode. To connect the wireless client to the AP, follow the procedures described in Wireless Client mode.

NOTES

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