



EN-4000<sup>™</sup> Reference Manual Document 13

# Configuring the EN-4000's 802.11 Wireless Card

The EN-4000 is the newest member of Encore Networks' family of routers. It provides wireless and cabled connections to a local area network (LAN) and to peripheral devices and remote devices.

The 802.11 wireless card was installed in the internal card slot (also called the embedded card slot) before the EN-4000 was shipped. Place the EN-4000 in its network location, and attach antennas to the ports labeled MAIN 1 and AUX 1, to support the internal wireless card. (For details, see the *EN-4000<sup>TM</sup> Quick Installation Guide*.) The EN-4000 supports 802.11a, b, and n wireless protocols.

After logging in to the EN-4000 Management System, follow the procedures in this discussion to configure the EN-4000's wireless card as a wireless access point or as a wireless client.

**Note:** For additional details of EN-4000 configuration, see *Configuring General Settings for the EN-4000*.

### 13.1 Configuring the 802.11 Wireless Card for the Network

The EN-4000's 802.11 wireless card can use one of two operating modes:

- It can function as an access point. See *Configuring the 802.11 Wireless Card as an Access Point*, on page 2.
- It can function as a wireless client. See *Configuring the 802.11 Wireless Card as a Wireless Client*, on page 10.

Note: A single wireless card can support only one mode at a time.

### 13.1.1 Configuring the 802.11 Wireless Card as an Access Point

To configure the 802.11 wireless card as an access point, use the steps in the following procedure.

- 1 On the EN-4000 Management System, select the **Networks** tab; then select the **Wifi** tab.
  - If the EN-4000 contains a wireless card, the Overview Screen for Wireless Configuration is displayed (Figure 13-1).

This screen provides basic information about the card's wireless specifications; it displays the MAC ID and supported versions of 802.11 (in Figure 13-1, 802.11abgn). If the wireless card has already been configured, the display also lists the card's mode and related specifications.

encorein	etworks	Auto Refresh:	on					Changes:
Status System Interfaces Wifi VPN VRRP Se	Network Sta Firewall Stat	tistics Logout	ring/Failover [	Diagnostics	QoS Hos	stnames D	HCP and D	DNS
Wireless Overv	riew c MAC80211 80	02.11abgn (radio0	))			) Scan	1	Add
Associated Sta	tions	TD:4-A	ddraaa	Cianal	Naisa	BY Bata	T	Pata
SSID	MAC-Address	s IPv4-A	aaress Collecting data	, ,	Noise	KA Kate		Kate

Figure 13-1. Overview Screen for Wireless Configuration

- 2 In the row for the new wireless card, select the Add button.
  - The Wireless Access Point Initial Configuration Screen is displayed (Figure 13-2).

Figure 13-2. Wireless Access Point Initial Configuration Screen

	Changes:
Status System Network Statistics Logout	
Interfaces Wifi Firewall Static Routes Load Sharing/Failover Diagno	stics QoS Hostnames DHCP and DNS VPN VRRP Serial
Wireless Network: Master "FN4KWIFI" (wlan0)	
the radio hardware is multi-SSID capable). Per network settings like encryption	The such as channel, transmit power or antenna selection which is shared among all defined wireless networks (in on or operation mode are grouped in the <i>Interface Configuration</i> .
Device Configuration	
General Setup Advanced Settings	
Status	Mode: Master   SSID: EN4KWIFI BSSID: 044F0-2104459:2104459:59   Encryption: WPA2 PSK (CCMP) Channel: 1 (2.412 GH2) [ Tx-Power: 0 dBm 80% Signal: -54 dBm   Noise: -95 dBm Bitrate: 93.4 Mbit/s   Country: 00
Wireless network is enabled	(3) Disable
Channel	auto 💌
Transmit Power	20 dBm (100 mW) 💌
Interface Configuration	
General Setup Wireless Security MAC-Filter	
ESSID	EN4KWIFI
Mode	Access Point
Network	🗹 lan: 🖉 🛞
	🔲 wan: 🖉
	wwan: (no interfaces attached)
	create:
	Choose the network(s) you want to attach to this wireless interface or fill out the create field to define a new network.
Hide ESSID	
WMM Mode	V
	🌏 Reset 🏾 🚳 Save & Apply

**Note:** Configure the fields in the lower half of this screen first (under the heading **Interface Configuration**).

- **3** Under the heading Interface Configuration, make sure the General Settings tab is displayed, and do the following:
  - a For the Mode, select Access Point.
  - **b** In the field labeled **ESSID**, type a name for the access point. (In this example, that name is **EN4KWIFI**.)
  - c Select the box to indicate that the Network is a LAN.
  - d Leave the field labeled Hide ESSID blank.
  - e Make sure the box for WMM Mode contains a check mark.
- 4 Under the heading Interface Configuration, select the Wireless Security tab.
  - The Wireless Configuration Screen, Wireless Security, is displayed (Figure 13-3).

Figure 13-3.	Wireless	Configuration	Screen,	Wireless	Security
. /		. /			

	esh: on				Change
Status System Network Statistics L	ogout				
Interfaces Wifi Firewall Static Routes Los	ad Sharing/Failover Diagnostics	QoS Hostnames DHC	P and DNS VPN	VRRP Serial	
Wireless Network: Master "EN4KWIFI"	(wlan0)				
The Device Configuration section covers physical se the radio hardware is multi-SSID capable). Per net	ttings of the radio hardware such work settings like encryption or op	as channel, transmit pow peration mode are groupe	er or antenna sele d in the <i>Interface</i>	ection which is shared Configuration.	d among all defined wireless networks (if
Device Configuration					
General Setup Advanced Settings					
Status	<b>4</b> 84%	Mode: Master   SSID: EN BSSID: 04:F0:21:0A:65: Channel: 1 (2.412 GHz)   Signal: -51 dBm   Noise: Bitrate: 74.7 Mbit/s   Cou	4KWIFI 95   Encryption: W Tx-Power: 0 dBm -95 dBm Intry: 00	IPA2 PSK (CCMP)	
Wireless network is enabled	🙆 Disa	ble			
Channel	auto				
Transmit Power	20 dBm dBm	(100 mW) ר			
Interface Configuration					
General Setup Wireless Security MAC-Filt	er				
Encryption	WPA2-F	PSK			
Cipher	auto		•		
Кеу	<b>&gt;</b>		2		
					🙆 Reset 🖉 Save 🔝 Save & Apply

- **5** On that screen, set the following values:
  - a Make sure the Encryption is WPA2-PSK.
- **b** Make sure the **Cipher** is set to **Auto**.

**Note:** In auto mode, the cipher uses CCMP (AES). Other protocols, such as TKIP, might appear in the list, but 802.11n recommends CCMP (AES).

- **c** For the **Key** field, specify a password for users to gain wireless access through this Access Point.
- 6 Under the heading Interface Configuration, select the MAC Filter tab.
  - The Wireless Configuration Screen, MAC Filter, is displayed (Figure 13-4).

Figure 13-4. Wireless Configuration Screen, MAC Filter

	Network	Statistics	Logout										
nterfaces Wifi	Firewall	Static Routes	Load Sharing/Failover	Diagnostics	QoS	Hostnames	DHCP and DNS	VPN	VRRP	Serial			
ireless Netwo	ork: Maste	er "EN4KWI	FI" (wlan0)										
e Device Configura	tion section	covers physic	al settings of the radio	hardware such	n as chai	nnel, transmi	t power or ante	nna sele	ction whi	ch is shared a	among all define	d wireless n	etworks (i
e radio nardware Dovico Configu	is multi-SSI	D capable). Pe	r network settings like (	encryption or d	peration	n mode are g	rouped in the Ir	iterrace C	ontigurat	ion.			
Conoral Sotun	Advanced	Sottinga											
Status	Auvanceu	Securigs			Maday	Venter   CCT							
ototoo					Mode: BSSID	04:F0:21:0	A:65:95   Encry	ption: W	PA2 PSK	(CCMP)			
				95%	Channe Signal:	el: 1 (2.412 0 -43 dBm   N	GHz)   Tx-Powe oise: -95 dBm	r: 0 dBm					
					Bitrate	97.5 Mbit/s	Country: 00						
Wireless networ	k is enabled	ł		🙆 Dis	sable								
Channel				auto			-						
Transmit Power				20 dB	m (100 mW	)	-						
				вь 🕥	lm								
Interface Com	guration												
	wireless S	Security MAG	2-Hilter										
MAC Address Filt													

7 On that screen, make sure the MAC Address Filter is disabled.

**Note:** You can enable that filter if you wish to allow or block specific MAC addresses.

- 8 In the top portion of the screen, under **Device Configuration**, make sure the **General Setup** tab is displayed. (Note that the **Status** display is only for information; it cannot be changed.) Then do the following:
  - a Make sure the Wireless Network is Enabled. (Do NOT select Disable.)
  - **b** Leave the Channel on Auto.
  - **c** For **Transmit Power**, select the maximum value allowed under your region's regulations.
- Under the heading Interface Configuration, select the Advanced Settings tab.
  - The Wireless Configuration Screen, Advanced Settings, is displayed (Figure 13-5).

	Changes: (
encoreinetworks	
Status System Network Statistics Logout	
Interfaces Wifi Firewall Static Routes Load Sharing/Failover D	Diagnostics QoS Hostnames DHCP and DNS VPN VRRP Serial
Wireless Network: Master "EN4KWIFI" (wlan0)	
The Device Configuration section covers physical settings of the radio har the radio hardware is multi-SSID capable). Per network settings like enc	rdware such as channel, transmit power or antenna selection which is shared among all defined wireless networks (if ryption or operation mode are grouped in the <i>Interface Configuration</i> .
General Setup Advanced Settings	
Mode	802.11g+n
HT mode	20MHz
Country Code	US - United States
Distance Optimization	Ø Distance to farthest network member in meters.
Fragmentation Threshold	
RTS/CTS Threshold	
- Interface Configuration	
General Setup Wireless Security MAC-Filter	
MAC-Address Filter	disable
	🕲 Reset 🖉 Save & Apply

Figure 13-5. Wireless Configuration Screen, Advanced Settings

- **10** On that screen, do the following:
  - a Select the Mode that provides the highest throughput for your region.802.11n is the preferred mode when it is available.
  - **b** Select a range that works well for **HT Mode** in your area.

**Note:** If there are few wireless networks in your area, and if all the devices that will connect to this access point can support 40 MHz, then this access point can use **40 MHz**. If several wireless networks are in the same area, **20 MHz** works better.

**c** Set the **Country Code** for the country where the device is located (to conform to regulations for use of frequencies, etc.).

- **d** Leave the **Distance Optimization** field blank.
- e Leave the Fragmentation Threshold field blank.
- f Leave the RTS/CTS Threshold field blank.
- 11 Select the Save & Apply button.
- **12** When the EN-4000 is configured as an access point, the 802.11 wireless interface and the LAN interface can be bridged, to allow the user to connect through Ethernet or through 802.11 wireless. Do the following:
  - a On the EN-4000 Management System, select Network, then Interfaces.
    - The EN-4000 Interfaces Screen is displayed (Figure 13-6).

		C
cor <mark>e n</mark> etworks		
Auto	> Refresh: on	
latus System Network Statistics	Legent	A webs
aterfaces Wifi Firewall Static Ros	utes Load Sharing/Failover Diagnostics .QoS Hostnames DHCP and DNS VPN VRRP 1	Serial
terfaces		
Interface Overview		
Network	Chabus	Artions
The Physics of the Ph		
Network	Uptimer Oh S&m 24s	
LAN	Uptime: 0h 58m 24s HAC-Address: 00:A0:EB:02:00:01	
LAN (2.2)	Uptime 06 EPm 34s HAC-Address 00,0018102100101 HAC-1350.01 HE (MA35 Stat.) TX: 1250.01 HE (MA35 Stat.)	🕸 Connect 🧔 Stop 📝 Edit 🖹 Delete
LAN (1.2.1) (-1.0.1)	Uptime: 0h SBm 24s HAC-Address 00 A0 (BE)02100101 RX: 15-01 KB (1343 Sett.) TX: 13-07 KB (77 PKts.) IBovit 192, 160-2.1/24	🖉 Connect 🧿 Stop 📝 Edit 🖹 Delete
LAN S <sup>3</sup> (S 2) Drive	Uptimes Ch 58m 24e HAC-Address 001/018102100/01 RX: 1550.01 KG (3435 PKts.) TX: 132.01 KG (2435 PKts.) 19v4: 192.160.2.1/24 Uptimes Ch 58m 31s	😤 Connect 🥥 Stop 🙋 Edit 💉 Delete
Network	Uptime         OH Stars         Star         Star           IHO         Address         00/018102/00/01         Hot         Star         Star </td <td>🕸 Connect 🥥 Stop 🔏 Edit 🖹 Delete</td>	🕸 Connect 🥥 Stop 🔏 Edit 🖹 Delete
Hetwork LAN 같 (같 중) boas WAN	Uptimer (M: Stm: 24e           Uptimer (M: Stm: 24e           UM: Address (0.0018)(0.2100/01           UM: 155.05 kf (1.9405 Fisk.)           DY: 157.06 (1.9405 Fisk.)           UPtimer (M: Stm: 21e           UPtim	🕸 Connect 🥥 Stop 🔏 Edit 🖹 Delete

Figure 13-6. EN-4000 Interfaces Screen

- **b** In the LAN row, select the **Connect** button.
  - The LAN Interfaces Screen is displayed (Figure 13-7).

Figure 13-7. LAN Interfaces Screen

core-networks	
Status System Network Statistics Logout	
Interfaces Wifi Firewall Static Routes Load Sharing/Failover	Disgnostics QoS Hostnames DHCP and DNS VPN VRRP Serial
nterfaces - LAN	
n this page you can configure the network interfaces. You can bridge se NTERFACE.VIANNR (e.g.: etb0.1).	veral interfaces by ticking the "bridge interfaces" field and enter the names of several network interfaces separated by spaces. You can also use <u>VLAN</u> notation
Common Configuration	
General Setup Advanced Settings Physical Settings Firewall S	
Bridge interfaces	🗷 🕥 creates a bridge over specified interface(s)
Enable STP	Q Enables the Spanning Tree Protocol on this bridge
Interface	Zithernet Adapter: "eth" (an)     Zithernet Adapter: "eth"     Zithernet Adapter: "eths"     Zithernet Adapter: "wan5"     Zithernet Adapter: "Wan5"
DHCP Server	
General Setup Advanced Settings	
Ignore interface	Disable <u>DHCP</u> for this interface.
Start	100 Dowest leased address as offset from the network address.
Limit	(150 Maximum number of leased addresses.
Leasetime	12h Expiry time of leased addresses, minimum is 2 Minutes (ax).
	🙆 Reset 🥴 Save & Apph

**Note:** The DHCP server assigns an IP address to each device that connects to this EN-4000 over a wireless connection or over an Ethernet LAN. (The DHCP server's configuration is shown in the lower portion of Figure 13-7.)

c On the LAN Interfaces Screen, select the Physical Settings tab.

The LAN Interfaces Physical Settings Screen is displayed (Figure 13-8).

Figure 13-8. LAN Interfaces Physical Settings Screen

Bateling         Peterork         Statistic         Logost           Interface:         LAN           On this page you can configure the rethonk interfaces. You can bridge several interfaces thidge interfaces field and enter the names of several network interfaces separated by spaces. You can also use VLAN notation           Common Configuration         Common Configuration           Common Configuration         Implementation           Bridge interfaces         Implementation           Bridge interfaces         Implementation           Difference         Implementation           Common Configuration         Implementation           Common Configuration         Implementation           Bridge interfaces         Implementation           Enable SIP         Implementation           Interface         Implementation           Interface         Implementation           Interface         Implementation           Interface         Implementation           Interface         Implementation           Interface         Implementation           Implementation         Implementation           Implementation         Implementation           Implementation         Implementation           Implementation         Implementation           Impl		
Interface         Writ         Tream         Static Routes         Load Sharing/Failower         Did Diagnetice         QOS         Mathematica         Mathematica           Interfaces         LAM         Common Configuration         Sarial         Sarial           Common Configuration         Physical Settings         Prevail Settings         Image you can configuration         Sarial           Common Configuration         Common Configuration         Image you can configuration         Image you can configuration         Image you can configuration           Common Configuration         Advanced Settings         Prevail Settings         Image you can configuration         Image you can configuration           Enable State         Advanced Settings         Prevail Settings         Image you can configuration         Image you can configuration           Common Configuration         Image you can configuration           Independence         Image you can configuration         Image you can configuration         Image you can configuration         Image you can configuration           Interface         Image you can configuration         Image you can configuration         Image you can configuration         Image you can configuration <th>Status System Network Statistics Logout</th> <th></th>	Status System Network Statistics Logout	
Interfaces - LAN On this page you can configure the network interfaces. You can also use <u>VLAN</u> notation TERRER.VLANN (6.2): 410-1). Common Configuration Co	Interfaces Wifi Firewall Static Routes Load Sharing/Failover	Diagnostics QoS Hostnames DHCP and DNS VPN VRRP Serial
On this page you can configure the network interfaces. You can bridge several interfaces by ticking the "bridge interfaces" field and enter the names of several network interfaces separated by spaces. You can also use <u>YLAN</u> notation  Common Configuration  Common	Interfaces - LAN	
Common Configuration Common Co	On this page you can configure the network interfaces. You can bridge so INTERFACE. VLANNR (e.g., eth0.1).	everal interfaces by ticking the "bridge interfaces" field and enter the names of several network interfaces separated by spaces. You can also use <u>VLAN</u> notation
Operand Settings       Physical Settings       Pinewall Settings         Bridge interfaces       If Brankes the Spanning Tree Protocol on this bridge         Enable 512       If Bharnet Adapter: "eith" (tan)         Interface       If Bharnet Adapter: "wand5"         Interface       If Bharnet Adapter: "wand5"         Interface       If Bharnet Adapter: "wand5"         Interface       If Disable DHCP for this Interface.         Bridge interface       If Disable DHCP for this Interface.         Start       If Disable DHCP for this Interface.         Itimut       If Disable DHCP for this Interface.         Start       If Disable DHCP for this Interface.         Itimut       If Disable DHCP for this Interface.         Itimut       If Disable DHCP for this Interface.         Itimut       If Disable DHC	Common Configuration	
Bridge interfaces       If pravises a bridge over specified interface(s)         Enable 512       If banks the Spanning Tree Protocol on the bridge         Interface       If banks the Spanning Tree Protocol on the bridge         Interface       If banks the Spanning Tree Protocol on the bridge         Interface       If banks the Spanning Tree Protocol on the bridge         Interface       If banks the Spanning Tree Protocol on the bridge         Interface       If banks the Spanning Tree Protocol on the bridge         Interface       If banks the Spanning Tree Protocol on the bridge         Interface       If banks the Spanning Tree Protocol on the bridge         Interface       If banks the Spanning Tree Protocol on the bridge         Interface       If banks the Spanning Tree Protocol on the bridge         Interface       If banks the Spanning Tree Protocol on the bridge         Interface       If banks the Spanning Tree Protocol on the bridge         Interface       If banks the Spanning Tree Protocol on the bridge         Interface       If banks the Spanning Tree Protocol on the bridge         Interface       If banks the Spanning Tree Protocol on the bridge         Interface       If banks the Spanning Tree Protocol on the bridge         Interface       If banks the Spanning Tree Protocol on the bridge         Interface       If bankspret of leas	General Setup Advanced Settings Physical Settings Firewall 5	
Enable <u>STP</u> Interface  DHCP Server  General Setup Advanced Settingte  Limit Limit Lessetime  Exact  DHCP Server  General Setup Advanced Settingte  Limit Limit Lessetime  Exact  DHCP Server  DHCP Server DHCP Server DHCP Server DHCP Server DHCP Server DHCP Server DHCP Server DHCP Server DHCP Server DHCP Server DHCP Server DHCP Server DHCP Server DHCP Server DHCP Server DHCP Server DHCP Server DHCP Server	Bridge interfaces	🗷 😳 creates a bridge over specified interface(s)
Interface	Enable STP	🗐 😳 Enables the Spanning Tree Protocol on this bridge
DHCP Server  General Setup Advanced Settings  Janner interface  Start  Start  Decement leased address as offset from the network address.  Lessetime  Tan  Provide Settings  Decement leased addresses, minimum is 2 Minutes (as).	Interface	Z Ethernet Adapter: "etho" (an)     Z Ethernet Adapter: "etho" (an)     Z Ethernet Adapter: "etho"     Z Ethernet Adapter: "wan5"     Z Ethernet Adapter: "Ethor" (an)     Z Custom Interface:
Ignore interface <ul> <li>Disable <u>DHCP</u> for this interface.</li> <li>Stort</li> <li>Lowest Leased address as offset from the network address.</li> <li>Limit</li> <li>Leasetime</li> <li>Buping time of leased addresses. minimum is 2 Minutes (2n).</li> </ul>	DHCP Server General Setup Advanced Settings	
Start     100       Limit     150       Leasetime     150       Bispiny time of leased addresses, minimum is 2 Minutes (24).	Ignore interface	🖹 😳 Disable <u>DHCP</u> for this interface.
Limit  It50  Maximum number of leased addresses.  Leasetime  It27  Exploy time of leased addresses, minimum is 2 Minutes (an).	Start	100 Lowest leased address as offset from the network address.
Leadetime (12h) Exploy time of leased addresses, minimum is 2 Minutes (au).	Limit	150 ● Maximum number of leased addresses.
	Leasetime	12h Supiry time of leased addresses, minimum is 2 Minutes (2w).

**d** On that screen, make sure the following settings apply:

- Bridge Interfaces: Make sure Creates a bridge over specified interfaces is selected.
- Interface: Make sure Ethernet Adapter "eth1" (LAN) is selected, and make sure Wireless Network Master \*\*\* (LAN) is selected, where \*\*\* represents the name of the client interface you created in Step 3b on page 3. (\*\*\* is EN4KWIFI in Figure 13-8.)
- e Select the Save & Apply button.
  - The bridge is saved, and the Wireless Overview Screen is displayed (Figure 13-9). Note that the list of associated stations includes two interfaces now.

Status	System Network	Auto Refresh: on						
Interfacer	Wifi Firewall	Static Routes Load Sharing/Fi	allover Diagnostics QoS	Hostnames DH0	CP and DNS VPN VR	RP Serial		
ireless	Overview							
	Generic MAC8021	11 802.11abgn (radio0) 12)   Bitrate: 91 Mbit/s						🗟 Scan 📩
	SSID: EN4KWIFI BSSID: 04:F0:2	Mode: Master 1:0F:88:48   Encryption: WPA2 P:	SK (CCMP)				Disable	🕹 Edit 💌 Ri
sociat	ed Stations							
isociat	ed Stations	MAC-Address	IPv4-Address	Signal	Noise	RX Rate	מ	K Rate

Figure 13-9. Wireless Overview Screen

**13** On the EN-4000 Management System, select the **Network** tab; then select the **Wifi** tab.

The Wireless Access Point Configuration Screen is redisplayed, showing the completed configuration for the wireless card as a wireless access point (Figure 13-10).



atus System Netwo	rk Statistics	Logout										
terfaces Wifi Firew	all Static Routes	Load Sharing/Failover	Diagnostics	QoS Hostnames	DHCP and DNS	VPN VI	RRP Serial	_				
reless Overview												
Generic MAC8 Channel: 1 (2.41	0 <b>211 802.11abg</b> 2 GHz)   <b>Bitrate:</b> 91	I <b>n (radio0)</b> L Mbit/s							۵	Scan	1	Add
<b>SSID:</b> EN48 95% <b>BSSID:</b> 043	WIFI   <b>Mode:</b> Maste F0:21:0A:65:95   E	er ncryption: WPA2 PSK (Co	CMP)					Disable		Edit	×	Remove
ssociated Sta	tions											
					I	_						
SSID	MAC-AC	Idress	IPv4-	Address	Signal	N	loise	KX K	ate		IX Ra	ate
				No information	available							

14 Open a device that will use this access point to reach the wireless network. That can be any mobile or static device with 802.11 wireless capability. Use that device's system to connect to the wireless access point.

**Note:** If you are connecting another device to this access point, that device must be an 802.11 wireless client. If that other device is an EN-4000, you can connect that device to this access point by doing the following on that EN-4000's management system:

- a Select the Network tab,
- **b** Then select the Wifi tab.
- c Then select the Scan Button.
  - ♦ A list displays 802.11 wireless networks within range.
- d In that list, find the access point's network and select Join Network.

**Note:** For details, see step 1 through step 3 and Figure 13-14 and Figure 13-15, on page 10 through page 11 of *Configuring the 802.11 Wireless Card as a Wireless Client*.

That device connects to the access point and can now access the wireless network.

Figure 13-11 shows some 802.11 wireless devices connected to the EN-4000 access point.





- **15** On the EN-4000 that is the wireless access point, select the **Network** tab, then the **Wifi** tab.
  - The Wireless Overview Screen is displayed (Figure 13-12). The list of associated stations includes the IP address of an EN-4000 that connected in step 14.



Figure 13-12. Wireless Overview Screen Listing Associated Stations

## 13.1.2 Configuring the 802.11 Wireless Card as a Wireless Client

Figure 13-13 shows the EN-4000 as a wireless client.

Figure 13-13. EN-4000 as Wireless Client



To configure the wireless card as a client, you must first identify the wireless access point that the wireless card will connect to. That access point must support the type of 802.11 wireless transmission that the EN-4000 supports (802.11a, 802.11b, 802.11n; or combined support for 802.11a+n). You must also know the password (and other credentials, if applicable) to log on to that access point.

- 1 On the EN-4000 Management System, select the **Network** tab; then select the **Wifi** tab.
  - If the EN-4000 contains a wireless card, the Overview Screen for Wireless Configuration is displayed (Figure 13-14).

This screen provides basic information about the card's wireless specifications; it displays the MAC ID and supported versions of 802.11 (in Figure 13-14, **802.11abgn**). If the wireless card has already been configured, the display also lists the card's mode and related specifications.

encorein	etworks I A	uto Refresh: on				Changes:						
Status System	Status System Network Statistics Logout											
Interfaces <b>Wifi</b> VPN VRRP Se	Firewall Static Rout erial	es Load Sharing/Failover	Diagnostics	QoS	Hostnames	DHCP and DNS						
Wireless Over	Wireless Overview         Image: Generic MAC80211 802.11abgn (radio0)         Image: No network configured on this device											
Associated Sta	itions											
SSID	MAC-Address	<b>IPv4-Address</b> Collecting da	Signal ata	Noise	RX Rate	e TX Rate						

Figure 13-14. Overview Screen for Wireless Configuration

2 On the Overview Screen for Wireless Configuration, select the Scan button.

The screen lists available wireless networks (Figure 13-15).

Figure 13-15. Available Wireless Networks

encor <mark>e n</mark> etworks				1	Unsaved Changes: 1
Status System Network Sta	atistics Logout				
Interfaces Wifi Firewall Statio	ic Routes Load Sharing/Failov	er Diagnostics	QoS Hostnames	DHCP and DNS	VPN VRRP
Join Network: Wireless Sca	BSSID: 14:D6:4D:3A:1B:BF   Er	cryption: mixed W	/PA/WPA2 - PSK		Join Network
PMCBP 98% Channel: 11   Mode: Master	BSSID: F8:E4:FB:D0:27:3D   E	ncryption: WPA2 -	PSK		Join Network
MimoWifi 57% Channel: 36   Mode: Master	BSSID: 04:F0:21:0F:FF:DA   Er	cryption: WPA2 -	PSK		Join Network
				Back to over	view 💽Repeat scan

3 Select the **Join Network** button for the network you wish to join.

The selected network requests log-in credentials (Figure 13-16).

Note: You should already have requested the password and other log-in information for the selected network.

Figure 13-16.	Log-In Screen for a Wireless Network
3	5

encor <mark>e n</mark> etworks	Unsaved Changes: 2
Status System Network Statistics Logout Interfaces Wifi Firewall Static Routes Load Sharing/Failover D Join Network: Settings	Diagnostics QoS Hostnames DHCP and DNS VPN VRRP Serial
Replace wireless configuration WPA passphrase	
Name of the new network Create / Assign firewall-zone	PMCBPV/fiV/an  The allowed characters are: $\lambda$ -2, $\alpha$ -2, $0$ -9 and  Ian: Ian: $\sum_{i=1}^{i}$
	wan: wan:          unspecified -or- create:
	Choose the firewall zone you want to assign to this interface. Select <i>unspecified</i> to remove the interface from the associated zone or fill out the create field to define a new zone and attach the interface to it.
	Back to scan results Submit

- **4** Do the following:
  - a Make sure the box is checked to **Replace wireless configuration**.
  - **b** In the field for the **WPA passphrase**, type the password provided by the network.

- Go to Table of Contents
- **c** Specify the **Name of the new network**. This can be any unique name in your network. We recommend including the name of the network you selected in step 3 as part of this name.
- **d** In the list for **Create/Assign firewall zone**, select **unspecified or create**, and type a name for the set of firewall rules that will apply to packets from the selected wireless network.
- e When all the information has been entered, select the **Submit** button (in the lower right corner of the screen).
  - If your credentials are approved, the Wireless Network Configuration Screen is displayed (Figure 13-17).

**Note:** Under the heading **Interface Configuration** (in the lower half of the screen), the card's **Mode** as a wireless **Client** has automatically been specified.

Status System Network Statistics Logout	
anternates with crewen static houses Lines sharing railover	Diagnesius geo messnames unur ano uno vvii vinny benai.
Vireless Network: Unknown "PMCBP" (radio0.networ	K1)
he Device Configuration section covers physical settings of the radio l etwork settings like encryption or operation mode are grouped in the	ardware such as channel, transmit power or antenna selection which is shared among all defined wireless networks (if the radio hardware is multi-SSID capable). Per Interface Configuration.
Device Configuration	
General Setup Advanced Settings	
Status	Hode: Unicomy 1 SSID: PHCRP BSSTD: PR:E4:FR:BOX7301 [Encryption: - Channel: 36 (0.000 GHz) [Tx-Power: 0 dBm O <sup>th</sup> Signat 0 dBm [Hoiste 0 dBm Bitrate: 0.0 Mbd/s [ Country: 00
Wireless network is enabled	O Disable
Channel	11 (2.462 GHz) *
Transmit Power	16 dBm (39 mW) •
Interface Configuration	
General Setup Windows Security	
ESSID	PMCBP
Mode	Client
<u>8551D</u>	F8 E4 FB D0 27:3D
Network	R PMCBPwifiWan:
	💷 lan: 🖉
	an an a
	Create:
	Choose the network(s) you want to attach to this wireless interface or fill out the owate field to define a new network.

Figure 13-17. Wireless Network Configuration Screen

- 5 In the area for **Device Configuration**, select **Advanced Settings**.
  - The screen displays applicable fields (Figure 13-18).

🙂 Reset 🥝 Save 💷 Save & Apply

Figure 13-18. Wireless Network Configuration Screen, Advanced Settings

Status System Network Statistics Logout	
Interfaces Wifi Firewall Static Routes Load Sharing/Failover Diagnosti	ics QoS Hostnames DHCP and DNS VPN VRRP Serial
Wireless Network: Unknown "PMCBP" (radio0.network1)	
The Device Configuration section covers physical settings of the radio hardware su network settings like encryption or operation mode are grouped in the Interface Co	ch as channel, transmit power or antenna selection which is shared among all defined wireless networks (if the radio hardware is multi-SSID capable). Per onfiguration.
Device Configuration	
General Setup Advanced Settings	
Mode	auto •
Country Code	US - United States  Use ISO/IIC 3166 alpha2 country codes.
Distance Optimization	Distance to farthest network member in meters.
Fragmentation Threshold	
RTS/CTS Threshold	
Interface Configuration	
General Setup Wireless Security	
ESSID	PMCBP
Mode	Client
BSSID	F8E4FBD0273D
Natwork	PMCBPWfiWan:     PMCBPWfiWan:     PmCBPWfiWan:     man:     man:     create:     create:     Choses the network(s) you want to attach to this wireless interface or fill out the create field to define a new network.
<u></u>	

6 In the field for **Country Code**, select the arrow for the drop-down list. Then, in the drop-down list, select the country where the router is located, to comply with local regulations for frequencies, etc.

**Note:** All other fields were automatically populated with the proper values. You do not need to change them.

7 In the area for Interface Configuration, select Wireless Security.

The screen displays applicable fields (Figure 13-19).

	Figure 13-19. Wileless Ne	twork configuration screen, wireless security
en		Unsaved Change
	Status System Network Statistics Logout	
	Interfaces Wifi Firewall Static Routes Load Sharing/Failover Diagnostics QoS	Hostnames DHCP and DNS VPN VRRP Serial
	Wireless Network: Unknown "PMCBP" (radio0.network1)	
	The Device Configuration section covers physical settings of the radio hardware such as channetwork settings like encryption or operation mode are grouped in the Interface Configuration	nel, transmit power or antenna selection which is shared among all defined wireless networks (if the radio hardware is multi-SSID capable). Per h.
	Device Configuration	
	General Setup Advanced Settings	Hode:         Unknown         [ SSID: FMCBP           SSID:         F0:E414/B100127320 / Encryption: -         -           Channet:         50(0.000 + 1): Tx-Fower: 0 dBm         -           Signal:         0 dBm / Soutry: 0 dBm         -           Bitrate:         0 MM/s / Gounty: 0         -
	Wireless network is enabled	O Disable
	Channel	11 (2.462 GHz) •
	Transmit Power	16 dBm (39 mW) • • • • • • • • • • • • • • • • • • •
	Interface Configuration	
	General Setup Wireless Security	
	Encryption	WPA2-PSK *
	Cipher	auto
	Key	<b>)</b>

Figure 13-19. Wireless Network Configuration Screen, Wireless Security

- 8 Set the **Encryption** to match the encryption used by the network you are connecting to.
- **9** Set the **Cipher** to match the cipher used by the network you are connecting to.

#### 10 In the area for **Device Configuration**, select **General Settings**.

The screen displays applicable fields (Figure 13-20).

Figure 13-20. Wireless Network Configuration Screen, General Device Settings

tatus System Network Statistics Logout	
nterfaces Wifi Firewall Static Routes Load Sharing/F	allover Diagnostics QoS Hostnames DHCP and DNS VPN VRRP Serial
ireless Network: Unknown "PMCBP" (radio0.ne	twork1)
e Device Configuration section covers physical settings of the r network settings like encryption or operation mode are group of the settings like encryption or operation mode are group of the setting se	radio hardware such as channel, transmit power or antenna selection which is shared among all defined wireless networks (if the radio hardware is multi-SSID capable ped in the Interface Configuration.
Device Configuration	
General Setup Advanced Settings	
status	Mode: Unknown   SSID: PMCBP ■ SSID: P812-F812-B002;73:0   Encryption: - Channel: 36 (0,000 GHz)   Tx-Power: 0 dBm 0% Signal: 0 dBm   Noise: 0 dBm Bitrate: 0.0 Mbit/s   Country: 00
Wireless network is enabled	Disable
Channel	auto v
Transmit Power	16 dBm (39 mW) ▼
Interface Configuration	
ESSID	PMCRP
Hede	
Phone	Citra .
BSSID	F8E4/F8:D0:27:3D
Network	PMCBPWiffWen: *
	🔲 lan: 🔊
	wan: 🗾
	create:
	Choose the network(s) you want to attach to this wireless interface or fill out the create field to define a new network.

- 11 Set the Channel to Auto.
- **12** Set the **Transmit Power** to the highest value allowed in your region.
- **13** Select the **Save & Apply** button (in the lower right corner of the screen).
- **14** The EN-4000 is accepted as a wireless client, and the card's Wireless Overview screen is redisplayed, with updated information (Figure 13-21).

Figure 13-21. Completed Configuration as Wireless WAN Client

core	etwo	orks	h: on										Cha
Status	System Net	work Statistics Lo	opout										
Interface	is Wifi Fin	wall Static Routes Lo	ad Sharing/Failover	Diagnostics Q	205 Hostnames	DHCP and DNS	VPN VRRP	Serial		_	_	_	_
Vireles	s Overview												
	Generic MAC Channel: 11 (2	80211 802.11abgn (ra 462 GHz)   Bitrate: 130 M	adio0) bit/s								Scan	1	Add
	SSID: PMC 85% BSSID: F8	8P   Hoder Client 1E41F81D012713D   Encrypt	tion: WPA2 PSK (NON	E)					Oisable	4	Edit		Remove
ssocia	ted Station:	i .											
	SSID	HAC-Address	IP	v4-Address	Signal	Noise		RX Rate		TX Ra	te		

**15** On the EN-4000 Management Screen, select the **Network** tab; then select the **Firewall** tab. If necessary, select the **General Settings** tab.

The interface's Firewall Zone Settings Screen is displayed (Figure 13-22).

Figure 13-22. Firewall Zone Settings Screen

cor <mark>e n</mark> etworks					đ
itatus System Network Statistics Logout					
nterfaces Wifi Firewall Static Routes Load Sharing/Failover	Diagnostics QoS Hostna	mes DHCP and DNS VPN VRRP	Serial		
eneral Settings Port Forwards Traffic Rules Custom Rules					
rewall - Zone Settings					
e firewall creates zones over your network interfaces to control netw	ork traffic flow.				
General Settings					
Enable SYN-flood protection	8				
Drop invalid packets	8				
Input	accept	٣			
Output	accept	Ŧ			
Forward	relact	•			
	(14)44				
Zones					
Zone - Forwardings	Input	Output Forward	Masquerading	MSS clamping	
lans lans 🖉 🗕 wan	accept 🔻	accept Treject	• 0	8	Edit 💌 Delete
wan: wani 🖉 - REBET	reject 🔻	accept Treject	• 2	8	Edit 💌 Delete
newzone: (empty) - REXECT	accept *	accept Treject	•		Edit 🗶 Delete
wifiwanz PMC8PWifiWani 👾 🝝 RESECT	accept *	accept reject	•		Edit 💌 Delete
Add					
					🥥 Reset 🙄 Save 🔛 Save & A

**Note:** Firewall forwarding must be set up for each network that will be part of a failover set. (For an example of policies, weights, and measures used to configure failover priorities, see *Configuring a MultiWAN for the EN-4000*.)

- 16 In the area under **Zones**, in the column labeled **Zone** => **Forwarding**, select the **Edit** button in the row that starts with the label **LAN** (the first row in the list).
  - The Firewall Zone Settings LAN Screen is displayed (Figure 13-23).

		c
or <mark>e-n</mark> etworks		
The Party of		
terfaces Wifi Firewall Static Routes Load Sharing/Failo	ver Disphostics GoS Hostnames DHCP and DNS VPN VRRP Senal	
neral Settings Port Forwards Traffic Rules Custom Roles	N Contraction of the second	
ewall - Zone Settings - Zone "lan"		
one "lan"		
is section defines common properties of "lan". The input and out a zone. Covered networks specifies which available networks are m	nut options set the default policies for traffic entering and leaving this zone while the <i>forward</i> option describes the policy for rember of this zone.	forwarded traffic between different networks within
Seneral Settings Advanced Settings		
lame	lan	
nput	accept •	
Dutput	accept	
orward	reject	
Sasquerading	0	
455 clamping	0	
Jovered networks	E PMCBPWifiWan:	
	8 lan: 🖉	
	wan: 2	
	Create:	
nter-Zone Forwarding		
e options below control the forwarding policies between this zone merding rule is undirectional, e.g. a forward from lan to wan does	(Ian) and other zones. Destination zones cover forwarded traffic originating from "Ian". Source zones match forwarded traffic not imply a permission to forward from wan to Ian as well.	from other zones targeted at "lan". The
Allow forward to destination zones:	D manager front	
	· newzone, (empty)	
	want wan: 🖉	
	🕑 wifiwan: PMCBPWifiWan: 👳	
llow forward from source zones:	newzone: (empty)	
	autor war i	
	Wifiwan: PMC8PWifiWan:	

Figure 13-23. Firewall Zone Settings LAN Screen

- 17 On that screen, make sure LAN is selected under Covered Networks, and make sure WAN and the new client network you created (WIFIWAN in this example) are selected under Allow Forward to Destination Zones.
- **18** On the Firewall Zone Settings LAN Screen, select Advanced Settings.
  - The applicable fields are displayed.

Figure 13-24. Firewall Zone Settings LAN Screen, Advanced Settings

- **19** You can use this screen if you wish to restrict masquerading for specific source or destination IP addresses.
  - ✤ Figure 13-24 does not use any rules to restrict masquerading.
- 20 On the Firewall Zone Settings LAN Screen, select General Settings.
  - The applicable fields are displayed.

Figure 13-25. Firewall Zone Settings LAN Screen, General Settings

atus System Network Statistics Logout						
terfaces Wifi Firewall Static Routes Load Sharing/Failover D	Diagnostics QoS H	lostnames DHCP and I	ONS VPN VRRP Seria	I.		
eneral Settings Port Forwards Traffic Rules Custom Rules						
ewall - Zone Settings						
firewall creates zones over your network interfaces to control network	traffic flow.					
General Settings						
Enable SYN-flood protection		2				
Drop invalid packets		0				
Input		accept	٣			
Output		accept	٣			
Forward		reject	۲			
Zones						
Zone - Forwardings	Input	Output	Forward	Masquerading	MSS clamping	
lan: lan: 🖉 🖛 wan wifiwan	accept	<ul> <li>accept</li> </ul>	<ul> <li>reject</li> </ul>	0		Z Edit 🗙 Delete
wani weni 🔬 - AEJECT	reject	<ul> <li>accept</li> </ul>	<ul> <li>reject</li> </ul>	8	8	🗹 Edit 💌 Delete
newzones (empty) = RERECT	accept	<ul> <li>accept</li> </ul>	<ul> <li>reject</li> </ul>	0	8	Edit Delete
wifiwan: PMCBPWifiWani 🎡 - REECT	accept	<ul> <li>accept</li> </ul>	<ul> <li>reject</li> </ul>	8	2	Edit Delete
Add						

- 21 Make sure Masquerading and MSS Clamping are selected for the networks to which you forwarded firewall settings in step 17 (in this example, WAN and the new client network WIFIWAN).
- 22 Select the Save & Apply button.
  - The LAN's firewall rules are applied to the wireless WAN (the wireless card's wireless client interface).
- **23** On the EN-4000 Management Screen, again select the **Network** tab, then the **Interfaces** tab.
  - Interfaces on the EN-4000 are redisplayed, with updated information (Figure 13-26). This includes the client interface that you just configured.
  - Configuration of the wireless card as a wireless client is complete.

		Changes: I
Status System Network Statistics Logout Interfaces Wifi Firewall Static Routes Load Sharing/Failow	er Disgnostics QoS Hostnames DHCP and DNS VPN VRRP Serial	
Interfaces		
Interface Overview		
Network	Status	Actions
LAN	MAC-Addressi 001A01E8102100101	
ga (≱) Brian	RX: 112.10 KB (2437 Pitts.) TX: 11.57 KB (71 Pitts.) IPv4: 192.168.2.1/24	2 Connect 🥹 Stop 🗹 Edit 💌 Delete
WAN	Uptime: 0h 41m 34s	
2 490	TX: 2.4 MB (2576) Pate.) TX: 2.4 MB (2576) Pate.) TX: 2.49 MB (2583) Pate.) IPv4: 192.168.101.77/24	Stop dit Edit Defete
PHODEWIFIWAN	Uptime: 0h 14m 53s	
Claret "PHOSP"	NAX, Address Official to Hoster RX: 10.3,4 K0 (555 PKz), TX: 15,95 K8 (51 PKz), TX: 15,95 K8 (51 PKz), TX: 15,95 K8 (51 PKz),	🌮 Connect 🧔 Stop 👔 Edit 💌 Delete
MAdd new interface		

Figure 13-26. Interfaces on the EN-4000

**Note:** It is possible for other devices on the EN-4000's wired LAN to use the EN-4000 Wireless Client's connection to reach the internet (Figure 13-27).



Figure 13-27. Additional Devices on the LAN Using the EN-4000 Wireless Client's Connection to the Internet

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### 13.2 Checking the Status of the Wireless Card

Select the **Status** tab, then the **Overview** tab, to display the status for the EN-4000 (Figure 13-28). The **Wireless** heading and information are in the lower portion of the display.

oronotworks						
	Auto Refresh: on					
us System Network Stati	stics Logout					
rview Firewall Routes Sy	stem Log Processes Re	altime Graphs				
us						
stem						
outer Name		EN4000				
outer Model		EN 4000				
rmware Version		17322 04 99				
ocal Time	Thu May 29 13:18	8:30 2014				
ptime	21h 49m 45s					
mory						
tal Available		225644 kB / 254	744 kB (88%)			
Free		206544 kB / 254	744 kB (81%)			
ached		19100 kB / 254	744 kB (7%)			
Ruffered		0 kB / 25474	14 kB (0%)			
twork						
v4 WAN Status		Type: dhcp				
		Netmask: 25	5.255.255.0			
		eth0 Gateway: 19 DNS 1: 8.8.8	2.168.101.17 .8			
		Connected:	21h 49m 29s			
v6 WAN Status						
		Not connecte	d			
tive Connections		290 / 163	84 (1%)			
00.1						
Hostname		IPv4-Addr	ess	MAC-Address	Leasetime remaining	
COLIN-PC		192.168.1.1	198	00:27:10:2a:57:34	9h 52m 56s	
Colins-Air		192.168.1.154		60:c5:47:0c:fe:f6	8h 8m 24s	
CPRIPAD		192.168.1.118		00:90:4b:e5:a9:fd	8h 6m 49s	
CPRiPhone5		192.168.1.223		d8:d1:cb:9e:36:05	8h 6m 18s	
android-5b2925ec6ada1a95 android-382eee78948590d3		192.168.1.156		80:96:b1:f4:ec:bd	8h 0m 17s	
Bruce-PC		192.168.1.225		cc:af:78:67:7b:e7	7h 30m 44s	
ardalan-HP		192.168.1.107		74:de:2b:31:8c:6b	7h 18m 44s	
Sneha Jabrat2-PC		192.168.1.209		68:94:23:ae:4a:61	7h 20m 29s	
android-4f86d6a233012f10		192.168.1.1	196	40:0e:85:07:83:30	7h 12m 50s	
iPhone		192.168.1.2	206	f4:37:b7:3b:e1:d0	7h 8m 51s	
ARDALAN-PC	2	192.168.1.1	160	58:94:6b:8e:1f:3c	7h 48m 32s	
reless	ttroller (radio0)	SSID: EN4K Mode: Mast Channel: 1 81% Bitrate: 97 BSSID: 04: Encryption:	WIFI ser (2.412 GHz) .4 Mbit/s F0:21:0A:65:95 : WPA2 PSK (CCMP)			
sociated Stations						
MAC-Address	Network	Signal	Noise	RX Rate	TX Rate	
F4:37:B7:3B:E1:D0	Master "EN4KWIFI"	-67 dBm	-95 dBm	24.0 Mbit/s, MCS 0, 20MHz	65.0 Mbit/s, MCS 7, 20MHz	
E0:06:E6:A4:48:83	Master "EN4KWIFI"	-55 dBm	-95 dBm	1.0 Mbit/s, MCS 0, 20MHz	65.0 Mbit/s, MCS 7, 20MHz	
74:DE:28:31:80:68	Master "EN4KWIFI"	-59 dBm -42 dBm	-95 dBm	1.0 Mbit/s, MCS /, 20MHz	65.0 Mbit/s, MCS 7, 20MHz	
68:94:23:AE:4A:61	Master "EN4KWIFI"	-47 dBm	-95 dBm	1.0 Mbit/s, MCS 0, 20MHz	65.0 Mbit/s, MCS 7, 20MHz	
58:94:6B:8E:1F:3C	Master "EN4KWIFI"	-45 dBm	-95 dBm	130.0 Mbit/s, MCS 15, 20MHz	104.0 Mbit/s, MCS 13, 20MHz	
40:0E:85:07:83:30	Master "EN4KWIFI"	-56 dBm	-95 dBm	1.0 Mbit/s, MCS 0, 20MHz	65.0 Mbit/s, MCS 7, 20MHz	
1C:AB:A7:AE:AA:FE	Master "EN4KWIFI"	-70 dBm	-95 dBm	65.0 Mbit/s, MCS 7, 20MHz	52.0 Mbit/s, MCS 5, 20MHz	
00:90:4B:E5:A9:FD	Master "EN4KWIFI"	-59 dBm	-95 dBm	36.0 Mbit/s, MCS 0, 20MHz	54.0 Mbit/s, MCS 0, 20MHz	
UU:27:10:2A:57:34	Master "EN4KWIFI"	-65 dBm	-95 dBM	104.0 MDI(/s, MCS 13, 20MHz	11/.U MDIt/s, MCS 14, 20MHz	
lti-WAN Status						
lti-WAN Status ad Sharing/Failover Status						

Figure 13-28. EN-4000 Status