Configuring the Access Point/Bridge for the First Time

This chapter describes how to configure basic settings on your access point/bridge for the first time. You can configure all the settings described in this chapter using the CLI, but it might be simplest to browse to the access point/bridge's web-browser interface to complete the initial configuration and then use the CLI to enter additional settings for a more detailed configuration.

This chapter contains these sections:

Before You Start

Before you install the access point/bridge, make sure you are using a computer connected to the same network as the access point/bridge, and obtain the following information from your network administrator:

- A system name for the access point/bridge
- The case-sensitive wireless service set identifier (SSID) that your access point/bridges use
- If not connected to a DHCP server, a unique IP address for your access point/bridge (such as 172.17.255.115)
- If the access point/bridge is not on the same subnet as your PC, a default gateway address and subnet mask
- A Simple Network Management Protocol (SNMP) community name and the SNMP file attribute (if SNMP is in use)
- If you use IPSU to find or assign the access point/bridge IP address, the MAC address from the product label on the access point/bridge (such as 00164625854c)

Resetting the Access Point/Bridge to Default Settings

You can use the web-browser interface or the CLI to reset the access point/bridge to a factory default configuration.

Note The following steps reset all configuration settings to factory defaults, including passwords, WEP keys, the IP address, and the SSID.

Using the Web-Browser Interface

Follow the steps below to delete the current configuration and return all access point/bridge settings to the factory defaults using the Web-browser interface.

Step 1 Open your Internet browser.

Step 2 Enter the access point/bridge's IP address in the browser address or location line and press **Enter**. An Enter Network Password screen appears.

Step 3 Enter your username (default *Cisco*) in the User Name field.

Step 4 Enter the access point/bridge password (default *Cisco*) in the Password field and press **Enter**. The Summary Status page appears.

Step 5 Click **System Software** and the System Software screen appears.

Step 6 Click **System Configuration** and the System Configuration screen appears.

Step 7 Click **Default**.

Note If the access point/bridge is configured with a static IP address, the IP address does not change.

Step 8 After the access point/bridge reboots, you can reconfigure the access point/bridge by using the Web-browser interface or the CLI (refer to the *Cisco IOS Software Configuration Guide for Cisco Aironet Bridges* or to the *Cisco IOS Software Configuration Guide for Cisco Aironet Access Points*).

Using the CLI

From the privileged EXEC mode, you can reset the access point/bridge configuration to factory default values using the CLI by following these steps:

Step 1 Enter **erase nvram:** to erase all NVRAM files including the startup configuration.

Step 2 Enter **Y** when the following CLI message displays: *Erasing the nvram filesystem will remove all configuration files! Continue? [confirm].*

Step 3 Enter **reload** when the following CLI message displays: *Erase of nvram: complete*. This command reloads the operating system.

Step 4 Enter **Y** when the following CLI message displays: *Proceed with reload? [confirm].*

⚠ **Caution** Do not interrupt the boot process to avoid damaging the configuration file. Wait until the access point/bridge Install Mode LED begins to blink green before continuing with CLI configuration changes. You can also see the following CLI message when the load process has finished: *Line protocal on Interface Dot11Radio0, changed state to up*.

Step 5 After the access point/bridge reboots, you can reconfigure the access point/bridge by using the Web-browser interface or the CLI.

The access point/bridge is configured with the factory default values including the IP address (set to receive an IP address using DHCP). To obtain the access point/bridge's new IP address, you can use the *show interface bvi1* CLI command. If the access point/bridge does not receive an IP address from a DHCP server, the access point/bridge IP address is 10.0.0.1.

Obtaining and Assigning an IP Address

To browse to the access point/bridge's Express Setup page, you must either obtain or assign the access point/bridge's IP address using one of the following methods:

- Use default address 10.0.0.1 when you connect to the access point/bridge locally. For detailed instructions, see the "Connecting to the Access Point/Bridge Locally" section on page 2-4.
- Use a DHCP server (if available) to automatically assign an IP address. You can find out the DHCP-assigned IP address using one of the following methods:
  - Provide your organization's network administrator with your access point/bridge's Media Access Control (MAC) address. Your network administrator will query the DHCP server using the MAC address to identify the IP address. The access point/bridge's MAC address is on the label attached to the bottom of the access point/bridge.

- Use the Cisco IP Setup Utility (IPSU) to identify the assigned address. You can also use IPSU to assign an IP address to the access point/bridge if it did not receive an IP address from the DHCP server. IPSU runs on most Microsoft Windows operating systems: Windows 9x, 2000, Me, NT, and XP.

  You can download IPSU from the Software Center on Cisco.com. Click this link to browse to the Software Center:

  http://www.cisco.com/cisco/software/navigator.html

- If the unit is a non-root bridge, browse to the Associations page on the root bridge to which the non-root is associated. The non-root bridge's MAC address and IP address appear on the root bridge's Associations page.

Connecting to the Access Point/Bridge Locally

If you need to configure the access point/bridge locally (without connecting the access point/bridge to a wired LAN), you can connect a PC to the Ethernet port on the long-reach power injector using a Category 5 Ethernet cable. You can use a local connection to the power injector's Ethernet port much as you would use a serial port connection.

Note You do not need a special crossover cable to connect your PC to the power injector; you can use either a straight-through cable or a crossover cable.

If the access point/bridge is configured with default values and not connected to a DHCP server or cannot obtain an IP address, it defaults to IP address 10.0.0.1. When a non-root bridge associates to a root bridge, it receives an IP address from the root bridge. Browse to the Associations page on the root bridge to find the non-root bridge's IP address, or use IPSU to find the IP address.

Follow these steps to connect to the bridge locally:

Step 1 Make sure that the PC you intend to use is configured to obtain an IP address automatically, or manually assign it an IP address from 10.0.0.2 to 10.0.0.10.

Step 2 With the power cable disconnected from the power injector, connect your PC to the power injector using a Category 5 Ethernet cable. You can use either a crossover cable or a straight-through cable.

Step 3 Connect the power injector to the access point/bridge using dual coaxial cables.

Step 4 Connect the power injector power cable and power up the access point/bridge.

Step 5 Follow the steps in the "Assigning Basic Settings" section on page 2-6. If you make a mistake and need to start over, follow the steps in the "Resetting the Access Point/Bridge to Default Settings" section on page 2-2.

Step 6 After configuring the access point/bridge, remove the Ethernet cable from your PC and connect the power injector to your wired LAN.

Note When you connect your PC to the access point/bridge or reconnect your PC to the wired LAN, you might need to release and renew the IP address on the PC. On most PCs, you can perform a release and renew by rebooting your PC or by entering **ipconfig /release** and **ipconfig /renew** commands in a command prompt window. Consult your PC operating instructions for detailed instructions.

Assigning Basic Settings

After you determine or assign the access point/bridge's IP address, you can browse to the access point/bridge's Express Setup page and perform an initial configuration:

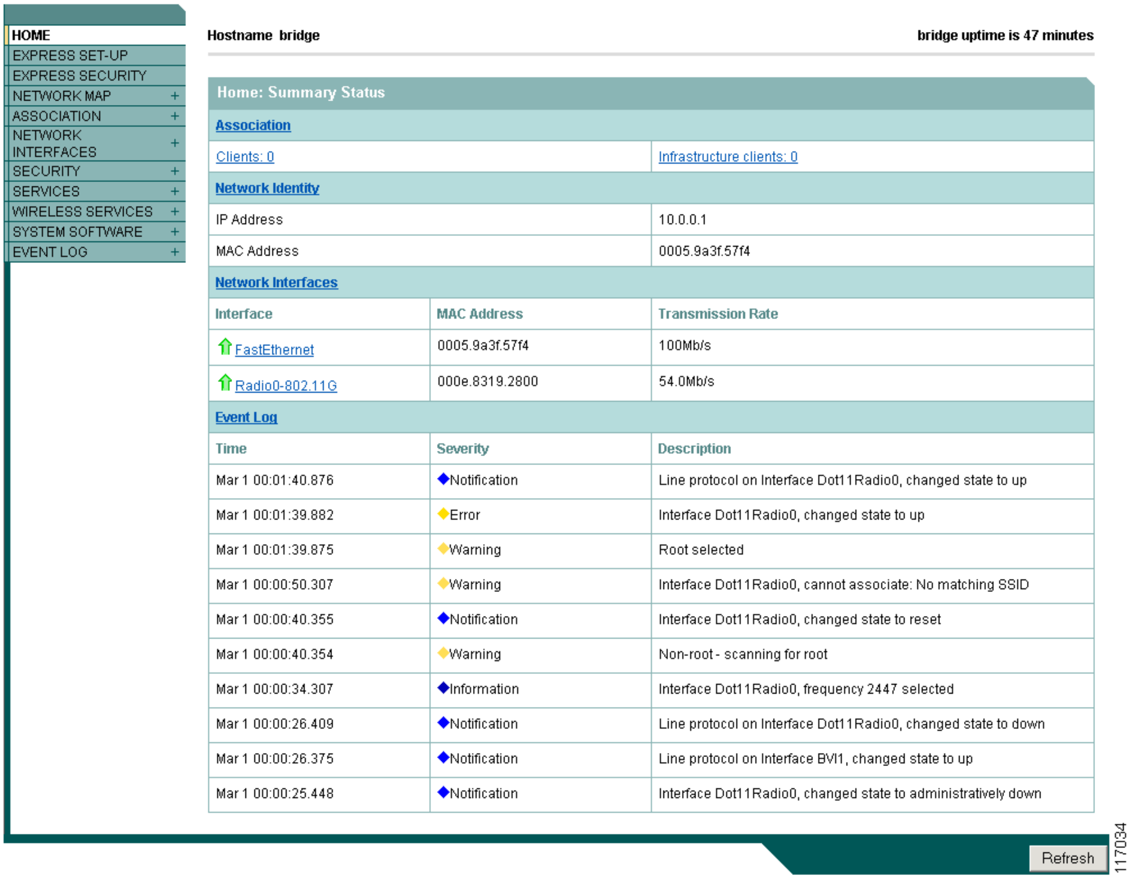
Step 1 Open your Internet browser. The access point/bridge web-browser interface is fully compatible with these browsers: Microsoft Internet Explorer versions 5.0, 5.01, 5.5 and 6.0; and Netscape Navigator versions 4.79 and 7.0.

Step 2 Enter the access point/bridge's IP address in the browser address line and press **Enter**. An Enter Network Password screen appears.

Step 3 Press **Tab** to bypass the Username field and advance to the Password field.

Step 4 Enter the case-sensitive password *Cisco* and press **Enter**. The Summary Status page appears. Figure 2-1 shows the Summary Status page.

Figure 2-1 Summary Status Page



Hostname bridge

bridge uptime is 47 minutes

Home: Summary Status

Association

Clients: 0 | Infrastructure clients: 0

Network Identity

IP Address	10.0.0.1
MAC Address	0005.9a3f.57f4

Network Interfaces

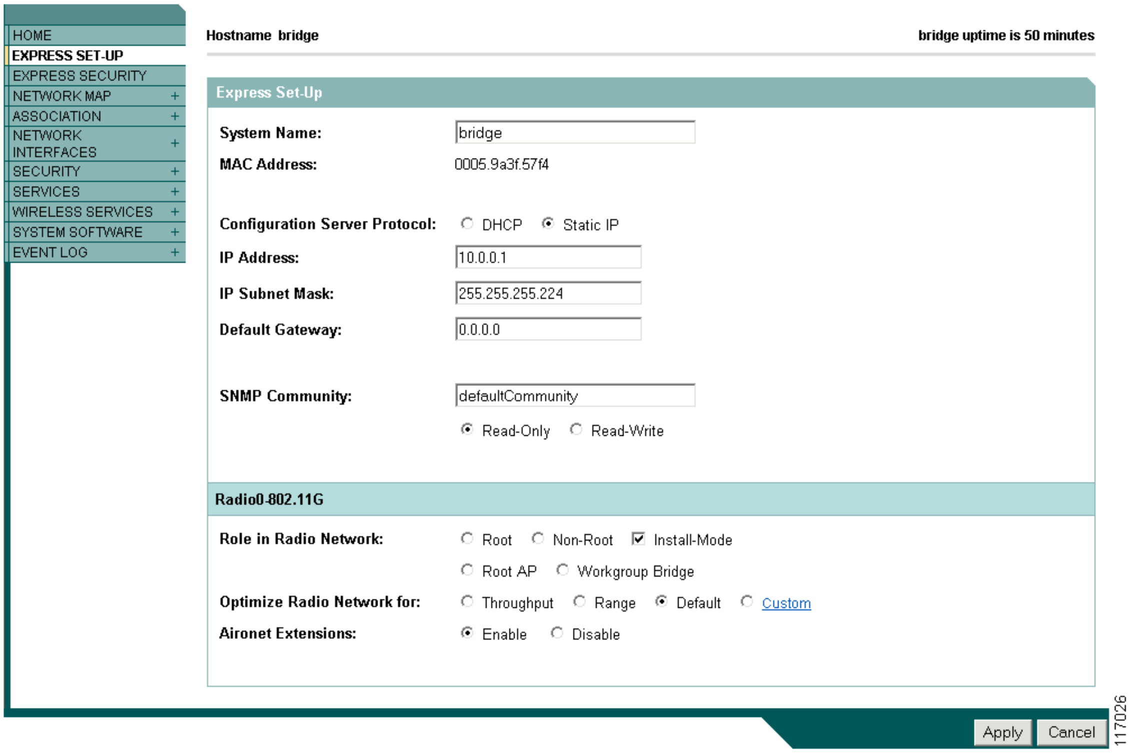
Interface	MAC Address	Transmission Rate
FastEthernet	0005.9a3f.57f4	100Mb/s
Radio0-802.11G	000e.8319.2800	54.0Mb/s

Event Log

Time	Severity	Description
Mar 1 00:01:40.876	Notification	Line protocol on Interface Dot11Radio0, changed state to up
Mar 1 00:01:39.882	Error	Interface Dot11Radio0, changed state to up
Mar 1 00:01:39.875	Warning	Root selected
Mar 1 00:00:50.307	Warning	Interface Dot11Radio0, cannot associate: No matching SSID
Mar 1 00:00:40.355	Notification	Interface Dot11Radio0, changed state to reset
Mar 1 00:00:40.354	Warning	Non-root - scanning for root
Mar 1 00:00:34.307	Information	Interface Dot11Radio0, frequency 2447 selected
Mar 1 00:00:26.409	Notification	Line protocol on Interface Dot11Radio0, changed state to down
Mar 1 00:00:26.375	Notification	Line protocol on Interface BVI1, changed state to up
Mar 1 00:00:25.448	Notification	Interface Dot11Radio0, changed state to administratively down

Step 5 Click **Express Setup**. The Express Setup screen appears. Figure 2-2 shows the Express Setup page.

Figure 2-2 Express Setup Page



Hostname bridge

bridge uptime is 50 minutes

Express Set-Up

System Name: bridge

MAC Address: 0005.9a3f.57f4

Configuration Server Protocol: ○ DHCP ● Static IP

IP Address: 10.0.0.1

IP Subnet Mask: 255.255.255.224

Default Gateway: 0.0.0.0

SNMP Community: defaultCommunity

● Read-Only ○ Read-Write

Radio0-802.11G

Role in Radio Network: ○ Root ○ Non-Root ☑ Install-Mode

○ Root AP ○ Workgroup Bridge

Optimize Radio Network for: ○ Throughput ○ Range ● Default ○ Custom

Aironet Extensions: ● Enable ○ Disable

Step 6 Enter the configuration settings you obtained from your system administrator. The configurable settings include:

- **System Name**— The system name, while not an essential setting, helps identify the access point/bridge on your network. The system name appears in the titles of the management system pages.
- **Configuration Server Protocol**—Click on the button that matches the network's method of IP address assignment.
  - **DHCP**—IP addresses are automatically assigned by your network's DHCP server.
  - **Static IP**—The access point/bridge uses a static IP address that you enter in the IP address field.
- **IP Address**—Use this setting to assign or change the access point/bridge's IP address. If DHCP is enabled for your network, leave this field blank.

Note If the access point/bridge's IP address changes while you are configuring the access point/bridge using the web-browser interface or a Telnet session over the wired LAN, you lose your connection to the access point/bridge. If you lose your connection, reconnect to the access point/bridge using its new IP address. Follow the steps in the "Resetting the Access Point/Bridge to Default Settings" section on page 2-2 if you need to start over.

- **IP Subnet Mask**—Enter the IP subnet mask provided by your network administrator so the IP address can be recognized on the LAN. If DHCP is enabled, leave this field blank.
- **Default Gateway**—Enter the default gateway IP address provided by your network administrator. If DHCP is enabled, leave this field blank.

- **SNMP Community**—If your network is using SNMP, enter the SNMP Community name provided by your network administrator and select the attributes of the SNMP data (also provided by your network administrator).
- **Role in Radio Network**—Click on the button that describes the role of the access point/bridge on your network.
  - **Root—**Configures the access point/bridge as a root access point/bridge. In this mode, you establish a link with a non-root access point/bridge. In this mode, the access point/bridge also accepts associations from clients.
  - **Non-Root**— Places the access point/bridge in non-root mode. In this mode, it links with a root access point/bridge.
  - **Install Mode**—Places the access point/bridge into installation mode so you can align and adjust a bridge link for optimum efficiency.

Note Install Mode is the access point/bridge's default setting for the Role in Radio Network parameter.

  - **Root AP**—Places the access point/bridge in the access point mode. In this mode, the access point/bridge emulates a Cisco Aironet 1100 Series Access Point and accepts associations from client devices.
  - **Workgroup Bridge**—Places the access point/bridge in the workgroup bridge mode. In this mode, the access point/bridge emulates the Cisco Aironet 350 Series Workgroup Bridge and accepts wired clients.

Note In bridge modes, one bridge in any pair or group of bridges must be set to root, and the bridge or bridges associated to the root bridge must be set to non-root.

- **Optimize Radio Network for**—Use this setting to select either preconfigured settings for the access point/bridge radio or customized settings for the access point/bridge radio. See the "Configuring the Radio Distance Setting" section on page 6-11 for more information on data rates and throughput.
  - **Throughput**—Maximizes the data volume handled by the access point/bridge but might reduce its range. When you select **Throughput**, the access point/bridge sets all data rates to **basic**.
  - **Range**—Maximizes the access point/bridge's range but might reduce throughput. When you select **Range**, the access point/bridge sets the 6-Mbps rate to **basic** and the other rates to **enabled**.
  - **Default**—The access point/bridge retains default radio settings that are designed to provide good range and throughput for most access point/bridges.
  - **Custom**—Takes you to the Network Interfaces: Radio-802.11G Settings page. The access point/bridge uses settings you enter on this page.
- **Aironet Extensions—**This setting is always enabled on 1300 series access point/bridges.

Step 7 Click **Apply** to save your settings. If you changed the IP address, you lose your connection to the access point/bridge. Browse to the new IP address to reconnect to the access point/bridge.

Your access point/bridge is now running but probably requires additional configuring to conform to your network's operational and security requirements.

Default Settings on the Express Setup Page

Table 2-1 lists the default settings for the settings on the Express Setup page.

Table 2-1 Default Settings on the Express Setup Page

Setting	Default
System Name	bridge
Configuration Server Protocol	DHCP
IP Address	Assigned by DHCP by default; if DHCP is disabled, the default setting is 10.0.0.1
IP Subnet Mask	Assigned by DHCP by default; if DHCP is disabled, the default setting is 255.255.255.224
Default Gateway	Assigned by DHCP by default; if DHCP is disabled, the default setting is 0.0.0.0
SNMP Community	defaultCommunity
Role in Radio Network	Install-Mode
Optimize Radio Network for	Default
Aironet Extensions	Enable

Protecting Your Wireless LAN

After you assign basic settings to your access point/bridge, you must configure security settings to prevent unauthorized access to your network. Because it is a radio device, the access point/bridge can communicate beyond the physical boundaries of your building. You can use Express Security page in the Configuring Basic Security Settings section to set basic security settings for your access point/bridge. Advanced security features can be found in the following chapters:

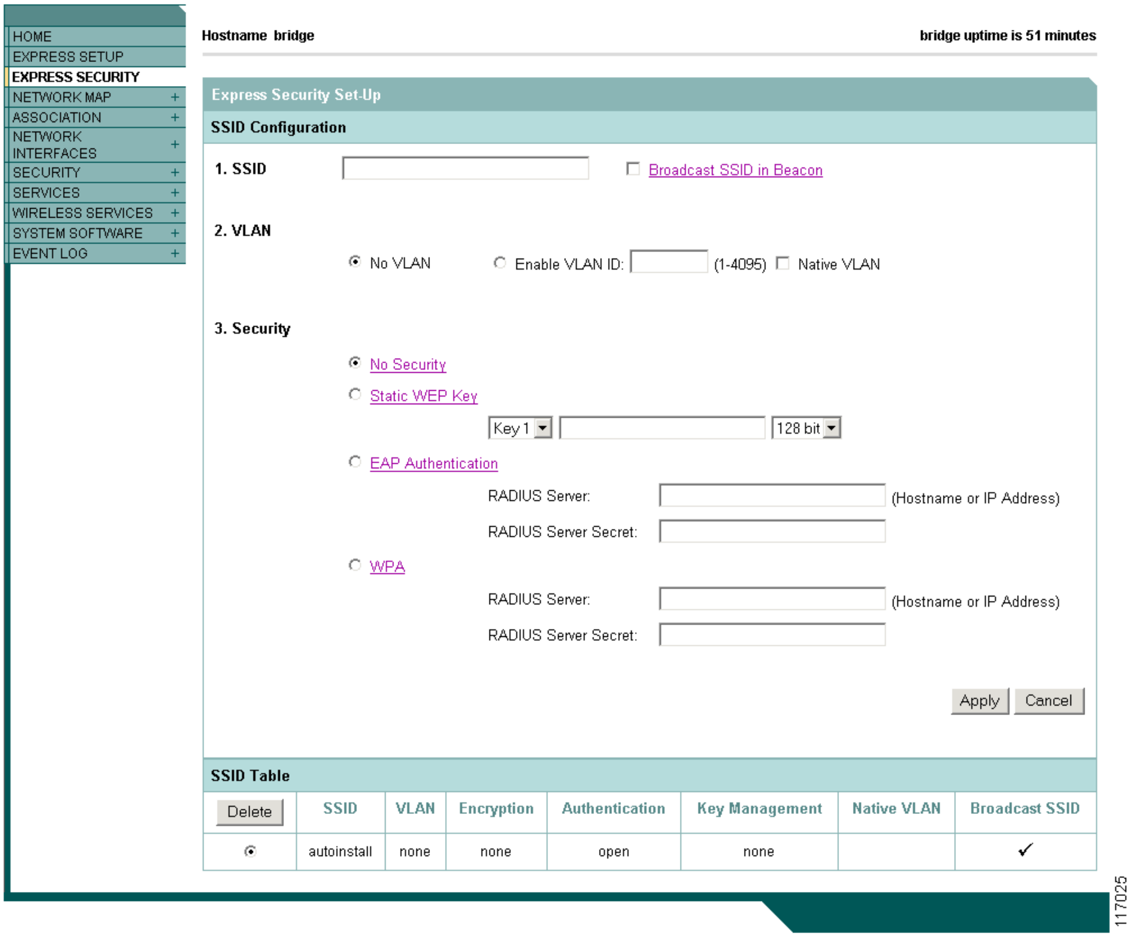
- A unique SSID that are not broadcast in the access point/bridge beacon (see Chapter 7, "Configuring SSIDs"
- WEP and WEP features (see Chapter 9, "Configuring WEP and WEP Features")
- Dynamic WEP and access point/bridge authentication (see Chapter 10, "Configuring Authentication Types")

Configuring Basic Security Settings

After you assign basic settings to your access point, you must configure security settings to prevent unauthorized access to your network. Because it is a radio device, the access point can communicate beyond the physical boundaries of your worksite.

Just as you use the Express Setup page to assign basic settings, you can use the Express Security page to create unique SSIDs and assign one of four security types to them. Figure 2-3 shows the Express Security page.

Figure 2-3 Express Security Page



Hostname bridge

bridge uptime is 51 minutes

Express Security Set-Up

SSID Configuration

1. SSID ☐ Broadcast SSID in Beacon

2. VLAN

● No VLAN ○ Enable VLAN ID: (1-4095) ☐ Native VLAN

3. Security

● No Security

○ Static WEP Key

Key 1 ▾ 128 bit ▾

○ EAP Authentication

RADIUS Server: (Hostname or IP Address)

RADIUS Server Secret:

○ WPA

RADIUS Server: (Hostname or IP Address)

RADIUS Server Secret:

SSID Table

Delete	SSID	VLAN	Encryption	Authentication	Key Management	Native VLAN	Broadcast SSID
●	autoinstall	none	none	open	none		✓

The Express Security page helps you configure basic security settings. You can use the web-browser interface's main Security pages to configure more advanced security settings.

Understanding Express Security Settings

When the access point/bridge configuration is at factory defaults, the first SSID that you create using the Express security page overwrites the default SSID, *install*, which has no security settings. The SSIDs that you create appear in the SSID table at the bottom of the page. You can create up to 16 SSIDs on the access point.

Using VLANs

If you use VLANs on your wireless LAN and assign SSIDs to VLANs, you can create multiple SSIDs using any of the four security settings on the Express Security page. However, if you do not use VLANs on your wireless LAN, the security options that you can assign to SSIDs are limited because, on the Express Security page, encryption settings and authentication types are linked. Without VLANs, encryption settings (WEP and ciphers) apply to an interface such as the 2.4-GHz radio, and you cannot use more than one encryption setting on an interface. For example, when you create an SSID with static

WEP with VLANs disabled, you cannot create additional SSIDs with WPA authentication because they use different encryption settings. If you find that the security setting for an SSID conflicts with another SSID, you can delete one or more SSIDs to eliminate the conflict.

Express Security Types

Table 2-2 describes the four security types that you can assign to an SSID.

Table 2-2 Security Types on Express Security Setup Page

Security Type	Description	Security Features Enabled
No Security	This is the least secure option. You should use this option only for SSIDs used in a public space and assign it to a VLAN that restricts access to your network.	None.
Static WEP Key	This option is more secure than no security. However, static WEP keys are vulnerable to attack. If you configure this setting, you should consider limiting association to the access point based on MAC address or, if your network does not have a RADIUS server, consider using an access point as a local authentication server.	Mandatory WEP encryption, no key management, and open authentication. In **Root AP** mode, client devices cannot associate using this SSID without a WEP key that matches the access point key.
EAP Authentication	This option enables 802.1x authentication (such as LEAP, PEAP, EAP-TLS, EAP-GTC, EAP-SIM, and others) and requires you to enter the IP address and shared secret for an authentication server on your network (server authentication port 1645). Because 802.1x authentication provides dynamic encryption keys, you do not need to enter a WEP key.	Mandatory 802.1x authentication, In **Root AP** mode, client devices that associate using this SSID must perform 802.1x authentication.
WPA	Wi-Fi Protected Access (WPA) permits wireless access to users authenticated against a database through the services of an authentication server, then encrypts their IP traffic with stronger algorithms than those used in WEP. As with EAP authentication, you must enter the IP address and shared secret for an authentication server on your network (server authentication port 1645).	Mandatory WPA authentication. In **Root AP** mode, client devices that associate using this SSID must be WPA-capable.

Express Security Limitations

Because the Express Security page is designed for simple configuration of basic security, the options available are a subset of the access point/bridge's security capabilities. Keep these limitations in mind when using the Express Security page:

- You cannot edit SSIDs. However, you can delete SSIDs and re-create them.
- You cannot assign SSIDs to specific radio interfaces. The SSIDs that you create are enabled on all radio interfaces. To assign SSIDs to specific radio interfaces, use the Security SSID Manager page.
- You cannot configure multiple authentication servers. To configure multiple authentication servers, use the Security Server Manager page.
- You cannot configure multiple WEP keys. To configure multiple WEP keys, use the Security Encryption Manager page.
- You cannot assign an SSID to a VLAN that is already configured on the access point/bridge. To assign an SSID to an existing VLAN, use the Security SSID Manager page.
- You cannot configure combinations of authentication types on the same SSID (for example, MAC address authentication and EAP authentication). To configure combinations of authentication types, use the Security SSID Manager page.

Using the Express Security Page

Follow these steps to create an SSID using the Express Security page:

Step 1 Type the SSID in the SSID entry field. The SSID can contain up to 32 alphanumeric characters.

a. The **Broadcast SSID in Beacon** setting is active only when the access point/bridge is in the Root AP mode. When you broadcast the SSID, devices that do not specify an SSID can associate to the access point/bridge when it is a root access point. This is a useful option for an SSID used by guests or by client devices in a public space. If you do not broadcast the SSID, client devices cannot associate to the access point unless their SSID matches this SSID. Only one SSID can be included in the beacon.

Step 2 (Optional) Check the Enable VLAN ID check box and enter a VLAN number (1 through 4095) to assign the SSID to a VLAN. You cannot assign an SSID to an existing VLAN.

Step 3 (Optional) Check the Native VLAN check box to mark the VLAN as the native VLAN.

Step 4 Select the security setting for the SSID. The settings are listed in order of robustness, from No Security to WPA, which is the most secure setting. If you select EAP Authentication or WPA, enter the IP address and shared secret for the authentication server on your network.

Note If you do not use VLANs on your wireless LAN, the security options that you can assign to multiple SSIDs are limited. See the "Using VLANs" section on page 2-10 for details.

Step 5 Click **Apply**. The SSID appears in the SSID table at the bottom of the page.

CLI Configuration Examples

The examples in this section show the CLI commands that are equivalent to creating SSIDs using each security type on the Express Security page. This section contains these example configurations:

- Example: No Security, page 2-13
- Example: Static WEP, page 2-13
- Example: EAP Authentication, page 2-14
- Example: WPA, page 2-15

Example: No Security

This example shows part of the configuration that results from using the Express Security page to create an SSID called *no_security_ssid*, including the SSID in the beacon, assigning it to VLAN 10, and selecting VLAN 10 as the native VLAN:

```
interface Dot11Radio0
 no ip address
 no ip route-cache
 !
 ssid no_security-ssid
    vlan 10
    authentication open
    guest-mode
 !
!
 concatenation
 speed basic-1.0 basic-2.0 basic-5.5 6.0 9.0 basic-11.0 12.0 18.0 24.0 36.0 48.0 54.0
 rts threshold 4000
 station-role root
 infrastructure-client
 bridge-group 1
!
interface Dot11Radio0.10
 encapsulation dot1Q 10
 no ip route-cache
 bridge-group 10
 bridge-group 10 spanning-disabled
!
interface FastEthernet0
 no ip address
 no ip route-cache
 duplex auto
 speed auto
 bridge-group 1
!
interface FastEthernet0
 no ip address
 no ip route-cache
 duplex auto
 speed auto
 bridge-group 1
```

Example: Static WEP

This example shows part of the configuration that results from using the Express Security page to create an SSID called *static_wep_ssid*, excluding the SSID from the beacon, assigning the SSID to VLAN 20, selecting 3 as the key slot, and entering a 128-bit key:

```
interface Dot11Radio0
```

```
 no ip address
 no ip route-cache
 !
 encryption vlan 20 key 3 size 128bit 7 4E78330C1A841439656A9323F25A transmit-ke

 encryption vlan 20 mode wep mandatory
 !
 ssid static_wep_ssid
    vlan 20
    authentication open
 !
 concatenation
 speed basic-1.0 basic-2.0 basic-5.5 6.0 9.0 basic-11.0 12.0 18.0 24.0 36.0 48.0 54.0
 rts threshold 4000
 station-role root
 infrastructure-client
 bridge-group 1
!
interface Dot11Radio0.20
 encapsulation dot1Q 20
 no ip route-cache
 bridge-group 20
 bridge-group 20 spanning-disabled
!
interface FastEthernet0
 no ip address
 no ip route-cache
 duplex auto
 speed auto
 bridge-group 1
!
interface FastEthernet0.20
 encapsulation dot1Q 20
 no ip route-cache
 bridge-group 20
 bridge-group 20 spanning-disabled
```

Example: EAP Authentication

This example shows part of the configuration that results from using the Express Security page to create an SSID called *eap_ssid*, excluding the SSID from the beacon, and assigning the SSID to VLAN 30:

```
interface Dot11Radio0
 no ip address
 no ip route-cache
 !
 encryption vlan 30 mode wep mandatory
 !
 ssid eap_ssid
    vlan 30
    authentication open eap eap_methods
    authentication network-eap eap_methods
 !
 speed basic-1.0 basic-2.0 basic-5.5 basic-11.0
 rts threshold 2312
 station-role root
 bridge-group 1
 bridge-group 1 subscriber-loop-control
 bridge-group 1 block-unknown-source
 no bridge-group 1 source-learning
 no bridge-group 1 unicast-flooding
 bridge-group 1 spanning-disabled
!
```

```
interface Dot11Radio0.30
 encapsulation dot1Q 30
 no ip route-cache
 bridge-group 30
 bridge-group 30 subscriber-loop-control
 bridge-group 30 block-unknown-source
 no bridge-group 30 source-learning
 no bridge-group 30 unicast-flooding
 bridge-group 30 spanning-disabled
!
interface FastEthernet0
 mtu 1500
 no ip address
 ip mtu 1564
 no ip route-cache
 duplex auto
 speed auto
 bridge-group 1
 no bridge-group 1 source-learning
 bridge-group 1 spanning-disabled
!
interface FastEthernet0.30
 mtu 1500
 encapsulation dot1Q 30
 no ip route-cache
 bridge-group 30
 no bridge-group 30 source-learning
 bridge-group 30 spanning-disabled
!
```

Example: WPA

This example shows part of the configuration that results from using the Express Security page to create an SSID called *wpa_ssid*, excluding the SSID from the beacon, and assigning the SSID to VLAN 40:

```
aaa new-model
!
!
aaa group server radius rad_eap
 server 10.91.104.92 auth-port 1645 acct-port 1646
!
aaa group server radius rad_mac
!
aaa group server radius rad_acct
!
aaa group server radius rad_admin
!
aaa group server tacacs+ tac_admin
!
aaa group server radius rad_pmip
!
aaa group server radius dummy
!
aaa authentication login eap_methods group rad_eap
aaa authentication login mac_methods local
aaa authorization exec default local
aaa authorization ipmobile default group rad_pmip
aaa accounting network acct_methods start-stop group rad_acct
aaa session-id common
!
!
bridge irb
!
```

```
!
interface Dot11Radio0
 no ip address
 no ip route-cache
 !
 encryption vlan 40 mode ciphers tkip
 !
 ssid wpa_ssid
    vlan 40
    authentication open eap eap_methods
    authentication network-eap eap_methods
    authentication key-management wpa
 !
 concatenation
 speed basic-1.0 basic-2.0 basic-5.5 6.0 9.0 basic-11.0 12.0 18.0 24.0 36.0 48 54.0
 rts threshold 4000
 station-role root
 infrastructure-client
 bridge-group 1
!
interface Dot11Radio0.40
 encapsulation dot1Q 40
 no ip route-cache
 bridge-group 40
!
interface FastEthernet0
 no ip address
 no ip route-cache
 duplex auto
 speed auto
 bridge-group 1
!
interface FastEthernet0.40
 encapsulation dot1Q 40
 no ip route-cache
 bridge-group 40
!
ip http server
ip http help-path http://www.cisco.com/warp/public/779/smbiz/prodconfig/help/eag
/122-15.JA/1100
ip radius source-interface BVI1
radius-server attribute 32 include-in-access-req format %h
radius-server host 10.91.104.92 auth-port 1645 acct-port 1646 key 7 135445415F59
radius-server authorization permit missing Service-Type
radius-server vsa send accounting
bridge 1 route ip
!
!
!
line con 0
line vty 5 15
!
end
```

Using the IP Setup Utility

IPSU enables you to find the access point/bridge's IP address when it has been assigned by a DHCP server. You can also use IPSU to set the access point/bridge's IP address and SSID if they have not been changed from the default settings. This section explains how to download the utility from Cisco.com and install it, how to use it to find the access point/bridge's IP address, and how to use it to set the IP address and the SSID.

Note IPSU can be used only on the following operating systems: Windows 95, 98, NT, 2000, ME, or XP.

Obtaining and Installing IPSU

IPSU is available on the Cisco web site. Follow these steps to obtain and install IPSU:

Step 1 Use your Internet browser to access the Cisco Software Center at the following URL:

http://www.cisco.com/cisco/software/navigator.html

Step 2 Click **Cisco Aironet Wireless LAN Client Adapters**.

Step 3 Scroll down to the Windows Utility section.

Step 4 Click **Cisco Aironet Client Utility** (**ACU**) **for Windows**.

Step 5 Click the file **IPSUvxxxxxx.exe**. The *vxxxxxx* identifies the software package version number.

Step 6 Read and accept the terms and conditions of the Software License Agreement.

Step 7 Download and save the file to a temporary directory on your hard drive and then exit the Internet browser.

Step 8 Double-click **IPSUvxxxxxx.exe** in the temporary directory to expand the file.

Step 9 Double-click **Setup.exe** and follow the steps provided by the installation wizard to install IPSU.

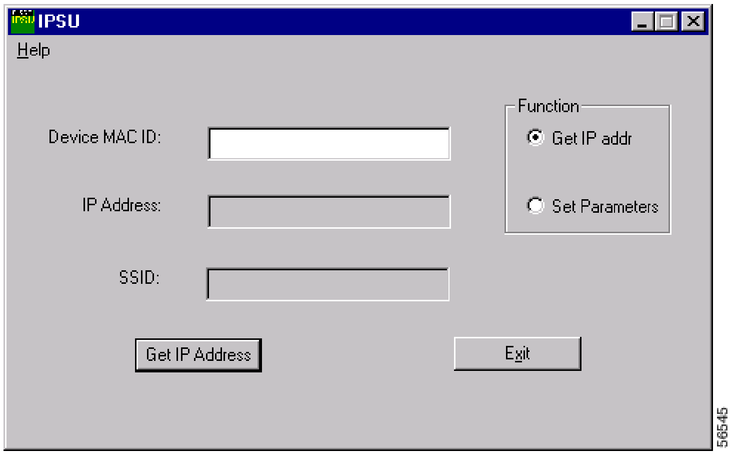
The IPSU icon appears on your computer desktop.

Using IPSU to Find the Access Point/Bridge's IP Address

If your bridge receives an IP address from a DHCP server, you can use IPSU to find its IP address. Because IPSU sends a reverse-ARP request based on the bridge MAC address, you must run IPSU from a computer on the same subnet as the bridge. Follow these steps to find the bridge's IP address:

Step 1 Double-click the **IPSU** icon on your computer desktop to start the utility. The IPSU screen appears (see Figure 2-4).

Figure 2-4 IPSU Get IP Address Screen



Step 2 When the utility window opens, make sure the *Get IP addr* radio button in the Function box is selected.

Step 3 Enter the access point/bridge's MAC address in the Device MAC ID field. The access point/bridge's MAC address is printed on the label on the bottom of the unit. It should contain six pairs of hexadecimal digits. Your access point/bridge's MAC address might look like the following example:

000164xxxxxx

Note The MAC address field is not case-sensitive.

Step 4 Click **Get IP Address**.

Step 5 When the access point/bridge's IP address appears in the IP Address field, write it down.

If IPSU reports that the IP address is 10.0.0.1, the default IP address, then the access point/bridge did not receive a DHCP-assigned IP address. To change the access point/bridge IP address from the default value using IPSU, refer to the "Using IPSU to Set the Access Point/Bridge's IP Address and SSID" section on page 2-18.

Using IPSU to Set the Access Point/Bridge's IP Address and SSID

If you want to change the default IP address (10.0.0.1) of the access point/bridge, you can use IPSU. You can also set the access point/bridge's SSID at the same time.

Note IPSU can change the access point/bridge's IP address and SSID only from their default settings. After the IP address and SSID have been changed, IPSU cannot change them again.

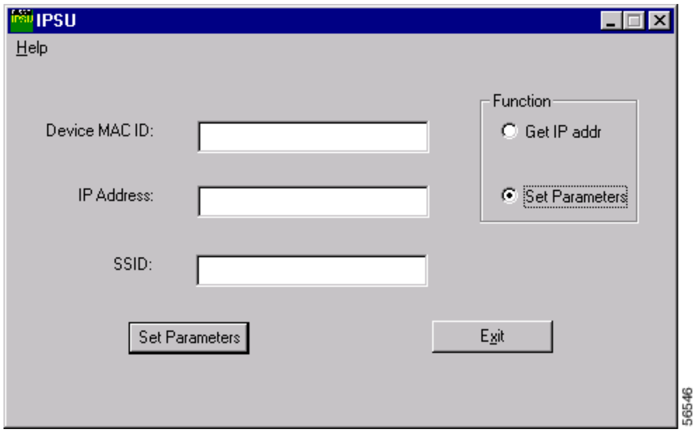
Note The computer you use to assign an IP address to the access point/bridge must have an IP address in the same subnet as the access point/bridge (10.0.0.x).

Follow these steps to assign an IP address and an SSID to the access point/bridge:

Step 1 Double-click the **IPSU** icon on your computer desktop to start the utility.

Step 2 Click the **Set Parameters** radio button in the Function box (see Figure 2-5).

Figure 2-5 IPSU Set Parameters Screen



Step 3 Enter the access point/bridge's MAC address in the Device MAC ID field. The access point/bridge's MAC address is printed on a label on the access point/bridge. It should contain six pairs of hexadecimal digits. Your access point/bridge's MAC address might look like this example:

004096xxxxxx

Note The MAC address field is not case-sensitive.

Step 4 Enter the IP address you want to assign to the access point/bridge in the IP Address field.

Step 5 Enter the SSID you want to assign to the access point/bridge in the SSID field.

Note You cannot set the SSID without also setting the IP address. However, you can set the IP address without setting the SSID.

Step 6 Click **Set Parameters** to change the access point/bridge's IP address and SSID settings.

Step 7 Click **Exit** to exit IPSU.

Assigning an IP Address Using the CLI

When you connect the access point/bridge to the wired LAN, the access point/bridge links to the network using a bridge virtual interface (BVI) that it creates automatically. Instead of tracking separate IP addresses for the access point/bridge's Ethernet and radio ports, the network uses the BVI.

Note The access point/bridge supports only one BVI. Configuring more than one BVI might cause errors in the access point/bridge's ARP table.

When you assign an IP address to the access point/bridge using the CLI, you must assign the address to the BVI. Beginning in privileged EXEC mode, follow these steps to assign an IP address to the access point/bridge's BVI:

	Command	Purpose
Step 1	**configure terminal**	Enter global configuration mode.
Step 2	**interface bvi1**	Enter interface configuration mode for the BVI.
Step 3	**ip address** *address mask*	Assign an IP address and address mask to the BVI. **Note** If you are connected to the access point/bridge using a Telnet session, you lose your connection to the access point/bridge when you assign a new IP address to the BVI. If you need to continue configuring the bridge using Telnet, use the new IP address to open another Telnet session to the access point/bridge.

Using a Telnet Session to Access the CLI

Follow these steps to browse to access the CLI using a Telnet session. These steps are for a PC running Microsoft Windows with a Telnet terminal application. Check your PC operating instructions for detailed instructions for your operating system.

Step 1 Select **Start > Programs > Accessories > Telnet**.

If Telnet is not listed in your Accessories menu, select **Start > Run**, type **Telnet** in the entry field, and press **Enter**.

Step 2 When the Telnet window appears, click **Connect** and select **Remote System**.

Note In Windows 2000, the Telnet window does not contain drop-down menus. To start the Telnet session in Windows 2000, type **open** followed by the access point/bridge's IP address.

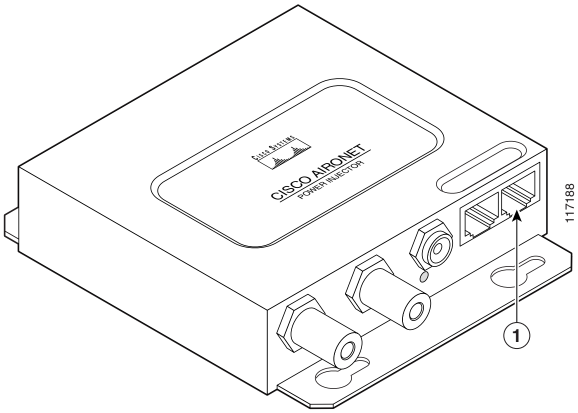
Step 3 In the Host Name field, type the access point/bridge's IP address and click **Connect**.

Using the Console Port to Access the CLI

If you need to configure the access point/bridge locally (without connecting to a wired LAN), you can connect a PC to power injector's serial port using a DB-9 to RJ-45 serial cable. Follow these steps to access the CLI by connecting to the serial port:

Step 1 Connect a nine-pin, female DB-9 to RJ-45 serial cable to the RJ-45 serial port on the power injector and to the COM port on your PC. Figure 2-6 shows the power injector's serial port connector.

Figure 2-6 Serial Port Connector



1	Serial port connector (RJ-45 connector)	

Note The Cisco part number for the DB-9 to RJ-45 serial cable is AIR-CONCAB1200. Browse to http://www.cisco.com/go/marketplace to order a serial cable.

Step 2 Set up a terminal emulator to communicate with the access point/bridge. Use the following settings for the terminal emulator connection: 9600 baud, 8 data bits, no parity, 1 stop bit, and no flow control.

Step 3 When the terminal emulator is activated, press **Enter**. An Enter Network Password window appears.

Step 4 Enter your username in the User Name field. The default username is *Cisco*.

Step 5 Enter the access point/bridge password in the Password field and press **Enter**. The default password is *Cisco*.

When the CLI activates, you can enter CLI commands to configure the access point/bridge.