



## Configuring the Bridge for the First Time

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This chapter describes how to configure basic settings on your 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 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, page 2-2](#)
- [Obtaining and Assigning an IP Address, page 2-3](#)
- [Assigning Basic Settings, page 2-4](#)
- [Configuring Basic Security Settings, page 2-9](#)
- [Using the IP Setup Utility, page 2-11](#)
- [Assigning an IP Address Using the CLI, page 2-14](#)
- [Using a Telnet Session to Access the CLI, page 2-15](#)

## Before You Start

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

- A system name for the bridge
- The case-sensitive wireless service set identifier (SSID) that your bridges use
- If not connected to a DHCP server, a unique IP address for your bridge (such as 172.17.255.115)
- If the 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 bridge IP address, the MAC address from the product label on the bridge (such as 00164625854c)

**Note**

If you are using an external antenna to the bridge, ensure that it is connected before applying power to the bridge.

## Resetting the Bridge to Default Settings

If you need to start over during the initial setup process, follow these steps to reset the bridge to factory default settings using the MODE button on the long-reach power injector:

- Step 1** Disconnect power from the power injector.
- Step 2** Press and hold the MODE button while you reconnect the power cable.
- Step 3** Hold the MODE button until the Status LED on the power injector turns amber (approximately 3 or 4 seconds), and release the button. Wait until the status LED turns green to indicate that the bridge has booted up. All bridge settings return to factory defaults.

Follow these steps to return to default settings using the web-browser interface:

- Step 1** Open your Internet browser. You must use Microsoft Internet Explorer (version 5.x or later) or Netscape Navigator (version 4.79 or 7.0).
- Step 2** Enter the bridge's IP address in the browser address line and press **Enter**. An Enter Network Password window appears.
- Step 3** Enter your username in the User Name field. The default username is **Cisco**.
- Step 4** Enter the bridge password in the Password field and press **Enter**. The default password is **Cisco**. 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 the **Reset to Defaults** button.



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

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## Obtaining and Assigning an IP Address

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

- Use default address 10.0.0.1 when you connect to the bridge locally. For detailed instructions, see the [“Connecting to the Bridge Locally” section on page 2-3](#).
- 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 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 bridge's MAC address is on the label attached to the bottom of the 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 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 Bridge Locally

If you need to configure the bridge locally (without connecting the 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.



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**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.

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If the 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:

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- 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 bridge using dual coaxial cables.
  - Step 4** Connect the power injector power cable and power up the bridge.
  - Step 5** Follow the steps in the [“Assigning Basic Settings” section on page 2-4](#). If you make a mistake and need to start over, follow the steps in the [“Resetting the Bridge to Default Settings” section on page 2-2](#).
  - Step 6** After configuring the bridge, remove the Ethernet cable from your PC and connect the power injector to your wired LAN.

**Note**

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When you connect your PC to the 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.

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## Assigning Basic Settings

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

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- Step 1** Open your Internet browser. The 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 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

HOME Hostname Mal-BR1410-R Mal-BR1410-R uptime is 3 days, 21 hours, 46 minutes

EXPRESS SET-UP  
EXPRESS SECURITY  
NETWORK MAP  
ASSOCIATION +  
NETWORK INTERFACES +  
SECURITY +  
SERVICES +  
SYSTEM SOFTWARE +  
EVENT LOG +

Home: Summary Status

**Association**

Clients: 2

**Network Identity**

IP Address	192.168.225.16
MAC Address	0005.9a3b.c624

**Network Interfaces**

Interface	MAC Address	Transmission Rate
↑ <a href="#">FastEthernet</a>	0005.9a3b.c624	100Mb/s
↑ <a href="#">Radio0-802.11A</a>	0005.9a3b.c625	54.0Mb/s

**Event Log**

Time	Severity	Description

Refresh

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**Step 5** Click **Express Setup**. The Express Setup screen appears. [Figure 2-2](#) shows the Express Setup page.

Figure 2-2 Express Setup Page

HOME Hostname Mal-BR1410-R Mal-BR1410-R uptime is 3 days, 21 hours, 46 minutes

EXPRESS SET-UP  
EXPRESS SECURITY  
NETWORK MAP  
ASSOCIATION +  
NETWORK INTERFACES +  
SECURITY +  
SERVICES +  
SYSTEM SOFTWARE +  
EVENT LOG +

**Home: Summary Status**

**Association**  
Clients: 2

**Network Identity**

IP Address	192.168.225.16
MAC Address	0005.9a3b.c624

**Network Interfaces**

Interface	MAC Address	Transmission Rate
↑ FastEthernet	0005.9a3b.c624	100Mb/s
↑ Radio0-802.11A	0005.9a3b.c625	54.0Mb/s

**Event Log**

Time	Severity	Description

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**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 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 bridge uses a static IP address that you enter in the IP address field.
- **IP Address**—Use this setting to assign or change the bridge’s IP address. If DHCP is enabled for your network, leave this field blank.



**Note**

If the bridge’s IP address changes while you are configuring the bridge using the web-browser interface or a Telnet session over the wired LAN, you lose your connection to the bridge. If you lose your connection, reconnect to the bridge using its new IP address. Follow the steps in the “Resetting the 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.

- **Radio Service Set ID (SSID)**—Enter the case-sensitive SSID (32 alphanumeric characters maximum) provided by your network administrator. The SSID is a unique identifier that bridges use to associate to each other.
- **Broadcast SSID in Beacon**—Use this setting to allow bridges that do not specify an SSID to associate with the bridge.
  - **Yes**—This is the default setting; it allows bridges that do not specify an SSID to associate with the bridge.
  - **No**—Bridges must specify an SSID to associate with the bridge. With No selected, the SSID used by other bridges must match exactly the bridge’s SSID.
- **Role in Radio Network**—Click on the button that describes the role of the bridge on your network. Select **Root** if the bridge is a root bridge. Select **Non-Root** if it is a non-root bridge. Select **Install Mode** to put the bridge into installation mode. 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.




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**Note** In Install Mode, the default distance setting is 99 km. When you change the role in radio network from Install Mode to Root or Non-Root, the distance setting changes automatically from 99 km to 0 km.

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- **Optimize Radio Network for**—Use this setting to select either preconfigured settings for the bridge radio or customized settings for the bridge radio. See the [“Configuring Radio Data Rates” section on page 6-4](#) for more information on data rates and throughput.
  - **Throughput**—Maximizes the data volume handled by the bridge but might reduce its range. When you select **Throughput**, the bridge sets all data rates to **basic**.
  - **Range**—Maximizes the bridge’s range but might reduce throughput. When you select **Range**, the bridge sets the 6-Mbps rate to **basic** and the other rates to **enabled**.
  - **Default**—The bridge retains default radio settings that are designed to provide good range and throughput for most bridges.
  - **Custom**—The bridge uses settings you enter on the Network Interfaces: Radio-802.11b Settings page. Clicking **Custom** takes you to the Network Interfaces: Radio-802.11b Settings page.
- **Aironet Extensions**—This setting is always enabled on 1400 series bridges.
- **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).

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

Your bridge is now running but probably requires additional configuring to conform to your network’s operational and security requirements. Consult the chapters in this manual for the information you need to complete the configuration.




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**Note** You can restore the bridge to its factory defaults by unplugging the power cable from the power injector and plugging it back in while holding down the power injector Mode button for a few seconds, or until the power injector Status LED turns amber.

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## 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
Radio Service Set ID (SSID)	autoinstall
Broadcast SSID in Beacon	Yes
Role in Radio Network	Bridge (root)
Optimize Radio Network for	Default
Aironet Extensions	Enable
SNMP Community	defaultCommunity

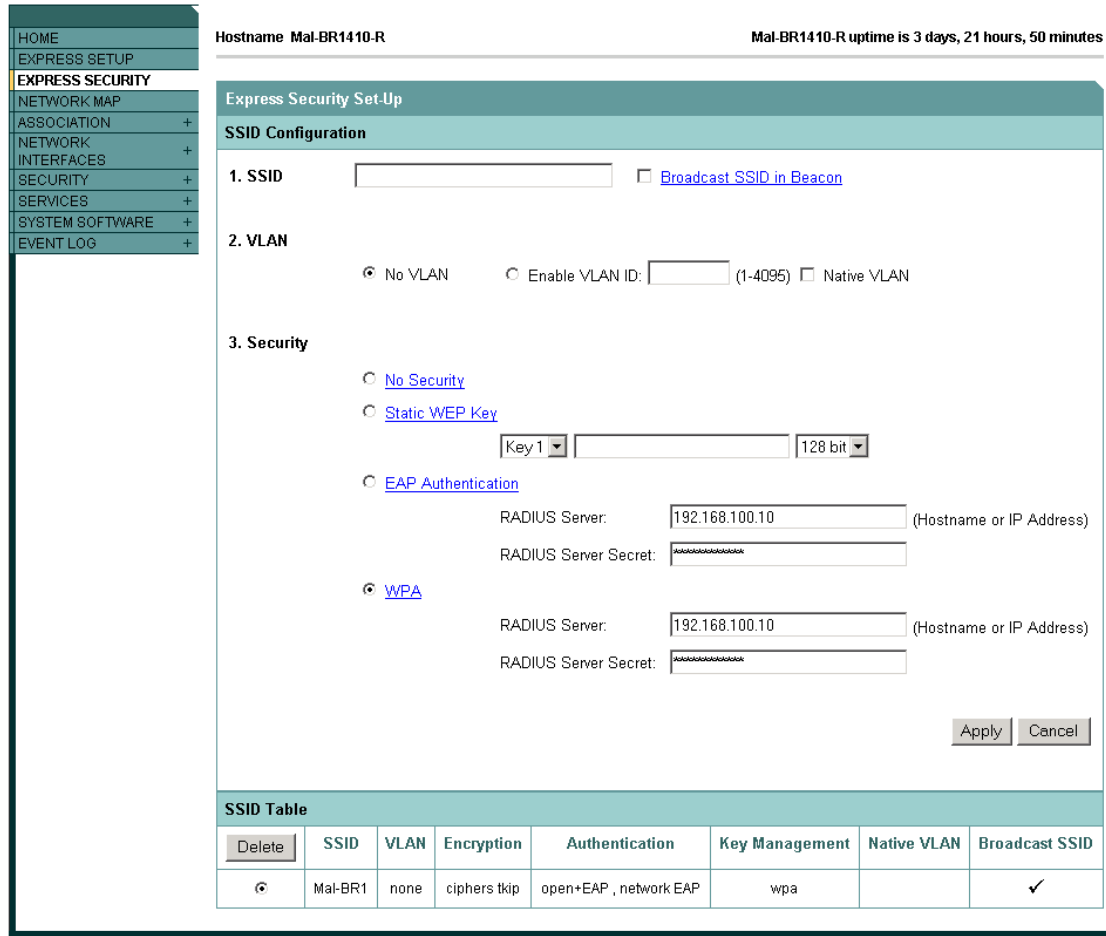


# Configuring Basic Security Settings

After you assign basic settings to your bridge, you must configure security settings to prevent unauthorized access to your network. Because it is a radio device, the bridge 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 a unique SSID and assign one of four security types to it. Figure 2-3 shows the Express Security page.

Figure 2-3 Express Security Page



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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 bridge configuration is at factory defaults, the first SSID that you create using the Express security page overwrites the default SSID, *autoinstall*, which has no security settings. The SSID that you create appears in the SSID table at the bottom of the page. You can create one SSID on the bridge.

## 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 an SSID 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 bridge based on MAC address or, if your network does not have a RADIUS server, consider using an access point as a local authentication server (see <a href="#">Chapter 10, “Configuring Authentication Types”</a> ).	Mandatory WEP. Other bridges cannot associate using this SSID without a WEP key that matches this bridge’s 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. Bridges that associate using this SSID must perform 802.1x authentication.
WPA	Wi-Fi Protected Access (WPA) permits wireless access to devices 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. Bridges 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 bridge's security capabilities. Keep these limitations in mind when using the Express Security page:

- The bridge supports only one SSID, so you can create only one SSID on the Express Security page.
- You cannot edit an SSID. However, you can delete an SSID and re-create it.
- 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. 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:

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- Step 1** Type the SSID in the SSID entry field. The SSID can contain up to 32 alphanumeric characters.
  - Step 2** To broadcast the SSID in the beacon, check the Broadcast SSID in Beacon checkbox. When you broadcast the SSID, devices that do not specify an SSID can associate to the bridge. If you do not broadcast the SSID, devices cannot associate to the bridge unless their SSID matches this SSID. Only one SSID can be included in the beacon.
  - Step 3** (Optional) Check the Enable VLAN ID checkbox 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 4** (Optional) Check the Native VLAN checkbox to mark the VLAN as the native VLAN.
  - Step 5** 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.
  - Step 6** Click **Apply**. The SSID appears in the SSID table at the bottom of the page.
- 

## Using the IP Setup Utility

IPSU enables you to find the bridge's IP address when it has been assigned by a DHCP server. You can also use IPSU to set the 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 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:

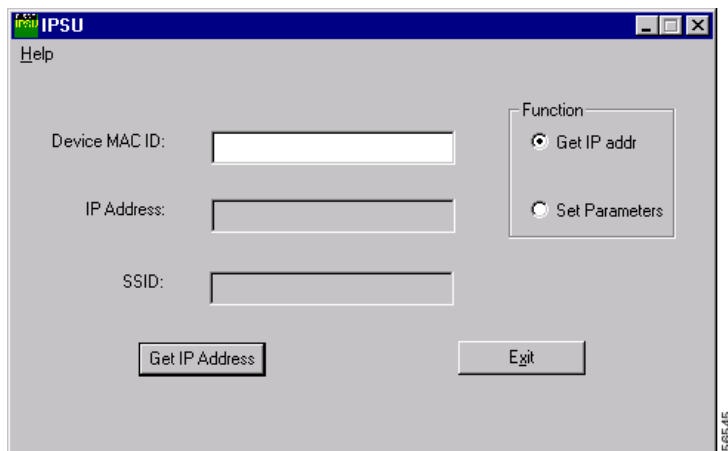
- 
- Step 1** Use your Internet browser to access the Cisco Software Center at the following URL:  
<http://www.cisco.com/cisco/software/navigator.html>
  - Step 2** Click **Cisco Aironet Wireless LAN Client Adapters**.
  - Step 3** Scroll down to the Windows Utility section.
  - Step 4** Click **Cisco Aironet Client Utility (ACU) for Windows**.
  - Step 5** Click the file **IPSUvxxxxxx.exe**. The *xxxxxx* 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.
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## Using IPSU to Find the 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 bridge's MAC address in the Device MAC ID field. The bridge's MAC address is printed on the label on the bottom of the unit. It should contain six pairs of hexadecimal digits. Your bridge's MAC address might look like the following example:

000164xxxxxx



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**Note** The MAC address field is not case-sensitive.

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- Step 4** Click **Get IP Address**.

- Step 5** When the 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 bridge did not receive a DHCP-assigned IP address. To change the bridge IP address from the default value using IPSU, refer to the [“Using IPSU to Set the Bridge's IP Address and SSID”](#) section on page 2-13.

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## Using IPSU to Set the Bridge's IP Address and SSID

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



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**Note** IPSU can change the 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.

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

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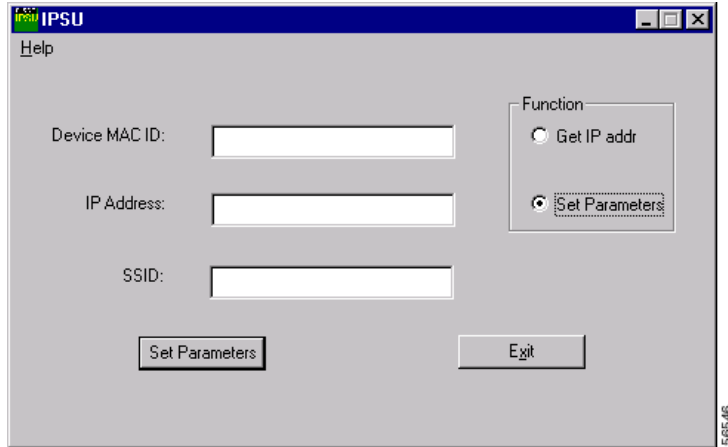
Follow these steps to assign an IP address and an SSID to the bridge:

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- 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 bridge's MAC address in the Device MAC ID field. The bridge's MAC address is printed on a label on the bridge. It should contain six pairs of hexadecimal digits. Your 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 bridge in the IP Address field.

- Step 5** Enter the SSID you want to assign to the 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 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 bridge to the wired LAN, the bridge links to the network using a bridge virtual interface (BVI) that it creates automatically. Instead of tracking separate IP addresses for the bridge's Ethernet and radio ports, the network uses the BVI.



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

When you assign an IP address to the 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 bridge's BVI:

	Command	Purpose
Step 1	<b>configure terminal</b>	Enter global configuration mode.
Step 2	<b>interface bvi1</b>	Enter interface configuration mode for the BVI.
Step 3	<b>ip address</b> <i>address</i> <i>mask</i>	Assign an IP address and address mask to the BVI.  <b>Note</b> If you are connected to the bridge using a Telnet session, you lose your connection to the 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 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 bridge's IP address.

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

