

**SpeedStream®**

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**5600**

**Series**

**DSL Router  
Installation Guide**



Part No. 007-5600-003, Rev C



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Dallas, TX 75244

U.S.A.

Attn: Customer Service



# Contents

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## Introduction

About the 5600 Series Router . . . . .	7
About this Installation Guide . . . . .	7
Installation Requirements . . . . .	7
Verify Package Contents . . . . .	8

## Cable Connections

Installation Instructions . . . . .	9
RJ45 vs. RJ11 . . . . .	10
Interpreting the Router Lights . . . . .	11

## Configuring the Router

Router Configuration . . . . .	13
Step 1: Assign an IP Address to your PC . . . . .	13
Using DHCP to Assign an IP Address . . . . .	13
Manually Assigning an IP Address . . . . .	14
Step 2: Setting the Password . . . . .	14
Step 3: Configuring the Router . . . . .	14
Configuring the Router through the Web Interface . . . . .	14
Configuring the Router through the Command Line Interface . . . . .	16
Step 4: Testing the Configuration . . . . .	17
Step 5: (Optional) FTP Access for Firmware/Configuration Uploads . . . . .	17
Bridge Configuration . . . . .	18
Step 1: Changing Modes . . . . .	18
Changing to Bridge Mode through the Web Interface	18
Changing to Bridge Mode through the Command Line Interface . . . . .	18
Step 2: Assign an IP Address to your PC . . . . .	20

Manually Assigning an IP Address . . . . .	20
Step 3: Setting the Password . . . . .	20
Step 4: Configuring the Bridge . . . . .	21
Configuring the Bridge through the Web Interface . . . . .	21
Configuring the Bridge through the Command Line Interface . . . . .	21
Step 5: Testing the Configuration . . . . .	23
Step 6: (Optional) FTP Access for Firmware/Configuration Uploads . . . . .	23

## **Appendix A**

Types of User Interfaces . . . . .	25
Web Interface . . . . .	25
Command Line Interface . . . . .	26
Command Prompt/Error Prompt . . . . .	26
Using the Command Line Interface . . . . .	26

## **Appendix B**

Factory Default Settings . . . . .	29
Restoring the Factory Default Configuration . . . . .	30

## **Appendix C**

5660 Ethernet ADSL Router Specifications . . . . .	31
5621 ADSL Router Specifications . . . . .	32

## About the 5600 Series Router

The SpeedStream 5600 Ethernet to DSL router provides ATM-based network access for home users, telecommuters, or remote offices over existing telephone lines.

Through its Ethernet and DSL ports located on the back of the router, the 5600 provides local area network (**LAN**) and wide area network (**WAN**) connectivity. The router connects to the LAN through its Ethernet port and connects to the WAN through its DSL port.

Although the 5600 is referred to in this manual primarily as a *router*, it can be used as either a *router* or a *bridge*. Instructions for changing from *router mode* to *bridge mode* are included on page 18.

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## About this Installation Guide

This manual provides all the information necessary to install and configure the router, as well as details on using the various user interfaces available on the router.

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## Installation Requirements

To use the 5600 router, you will need the following:

- A computer equipped with an Ethernet network interface card OR an Ethernet hub
- A DSL-ready telephone line
- If you want to configure the router via the serial port, you will need a computer that has terminal emulation software such as Microsoft HyperTerminal® or ProComm®.

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## Verify Package Contents

Your package should contain the items listed below. If anything is missing or damaged, please contact the dealer from whom the equipment was purchased.

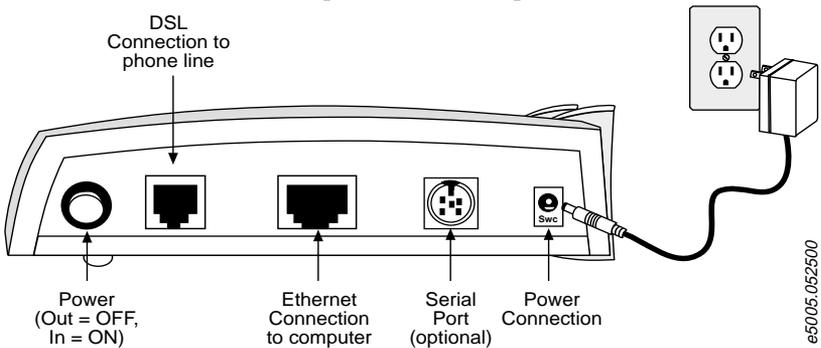
- 5600 router
- Power supply for either a 220v or a 110v electrical outlet
- One RJ45 or RJ11 unshielded twisted pair (UTP) cable (for the DSL connection)
- One RJ45 UTP crossover cable (for connecting to an Ethernet hub)
- One RJ45 UTP cable (for direct Ethernet connection to a PC)
- One serial cable with an RS232 DIN converter (connects to serial port)
- *Installation Guide, Safety and Certification Booklet, and Release Notes* (if applicable)

# Cable Connections

## Installation Instructions

**NOTE:** The labels for the back panel of the router are located on the underside of the unit.

- 1 Be sure the power switch is in the OFF position.
- 2 Insert the power cable jack into the power connector on the back of the router. Connect the power cable to a power outlet.

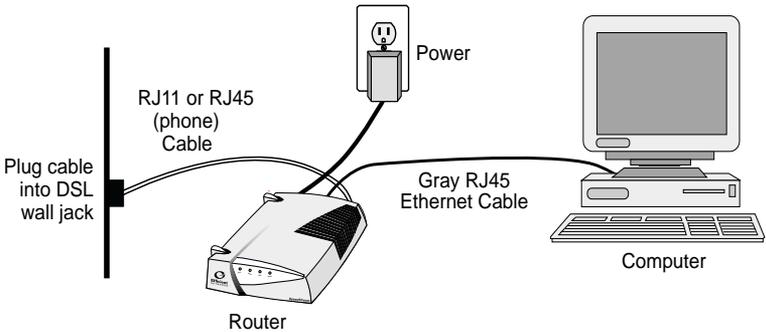


**Figure 1** Backplane of the Router

- 3 Connect the router to the LAN using one of the following methods:
  - Connect directly to the Ethernet port on a PC, workstation or laptop using the **gray RJ45 cable**, which is a straight-through cable.
  - Connect to an Ethernet hub or switch using the crossover cable labeled "**XOVER**" on one end.

**NOTE:** Some Ethernet hubs and switches have an "Uplink" port that allows you to connect to the router using the gray RJ45 straight-through cable.

- 4 Connect one end of an RJ11 or RJ45 telephone cable to the router's DSL port and the other end to the DSL service port (wall jack).
- 5 Press the router's power button to turn ON the unit.

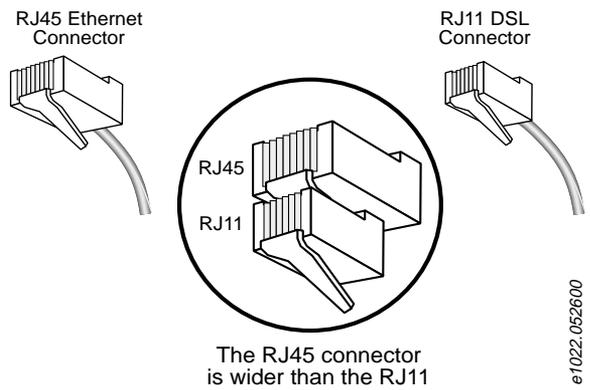


e5006.071000

**Figure 2** 5600 Router connected directly to a PC

## RJ45 vs. RJ11

At first glance, it may be difficult to tell the RJ11 cable from the RJ45 cables. If you set the connectors of each side-by-side, you can see that the RJ45 connector is wider than the RJ11.

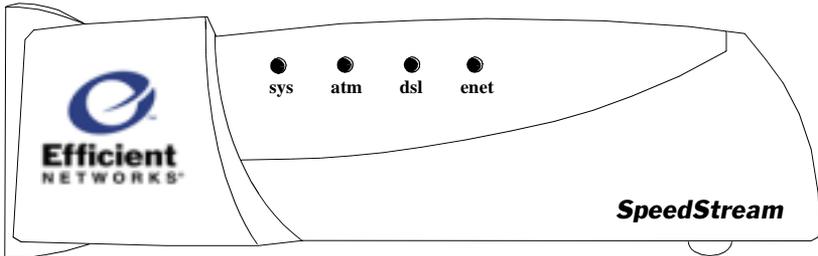


e1022.052600

**Figure 3** RJ45 and RJ11 Comparison

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## Interpreting the Router Lights



**Figure 4** Front view of the Router

The router is equipped with four lights on the front panel: the System light (**sys**), ATM light (**atm**), DSL light (**dsl**), Ethernet light (**enet**).

- 1 All four lights flash red for a moment as the hardware initializes. Then, the **sys** light turns yellow while the router performs a self-test. The **sys** light turns green when the unit has finished passing diagnostic tests.
- 2 The **dsl** light will flash green while the router is attempting to obtain the optimum transmission rate over the DSL line. If a DSL link cannot be established, the light will flash green and yellow. When a link is established, the **dsl** light turns solid green.
- 3 The **enet** light will turn solid green when there is a link detected, then begin to flash green when Ethernet traffic is flowing.
- 4 The **atm** light will flash green indicating traffic flow on the DSL line.

**Table 1** Router Light Descriptions

	<b>sys</b>	<b>atm</b>	<b>dsl</b>	<b>enet</b>
Unlit	Power off	<ul style="list-style-type: none"><li>• Power off</li><li>• ATM inactive</li></ul>	N/A	No Ethernet link detected; check cable connection, ensure correct cable was used.
Red	POST Failure; contact customer support to report problem	POST Failure; contact customer support to report problem	POST Failure; contact customer support to report problem	POST Failure; contact customer support to report problem
Yellow	POST Phase	N/A	N/A	N/A
Flashing Green	N/A	ATM traffic flow	Connected; attempting to establish a DSL link	Ethernet traffic flow
Green/ Yellow	N/A	N/A	Attempting to connect	N/A
Green	Operational	ATM ready	DSL ready	Ethernet ready

# Configuring the Router

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## Router Configuration

The 5600 unit can be used as either a *router* or a *bridge*. The following instructions are for configuring the 5600 in *router mode* (default configuration). To configure the 5600 in *bridge mode*, refer to “Bridge Configuration” on page 18.

**NOTE:** In the factory configuration, the user interface can only be accessed from the LAN or via the serial port. Advanced users can also use Telnet or a web browser from the WAN side once they have allowed WAN access to router servers. The 5600 uses a feature called network address port translation (NAPT) to control access to the router and the LAN from the WAN. See the “Advanced Setup” portion of the web-based management interface for instructions on setting up NAPT to enable WAN-side access.

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## Step 1: Assign an IP Address to your PC

### Using DHCP to Assign an IP Address

Before you can use your computer over a network, it must have an IP address. The router contains a dynamic host configuration protocol (DHCP) server that will automatically assign an IP address to the PC if the PC is set to obtain an IP address from a DHCP server. If you have set up your router and computer according to the installation instructions, follow these steps to get an IP address via DHCP if you are running a PC with Windows 95/98:

- 1 Select **Start** > **Settings** > **Control Panel**
- 2 Double click the **Network** icon
- 3 Select **TCP/IP** from the list of network components. Select **Properties**.
- 4 Select the **IP Address** tab and verify that **Obtain an IP address automatically** is selected. If not, then click this button.

- 5 Click **OK** twice.

## Manually Assigning an IP Address

If you prefer, you can also specify an address manually.

- IP address range 10.0.0.2 to 10.0.0.254
- Subnet Mask: 255.0.0.0
- Default gateway: 10.0.0.1

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## Step 2: Setting the Password

The router has no password protection as configured from the factory. As soon as you log into the router, you should set the password. This can be done in one of two ways:

- from the web interface by clicking on the “**Set Password**” link
- from the command line interface using the **set password** command

Password protection can be disabled again by entering the current password and a blank for the new password. If the password is forgotten, the router can be set to the factory default state from the serial port during the boot process. Refer to “Restoring the Factory Default Configuration” on page 30 for more information on this procedure.

**NOTE:** It is wise to restrict physical access to the router to prevent the accidental or malicious defaulting of your configuration.

---

## Step 3: Configuring the Router

Once your PC has an IP address, you can configure the router using either the web interface or the command line interface.

### Configuring the Router through the Web Interface

**NOTE:** Consult your service provider for your encapsulation type.

#### Creating a Virtual Circuit using PPP Encapsulation (default):

- 1 Start your web browser
- 2 Enter the router’s IP address: **10.0.0.1**

- 3 The browser displays the router's management interface.
- 4 On the main page, click on **Simple Setup**.
- 5 If your service provider has specified a VPI/VCI number to use, enter the numbers in the **VPI** and **VCI** fields.
- 6 Enter the PPP **Username** and **Password** issued by your service provider.
- 7 Click the **Set** button. This will set the new VPI/VCI parameters on the router. Refer to "Web Interface" on page 25 for more information on configuring the router via the web interface.

#### **Creating a Virtual Circuit using RFC 1483 Encapsulation:**

- 1 Start your web browser
- 2 Enter the router's IP address: **10.0.0.1**
- 3 On the main page, look in the Configuration Summary table and click on the title **Encapsulation Protocol**.
- 4 Click the button for the type of virtual connection (VC) you want to create.
- 5 If your service provider has specified a different VPI/VCI number to use, enter the numbers in the **VPI** and **VCI** fields. Otherwise, enter the default VPI and VCI values.
- 6 Select the desired RFC 1483 multiplexing method (**LLC** or **VCMUX**).
- 7 Select **Max** as the rate.
- 8 If you are not using DHCP, enter an IP address and a default gateway that is on the same IP subnet as the WAN IP.
- 9 Click the **Submit** button to set new parameters or select **Default VC** to reset the default configuration for the selected encapsulation protocol.
- 10 When the response appears at the bottom of the screen, it may include a link that says "**REBOOT REQUIRED**". If so, click on that link and choose **yes** to reboot the router.

- 11 Select **Refresh** after the Ethernet (**enet**) light turns green to see the new configuration. Refer to “Web Interface” on page 25 for more information on configuring the router via the web interface.

## Configuring the Router through the Command Line Interface

The command line interface is designed for advanced users. Refer to “Command Line Interface” on page 26 for more information about the command line. Detailed instructions for using the command line interface are available on the web interface. Click “Advance Setup” and then “5600 Series Command Line Interface User’s Guide”.

### Method 1: Via Telnet

- 1 Start your Telnet client. If you are using Windows on a PC, select **Start > Run** and enter **telnet 10.0.0.1**. If you are on a UNIX system, type **telnet 10.0.0.1**.
- 2 The Telnet client connects to the router and displays a command line prompt.
- 3 Enter the desired configuration commands and parameters when prompted.

The router can also be reset to the factory default configuration from the command line interface using the **default all** command.

### Method 2: Via the Serial Port

- 1 Select **Start > Programs > Accessories > HyperTerminal > HyperTerminal**
- 2 Enter a name in the **Connection Description** window and click **OK**
- 3 In the **Connect To** window, select the serial port you have connected to the router and click **OK**.
- 4 Enter the following port settings:

<b>Bits per second</b>	<b>38400</b>
<b>Data bits</b>	<b>8</b>
<b>Parity</b>	<b>None</b>

<b>Stop bits</b>	<b>1</b>
<b>Flow Control</b>	<b>None</b>

5 Click **OK**.

6 When the HyperTerminal window appears, you must press the **[Enter]** key five times to get the “Command->” prompt.

7 Enter the desired configuration commands and parameters when prompted.

This completes your router configuration. The router can be reset to the factory default configuration from the command line interface using the **default all** command.

---

## Step 4: Testing the Configuration

After completing the configuration process, you can test the operation of the router by starting a Web browser and accessing a remote web site such as **http://www.efficient.com**. Alternatively, you can open an MS DOS (or shell) window and issue a “ping <ip\_address>” command to a known host on the wide-area network.

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## Step 5: (Optional) FTP Access for Firmware/Configuration Uploads

Using FTP, you can:

- Upload a new revision of the router firmware
- Save the router’s current configuration to a file on the host computer and then upload the configuration to another 5600 router.

### To log into the router via FTP:

- 1 If using Windows on a PC, select **Start > Programs > Command Prompt**. If on a UNIX system, bring up a shell window.
- 2 When the MSDOS window appears, enter: **ftp 10.0.0.1**
- 3 At the **User** prompt, enter the username **ftp**

- 4 At the FTP command prompt, type in: **binary**
  - 5 You can upload a new revision of firmware by changing to the directory where the file is stored and entering the command **put 5600.img**
  - 6 The command prompt will return when the router has finished programming the firmware into memory.
- 
- 

## Bridge Configuration

Because the 5600 is configured by default in router mode, it must be set to bridge mode in order to function as a bridge.

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### Step 1: Changing Modes

You can choose one of two methods to change the router to function in bridge mode, the web interface or the command line interface.

#### Changing to Bridge Mode through the Web Interface

- 1 Start your web browser
- 2 Enter the router's IP address: **10.0.0.1**
- 3 On the first page, click on the link, "**Change to Bridge Mode**".
- 4 When the display appears, click on the radio button labeled **Bridge**.
- 5 Click on the button, **Change Mode**
- 6 When the response appears at the bottom of the screen, it will include a link that says "**REBOOT REQUIRED**". Click on that link and choose **yes** to reboot the router. Select **Refresh** after a minute to see the new configuration.

#### Changing to Bridge Mode through the Command Line Interface

The command line interface is designed for use by advanced users. Refer to "Command Line Interface" on page 26 for more information about the command line. Detailed instructions for using the command line interface

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are available on the web interface. Click “Advance Setup” and then “5600 Series Command Line Interface User’s Guide”.

### Method 1: Via Telnet

- 1 Start your Telnet client. If you are using Windows on a PC, select **Start > Run** and enter **telnet 10.0.0.1**. If you are on a UNIX system, type **telnet 10.0.0.1**.
- 2 The Telnet client connects to the router and displays a command line prompt.
- 3 Type **set bridge enable** and press **Enter**.
- 4 You will be prompted to reboot the unit. Enter the **reboot** command at the prompt and press **Enter**.
- 5 You will then be prompted to confirm your request. Type **y** for “yes” and press **Enter**. Any existing Telnet sessions will be closed.
- 6 The unit will reboot and come back up in bridge mode.

### Method 2: Via the Serial Port

- 1 Select **Start > Programs > Accessories > HyperTerminal > HyperTerminal**
- 2 Enter a name in the **Connection Description** window and click **OK**
- 3 In the “**Connect To**” window, select the serial port you have connected to the router and click **OK**.
- 4 Enter the following port settings:

<b>Bits per second</b>	<b>38400</b>
<b>Data bits</b>	<b>8</b>
<b>Parity</b>	<b>None</b>
<b>Stop bits</b>	<b>1</b>
<b>Flow Control</b>	<b>None</b>

- 5 Click **OK**.

- 6 When the HyperTerminal window appears, you must press the **[Enter]** key five times to get the “Command->” prompt.
- 7 Type **set bridge enable** and press **Enter**.
- 8 You will be prompted to reboot the unit. Enter the **reboot** command at the prompt and press **Enter**.
- 9 You will then be prompted to confirm your request. Type **y** for “yes” and press **Enter**. Any existing Telnet sessions will be closed.
- 10 The unit will reboot and come back up in bridge mode.

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## Step 2: Assign an IP Address to your PC

### Manually Assigning an IP Address

- IP address range 10.0.0.2 to 10.0.0.254
- Subnet Mask: 255.0.0.0
- Default gateway: 10.0.0.1

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## Step 3: Setting the Password

The bridge has no password protection as configured from the factory. As soon as you log into the bridge, you should set the password. This can be done from the web interface by clicking on the “**Set Password**” link or from the command line interface using the **set password** command.

Password protection can be disabled again by entering the current password and a blank for the new password. If the password is forgotten, the unit can be set to the factory default state from the serial port during the boot process. Refer to “Restoring the Factory Default Configuration” on page 30 for more information on this procedure.

**NOTE:** It is wise to restrict physical access to the bridge to prevent the accidental or malicious defaulting of your configuration.

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## Step 4: Configuring the Bridge

Once your 5600 unit is functioning in bridge mode, you can configure the Bridge through either the Web Interface or the Command Line Interface:

### Configuring the Bridge through the Web Interface

#### Creating a Virtual Circuit using RFC 1483 Encapsulation:

- 1 Start your web browser
- 2 Enter the bridge's IP address: **10.0.0.1**
- 3 The browser displays the bridge's management interface.
- 4 On the main page, click on **Simple Setup**.
- 5 Enter the **VPI** and **VCI** numbers provided by your Internet service provider. If your provider has not given you a VPI and VCI, click the **set defaults** button and skip to step 9.
- 6 Select the desired RFC 1483 multiplexing method (**LLC** or **VCMUX**).
- 7 Select **Max** as the rate.
- 8 Click on the **Create VC** button to set new parameters or select **Set Defaults** to return to the default configuration.
- 9 When the response appears at the bottom of the screen, it will include a link that says "**REBOOT REQUIRED**". Click on that link and choose **yes** to reboot the bridge.
- 10 Select **Refresh** after the Ethernet (**enet**) light turns green to see the new configuration. Refer to "Web Interface" on page 25 for more information on configuring the bridge via the web interface.

### Configuring the Bridge through the Command Line Interface

The command line interface is designed for advanced users. Refer to "Command Line Interface" on page 26 for more information about the command line. Detailed instructions for using the command line interface

are available on the web interface. Click “Advance Setup” and then “5600 Series Command Line Interface User’s Guide”.

### **Method 1: Via Telnet**

- 1 Start your Telnet client. If you are using Windows on a PC, select **Start > Run** and enter **telnet 10.0.0.1**. If you are on a UNIX system, type **telnet 10.0.0.1**.
- 2 The Telnet client connects to the bridge and displays a command line prompt.
- 3 Enter the desired command(s) and any necessary configuration parameters as prompted.

The bridge can also be reset to the factory default configuration from the command line interface using the **default all** command.

### **Method 2: Via a the Serial Port**

- 1 Select **Start > Programs > Accessories > HyperTerminal > HyperTerminal**
- 2 Enter a name in the “**Connection Description**” window and click **OK**
- 3 In the “**Connect To**” window, select the serial port you have connected to the router and click **OK**.
- 4 Enter the following port settings:

<b>Bits per second</b>	<b>38400</b>
<b>Data bits</b>	<b>8</b>
<b>Parity</b>	<b>None</b>
<b>Stop bits</b>	<b>1</b>
<b>Flow Control</b>	<b>None</b>

- 5 Click **OK**.
- 6 When the HyperTerminal window appears, you must press the **[Enter]** key five times to get the “**Command->**” prompt.

- 7 Enter the desired command(s) and any necessary configuration parameters as prompted.

This completes your bridge configuration. The bridge can also be reset to the factory default configuration from the command line interface using the **default all** command.

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## Step 5: Testing the Configuration

After completing the configuration process, you can test the operation of the bridge by starting a Web browser and accessing a remote web site such as **http://www.efficient.com**. Alternatively, you can open an MS DOS (or shell) window and issue a “ping <ip\_address>” command to a known host on the wide-area network.

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## Step 6: (Optional) FTP Access for Firmware/Configuration Uploads

Using FTP, you can:

- Upload a new revision of the router firmware
- Save the router’s current configuration to a file on the host computer and then upload the configuration to another 5600 router.

### To log into the router via FTP:

- 1 If using Windows on a PC, select **Start > Programs > Command Prompt**. If on a UNIX system, bring up a shell window.
- 2 When the MSDOS window appears, enter: **ftp 10.0.0.1**
- 3 At the User prompt, enter the username: **ftp**
- 4 At the FTP command prompt, type in: **binary**
- 5 You can upload a new revision of firmware by changing to the directory where the file is stored and entering the command **put 5600.img**
- 6 The command prompt will return when the router has finished programming the firmware into memory.



## Types of User Interfaces

The 5600 router provides two user interfaces in both bridge and router mode:

- **Web interface** – provides simple setup screens for quick configuration and an advanced configuration interface.
- **Command-line user interface** – allows quick configuration and provides status and configuration information. Only the command-line interface is available over the serial port connection.

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## Web Interface

The web interface for the router first displays a page showing the current configuration of the router. The first page also has a menu with links to the following web pages:

<b>Simple Setup</b>	Presents configuration forms where you can enter the minimum configuration parameters needed to configure the router for use on the network.
<b>Advanced Setup</b>	Leads to a more detailed interface with several links that allow more in-depth configuration of the router. This interface provides a menu with links to the following web pages: <ul style="list-style-type: none"><li>• <b>Configuration Procedures</b></li><li>• <b>Status and Statistics</b></li><li>• <b>Command List</b></li></ul>
<b>Configuration Summary</b>	Redisplays the router configuration summary.
<b>Change To Bridge Mode</b>	Switches from router to bridge mode. If the 5600 is configured as a bridge this item changes to “Change to Router Mode”.

## Set Password

Sets the login password on the router. To reset the router to not require a password, do not enter any text in the new password fields and click on **Set**.

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## Command Line Interface

A detailed guide to configuring the router using the command line interface is available on the “Advanced Setup” page of the web interface.

### Command Prompt/Error Prompt

The following are the conventions used during a command session. Normally, the command line prompt is:

```
Command->
```

However, if there has been a non-fatal error during power-on self test (POST), the prompt will display as:

```
post_error->
```

If you see this prompt, you can connect to the router via serial port and reboot the unit. When the router reboots, the POST error messages will be displayed to the serial console. Contact Efficient Networks Customer Support to report the problem.

### Using the Command Line Interface

The following commands and keystrokes can be issued from the Command-> prompt:

- |                      |  |
|----------------------|--|
| <b>help</b>          | Displays the conventions described below.  |
| <b>?</b>             | Displays the top-level command set.  |
| <b>&lt;cmd&gt; ?</b> | Displays help for the command <cmd>. For example, to see all “set” commands, type <b>set ?</b> . |
| <b>ESC- or ESC+</b>  | Scrolls through the last commands executed. Type ENTER to execute the command displayed.         |
| <b>[Control+U]</b>   | Erases the entire line.  |
| <b>[Backspace]</b>   | Backs up one character   |
| <b>[Control+C]</b>   | Aborts the current command-line entry.   |

**[ESC]** Can be used to put the command line into the vi-style line editing mode.

Some commands have required or optional parameters. If you type the command name and press [Enter], you will be prompted for each parameter. When being prompted for a command argument:

**+ or -** - Scrolls through the keywords. This control only works for arguments that are keywords.



## Factory Default Settings

The factory default configuration of the 5600 series router will be appropriate for most users. Configuration changes can be made from the “Advanced Setup” section of the web interface.

**Table 2** Factory Default Configuration

Configurable Item	Default Settings
Operating Mode	Router
Ethernet Interface	IP Address 10.0.0.1 Network Mask 255.0.0.0
IP Gateway (Default Route) Address	None
DSL (WAN) Interface	IP Address None Network Mask None
Data Encapsulation Protocol	PPP
PPP Authentication	Username ENI-Router Password ENI-Router
PPP Multiplexing method	LLC/SNAP encapsulation
Hostname	speedstream
Domain name	domain.invalid
DHCP server	Enabled
DNS	Enabled
DNS Resolver or Forwarders	None specified
NAPT	Enabled
RIP	Enabled; uses RIP2 in passive mode
IP Filtering	Disabled
Spanning Tree (bridge only)	Disabled

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## Restoring the Factory Default Configuration

In the event that you need to reset the 5600 router to the factory default settings, you may do so using the following procedure:

**To reset router to the factory default state:**

- 1 Access the router through the serial port.
- 2 Enter the **reboot** command
- 3 During the boot process, the screen will start displaying a series of periods (“.”). Enter the **default** command while the dots are being displayed.

**NOTE:** The default boot process will reset all user-configurable parameters on the router to factory defaults.

# Appendix C

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## 5660 Ethernet ADSL Router Specifications

Size	5.5W in. x 7D in. x 1.5H in.” (14W cm x 17.8D cm x 3.8H cm)
Weight	1.25 lbs. (0.57 Kg)
Power	Integrated 110-240 VAC; 50-60 Hz power supply; 0.1A @ 110VAC, 0.05A @ 240VAC
Temperature	Operating: 0° to 40° C Non-Operating, storage: -10°C to 85° C
Humidity	Operating humidity: 10% to 90% noncondensing Non-operating storage humidity: 5% to 95% non-condensing
Ringer Equivalency	REN=0.8B
Performance	Meets or exceeds requirements for T1E1.4 line connected equipment for noise, line balance, return loss, reach and line disturbance. DMT: up to 640 Kbps upstream; up to 6.144 Mbps downstream
Cabling	Unshielded Twisted Pair (UTP) Category 3, 4, or 5
Local Console	RS232 using Mini DIN (38400 baud default)

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## 5621 ADSL Router Specifications

Size	5.5W in. x 7D in. x 1.5H in." (14W cm x 17.8D cm x 3.8H cm)
Weight	1.25 lbs. (0.57 Kg)
Power	Integrated 110-240 VAC, 50-60 Hz power supply 0.2A @ 110VAC, 0.1A @ 240VAC
Temperature	Operating: 0° to 40° C Non-Operating, storage: -10°C to 85° C
Humidity	10% to 90% noncondensing Non-operating storage humidity: 5% to 95% non-condensing
Ringer Equivalency	REN=0.8B
Performance	Meets or exceeds requirements for T1E1.4 line connected equipment for noise, line balance, return loss, reach and line disturbance. DMT: up to 640 Kbps upstream; up to 6.144 Mbps downstream
Cabling	Unshielded Twisted Pair (UTP) Category 3, 4, or 5
Local Console	RS232 using Mini DIN (38400 baud default)