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**LINKSYS**<sup>®</sup>  
A Division of Cisco Systems, Inc.



**10/100 4-Port  
VPN Router**

**User Guide**

Model No. **RV042**



**CISCO SYSTEMS**



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**Manual abstract:**

S. and certain other countries. Copyright © 2004 Cisco Systems, Inc. @@@@What is a VPN? 4 4 4 5 6 Chapter 3: Getting to Know the Router The Front Panel The Back and Side Panels 8 8 9 Chapter 4: Connecting the Router Overview Connection Instructions 11 11 12 Chapter 5: Configuring the PCs Overview Configuring Windows 98 and Millennium PCs Configuring Windows 2000 PCs Configuring Windows XP PCs 14 14 14 15 15 Chapter 6: Set Up and Configure the Router Overview How to Access the Web-based Utility System Summary Tab Setup Tab - Network Setup Tab - Password Setup Tab - Time Setup Tab - DMZ Host Setup Tab - Forwarding Setup Tab - UPnP Page Setup Tab - One-to-One NAT Setup Tab - MAC Clone Setup Tab - DDNS 17 17 20 20 23 25 25 26 26 27 27 28 29 10/100 4-Port VPN Router Setup Tab - Advanced Routing DHCP Tab - Setup DHCP Tab - Status System Management Tab - Dual-WAN System Management Tab - SNMP System Management Tab - Diagnostic System Management Tab - Factory Default System Management Tab - Firmware Upgrade System Management Tab - 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The Linksys 10/100 4-Port VPN Router is an advanced Internet-sharing network solution for your small business needs. Like any router, it lets multiple computers in your office share an Internet connection. But the unique dual Internet ports on the 10/100 4-Port VPN Router let you connect a second Internet line as a backup to insure that you're never disconnected. Or, use both Internet ports at the same time, and let the router balance your office's requirements between them for maximum bandwidth efficiency. The 10/100 4-Port VPN Router also features a built-in 4-Port full-duplex 10/100 Ethernet switch to connect four PCs directly, or you can connect more hubs and switches to create as big a network as you need. The Virtual Private Network (VPN) capability creates encrypted "tunnels" through the Internet, allowing up to 30 remote office or traveling users to securely connect into your office network from off-site. Users connecting through a VPN tunnel are attached to your company's network -- with secure access to files, e-mail, and your intranet -- just as if they were in the building. You can also use the VPN capability to allow users on your small office network to securely connect out to a corporate network. The 10/100 4-Port VPN Router can serve as a DHCP Server, and has a powerful SPI firewall to protect your PCs against intruders and most known Internet attacks. It can be configured to filter internal users' access to the Internet, and has IP address filtering so you can specify exactly who has access to your network.



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Configuration is a snap with the web browser-based configuration utility.

This user guide will give you all the information you need to connect, set up, and configure your Router. Ethernet: a network protocol that specifies how data is placed on and retrieved from a common transmission medium. Chapter 1: Introduction Welcome 1 10/100 4-Port VPN Router What's in this Guide? This user guide covers the steps for setting up and using the 10/100 4-Port VPN Router. · Chapter 1: Introduction This chapter describes the 10/100 4-Port VPN Router applications and this User Guide. · Chapter 2: Networking Basics This chapter describes the basics of networking.

· Chapter 3: Getting to Know the 10/100 4-Port VPN Router This chapter describes the physical features of the Router. · Chapter 4: Connecting the 10/100 4-Port VPN Router This chapter instructs you on how to connect the Router to your network. · Chapter 5: Configuring the PCs This chapter explains how to configure the PCs for your network. · Chapter 6: Set Up and Configure the Router This chapter explains how to use the Web-Based Utility to set up the Router and configure its settings. · Appendix A: Troubleshooting This appendix describes some problems and solutions, as well as frequently asked questions, regarding installation and use of the 10/100 4-Port VPN Router. · Appendix B: Upgrading Firmware This appendix instructs you on how to upgrade the firmware on your Router if you should need to do so. · Appendix C: Finding the MAC Address and IP Address for your Ethernet Adapter. This appendix describes how to find the MAC address for your computer's Ethernet adapter so you can use the MAC address cloning feature of the Router. · Appendix D: Physical Setup of the Router This appendix describes the physical setup of the Router..

· Appendix F: Windows Help This appendix describes how you can use Windows Help for instructions about networking, such as installing the TCP/IP protocol. · Appendix G: Glossary This appendix gives a brief glossary of terms frequently used in networking. Chapter 1: Introduction What's in this Guide? 2 10/100 4-Port VPN Router · Appendix H: Specifications This appendix provides the technical specifications for the Router. · Appendix I: Warranty Information This appendix supplies the warranty information for the Router. · Appendix J: Regulatory Information This appendix supplies the regulatory information regarding the Router. · Appendix K: Contact Information This appendix provides contact information for a variety of Linksys resources, including Technical Support. Chapter 1: Introduction What's in this Guide? 3 10/100 4-Port VPN Router Chapter 2: Networking Basics An Introduction to LANs A Router is a network device that connects two networks together. The Router connects your local area network (LAN), or the group of PCs in your home or office, to the Internet. The Router processes and regulates the data that travels between these two networks. The Router's Network Address Translation (NAT) technology protects your network of PCs so users on the Internet cannot "see" your PCs.

This is how your LAN remains private. The Router protects your network by inspecting the first packet coming in through the Internet port before delivery to the final destination on one of the Ethernet ports. The Router inspects Internet port services like the web server, ftp server, or other Internet applications, and, if allowed, it will forward the packet to the appropriate PC on the LAN side. NAT (Network Address Translation): NAT technology translates IP addresses of a local area network to a different IP address for the Internet. The Use of IP Addresses IP stands for Internet Protocol.

Every device in an IP-based network, including PCs, print servers, and routers, requires an IP address to identify its location, or address, on the network. This applies to both the Internet and LAN connections. There are two ways of assigning IP addresses to your network devices. A static IP address is a fixed IP address that you assign manually to a PC or other device on the network. Since a static IP address remains valid until you disable it, static IP addressing ensures that the device assigned it will always have that packet headers contain both the source and destination information for that packet to transmit efficiently.

Chapter 2: Networking Basics Why do I need a VPN? LAN: the computers and networking products that make up your local network NOTE: Since the Router is a device that connects two networks, it needs two IP addresses--one for the LAN, and one for the Internet. In this User Guide, you'll see references to the "Internet IP address" and the "LAN IP address." Since the Router uses NAT technology, the only IP address that can be seen from the Internet for your network is the Router's Internet IP address. However, even this Internet IP address can be blocked, so that the Router and network seem invisible to the Internet. 5 10/100 4-Port VPN Router A hacker can use this information to spoof (or fake) a MAC address allowed on the network. With this spoofed MAC address, the hacker can also intercept information meant for another user. 2) Data Sniffing Data "sniffing" is a method used by hackers to obtain network data as it travels through unsecured networks, such as the Internet. Tools for just this kind of activity, such as protocol analyzers and network diagnostic tools, are often built into operating systems and allow the data to be viewed in clear text. 3) Man in the middle attacks Once the hacker has either sniffed or spoofed enough information, he can now perform a "man in the middle" attack. This attack is performed, when data is being transmitted from one network to another, by rerouting the data to a new destination.

Even though the data is not received by its intended recipient, it appears that way to the person sending the data. These are only a few of the methods hackers use and they are always developing more. Without the security of your VPN, your data is constantly open to such attacks as it travels over the Internet. Data travelling over the Internet will often pass through many different servers around the world before reaching its final destination. That's a long way to go for unsecured data and this is when a VPN serves its purpose. What is a VPN? A VPN, or Virtual Private Network, is a connection between two endpoints - a VPN Router, for instance - in different networks that allows private data to be sent securely over a shared or public network, such as the Internet. This establishes a private network that can send data securely between these two locations or networks. This is done by creating a "tunnel". A VPN tunnel connects the two PCs or networks and allows data to be transmitted over the Internet as if it were still within those networks.



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*Not a literal tunnel, it is a connection secured by encrypting the data sent between the two networks.*

*VPN was created as a cost-effective alternative to using a private, dedicated, leased line for a private network. Using industry standard encryption and authentication techniques - IPsec, short for IP Security - the VPN creates a secure connection that, in effect, operates as if you were directly connected to your local network. Virtual Private Networking can be used to create secure networks linking a central office with branch offices, telecommuters, and/or professionals on the road (travelers can connect to a VPN Router using any computer with VPN client software that supports IPsec, such as SSH Sentinel.)*

*There are two basic ways to create a VPN connection: Chapter 2: Networking Basics What is a VPN? 6 10/100 4-Port VPN Router ·VPN Router to VPN Router ·Computer (using VPN client software that supports IPsec) to VPN Router The VPN Router creates a "tunnel" or channel between two endpoints, so that data transmissions between them are secure. A computer with VPN client software that supports IPsec can be one of the two endpoints. Any computer with the built-in IPsec Security Manager (Microsoft 2000 and XP) allows the VPN Router to create a VPN tunnel using IPsec). Other versions of Microsoft operating systems require additional, third-party VPN client software applications that support IPsec to be installed. VPN Router to VPN Router An example of a VPN Router-to-VPN Router VPN would be as follows. (See Figure 2-1.) At home, a telecommuter uses his VPN Router for his always-on Internet connection.*

*His router is configured with his office's VPN settings. When he connects to his office's router, the two routers create a VPN tunnel, encrypting and decrypting data. As VPNs utilize the Internet, distance is not a factor. Using the VPN, the telecommuter now has a secure connection to the central office's network, as if he were physically connected. Computer (using VPN client software that supports IPsec) to VPN Router The following is an example of a computer-to-VPN Router VPN. (See Figure 2-2.) In her hotel room, a traveling businesswoman dials up her ISP. Her notebook computer has VPN client software that is configured with her office's VPN settings. She accesses the VPN client software that supports IPsec and connects to the VPN Router at the central office. As VPNs utilize the Internet, distance is not a factor.*

*Using the VPN, the businesswoman now has a secure connection to the central office's network, as if she were physically connected. For additional information and instructions about creating your own VPN, please visit Linksys's website at [www.linksys.com](http://www.linksys.com). Figure 2-1: VPN Router-to-VPN Router VPN Figure 2-2: Computer-to-VPN Router VPN Chapter 2: Networking Basics What is a VPN? 7 10/100 4-Port VPN Router Chapter 3: Getting to Know the Router The Front Panel The Router's LEDs are located on the front panel of the Router. Figure 3-1: Front Panel LEDs System Green. The System LED lights up when the Router is powered on. If the LED is flashing, the Router is running a diagnostic test. Orange. The Diag LED lights up when the system is not ready.*

*The LED goes off when the system is ready. Green. The Internet LED lights up when the Router is connected to your cable or DSL modem. Green. The DMZ/Internet LED lights up when the Router is connected to your cable or DSL modem when used as an Internet port, and it lights up when the Router is connected to the hub, switch, or public server when used as a DMZ port.*

*Green. The DMZ Mode LED lights up when the Router is using DMZ mode. Green. The LAN LED serves two purposes. If the LED is continuously lit, the Router is connected to a device through the corresponding port (1, 2, 3, or 4).*

*If the LED is flashing, the Router is actively sending or receiving data over that port. 8 Diag Internet DMZ/Internet DMZ Mode 1-4 (LAN) Chapter 3: Getting to Know the Router The Front Panel 10/100 4-Port VPN Router The Back and Side Panels The Router's ports and Reset button are located on the back panel of the Router. LAN WAN1 Figure 3-2: Back Panel WAN2 Reset Button Reset Button The Reset button can be used in one of two ways: If the Router is having problems connecting to the Internet, press the Reset button for just a second with a paper clip or a pencil tip. This is similar to pressing the Reset button on your PC to reboot it. If you are experiencing extreme problems with the Router and have tried all other troubleshooting measures, press and hold in the Reset button for 30 seconds. This will restore the factory defaults and clear all of the Router's settings, such as port forwarding or a new password. Ports 1-4 (LAN) These four LAN (Ethernet) ports connect to network devices, such as PCs, print servers, or additional switches. The Internet port connects to a cable or DSL modem. The DMZ/Internet port can be used in two different ways: a second Internet port, or DMZ port. When used as an additional Internet port, it connects to a cable or DSL modem.*

*When used as a DMZ port, it connects to a hub, switch, or public server. Internet (WAN1) DMZ/Internet (WAN2) Chapter 3: Getting to Know the Router The Back and Side Panels 9 10/100 4-Port VPN Router The power port is located on the right side panel of the Router. Figure 3-3: Right Side Panel Power The Power port is where you will connect the included AC power cable. The security slot is located on the left side panel. Figure 3-4: Left Side Panel Security Slot The security slot is where you can attach a lock so the Router will be protected from theft. Proceed to "Chapter 4: Connecting the Router." Chapter 3: Getting to Know the Router The Back and Side Panels 10 10/100 4-Port VPN Router Chapter 4: Connecting the Router Overview To set up your network, you will do the following: · Connect the Router to one of your PCs according to the instructions in this chapter. · If necessary, configure your PCs to obtain an IP address automatically from the Router, according to "Chapter 5: Configuring the PCs." (By default, Windows 98, 2000, Millennium, and XP computers are set to obtain an IP address automatically, so unless you have changed the default setting, then you will not need to configure your PCs.) · Set up and configure the Router with the setting(s) provided by your Internet Service Provider (ISP) according to "Chapter 6: Set up and Configure the Router.*

*" The installation technician from your ISP should have left the setup information with you after installing your broadband connection. If not, you can call your ISP to request the information. Once you have the setup information for your specific type of Internet connection, then you can begin installation and setup of the Router. Notebook with Ethernet Adapter Cable or DSL Modem 10/100 4-Port VPN Router PC with Ethernet Adapter Figure 4-1: Example of a Typical Network Chapter 4: Connecting the Router Overview 11 10/100 4-Port VPN Router Connection Instructions 1.*



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Before you begin, make sure that all of your hardware is powered off, including the Router, PCs, hubs, switches, and cable or DSL modem.

2. Connect one end of an Ethernet network cable to one of the numbered ports on the back of the Router (see Figure 4-2). Connect the other end to an Ethernet port on a network device, e.g., a PC, print server, hub, or switch.

Repeat this step to connect more PCs or other network devices to the Router. 3. Connect your cable or DSL modem's Ethernet cable to the Router's Internet port. If using the DMZ/Internet port, connect a second cable to it, and the other end to the network device, e.g., modem or public server. 4. Power on the cable or DSL modem and the other network device if using one. Figure 4-2: Connect a PC Figure 4-3: Connect the Internet Figure 4-4: Connect the DMZ/Internet Chapter 4: Connecting the Router Connection Instructions 12 10/100 4-Port VPN Router 5. Connect the included AC power cable to the Router's Power port on the side of the Router, as shown in Figure 4-5, and then plug the power adapter into an electrical outlet.

The System LED on the front panel will light up as soon as the power adapter is connected properly. If you need to configure your PCs, proceed to "Chapter 5: Configuring the PCs." Otherwise, proceed to "Chapter 6: Set Up and Configure the Router." Figure 4-5: Connect the Power Chapter 4: Connecting the Router Connection Instructions 13 10/100 4-Port VPN Router Chapter 5: Configuring the PCs Overview The instructions in this chapter will help you configure each of your computers so they will be able to communicate with the Router. Each PC must be set to obtain an IP address (or TCP/IP) address automatically (called DHCP). Computers use IP addresses to communicate with each other across a network or the Internet. Note: These instructions apply only to Windows 98, Millennium, 2000, or XP computers. By default, Windows 98, 2000, Millennium, and XP have TCP/IP installed and are set to obtain an IP address automatically. If you have not made any changes to your PC's default network settings, then proceed to "Chapter 6: Set Up and Configure the Router." Find out which operating system your computer is running, such as Windows 98, Millennium, 2000, or XP.

If you're not sure, you can find out by clicking the Start button. On the left side of the taskbar, it will say which operating system your computer is using. You may need to do this for each computer you are connecting to the Router. The next few pages tell you, step by step, how to configure your network settings based on the type of Windows operating system you are using. Make sure that an Ethernet card or adapter has been successfully installed in each PC you will configure.

Once you've configured your computers, proceed to "Chapter 6: Set Up and Configure the Router." Figure 5-1: TCP/IP for Windows 98 and Me Configuring Windows 98 and Millennium PCs 1. Click the Start button. Click Settings and then Control Panel. From there, double-click the Network icon.

2. On the Configuration tab, select the TCP/IP line for the applicable Ethernet adapter, as shown in Figure 5-1. Do not choose a TCP/IP entry whose name mentions Dial-Up Adapter, PPPoE, VPN, or AOL. If the word TCP/IP appears by itself, select that line. (If there is no TCP/IP line listed, refer to Windows Help or your Ethernet adapter's documentation to install TCP/IP now.) Click the Properties button. 3. Click the IP Address tab and select Obtain an IP address automatically, as shown in Figure 5-2. 4. Now click the Gateway tab to ensure that the Installed Gateway field is left blank.

Click the OK button. Figure 5-2: Obtain an IP address automatically for Windows 98 and Me 14 Chapter 5: Configuring the PCs Overview 10/100 4-Port VPN Router 5. Click the OK button again. Windows may ask you for the original Windows installation disk or additional files. Supply them by pointing to the correct file location, e.g., D:\win98, D:\win9x, c:\windows\options\cabs, etc. (if "D" is the letter of your CD-ROM drive). 6. Windows may ask you to restart your PC.

Click the Yes button. If Windows does not ask you to restart, restart your computer anyway. Go to "Chapter 6: Set Up and Configure the Router." Configuring Windows 2000 PCs 1. Click the Start button.

Click Settings and then Control Panel. From there, double-click the Network and Dial-up Connections icon. 2. Select the Local Area Connection icon for the applicable Ethernet adapter (usually it is the first Local Area Connection listed). Double-click the Local Area Connection.

Click the Properties button. 3. Select Internet Protocol (TCP/IP), and click the Properties button. See Figure 5-3. 4. Select Obtain an IP address automatically (see Figure 5-4). Once the new windows appears, click the OK button. Click the OK button again to complete the PC configuration. 5. Restart your computer.

Go to "Chapter 6: Set Up and Configure the Router." Figure 5-3: Internet Protocol (TCP/IP) for Windows 2000 Configuring Windows XP PCs The following instructions assume you are running Windows XP with the default interface. If you are using the Classic interface (where the icons and menus look like previous Windows versions), follow the instructions for Windows 2000. 1. Click the Start button. Click Settings and then Control Panel. Click the Network and Internet Connections icon and then the Network Connections icon. 2. Select the Local Area Connection icon for the applicable Ethernet adapter (usually it is the first Local Area Connection listed). Double-click the Local Area Connection.

Click the Properties button. Figure 5-4: Obtain an IP address automatically for Windows 2000 Chapter 5: Configuring the PCs Configuring Windows 2000 PCs 15 10/100 4-Port VPN Router 3. Select Internet Protocol (TCP/IP), and click the Properties button. See Figure 5-5. 4.

Select Obtain an IP address automatically (see Figure 5-6). Once the new window appears, click the OK button. Click the OK button again (or the Close button if any settings were changed) to complete the PC configuration. 5. Restart your computer.

Go to "Chapter 6: Set Up and Configure the Router." Figure 5-5: Internet Protocol (TCP/IP) for Windows XP Figure 5-6: Obtain an IP address automatically for Windows XP Chapter 5: Configuring the PCs Configuring Windows XP PCs 16 10/100 4-Port VPN Router Chapter 6: Set Up and Configure the Router Overview For your convenience, use the Router's Web-based Utility to set it up and configure it. This chapter will explain all of the functions in this Utility. There are eleven main tabs in the Utility: System Summary, Setup, DHCP, System Management, Firewall, VPN, Log, Wizard, Support, and Logout. Additional tabs will be available after you click one of the main tabs. The tabs are described below: System Summary Tab The System Summary Tab displays the router's current status and settings.



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*This information is read only. If you click the button with underline, it will hyperlink to related setup pages. Setup Tab · Network. Enter the Internet connection and network settings on this screen.*

· *Password. You can change the Router's password on this screen. it is strongly recommended that you change the Router's password from the default. · Time. Change the time on this screen. · DMZ Host. The DMZ (Demilitarized Zone) Host feature allows one local user to be exposed to the Internet to use a special-purpose service such as Internet gaming or video conferencing. · Forwarding. Port forwarding can be used to set up public services on your network. You may use this function to establish a Web server or FTP server via an IP Gateway.*

· *UPnP. UPnP forwarding can be used to set up public services on your network. · One-to-One NAT. One-to-One NAT creates a relationship which maps valid external addresses to internal addresses hidden by NAT. · MAC Clone.*

*Some ISPs require that you register a MAC address. This feature "clones" your network adapter's MAC address onto the Router, and prevents you from having to call your ISP to change the registered MAC address to the Router's MAC address. Chapter 6: Set Up and Configure the Router Overview 17 10/100 4-Port VPN Router · DDNS. DDNS (Dynamic DNS) service allows you to assign a fixed domain name to a dynamic WAN IP address. This allows you to host your own Web, FTP or other type of TCP/IP server in your LAN.*

· *Advanced Routing. The Router's dynamic routing feature can be used to automatically adjust to physical changes in the network's layout. DHCP Tab · Setup. You can enable/disable the DHCP server, set up client lease time, DHCP IP Range, and the WINS Server IP address. · Status. A Status page is available to review DHCP Server Status. System Management Tab · Dual WAN. There are two functions provided for users Smart Link Backup and Load Balance. · SNMP. SNMP, or Simple Network Management Protocol, is a network protocol that provides network administrators with the ability to monitor the status of the Router and receive notification of any critical events as they occur on the network.*

· *Diagnostic. The Router has two built-in tools that will help with troubleshooting network problems. · Factory Default. The "Factory Default" button can be used to clear all of your configuration information and restore the Router to its factory default settings. Only use this feature if you wish to discard all other configuration preferences. · Firmware Upgrade. Users can use the following function to upgrade the Router's firmware to the newest version. · Restart. The recommended method of restarting your Router is to use this "Restart" tool. Restarting with this button will send out your log file before the box is reset.*

· *Setting Backup. This tab allows you to make a backup file of your Preferences file for the Router. Chapter 6: Set Up and Configure the Router Overview 18 10/100 4-Port VPN Router Firewall Tab · General. From the Firewall Tab, you can configure the Router to deny or allow specific internal users from accessing the Internet. · Access Rules.*

*Network Access Rules evaluate the network traffic's Source IP address, Destination IP address, and IP protocol type to decide if the IP traffic is allowed to pass through the firewall. · Content Filter. This tab allows you to filter web access by site and time. VPN Tab · Summary. The VPN Summary displays the Summary, Tunnel Status and GroupVPN Status.*

· *Gateway to Gateway. By setting this page, users can add a new tunnel between two VPN devices. · Client to Gateway. By setting this page, you can create a new tunnel between a Local VPN device and a mobile user. · VPN Pass Through. This tab allows you to disable IPsec Pass Through, PPTP Pass Through, and L2TP Pass Through. Log Tab · System Log. The System Log displays Syslog, E-mail and Log Settings. · System Statistics. This tab displays the system statistics.*

*Wizard Tab · Wizard. Use this tab to access two Setup Wizards, the Basic Setup Wizard and Access Rule Setup Wizard. Support Tab · Support. This tab supplies buttons to access the user guide and the Linksys website. Logout Tab · Logout. Clicking this tab exits you from the Utility. Chapter 6: Set Up and Configure the Router Overview 19 10/100 4-Port VPN Router How to Access the Web-based Utility To access the Web-based Utility of the Router, launch Internet Explorer or Netscape Navigator, and enter the Router's default IP address, 192.168.1.1, in the Address field, as shown in Figure 6-1.*

*Press the Enter key. · A screen will appear asking you for your User name and Password, as shown in Figure 6-2. Enter admin in the User name field, and enter admin in the Password field. Then click the OK button. Figure 6-1: Router's IP Address System Summary Tab The first screen that appears is System Summary Tab.*

*See Figure 6-3. This screen displays the router's current status and settings. This information is read only. If you click the button with underline, it will hyperlink to related setup pages. On the right side of the screen and all other screens in the Utility will be a link to the Site Map, which has links to all of the Utility's tabs.*

*Click the Site Map button to view the Site Map. See Figure 6-4. Then, click on desired tab subject. Figure 6-2: Password System Information Serial Number: The serial number of the Router. Firmware version: The current version number of the firmware installed on this unit. CPU: The type of processor installed on the Router. It is Intel IXP425. DRAM: The size of DRAM on the board. Flash: The size of Flash on the board. System Up Time: The length of time in Days, Hours, and Minutes that the Router is active and the current time are displayed.*

*Configuration If you need help to re-configure the router, click the Setup Wizard button. To view the figures for the wizard, see the Wizard Tab section. Figure 6-3: System Summary Chapter 6: Set Up and Configure the Router How to Access the Web-based Utility 20 10/100 4-Port VPN Router Port Statistics Users can click the port number from the port diagram to see the status of the selected port. If the port is disabled, it will be red; if enabled, it will be black; if connected, it will be green. In the summary table, it will show the setting of the port selected by users, such as Type, Link Status (up or down), Port Disable (on or off), Priority (High or Normal), Speed Status (10Mbps or 100Mbps), Duplex Status (half or full), Auto negotiation (enable or disable). In the statistics table, it will show the port receive/transmit packet count/packet byte count and Port Packet Error Count of the selected port. The LAN ports can be configured from the LAN Setup page of the LAN Management Tab.*



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*Network Setting Status LAN IP:* It shows the current LAN IP Address of the Router, as seen by internal users on the network, and hyperlinks to the LAN Setting section on the Network page of the Setup Tab. *WAN1 IP:* It shows the current WAN1 IP Address of the Router, as seen by external users on the Internet and hyperlinks to WAN Connection type section on the Network page of the Setup Tab. When users select Obtain an IP automatically, it shows two buttons, Release and Renew.

Users can click the Release button to release the IP that users already have and click the Renew button to update the DHCP Lease Time or get a new IP. When users select PPPoE or PPTP, it shows Connect / Disconnect. *WAN2/DMZ IP:* It shows the current WAN2 IP Address of the Router, or DMZ IP when DMZ is selected, as seen by external users on the Internet and hyperlinks to WAN Connection type on the Network page of the Setup Tab. *Mode:* It shows the Working Mode (Gateway or Router) and hyperlinks to Dynamic Routing section on the Advanced Routing page of the Setup Tab. *DNS:* It shows all DNS Server Addresses and hyperlinks to WAN Connection Type on the Network page of the Setup Tab.

*DDNS:* It shows the status (On/Off) and hyperlinks to DDNS page of the Setup Tab. *DMZ Host:* It shows DMZ Private Address and hyperlinks to DMZ Host page of the Setup Tab. The default is disabled. *Figure 6-4: Site Map Firewall Setting Status SPI (Stateful Packet Inspection):* It shows the status (On/Off) and hyperlinks to the General page of the Firewall Tab. *DoS (Denial of Service):* It shows the status (On/Off) and hyperlinks to the General page of the Firewall Tab.

*Chapter 6: Set Up and Configure the Router System Summary Tab 21 10/100 4-Port VPN Router Block WAN Request:* It shows the status (On/ Off) and hyperlinks to the Block WAN Request section on the General page of the Firewall Tab. *VPN Setting Status VPN Summary:* It hyperlinks to Summary page of VPN Tab. *Tunnel(s) Used:* It shows the number of Tunnels used. *Tunnel(s) Available:* It shows the number of Tunnels available. *Current Connected (The Group Name of GroupVPN1) users:* It shows the number of users. *Current Connected (The Group Name of GroupVPN2) users:* It shows the number of users. (If GroupVPN is disabled, it will show "No Group VPN was defined.") *Log Setting Status:* It hyperlinks to the System Log page of Log Tab. If you have not set up the mail server in Log Tab, it shows "E-mail cannot be sent because you have not specified an outbound SMTP server address." If you have set up the mail server but the log has not come out due to Log Queue Length and Log Time Threshold settings, it shows "E-mail settings have been configured.

" If you have set up the mail server and the log has been sent to the mail server, it shows "E-mail settings have been configured and sent out normally." If you have set up the mail server and the log cannot be sent to mail server successfully, it shows "E-mail cannot be sent out, probably use incorrect settings."

*Chapter 6: Set Up and Configure the Router System Summary Tab 22 10/100 4-Port VPN Router Setup Tab - Network* The Setup screen contains all of the router's basic setup functions. See Figure 6-5. The device can be used in most network settings without changing any of the default values. Some users may need to enter additional information in order to connect to the Internet through an ISP (Internet Service Provider) or broadband (DSL, cable modem) carrier. *Network Host Name & Domain Name:* Enter a host and domain name for the Router. Some ISPs may require these names as identification, and these settings can be obtained from your ISP. In most cases, leaving these fields blank will work. *LAN Setting This is the Router's LAN IP Address and Subnet Mask.*

The default value is 192.168.1.1 for IP address and 255.255.

255.0 for the Subnet Mask. *Dual-WAN / DMZ Setting Before choosing the WAN Connection Type, please choose the Dual-WAN / DMZ Setting first. DMZ In order to allow such services, the Router comes with a special DMZ port which is used for setting up public servers. The DMZ port sits between the local network ports and the Internet port.*

*Servers on the DMZ are publicly accessible, but they are protected from attacks such as SYN Flooding and Ping of Death. Use of the DMZ port is optional; it may be left unconnected. Using the DMZ is preferred and, if practical, a strongly recommended alternative to Public LAN Servers or putting these servers on the WAN port where they are not protected and not accessible by users on the LAN. Each of the servers on the DMZ will need a unique, public Internet IP address. The ISP used to connect the network to the Internet should be able to provide these addresses, as well as information on setting up public Internet servers. If you plan to use the DMZ Mode, contact your ISP for the Static IP information. Specify DMZ IP Address: Enter the DMZ IP Address and Subnet Mask. Click the Save Settings button to save the network settings or click the Cancel Changes button to undo your changes. Chapter 6: Set Up and Configure the Router Setup Tab - Network Figure 6-5: Setup Tab 23 10/100 4-Port VPN Router WAN Connection Type Obtain an IP Automatically If your ISP automatically assigns an IP Address, select Obtain an IP automatically. Your ISP will assign these values.*

If you check the box for Use the Following DNS Server Addresses, enter a specific DNS Server IP. Multiple DNS IP Settings are common. In most cases, the first available DNS entry is used. See Figure 6-6. *Static IP* If you have to specify the WAN IP Address, Subnet Mask, Default Gateway Address, and DNS Server, select Static IP. You must obtain this information from your ISP. See Figure 6-7. *Figure 6-6: Obtain an IP Automatically PPPoE (Point-to-Point Protocol over Ethernet) (most DSL users) See Figure 6-8. You have to check with your ISP to make sure whether PPPoE should be enabled or not. If they do use PPPoE: 1.*

Enter your User Name and Password. 2. If you select Connect on Demand option, the PPPoE connection will be disconnected if it has been idle for a period longer than the Max Idle Time setting. 3. If you select Keep Alive option, the Router will keep the connection alive by sending out a few data packets at the Redial Period, so your Internet service thinks that the connection is still active.

*Figure 6-7: Static IP PPTP (Point-to-Point Tunneling Protocol) See Figure 6-9. 1. Enter the Specify WAN IP Address, Subnet Mask and Default Gateway Address that is provided by your ISP. 2. Enter your User Name and Password.*

3. If you select Connect on Demand option, the connection will be disconnected if it has been idle for a period longer than the Max Idle Time setting. 4. If you select Keep Alive option, the Router will keep the connection alive by sending out a few data packets at the Redial Period, so your Internet service thinks that the connection is still active. *Figure 6-8: PPPoE Figure 6-9: PPTP Chapter 6: Set Up and Configure the Router Setup Tab - Network 24 10/100 4-Port VPN Router Setup Tab - Password* The Router's default User Name and password is admin, and it is strongly recommended that you change the Router's password from the default.



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If you leave the password field blank, all users on your network will be able to access the Router simply by entering admin into the password field. See Figure 6-10. Old Password: Enter the old password. The default Password is 'admin' when you first power up the Router. (Note: The password cannot be recovered if it is lost or forgotten.

If the password is lost or forgotten, you have to reset the Router to its factory default settings.) New Password: Enter a new password for the Router. Your password must be less than 15 characters long and it can't contain any spaces. Confirm New Password: Re-enter the password for confirmation. Click the Save Settings button to save the Password settings or click the Cancel Changes button to undo the changes. Figure 6-10: Password Setup Tab - Time The Router uses the time settings to time stamp log events, to automatically update the Content Filter List, and for other internal purposes. See Figure 6-11. Set the local time using Network Time Protocol (NTP) automatically or manually. Automatic: Select the Time Zone and enter the Daylight Saving and NTP Server. The default Time Zone is Pacific Time.

Manual: Enter the Hours, Minutes, Seconds, Month, Day and Year. Click the Save Settings button to save the Time settings or click the Cancel Changes button to undo the changes. Figure 6-11: Time Chapter 6: Set Up and Configure the Router Setup Tab - Password 25 10/100 4-Port VPN Router Setup Tab - DMZ Host The DMZ (Demilitarized Zone) Host feature allows one local user to be exposed to the Internet to use a special-purpose service such as Internet gaming or video conferencing. See Figure 6-12. Enter the DMZ Private IP Address to access the DMZ Host settings.

The Default value zero (0) will deactivate the DMZ Host. Click the Save Settings button to save the DMZ Host setting or click the Cancel Changes button to undo the changes. Figure 6-12: DMZ Host Setup Tab - Forwarding Port forwarding can be used to set up public services on your network. When users from the Internet make certain requests on your network, the Router can forward those requests to computers equipped to handle the requests. If, for example, you set the port number 80 (HTTP) to be forwarded to IP Address 192.

168.1.2, then all HTTP requests from outside users will be forwarded to 192.168.1.2. See Figure 6-13. You may use this function to establish a Web server or FTP server via an IP Gateway. Be sure that you enter a valid IP Address. (You may need to establish a static IP address in order to properly run an Internet server.

) For added security, Internet users will be able to communicate with the server, but they will not actually be connected. The packets will simply be forwarded through the Router. Port Range Forwarding 1. Select the Service from the pull-down menu. See Figure 6-14. 2. If the Service you need is not listed in the menu, please click the Service Management button to add the new Service Name, and enter the Protocol and Port Range. Click the Add to List button. Then, click the Save Setting button. Click the Exit button.

3. Enter the IP Address of the server that you want the Internet users to access. Then enable the entry. 4. Click the Add to List button, and configure as many entries as you would like.

You also can Delete selected application. Figure 6-13: Forwarding Figure 6-14: Service Management Chapter 6: Set Up and Configure the Router Setup Tab - DMZ Host 26 10/100 4-Port VPN Router Port Triggering Some Internet applications or games use alternate ports to communicate between server and LAN host. When you want to use those applications, enter the triggering (outgoing) port and alternate incoming port in this table. The Router will forward the incoming packets to the LAN host. 1.

Enter the application name, range of port numbers, and the incoming port range. 2. You can click the Add to List button to add Port Triggering or Delete selected application. Click the Save Settings button to save the settings, click the Cancel Changes button to undo your changes, click the Show Tables to see the details. Setup Tab - UPnP Page UPnP forwarding can be used to set up public services on your network. Windows XP can modify those entries via UPnP when UPnP function is enabled by selecting Yes. See Figure 6-15. 1. Select the Service from the pull-down menu. 2.

If the Service you need is not listed in menu, please click the Service Management button to add the new Service Name, and enter the Protocol and Port Range. Click the Add to List button. Then, click the Save Setting button. Click the Exit button. 3. Enter the Name or IP Address of the server that you want the Internet users to access. Then enable the entry. Click the Add to List button, and configure as many entries as you would like. You also can Delete selected application. Figure 6-15: UPnP Setup Tab - One-to-One NAT One-to-One NAT creates a relationship which maps valid external addresses to internal addresses hidden by NAT.

Machines with an internal address may be accessed at the corresponding external valid IP address. See Figure 6-16. Creating this relationship between internal and external addresses is done by defining internal and external address ranges of equal length. Once that relationship is defined, the machine with the first internal address is accessible at the first IP address in the external address range, and the second machine at the second external IP address, and so on. Figure 6-16: One-to-One NAT Chapter 6: Set Up and Configure the Router Setup Tab - UPnP Page 27 10/100 4-Port VPN Router Consider a LAN for which the ISP has assigned the IP addresses range from 209.

19.28.16 to 209.19.28.

31, with 209.19.28.16 used as the Router's WAN IP (NAT Public) Address. The address range of 192.168.168.1 to 192.168.168.

255 is used for the machines on the LAN. Typically, only machines that have been designated as Public LAN Servers will be accessible from the Internet. However, with One-to-One NAT, the machines with the internal IP addresses of 192.168.168.2 to 192.168.168.15 may be accessed at the corresponding external IP address. Note: The Router's WAN IP (NAT Public) Address may not be included in a range.

One-to-One NAT: Enable: If you check the box, you will enable One-to-One NAT. Private Range Begin: Enter the beginning IP address of the private address range being mapped in the Private Range Begin field. This will be the IP address of the first machine being made accessible from the Internet. Public Range Begin: Enter the beginning IP address of the public address range being mapped in the Public Range Begin field. This address will be assigned by the ISP. The Router's WAN IP (NAT Public) Address cannot be included in the range. Range Length: Enter the number of IP addresses for the range. The range length may not exceed the number of valid IP address. Up to 64 ranges may be added. To map a single address, use a Range Length of 1.

Note: One-to-One NAT will change the way the firewall functions work. Access to machines on the LAN from the Internet will be allowed unless Network Access Rules are set.



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You can click Add to List button or Delete selected range. Click the Save Settings button to save the settings or click the Cancel Changes button to undo your changes. Setup Tab - MAC Clone Some ISPs require that you register a MAC address. This feature "clones" your network adapter's MAC address onto the Router, and prevents you from having to call your ISP to change the registered MAC address to the Router's MAC address. The Router's MAC address is a 12-digit code assigned to a unique piece of hardware for identification. See Figure 6-17. Input the MAC Address in the User Defined WAN1 or WAN2 MAC Address field or select MAC Address from this PC. Click Save Settings to save the MAC Cloning settings or click the Cancel Changes button to undo your changes.

Figure 6-17: MAC Clone Chapter 6: Set Up and Configure the Router Setup Tab - MAC Clone 28 10/100 4-Port VPN Router Setup Tab - DDNS DDNS (Dynamic DNS) service allows you to assign a fixed domain name to a dynamic WAN IP address. This allows you to host your own Web, FTP or other type of TCP/IP server in your LAN. See Figure 6-18. Before configuring DDNS, you need to visit [www.dyndns.org](http://www.dyndns.org) and register a domain name. (The DDNS service is provided by DynDNS.org). DDNS Service: The DDNS feature is disabled by default. To enable this feature, just select DynDNS.

org from the pull-down menu, and enter the User name, Password, and Host Name of the account you set up with DynDNS.org. Your IP Address: The Router's current Internet IP Address is displayed here. Because it is dynamic, this will change. Status: The status of the DDNS function and Internet status is displayed.

Click the Save Settings button to save the DDNS settings or click the Cancel Changes button to undo your changes. Figure 6-18: DDNS Setup Tab - Advanced Routing Dynamic Routing The Router's dynamic routing feature can be used to automatically adjust to physical changes in the network's layout. The Router uses the dynamic RIP protocol. It determines the route that the network packets take based on the fewest number of hops between the source and the destination. The RIP protocol regularly broadcasts routing information to other routers on the network.

See Figure 6-19. Working Mode: Select Gateway mode if your Router is hosting your network's connection to the Internet. Select Router mode if the Router exists on a network with other routers, including a separate network gateway that handles the Internet connection. In Router Mode, any computer connected to the Router will not be able to connect to the Internet unless you have another router function as the gateway. RIP (Routing Information Protocol): The Router, using the RIP protocol, calculates the most efficient route for the network's data packets to travel between the source and the destination, based upon the shortest paths. Receive RIP versions: Choose the RX protocol you want for receiving data from the network. (None, RIPv1, RIPv2, Both RIPv1 and v2). Transmit RIP versions: Choose the TX protocol you want for transmitting data on the network. (None, RIPv1, RIPv2-Broadcast, RIPv2-Multicast) Chapter 6: Set Up and Configure the Router Setup Tab - DDNS Figure 6-19: Advanced Routing 29 10/100 4-Port VPN Router Static Routing You will need to configure Static Routing if there are multiple routers installed on your network. The static routing function determines the path that data follows over your network before and after it passes through the Router.

You can use static routing to allow different IP domain users to access the Internet through this device. This is an advanced feature. Please proceed with caution. This Router is also capable of dynamic routing (see the Dynamic Routing tab). In many cases, it is better to use dynamic routing because the function will allow the Router to automatically adjust to physical changes in the network's layout. In order to use static routing, the Router's DHCP settings must be disabled. To set up static routing, you should add routing entries in the Router's table that tell the device where to send all incoming packets. All of your network routers should direct the default route entry to the Linksys Router. Enter the following data to create a static route entry: 1. Destination IP: Enter the network address of the remote LAN segment.

For a standard Class C IP domain, the network address is the first three fields of the Destination LAN IP, while the last field should be zero. 2. Subnet Mask: Enter the Subnet Mask used on the destination LAN IP domain. For Class C IP domains, the Subnet Mask is 255.255.255.0. 3. Default Gateway: If this Router is used to connect your network to the Internet, then your gateway IP is the Router's IP Address. If you have another router handling your network's Internet connection, enter the IP Address of that router instead.

4. Hop Count (max. 15): This value gives the number of nodes that a data packet passes through before reaching its destination. A node is any device on the network, such as switches, PCs, etc. 5. Interface: (LAN, WAN1, WAN2/DMZ) Interface tells you whether your network is on the LAN or the WAN, or the Internet. If you're connecting to a sub-network, select LAN. If you're connecting to another network through the Internet, select WAN. Click Add to list to add a route entry or click Delete Selected IP to delete the static route entry. Click the Save Settings button to save the Routing settings, click the Cancel Changes button to undo your changes or click the Show Routing Table button to view the current routing table.

Chapter 6: Set Up and Configure the Router Setup Tab - Advanced Routing 30 10/100 4-Port VPN Router DHCP Tab - Setup Setup The Router can be used as a DHCP (Dynamic Host Configuration Protocol) server on your network. A DHCP server assigns available IP addresses to each computer on your network automatically. If you choose to enable the DHCP server option, you must configure all of the PCs on your LAN to connect to a DHCP server. See Figure 6-20. If the Router's DHCP server function is disabled, you have to carefully configure the IP address, Mask, and DNS settings of every computer on your network. Be careful not to assign the same IP Address to different computers. Make any changes to the available fields as described below. Enable DHCP Server: Check the box to enable the DHCP Server. If you already have a DHCP server on your network, leave the box blank. Dynamic IP Client Lease Time: This is the lease time assigned if the computer (DHCP client) requests one.

The range is 5 ~ 43,200 Minutes. Range Start/End: Enter a starting IP address and ending IP address to make a range to assign dynamic IPs. The default range is 100~149. Figure 6-20: DHCP Setup WINS Windows Internet Naming Service (WINS) is a service that resolves NetBIOS names to IP addresses. The WINS is assigned if the computer (DHCP client) requests one. If you do not know the WINS, leave it as 0.



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Click the Save Settings button to save the DHCP settings or click the Cancel Changes button to undo the changes. DHCP Tab - Status A Status page is available to review DHCP Server Status. The DHCP Server Status reports the IP of the DHCP Server, the number of Dynamic IP Used, DHCP Available and Total. Client Table shows the current DHCP Client information.

You will see the related information (Client Host Name, IP Address, MAC Address, and Leased Time) of all network clients using the DHCP server. Click the Trash Can icon to delete the line, and the IP Address of the Client Host got will be released, or click the Refresh button to refresh the Client Table. See Figure 6-21. Figure 6-21: DHCP Status Chapter 6: Set Up and Configure the Router DHCP Tab - Setup 31 10/100 4-Port VPN Router System Management Tab - Dual-WAN Dual-WAN There are two functions provided for users Smart Link Backup and Load Balance. If you selected DMZ on the setup page, you cannot do the Dual-WAN settings here. If Smart Link Backup is selected, you only need to choose which WAN port is the primary and then the other will be the backup. See Figure 6-22. If Load Balance is selected, there will be two main choices: By Traffic Intelligent Balancer (Auto) and user defined. See Figure 6-23. First, choose the Max.

Bandwidth of Upstream (64K/128K/256K/384K/512K/1024K/1.5M/2M/2.5M or above) and Downstream (512K/1024K/1.5M/2M/2.5M or above) for WAN1 and WAN2, as provided by your ISP. Intelligent Balancer (Auto): When choosing Intelligent Balancer, it will automatically compute the maximum bandwidth of WAN1 and WAN2 by using Weighted Round Robin to balance the loading. If (upstream / downstream / upstream or downstream) bandwidth is excessive (30%, 40%, 50%, 60%, 70%, 80%, 90%), bring up the second link. When there is an inactivity time-out (None/10min/20min/30min/40min/50min/60min), the second link will be terminated. Click the Save Settings button to save the Dual WAN Load Balance settings or click the Cancel Changes button to undo the changes. Figure 6-23: Dual WAN Load Balance Figure 6-22: Dual-WAN Smart Link Backup System Management Tab - SNMP SNMP, or Simple Network Management Protocol, is a network protocol that provides network administrators with the ability to monitor the status of the Router and receive notification of any critical events as they occur on the network.

The Router supports SNMP v1/v2c and all relevant Management Information Base II (MIBII) groups. The appliance replies to SNMP Get commands for MIBII via any interface and supports a custom MIB for generating trap messages. See Figure 6-24. To configure SNMP, enter the necessary information in the following fields: Enable SNMP: SNMP is enabled by default. To disable the SNMP agent, leave the box blank. System Name: This is the hostname of the Router. Chapter 6: Set Up and Configure the Router System Management Tab - Dual-WAN Figure 6-24: SNMP 32 10/100 4-Port VPN Router System Contact: Enter the name of the network administrator for the Router. System Location: The network administrator's contact information is placed into this field. Enter an E-mail address, telephone number, or pager number. Get Community Name: Create a name for a group or community of administrators who can view SNMP data.

The default value is "Public". Set Community Name: Create a name for a group or community of administrators who can receive SNMP traps. A name must be entered. Trap Community Name: Type the Trap Community Name, which is the password sent with each trap to the SNMP manager. Send SNMP Trap to: Enter the IP or Domain Name in this field and the Router will send traps to it. Click the Save Settings button to save the SNMP settings or click the Cancel Changes button to undo your changes. System Management Tab - Diagnostic The Router has two built-in tools that will help with troubleshooting network problems. DNS Name Lookup The Internet has a service called the Domain Name Service (DNS), which allows users to enter an easily remembered host name, such as www.RV042.com, instead of numerical TCP/IP addresses to access Internet resources.

The Router has a DNS lookup tool that will return the numerical TCP/IP address of a host name. Enter the host name to look up in the Look up the name field and click the Go button. Do not add the prefix http://, otherwise the result will be Address Resolving Failed. The Router will then query the DNS server and display the result at the bottom of the screen. See Figure 6-25. Note: The IP address of the DNS server must be entered in the Network Settings page for the DNS Name Lookup feature to function. Figure 6-25: DNS Name Lookup Ping The Ping test bounces a packet off a machine on the Internet back to the sender. This test shows if the Router is able to contact the remote host. If users on the LAN are having problems accessing services on the Internet, try Chapter 6: Set Up and Configure the Router System Management Tab - Diagnostic Figure 6-26: Ping 33 10/100 4-Port VPN Router pinging the DNS server, or other machine at the ISP's location. If this test is successful, try pinging devices outside the ISP.

This will show if the problem lies with the ISP's connection. See Figure 6-26. Enter the IP address of the device being pinged and click the Go button. The test will take a few seconds to complete. Once completed, a message showing the results will be displayed at the bottom of the Web browser window.

The results include Packets transmitted / received / loss and Round Trip Time (Minimum, Maximum, and Average). Note: Ping requires an IP address. The Router's DNS Name Lookup tool may be used to find the IP address of a host. System Management Tab - Factory Default The "Factory Default" button can be used to clear all of your configuration information and restore the Router to its factory default settings. Only use this feature if you wish to discard all other configuration preferences.

Click the Return to Factory Default Setting button if you want to restore the Router to the factory default settings. See Figure 6-27. After clicking the button, another screen, as shown in Figure 28 will appear. Click OK to continue. Another screen will appear while the system reboots, as shown in Figure 29. Figure 6-27: Factory Default Figure 6-28: Are You Sure Figure 6-29: System is Rebooting Chapter 6: Set Up and Configure the Router System Management Tab - Factory Default 34 10/100 4-Port VPN Router System Management Tab - Firmware Upgrade Firmware Upgrade Users can use the following function to upgrade the Router's firmware to the newest version. If you have already downloaded the firmware into your computer, then click the Browse button to look for the file. Then, click the Firmware Upgrade Right Now button. See Figure 6-30. Firmware Download Users can click the Firmware Download from Linksys Web Site button to link to the downloads on the Support page of the Linksys website.



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