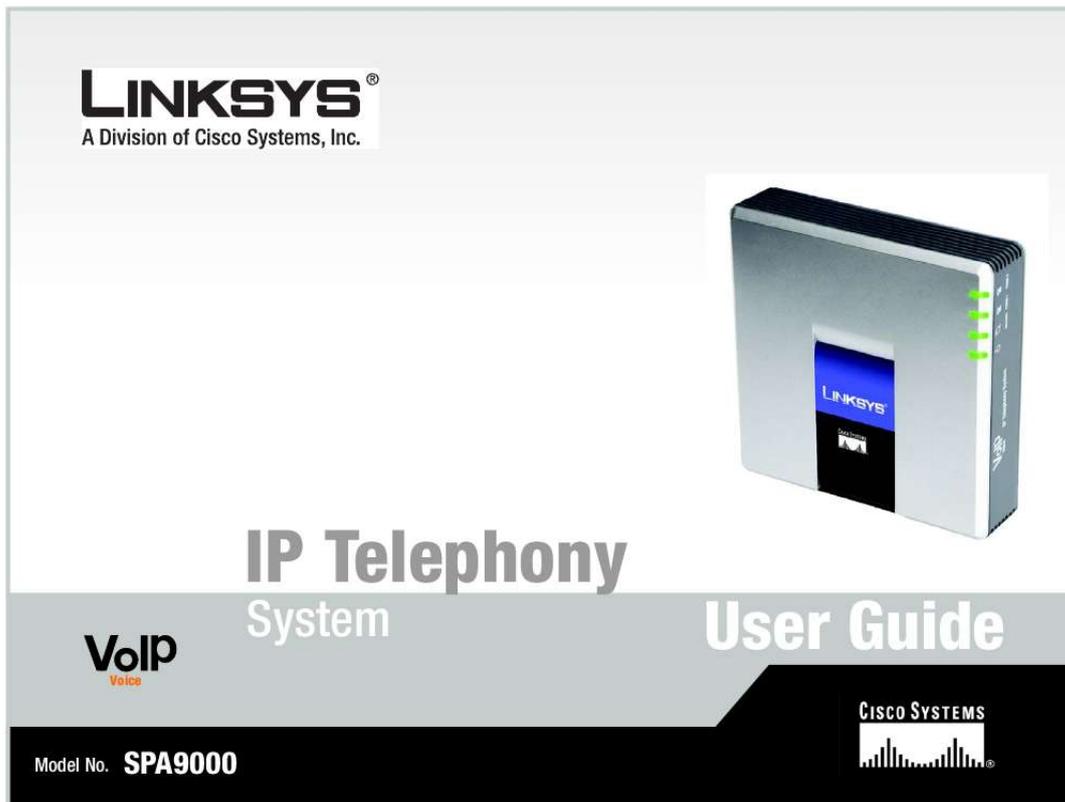




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**Manual abstract:**

and/or its affiliates in the U.S. and certain other countries. Copyright © 2006 Cisco Systems, Inc. All rights reserved. @@@@Look for the following items when reading this User Guide: This checkmark means there is a note of interest and is something you should pay special attention to while using the IP Telephony System. This exclamation point means there is a caution or warning and is something that could damage your property or the IP Telephony System.

This question mark provides you with a reminder about something you might need to do while using the IP Telephony System. In addition to these symbols, there are definitions for technical terms that are presented like this: word: definition. Also, each figure (diagram, screenshot, or other image) is provided with a figure number and description, like this: Figure 0-1: Sample Figure Description Figure numbers and descriptions can also be found in the "List of Figures" section.

SPA9000-UG-60613C DF IP Telephony System Table of Contents Chapter 1: Introduction Welcome What's in this Guide? 1 1 2 Chapter 2: Applications for the IP Telephony System How Does the IP Telephony System Fit into My Business or Home? What Does the IP Telephony System Do? A Typical Scenario Which Call Management Features Does the IP Telephony System Offer? 4 4 4 4 5 Chapter 3: Getting to Know the IP Telephony System The Back Panel The Front Panel 6 6 7 Chapter 4: Getting Started Overview Before You Begin Instructions for Installing the IP Telephony System Receiving and Handling External Phone Calls Configuring the Auto-Attendant 8 8 8 9 13 13 Chapter 5: Using the Interactive Voice Response Menu Overview Accessing the Interactive Voice Response Menu Using the Interactive Voice Response Menu Entering a Password Configuring the Settings for Your Internet Phone Service Configuring the Auto-Attendant Messages 14 14 14 14 19 19 20 Chapter 6: Using the Web-based Utility Overview How to Access the Web-based Utility The PBX Status Screen The Router Tab The Voice Tab 22 22 23 23 25 31 IP Telephony System Appendix A: Troubleshooting Common Problems and Solutions Frequently Asked Questions 70 70 80 Appendix B: Configuring the Nighttime Auto-Attendant Description of the Auto-Attendant Instructions for Setting Up the Nighttime Auto-Attendant 83 83 83 Appendix C: Dial Plan and Auto-Attendant Scripting for Advanced Users Overview Configuring Dial Plans Configuring Dial Plans for the Auto-Attendant Configuring the Auto-Attendant 87 87 87 89 89 Appendix D: New Music for the Music-on-Hold Feature Overview Before You Begin Instructions for Converting the Music File Instructions for Configuring the IP Telephony System 99 99 99 100 100 Appendix E: Finding the MAC Address and IP Address for Your Ethernet Adapter Windows 98 or Me Instructions Windows 2000 or XP Instructions For the Router's Web-based Utility 102 102 102 103 Appendix F: Windows Help Appendix G: Glossary Appendix H: Specifications Appendix I: Warranty Information Appendix J: Regulatory Information Appendix K: Contact Information Internet Telephony Service Provider (ITSP) Linksys 104 105 110 114 115 121 121 121 IP Telephony System List of Figures Figure 2-1: A Scenario for the IP Telephony System Figure 3-1: Back Panel Figure 3-2: Front Panel Figure 4-1: A Typical Scenario for the IP Telephony System Figure 4-2: Connect to the Phone 1 Port Figure 4-3: Connect to the Internet Port Figure 4-4: Connect to the Ethernet Port Figure 4-5: Connect to Power Figure 4-6: Voice - SIP Screen - PBX Parameters Figure 4-7: Router - WAN Setup Screen Figure 4-8: Voice - Line 1 Screen Figure 5-1: Auto-Attendant Options Figure 5-2: Auto-Attendant Message Options Figure 6-1: PBX Screen - Parking Lot Figure 6-2: PBX Screen - Inbound Call Figure 6-3: PBX Screen - Outbound Call Figure 6-4: Router - Status Screen Figure 6-5: Router - WAN Setup Screen Figure 6-6: Router - LAN Setup Screen Figure 6-7: Router - Application Screen Figure 6-8: Voice - Info Screen - Product Information Figure 6-9: Voice - Info Screen - System Status Figure 6-10: Voice - Info Screen - FXS Status Figure 6-11: Voice - Info Screen - Line Status Figure 6-12: Voice - Info Screen - Auto Attendant Prompt Status Figure 6-13: Voice - System Screen Figure 6-14: Voice - SIP Screen - SIP Parameters Figure 6-15: Voice - SIP Screen - SIP Timer Values 4 6 7 8 9 9 9 10 10 12 18 21 24 24 25 27 29 30 31 31 32 33 33 34 35 36 IP Telephony System Figure 6-16: Voice - SIP Screen - Response Status Code Handling Figure 6-17: Voice - SIP Screen - RTP Parameters Figure 6-18: Voice - SIP Screen - SDP Payload Types Figure 6-19: Voice - SIP Screen - NAT Support Parameters Figure 6-20: Voice - SIP Screen - PBX Parameters Figure 6-21: Voice - SIP Screen - Auto Attendant Parameters Figure 6-22: Voice - SIP Screen - PBX Phone Parameters Figure 6-23: Voice - Provisioning Screen - Configuration Profile Figure 6-24: Voice - Provisioning Screen - Firmware Upgrade Figure 6-25: Voice - Provisioning Screen - General Purpose Parameters Figure 6-26: Voice - Regional Screen - Call Progress Tones Figure 6-27: Voice - Regional Screen - Distinctive Ring Patterns Figure 6-28: Voice - Regional Screen - Distinctive Call Waiting Tone Patterns Figure 6-29: Voice - Regional Screen - Distinctive Ring/CWT Pattern Names Figure 6-30: Voice - Regional Screen - Ring and Call Waiting Tone Spec Figure 6-31: Voice - Regional Screen - Control Timer Values Figure 6-32: Voice - Regional Screen - Vertical Service Activation Codes Figure 6-33: Voice - Regional Screen - Vertical Service Announcement Codes Figure 6-34: Voice - Regional Screen - Outbound Call Codec Selection Codes Figure 6-35: Voice - Regional Screen - Miscellaneous Figure 6-36: Voice - FXS 1 Screen - Network Settings Figure 6-37: Voice - FXS 1 Screen - SIP Settings Figure 6-38: Voice - FXS 1 Screen - Subscriber Information Figure 6-39: Voice - FXS 1 Screen - Dial Plan Figure 6-40: Voice - FXS 1 Screen - Streaming Audio Server Figure 6-41: Voice - FXS 1 Screen - Call Feature Settings Figure 6-42: Voice - FXS 1 Screen - Audio Configuration Figure 6-43: Voice - FXS 1 Screen - FXS Port Polarity Configuration Figure 6-44: Voice - Line 1 Screen - Network Settings Figure 6-45: Voice - Line 1 Screen - SIP Settings 37 37 37 38 39 42 44 45 46 47 48 49 50 50 51 51 52 55 55 56 59 59 60 61 61 62 64 65 65 IP Telephony System Figure 6-46: Voice - Line 1 Screen - Subscriber Information Figure 6-47: Voice - Line 1 Screen - Dial Plan Figure 6-48: Voice - Line 1 Screen - NAT Settings Figure 6-49: Voice - Line 1 Screen - Proxy and Registration Figure B-1: Auto-Attendant Message Options Figure B-2: Voice - SIP Screen - Auto Attendant Parameters Figure E-1: IP Configuration Screen Figure E-2: MAC Address/Adapter Address Figure E-3: MAC Address/Physical Address Figure E-4: MAC Address Clone 66 68 68 68 84 85 102 102 103 103 IP Telephony System Chapter 1: Introduction Welcome Thank you for choosing the Linksys IP Telephony System.



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The System combines the rich feature set of legacy PBX (Private Branch eXchange) telephone systems with the convenience and cost advantages of Internet telephony. It supports common key system features such as an auto-attendant, music-on-hold, call forwarding, three-way call conferencing, and more. The System is so easy to configure that a fully working system can be set up in minutes. New Linksys SPA-family Internet telephones are automatically detected and registered when they are connected to the System.

While the System will work with any SIP-compatible Internet telephone, it is the ideal host for Linksys business telephones, including model number: SPA941. The System supports the advanced features of these phones, such as shared line appearances, hunt groups, call transfer, call park, and group paging. Plus, with its two FXS ports, the System can support traditional analog devices such as telephones, fax machines, answering machines, media adapters. How does the System do all of this? By connecting your analog phones or fax machines to the System and connecting the System and Internet phones to your router, then the System can direct voice communications for your network. But what does all of this mean? Networks are useful tools for sharing Internet access and computer resources.

Multiple computers can share Internet access, so you don't need more than one high-speed Internet connection. With Internet phone service, your Internet access can now be shared by your Internet phones as well. You will be able to make phone calls using your Internet phone service account, even while another colleague is web browsing. Plus, you can access one printer from different computers and access data located on another computer's hard drive (with the right permissions). PCs on a wired network create a LAN, or Local Area Network. They are connected with Ethernet cables, which is why the network is called "wired". The System takes your wired network and lets you integrate Internet phones and Internet phone service. When you first install the System, Linksys strongly recommends that you use the Setup Wizard, which you can download from [www.linksys.com](http://www.linksys.com).

If you do not wish to run the Setup Wizard, then use the instructions in the Quick Installation or this User Guide to help you. These instructions should be all you need to get the most out of the IP Telephony System. lan (local area network): the computers and networking products that make up the network in your home or office. ethernet: an IEEE standard network protocol that specifies how data is placed on and retrieved from a common transmission medium. NOTE:

Some of these features are set up from the Internet phones. network: a series of computers or devices connected for the purpose of data sharing, storage, and/or transmission between users. Chapter 1: Introduction Welcome 1 IP Telephony System What's in this Guide? This user guide covers the steps for setting up a network with the System. Most users will only need to use "Chapter 4: Getting Started." When you're finished, then you are ready to make calls within your system as well as calls to the outside world. You also have other chapter available for reference: · Chapter 1: Introduction This chapter describes the System and this User Guide.

· Chapter 2: Applications This chapter discusses the most common scenarios for the System. · Chapter 3: Getting to Know the IP Telephony System This chapter describes the physical features of the System. · Chapter 5: Using the Interactive Voice Response Menu This chapter explains how to configure the System's network settings when you access its Interactive Voice Response Menu. · Chapter 6: Using the Web-based Utility This chapter explains how to configure the settings of the System through the Web-based Utility. · Appendix A: Troubleshooting This appendix describes some possible problems and solutions, as well as frequently asked questions, regarding installation and use of the System.

· Appendix B: Configuring the Nighttime Auto-Attendant This appendix explains how to set up the auto-attendant for nighttime (non-business) hours. · Appendix C: Dial Plan and Auto-Attendant Scripting for Advanced Users This appendix explains how to define the dial plan and auto-attendant instructions. (These instructions are for advanced users only.) · Appendix D: New Music for the Music-on-Hold Feature This appendix explains how to replace the System's default music file with your own music file. · Appendix E: Finding the MAC Address and IP Address for Your Ethernet Adapter This appendix instructs you on how to find the MAC address or Ethernet address of your PC's Ethernet network adapter.

Chapter 1: Introduction What's in this Guide? 2 IP Telephony System · 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. · AppIP Telephony System Offer? Beyond basic call routing, the System offers several powerful and sophisticated features: · Auto-Attendant. An automated system guides each caller to the appropriate contact. · Music-on-Hold. You can combine the auto-attendant feature with the music-on-information-on-hold feature, so the caller has a richer experience with your call system. · Call Hunt. You can designate which Internet phones receive outside calls. You can even have calls ring multiple phones, either simultaneously or one at a time. · Paging.

When you want to page all of the Internet phones, you can use the System. · Dial Plans. When you have more than one dial plan, you can route outgoing calls to take advantage of the best rates available for the different types of calls. After setup of the System, you will have dynamic and feature-rich Internet voice communications for your business or home. NOTE: If your ITSP configured the System for you, then these features may already be set up. Check with your ITSP for more information. (To set up these features yourself, refer to "Chapter 6: Using the Web-based Utility.") Chapter 2: Applications for the IP Telephony System Which Call Management Features Does the IP Telephony System Offer? 5 IP Telephony System Chapter 3: Getting to Know the IP Telephony System The Back Panel The System's ports are located on its back panel. Figure 3-1: Back Panel PHONE 1/2 The PHONE 1/2 ports allow you to connect analog telephones (or fax machines) to the System using RJ-11 telephone cables (not included). The ETHERNET port connects to an administration computer, so you can access the System's Web-based Utility for configuration.

This INTERNET port connects to either a router or broadband modem. The Power port is where you will connect the power adapter.



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ETHERNET INTERNET Power Chapter 3: Getting to Know the IP Telephony System The Back Panel 6 IP Telephony System The Front Panel The System's LEDs are located on its front panel. Figure 3-2: Front Panel Power Green. The power LED is solidly lit when the System is powered on and connected to the Internet.

It flashes when there is no Internet connection. Green. The INTERNET LED is solidly lit when there is an Internet connection. It flashes when there is network activity. Green.

The PHONE 1/2 LED is solidly lit when the phone is on-hook and registered. (The connection is registered if your Internet phone service account is active.) The LED is not lit when the phone is on-hook and not registered. It flashes when the phone is off-hook. INTERNET PHONE 1/2 Chapter 3: Getting to Know the IP Telephony System The Front Panel 7 IP Telephony System Chapter 4: Getting Started Overview For first-time installation of the System, Linksys strongly recommends using the Setup Wizard, which you can download from [www.linksys.com](http://www.linksys.com). For advanced users, you may follow the instructions in this chapter, and then use the Web-based Utility for additional configuration (refer to "Chapter 6: Using the Web-based Utility"). To use the Interactive Voice Response Menu, proceed to "Chapter 5: Using the Interactive Voice Response Menu." Internet Before You Begin Make sure you have the following:

- IP Telephony System (model number: SPA9000)
- One or more Internet phones (for example, Linksys SPA-family IP Phones, model number: SPA941)
- A router and cable/DSL modem (or gateway)
- One or more Ethernet network switches (so you can connect Internet phones or computers)

NOTE: For best results, use a switch that offers QoS (Quality of Service) and full wire-speed switching.

QoS enables the switch to give top priority to voice traffic, while full wire-speed switching lets it forward packets as fast as your network can deliver them. The next best choice is a QoS (Quality of Service) switch.

- At least one active Internet phone service account and its settings if you want to make external calls
- An active Internet connection if you want to make external calls
- At least one computer for configuration of the System and Internet phones
- Two or more Ethernet network cables
- Analog telephones or fax machines (optional) Analog Phone Fax Administration Computer SPA941 Switch Router Desktop Computer SPA941 Cable/DSL Modem SPA941 Figure 4-1: A Typical Scenario for the IP Telephony System Chapter 4: Getting Started Overview 8 IP Telephony System Instructions for Installing the IP Telephony System Internal Calls To install the System for internal calls, you will do the following:

- connect and configure the System
- connect the Internet phones ip (internet protocol): a protocol used to send data over a network. ip address: the address used to identify a computer or device on a network. Connect and Configure the System 1. (optional) Plug an analog telephone into the Phone 1 port of the System. 2. (optional) If you have a second analog telephone or fax machine, plug it into the Phone 2 port of the System. IMPORTANT: Do not connect the Phone port to a telephone wall jack. Make sure you only connect a telephone or fax machine to the Phone port.

- Otherwise, the System or the telephone wiring in your home or office may be damaged. 3. Connect an Ethernet network cable to the Internet port of the System. Then connect the other end of the cable to one of the Ethernet ports on your router. 4.

- Connect a different Ethernet network cable to the Ethernet port of the System. Then connect the other end to the computer you will use to manage the System (this will be called the administration computer). 5. Connect the included power adapter to the Power port of the System, and then plug the power adapter into an electrical outlet. 6.

- Launch the web browser on the administration computer. 7. Enter 192.168.0.1/admin/voice/advanced in the Address field (192.168.0.1 is the default local IP address of the System). Then press the Enter key.

Figure 4-3: Connect to the Internet Port Figure 4-2: Connect to the Phone 1 Port Figure 4-4: Connect to the Ethernet Port Figure 4-5: Connect to Power Chapter 4: Getting Started Instructions for Installing the IP Telephony System 9 IP Telephony System 8. The Voice - Info screen will appear. Click the SIP tab. 9. In the PBX Parameters section, select WAN from the Proxy Network Interface drop-down menu. 10. Click the Submit All Changes button. 11. The Voice - Info screen will appear. Click the Router tab.

12. Click the WAN Setup tab. 13. From the Connection Type drop-down menu, select Static IP. 14.

In the Static IP Settings section, complete the Static IP, NetMask, and Gateway fields. Static IP. Enter a static IP address appropriate for your network. Write this down; you will use it later. NOTE: Make sure your router will not assign the System's static IP address to any other network device.

For example, you can assign a static IP address outside of your router's DHCP IP address range; however, it must be within the router's subnet range. For more information about IP addressing, refer to the router's documentation. NetMask. Enter the subnet mask of your network router. Gateway. Enter the local IP address of your network router or gateway. 15. In the Optional Settings section, complete the Primary DNS field. Primary DNS. Enter the DNS IP address of your network router.

16. In the Remote Management section, select yes from the Enable WAN Web Server drop-down menu. 17. Click the Submit All Changes button. Figure 4-7: Router - WAN Setup Screen Figure 4-6: Voice - SIP Screen - PBX Parameters Chapter 4: Getting Started Instructions for Installing the IP Telephony System 10 IP Telephony System 18. The Router - Status screen will appear. Verify that the following settings match your entries:

- WAN Connection Type - Static IP
- Current IP
- Current Netmask
- Current Gateway
- Primary DNS

Proceed to the next section, "Connect the Internet Phones." Connect the Internet Phones 1.

Connect an Ethernet network cable to one of the Ethernet ports on your router. Then connect the other end of the cable to an Ethernet port on a network switch.

2. Connect the switch's power adapter to its power port, and then plug the power adapter into an electrical outlet. 3. Connect an Ethernet network cable to an Internet phone. Then connect the other end to one of the Ethernet ports on the switch.

(If the Internet phone has been used before, reset it to its factory default settings first. Refer to its documentation for more information.) 4. Connect the Internet phone's power adapter to its power port, and then plug the power adapter into an electrical outlet. 5.

The Internet phone will reboot two to three times (each reboot may take up to one minute). The System will automatically assign an extension number to the Internet phone.



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When the Internet phone displays its extension number, then it is ready for use. NOTE: The System automatically registers Linksys SPA-family Internet phones (including model number SPA941). If you connect a different SIP-compatible phone, then registration will be manual. Refer to the documentation for your phone. 6. Repeat steps 3-5 until you have installed all of your Internet phones. Congratulations! Now you can make calls from one Internet phone to another by dialing an extension number. Continue to the next section to configure the System for external calls.

NOTE: The default SIP port of the System is 6060. Chapter 4: Getting Started Instructions for Installing the IP Telephony System 11 IP Telephony System External Calls For external calls, make sure you have an active Internet connection. Then configure the settings for your Internet phone service account on the System. 1. Launch the web browser on the administration computer. 2. Enter <IP address of the System>/admin/voice/advanced in the Address field (use the static IP address you previously assigned to the System). Then press the Enter key. 3. The Voice - Info screen will appear.

Click the Line 1 tab. 4. On the Line 1 screen, enter the settings for your Internet phone service account. Subscriber Information User ID. Enter the user ID (also called the account number) supplied by your ITSP.

Do not use any hyphens, spaces, or other punctuation. Password. Enter the case-sensitive password supplied by your ITSP. Proxy and Registration Proxy. Enter the proxy address supplied by your ITSP.

If your ITSP supplied additional settings, enter those as well. Refer to the instructions your ITSP gave you. 5. Click the Submit All Changes button to save your new settings. 6. The System will reboot itself. Then the Internet phones will reboot themselves. 7. The Voice - Info screen will appear. In the Line 1 Status section, make sure that the Registration Status says, "Registered."

"You are now ready to make your first external call. Use any phone connected to the System, and dial 9 first when you make an external call with the default US dial plan. You can use analog telephones to make external calls; however, you cannot receive calls on any analog telephones unless you configure the appropriate settings. Refer to the Voice - FXS 1 section of "Chapter 6: Using the Web-based Utility" for instructions. Congratulations! Now you can make external calls using the System. NOTE: If your Internet Telephony Service Provider (ITSP) supplied the System, then it may be pre-configured for you, and you do not need to change any settings. Refer to the instructions supplied by your ITSP for more information. Figure 4-8: Voice - Line 1 Screen NOTE: If you cannot make calls with the default US dial plan, visit [www.linksys.com/kb](http://www.linksys.com/kb) for additional dial plans, or refer to "Appendix C: Dial Plan and Auto-Attendant Scripting for Advanced Users" to write your own script.

12 Chapter 4: Getting Started Instructions for Installing the IP Telephony System IP Telephony System Receiving and Handling External Phone Calls To receive external phone calls, you need to know the Direct Inward Dialing (DID) number assigned to you by your ITSP. Usually this is the same as your user ID, but it can be a different number. Check with your ITSP to find out what your DID number is. Then decide which Internet phones will ring when an outside caller calls your DID number. The default is aa, which stands for auto-attendant, an automated system that picks up external calls and plays pre-recorded voice messages.

If you want only the auto-attendant to receive a call, keep the default setting. When the auto-attendant receives a call, it will prompt the caller to dial the appropriate extension. If you want specific Internet phones to ring when your DID number is called, then refer to "Chapter 6: Using the Web-based Utility" for instructions about the Contact List setting. NOTE: If you decide to keep traditional phone service, which is also known as Plain Old Telephone Service (POTS), then you will use the Linksys Analog Telephone Adapter (model number: SPA3000). For details, refer to the Analog Telephone Adapter's documentation.

Configuring the Auto-Attendant By default, the daytime auto-attendant is enabled, so the first message it plays ("If you know your party's extension, you may enter it now") is suitable for business hours. If you want a caller to hear a different greeting during nighttime (non-business) hours, then refer to "Appendix B: Configuring the Nighttime Auto-Attendant." To use the Web-based Utility for additional configuration, refer to "Chapter 6: Using the Web-based Utility." To use the Interactive Voice Response Menu, proceed to "Chapter 5: Using the Voice Interactive Response Menu." Chapter 4: Getting Started Receiving and Handling External Phone Calls 13 IP Telephony System Chapter 5: Using the Interactive Voice Response Menu Overview You may need to manually configure the System by entering the settings provided by your Internet Telephony Service Provider (ITSP). This chapter explains how to use the Interactive Voice Response Menu to configure the System's network settings and record auto-attendant messages. You will use the telephone's keypad to enter your commands and select choices, and the System will use voice responses. For more advanced configuration, refer to "Chapter 6: Using the Web-based Utility." NOTE: If your ITSP sent you the System, then it may be pre-configured for you, and you do not need to change any settings. Refer to the instructions supplied by your ITSP for more information.

Accessing the Interactive Voice Response Menu 1. Use a telephone connected to the Phone 1 or Phone 2 port of the System. (You can only access the Interactive Voice Response Menu through an analog telephone, not any of the Internet phones.) 2. Press \*\*\*\* (in other words, press the star key four times). 3. Wait until you hear "Linksys configuration menu. Please enter the option followed by the # (pound) key or hang up to exit." 4. Refer to the following table that lists actions, commands, menu choices, and descriptions.

After you select an option, press the # (pound) key. To exit the menu, hang up the telephone. Using the Interactive Voice Response Menu While entering a value, such as an IP address, you may exit without entering any changes. Press the \* (star) key twice within half a second. Otherwise, the \* will be treated as a decimal point or dot.

After entering a value, such as an IP address, press the # (pound) key to indicate you have finished your selection. To save the new setting, press 1. To review the new setting, press 2. To re-enter the new setting, press 3. To cancel your entry and return to the main menu, press \* (star).

Chapter 5: Using the Interactive Voice Response Menu Overview 14 IP Telephony System For example, to enter the IP address 191.168.1.



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105 by keypad, press these keys: 191\*168\*1\*105. Press the # (pound) key to indicate that you have finished entering the IP address. Then press 1 to save the IP address or press the \* (star) key to cancel your entry and return to the main menu. If the menu is inactive for more than one minute, the System will time out. You will need to re-enter the menu by pressing \*\*\*\*. The settings you have saved will take effect after you have hung up the telephone. The System may reboot at this time.

*Interactive Voice Response Menu Action Command (press these keys on the telephone) \*\*\*\* Choices Description Enter Interactive Voice Response Menu Use this command to enter the Interactive Voice Response Menu. Do not press any other keys until you hear, "Linksys configuration menu. Please enter the option followed by the # (pound) key or hang up to exit." Hear the Internet connection type of the System. Hear the IP address assigned to the System's Internet (external) interface. Hear the network or subnet mask assigned to the System. Hear the IP address of the gateway (usually the network router). Hear the MAC address of the System in hexadecimal string format. Hear the version number of the firmware currently running on the System. Check Internet Connection Type Check Internet IP Address Check Network Mask (or Subnet Mask) Check Gateway IP Address Check MAC Address Check Firmware Version 100 110 120 130 140 150 ip (internet protocol): a protocol used to send data over a network.*

*ip address: the address used to identify a computer or device on a network. subnet mask: an address code that determines the size of the network. gateway: a device that forwards Internet traffic from your local area network. mac address: the unique address that a manufacturer assigns to each networking device. firmware: the programming code that runs a networking device.*

*15 Chapter 5: Using the Interactive Voice Response Menu Using the Interactive Voice Response Menu IP Telephony System Interactive Voice Response Menu Action Command (press these keys on the telephone) 160 170 Choices Description Check Primary DNS Server IP Address Check Internet Web Server Port Check Local IP Address Set Internet Connection Type Hear the IP address of the primary DNS (Domain Name Service) server. Hear the port number of the Internet Web server used for the Web-based Utility. Hear the local IP address of the System. Press 0 to use DHCP. Press 1 to use a static IP address. Press 2 to use PPPoE. Enter the IP address using numbers on the telephone keypad. Use the \* (star) key when entering a decimal point. Enter the network or subnet mask using numbers on the telephone keypad. Use the \* (star) key when entering a decimal point. Enter the IP address using numbers on the telephone keypad. Use the \* (star) key when entering a decimal point. Select the type of Internet connection you are using. Refer to the documentation supplied by your Internet service provider. First, set the Internet Connection Type to static IP address; otherwise, you will hear, "Invalid Option," if you try to set the static IP address.*

*First, set the Internet Connection Type to static IP address; otherwise, you will hear, "Invalid Option," if you try to set the network or subnet mask. 210 101 dhcp (dynamic host configuration protocol): a protocol that lets one device on a local network, known as a DHCP server, assign temporary IP addresses to the other network devices, typically computers. static ip address: a fixed address assigned to a computer or device that is connected to a network. pppoe: a type of broadband connection that provides authentication (username and password) in addition to data transport. Set Static IP Address 111 Set Network (or Subnet) Mask 121 Set Gateway IP Address 131 First, set the Internet Connection Type to static IP address; otherwise, you will hear, "Invalid Option," if you try to set the gateway IP address. Chapter 5: Using the Interactive Voice Response Menu Using the Interactive Voice Response Menu 16 IP Telephony System Interactive Voice Response Menu Action Command (press these keys on the telephone) 161 Choices Description Set Primary DNS Server IP Address Enter the IP address using numbers on the telephone keypad. Use the \* (star) key when entering a decimal point. Press 0 to select the router/NAT mode. Press 1 to select the bridge/switch mode. First, set the Internet Connection Type to static IP address; otherwise, you will hear, "Invalid Option," if you try to set the IP address of the primary DNS server.*

*Use the router/NAT mode when the Internet phones are on the Local Area Network (LAN) side. Use the bridge/switch mode when the Internet phones are on the Wide Area Network (WAN) side. Set the Mode 201 Configure Auto-Attendant Messages Enable/Disable WAN Access to the Web-based Utility Manual Reboot 72255 Refer to the "Configuring the Auto-Attendant Messages" section at the end of this chapter. Press 1 to enable. Press 0 to disable.*

*Use this setting to enable or disable WAN access to the Web-based Utility. (This Utility lets you configure the System.) After you hear, "Option successful," hang up the phone. The System will automatically reboot. Press 1 to confirm.*

*Press \* (star) to cancel. If necessary, enter the password. The System will request confirmation; enter 1 to confirm. You will hear, "Option successful." Hang up the phone. The System will reboot, and all settings will be reset to their factory default settings. 7932 732668 Factory Reset 73738 NOTE: This feature may be protected by a password available only from your ITSP. If you need to enter a password, refer to the following section, "Entering a Password." Chapter 5: Using the Interactive Voice Response Menu Using the Interactive Voice Response Menu 17 IP Telephony System Interactive Voice Response Menu Action Command (press these keys on the telephone) 79228 Choices Description Change Auto-Attendant Press 0 to use the auto-attendant based on day and time. Press 1 to use the Daytime Auto-Attendant.*

*Press 2 to use the Nighttime Auto-Attendant. Press 3 to use the Weekend/Holiday Auto-Attendant. Use this setting to select the auto-attendant you want to use. You can have the auto-attendant change depending on the day and time, or you can use one auto-attendant for all days and hours. (Make sure the auto-attendant you select has been enabled through the Web-based Utility; otherwise, the auto-attendant feature will not work.) For more information, refer to "Chapter 6: Using the Web-based Utility." User Factory Reset 877778 Press 1 to confirm. Press \* (star) to cancel. The System will request confirmation; enter 1 to confirm. You will hear, "Option successful."*

*" Hang up the phone. The System will reboot and all user-configurable settings will be reset to their factory default settings.*



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*Figure 5-1: Auto-Attendant Options Chapter 5: Using the Interactive Voice Response Menu Using the Interactive Voice Response Menu 18 IP Telephony System Entering a Password You may be prompted to enter a password when you want to reset the System to its factory default settings. To enter the password, use the phone's keypad, and follow the appropriate instructions. · To enter A, B, C, a, b, or c -- press 2. · To enter D, E, F, d, e, or f -- press 3. · To enter G, H, I, g, h, or i -- press 4. · To enter J, K, L, j, k, or l -- press 5. · To enter M, N, O, m, n, or o -- press 6. · To enter P, Q, R, S, o, q, r, or s -- press 7. · To enter T, U, V, t, u, or v -- press 8. · To enter W, X, Y, Z, w, x, y, or z -- press 9. · To enter all other characters, press 0. NOTE: These bulleted instructions only apply when you are entering a password. At all other times, pressing a number only selects a number, not a letter or punctuation mark. For example, to enter the password phone@321 by keypad, press these keys: 746630321. Then press the # (pound) key to indicate that you have finished entering the password. To cancel your entry and return to the main menu, press \* (star). Configuring the Settings for Your Internet Phone Service If you want to change the settings for your Internet phone service, refer to the instructions provided by your ITSP and "Chapter 6: Using the Web-based Utility." Chapter 5: Using the Interactive Voice Response Menu Entering a Password 19 IP Telephony System Configuring the Auto-Attendant Messages The System provides a feature called the auto-attendant, which automatically answers incoming calls with greetings or directory messages.*

*It can handle up to 10 incoming calls and uses the default user ID aa. Auto-Attendant Messages You can save up to 10 customized greetings. The first four have default messages, which can be changed through the Interactive Voice Response Menu. Prompt ID 1 2 3 4 Default Audio Message "If you know your party's extension, you may enter it now." "Your call has been forwarded." "Not a valid extension, please try again." "Goodbye." The recorded messages will be encoded with G711U and saved in flash memory. These messages will be erased whenever you reset the System to its factory default settings. The maximum length of any message is one minute.*

*You can record up to 94.5 seconds of audio, excluding the default messages. When there is not enough memory left, the Interactive Voice Response Menu will automatically end the recording. You can access the auto-attendant prompt settings through the Interactive Voice Response Menu. 1.*

*Using one of the analog telephones connected to the System, press \*\*\*\* (in other words, press the star key four times). 2. Wait until you hear "Linksys configuration menu. Please enter the option followed by the # (pound) key or hang up to exit." 3.*

*Press 72255# to access the auto-attendant message settings. 4. You will hear, "Please enter the message number followed by the # (pound) key." Enter the number of the message you wish to record, review, or delete. 5. The Interactive Voice Response Menu will say, "Enter 1 to record. Enter 2 to review. Enter 3 to delete. Enter \* to exit." Follow the instructions for your selection.*

*Chapter 5: Using the Interactive Voice Response Menu Configuring the Auto-Attendant Messages 20 IP Telephony System 1 to Record a. If you entered 1, you will hear, "You may record your message after the tone. When finished, press #." b. After you record the message, you will hear, "To save, enter 1. To review, enter 2. To re-record, enter 3. To exit, enter \*." c. Follow the instructions for the entry you have selected.*

*If you entered 1, the new message will be saved. You will be returned to the menu described in step 5. If you entered 2, you will hear the message played. You will be returned to the menu described in step b. If you entered 3, you will be returned to the menu in step a.*

*If you entered \*, you will be returned to the menu in step 5. 2 to Review If you entered 2, you will hear the message played. You will be returned to the menu described in step 5. 3 to Delete a. If you entered 3, you will hear, "Enter 1 to confirm; enter \* to exit.*

*" b. If you entered 1, the message will be erased. You will be returned to the menu described in step 5. If you entered \*, you will be returned to the previous menu described in step 5. Figure 5-2: Auto-Attendant Message Options \* to Exit If you entered \*, you will be returned to the previous menu in step 4. Through the Web-based Utility, you can configure the auto-attendant to answer calls in a specific number of seconds. By default, the auto-attendant answer delay is set to 12 seconds for the daytime hours, while it is set to 0 seconds for nighttime hours and weekends. For status information about the auto-attendant messages or to configure additional settings, such as the auto-attendant answer delay, refer to "Chapter 6: Using the Web-based Utility." NOTE: If there is not enough memory left to record a new message, then you will hear, "Option failed" and be returned to step 4. NOTE: If the message you want to save is longer than 15 seconds, then you will hear, "One moment, please.*

*" This indicates that it will take several seconds to save the message. After the message has been saved, you can continue to use the Interactive Voice Response Menu. 21 Chapter 5: Using the Interactive Voice Response Menu Configuring the Auto-Attendant Messages IP Telephony System Chapter 6: Using the Web-based Utility Overview When you first install the System, Linksys strongly recommends that you use the Setup Wizard, which you can download from [www.linksys.com](http://www.linksys.com). If you do not wish to run the Setup Wizard, you can use the Web-based Utility to configure the System. The System may have been pre-configured by your Internet Telephony Service Provider (ITSP), so you may not have to make any changes. If you do wish to make changes, follow the instructions in this chapter. The Web-based Utility offers two levels of access: user and admin (administrator). Your level of access depends on your service provider's policies.*

*Also, access to some settings may be protected or blocked, so that service settings cannot be accidentally changed. For more information, contact your ITSP.*

*This chapter will describe each web page of the Web-based Utility and each page's key functions. The Internet connection settings are configured on the Router - WAN Setup screen, while some of the most popular features: auto-attendant, music-on-hold, and call hunt are configured on the Voice - SIP screen.*

*The Utility can be accessed via your web browser through use of a computer on your network.*

*There are two main tabs: Router and Voice. Additional tabs will be available after you click one of the main tabs.*



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*NOTE: If you are not sure how to configure the settings, then keep the default settings. Router · Status. This screen displays routing information about the System.*

*· WAN Setup. Use this screen to configure the Internet connection, MAC clone, remote management, QoS, VLAN, and optional settings. · LAN Setup. Use this screen to configure the local network, dynamic DHCP, and static DHCP lease settings. · Application. On this screen, configure port forwarding, DMZ, and reserved ports range settings. Voice · Info. This screen displays voice-related information about the System. · System. Use this screen to configure system settings.*

*In most cases, you should not change these settings unless instructed to do by your ITSP. Chapter 6: Using the Web-based Utility Overview 22 IP Telephony System · SIP. Configure service, music-on-hold, group paging, call hunt, and auto-attendant settings on this screen. In most cases, do not change service settings unless instructed to do so by your ITSP. · Provisioning. Use this screen to configure service provisioning settings. In most cases, you should not change these settings unless instructed to do by your ITSP. · Regional. Use this screen to configure call settings. In most cases, you should not change these settings unless instructed to do by your ITSP.*

*· FXS 1/2. Use the appropriate screen to configure settings for each FXS (Phone) port on the System. · Line 1/2/3/4. Use the appropriate screen to configure settings for each external Internet phone line. How to Access the Web-based Utility To access the Web-based Utility of the System, launch Internet Explorer or Netscape Navigator on the administration computer connected to the System's Ethernet port.*

*If the System uses its default address, then enter 192.168.0.1 in the Address field. If you have assigned a static IP address to the System, then enter <IP address of the System> in the Address field.*

*Press the Enter key. Enter your user name and password. The default user name for administrative access is admin, and the default user name for user access is user. (These user names cannot be changed.) Then enter the password supplied by your ITSP. (By default, there is no password, so if you were not given a password, then leave this field blank.) To view the status information for the phones and their calls, click PBX Status. To switch to a different login, click User Login or Admin Login. Enter the appropriate login information. Two views of the Web-based Utility are available.*

*Click basic to view basic settings, or click advanced to view advanced settings. When you have finished making changes on a screen, click the Submit All Changes button to save the changes, or click the Undo All Changes button to undo your changes. When changes are saved, the System may reboot. NOTE: If your ITSP supplied the System, then it may be pre-configured for you, and you do not need to change any settings. Refer to the instructions supplied by your ITSP for more information. The PBX Status Screen This screen shows status information for the phones and their calls. Registration This section shows the registration information for the phones. Registration. To remove a phone's registration, click its checkbox. Then click the Delete button.*

*Chapter 6: Using the Web-based Utility How to Access the Web-based Utility 23 IP Telephony System Station. Shown here is the station name assigned to the phone. (This setting is configured through the phone.) User ID. Shown here is the extension number assigned to the phone.*

*IP Address. Shown here is the local IP address of the phone. Reg Expires. This indicates the number of seconds left before the phone needs to re-register with the System. Parking Lot This section shows the calls that have been parked.*

*Call park is a convenient feature that lets a call be put on hold and picked up from any extension number. Parking Lot. To remove a call from the Parking Lot, click its checkbox. Then click the Delete button. Caller ID. Shown here is the phone number of the caller. Parked By. Shown here is the extension number that parked the call. Figure 6-1: PBX Screen - Parking Lot Parked At. Shown here is the call park number that you should use to pick up this call.*

*Duration. Shown here is the length of time that the call has been parked. Line 1 Calls This section shows the current incoming and outgoing calls. Line 1 Calls. To remove a call, click its checkbox. Then click the Delete button. External. Shown here is the external phone number of the caller. Station. Shown here is the extension number of the call; it displays the word "callpark" when the call has been parked for pickup from any extension number.*

*Direction. Shown here is the direction of the call, Inbound or Outbound. State. Shown here is the status of the call, Connected or Proceeding. Duration. Shown here is the length of time the call has been active. Figure 6-2: PBX Screen - Inbound Call Figure 6-3: PBX Screen - Outbound Call Chapter 6: Using the Web-based Utility The PBX Status Screen 24 IP Telephony System The Router Tab The Router - Status Screen This screen displays product and system information. Product Information Product Name. Shown here is the model number of the System. Serial Number.*

*Shown here is the serial number of the System. Software Version. Shown here is the version number of the System software. Hardware Version. Shown here is the version number of the System hardware. MAC Address. Shown here is the MAC address of the System. Client Certificate. Shown here is the status of the client certificate. It authenticates the System for use in the ITSP's network.*

*Licenses. This indicates how many additional licenses you have acquired for the System. mac address: the unique address that a manufacturer assigns to each networking device. Figure 6-4: Router - Status Screen System Status Current Time. Displayed here is the current date and time of the System. Elapsed Time. Displayed here is the amount of time elapsed since the last reboot of the System. WAN Connection Type. Displayed here is the Internet connection type of the System. Current IP.*

*Displayed here is the Internet IP address of the System. Host Name. Displayed here is the host name of the System. Domain. Displayed here is the domain name of the System.*

*Current Netmask. Displayed here is the netmask or subnet mask of the System. Current Gateway. Displayed here is the IP address of the gateway. Primary DNS.*

*Displayed here is the IP address of the primary DNS server. Chapter 6: Using the Web-based Utility The Router Tab ip (internet protocol): a protocol used to send data over a network. ip address: the address used to identify a computer or device on a network. subnet mask: an address code that determines the size of the network. gateway: a device that forwards Internet traffic from your local area network. 25 IP Telephony System Secondary DNS. Displayed here is the IP address of the secondary DNS server.*



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LAN IP Address. Displayed here is the local IP address of the System. Broadcast Pkts Sent.

Displayed here is the number of broadcast packets sent. Broadcast Bytes Sent. Displayed here is the number of broadcast bytes sent. Broadcast Pkts Recv. Displayed here is the number of broadcast packets received and processed. Broadcast Bytes Recv. Displayed here is the number of broadcast bytes received and processed. Broadcast Pkts Dropped. Displayed here is the number of broadcast packets received but not processed. Broadcast Bytes Dropped.

Displayed here is the number of broadcast bytes received but not processed. packet: a unit of data sent over a network. Chapter 6: Using the Web-based Utility The Router Tab 26 IP Telephony System The Router - WAN Setup Screen This screen lets you configure the Internet connection, MAC clone, remote management, QoS, VLAN, and optional settings. Information about your Internet connection type should be provided by your Internet Service Provider (ISP).

If you do not have this information, contact your service provider.

Internet Connection Settings Connection Type. Select the connection type you use: DHCP, Static IP, or PPPOE. If you already have a router for your network, select Static IP and assign an address that is appropriate for your network. (Refer to the router's documentation for more information about IP addressing.) Static IP Settings If you selected Static IP, complete the Static IP Settings section.

Static IP. Enter the static or fixed IP address of the System (this should be provided by your ISP). NetMask. Enter the net or subnet mask of the System (this should be provided by your ISP). Gateway. Enter the IP address of the gateway (this should be provided by your ISP). Figure 6-5: Router - WAN Setup Screen dhcp (dynamic host configuration protocol): a protocol that lets one device on a local network, known as a DHCP server, assign temporary IP addresses to the other network devices, typically computers. static ip address: a fixed address assigned to a computer or device that is connected to a network. pppoe: a type of broadband connection that provides authentication (username and password) in addition to data transport PPPOE Settings If you selected PPPOE, complete the PPPOE Settings section. PPPoE Login Name.

Enter the name provided by your ISP. PPPOE Login Password. Enter the password provided by your ISP. PPPOE Service Name (optional). Enter the service name provided by your ISP. Optional Settings HostName. Enter the host name, if provided by your ISP. Domain. Enter the domain name, if provided by your ISP. Primary DNS.

Enter the IP address of the primary DNS server. Secondary DNS (optional). Enter the IP address of the secondary DNS server. Chapter 6: Using the Web-based Utility The Router Tab 27 IP Telephony System DNS Server Order. Select the order in which the DNS servers should be used: Manual; Manual, DHCP; or DHCP, Manual.

The default is Manual. DNS Query Mode. Select how the DNS servers should be queried: Parallel or Sequential. The default is Parallel. Primary NTP Server.

Enter the IP address of the primary NTP server, which the System uses to keep the date and time current. Secondary NTP Server (optional). Enter the IP address of the secondary NTP server. MAC Clone Settings Enable MAC Clone Service. Select whether you want to clone a MAC address onto the System, yes or no. The default is no. Cloned MAC Address. Enter the MAC address you want to clone. Remote Management Enable WAN Web Server. This feature lets you enable or disable access to the Web-based Utility from the WAN side.

Select yes or no from the drop-down menu. The default is no. WAN Web Server Port. Enter the port number used to access the Utility from the WAN side. The default is 80. QoS Settings QoS QDisc. QoS prioritizes voice communications when different types of traffic are competing for bandwidth. Select the method you want to use: NONE, CBQ, or TBF. The default is NONE. Maximum Uplink Speed.

Enter the maximum upload speed of your Internet connection. The default is 128Kbps. VLAN (Virtual Local Area Network) Settings Enable VLAN. VLAN (802.1Q) settings let you use the System in a virtual LAN environment.

Select yes or no from the drop-down menu. The default is no. VLAN ID. Enter the ID number used by the System. The default is 1.

When you have finished making changes, click the Submit All Changes button to save the changes, or click the Undo All Changes button to undo your changes. Chapter 6: Using the Web-based Utility The Router Tab 28 IP Telephony System The Router - LAN Setup Screen This screen lets you configure the local network, dynamic DHCP, and static DHCP lease settings. Networking Service. Select the service you want to use, NAT or Bridge. The default is NAT. LAN Network Settings LAN IP Address. Enter the local IP address of the System. The default is 192.168.0.

1. LAN Subnet Mask. Select the local subnet mask: 255.255.255.0, 255.255.255.128, 255.255.255.192, 255.255.255.224, 255.255.255.240, 255.255.255.252.

The default is 255.255.255.0. Enable DHCP Server. To use the System as a router assigning IP addresses, select yes.

Otherwise, select no. The default is yes. DHCP Lease Time. Enter the lease time used by the System to distribute IP addresses. The default is 24 Hours. DHCP Client Starting IP Address. When the System issues IP addresses, it starts with the first value of its DHCP client IP address range. Enter that value here. The default is 192.168.

0.2. Number of Client IP Addresses. Enter the number of IP addresses that can be distributed. The default is 50.

Figure 6-6: Router - LAN Setup Screen Static DHCP Lease Settings Enable. You can have the System assign the same IP address to a specific device. To disable this feature, select no. To use this feature, select yes. The default is no.

Host MAC Address. Enter the MAC address of the device whose IP address you want to specify. Host IP Address. Enter the IP address you want to assign to the device, 192.168.0.x (x being a different number for each device you specify). When you have finished making changes, click the Submit All Changes button to save the changes, or click the Undo All Changes button to undo your changes. Chapter 6: Using the Web-based Utility The Router Tab 29 IP Telephony System The Router - Application Screen This screen lets you configure port forwarding, DMZ, and reserved ports range settings. Port Forwarding Settings Enable.

Select yes or no for each port forwarding entry, which defines a port range to be forwarded to a server. The default is no. Service Name. Enter the name of the service or application. Starting Port. Enter the starting port number of the forwarded port range. Ending Port. Enter the ending port number of the forwarded port range. Protocol. Select the protocol used, TCP, UDP, or Both.

The default is TCP. Server IP Address. Enter the IP address of the server, 192.168.0.

x (x being a different number for each server you specify). DMZ Settings Enable DMZ. DMZ hosting forwards all ports at the same time to one computer.

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This allows one local user to be exposed to the Internet for use of special-purpose services such as videoconferencing. Select yes or no from the drop-down menu.

The default is no. DMZ Host IP Address. Enter the IP address of the DMZ host, 192.168.0.x (x being the number for the computer you want to specify). Use the Static DHCP Lease Settings section on the LAN Setup screen, so the DMZ Host keeps this IP address; otherwise, its IP address may change. Figure 6-7: Router - Application Screen tcp: a network protocol for transmitting data that requires acknowledgement from the recipient of data sent. udp: a network protocol for transmitting data that does not require acknowledgement from the recipient of the data that is sent. System Reserved Ports Range Starting Port.

This port range defines the random TCP/UDP ports used by the application running on the System. They cannot be used by port forwarding or DMZ. Enter the starting port number of the reserved ports range. The default is 50000. Num of Ports Reserved. Select the number of ports you want to reserve: 256, 512, or 1024. The default is 256. When you have finished making changes, click the Submit All Changes button to save the changes, or click the Undo All Changes button to undo your changes. Chapter 6: Using the Web-based Utility The Router Tab 30 IP Telephony System The Voice Tab The Voice - Info Screen This screen shows voice-related settings for the System. Figure 6-8: Voice - Info Screen - Product Information Product Information Product Name. Shown here is the model number of the System. Serial Number. Shown here is the serial number of the System. Software Version. Shown here is the version number of the System software.

Hardware Version. Shown here is the version number of the System hardware. MAC Address. Shown here is the MAC address of the System. Client Certificate.

Shown here is the status of the client certificate, which indicates that the System has been authorized by your ITSP. Licenses. This indicates how many additional licenses you have acquired for the System. System Status Current Time. Displayed here is the current date and time of the System. Elapsed Time. Displayed here is the amount of time elapsed since the last reboot of the System. Figure 6-9: Voice - Info Screen - System Status FXS 1/2 Status The FXS 1 and FXS 2 ports are the Phone ports of the System. (You can connect analog phones or fax machines to both ports.) They have the same status information available.

Hook State. Displayed here is the status of the phone's readiness. On indicates that the phone is ready for use, while Off indicates that the phone is in use. Message Waiting. This indicates whether you have new voicemail waiting. Call Back Active. This indicates whether a call back request is in progress. Last Called Number. Displayed here is the last number called. Chapter 6: Using the Web-based Utility The Voice Tab 31 IP Telephony System Last Caller Number.

Displayed here is the number of the last caller. Calls 1 and 2 have the same status information available. Call 1/2 State. Displayed here is the status of the call. Call 1/2 Tone.

Displayed here is the type of tone used by the call. Call 1/2 Encoder. Displayed here is the codec used for encoding. Call 1/2 Decoder. Displayed here is the codec used for decoding.

Call 1/2 FAX. Displayed here is the status of the fax pass-through mode. Call 1/2 Type. Displayed here is the direction of the call. Call 1/2 Remote Hold. This indicates whether the far end has placed the call on hold. Call 1/2 Callback. This indicates whether the call was triggered by a call back request. Call 1/2 Peer Name. Displayed here is the name of the internal phone.

Call 1/2 Peer Phone. Displayed here is the phone number of the internal phone. Call 1/2 Duration. Displayed here is the duration of the call. Call 1/2 Packets Sent. Displayed here is the number of packets sent. Call 1/2 Packets Recv. Displayed here is the number of packets received. Call 1/2 Bytes Sent. Displayed here is the number of bytes sent.

Call 1/2 Bytes Recv. Displayed here is the number of bytes received. Call 1/2 Decode Latency. Displayed here is the number of milliseconds for decoder latency. Call 1/2 Jitter.

Displayed here is the number of milliseconds for receiver jitter. Call 1/2 Round Trip Delay. Displayed here is the number of milliseconds for delay. Call 1/2 Packets Lost. Displayed here is the number of packets lost.

Call 1/2 Packet Error. Displayed here is the number of invalid packets received. Chapter 6: Using the Web-based Utility The Voice Tab Figure 6-10: Voice - Info Screen - FXS Status 32 IP Telephony System Line 1/2/3/4 Status Lines 1, 2, 3, and 4 have the same status information available. Registration State. Shown here is the status of the line's registration with the ITSP. Last Registration At. Shown here are the last date and time the line was registered. Next Registration In. Shown here is the number of seconds until the next registration. Figure 6-11: Voice - Info Screen - Line Status Message Waiting.

This indicates whether you have new voicemail waiting. Mapped SIP Port. Shown here is the port number of the mapped SIP port. Auto Attendant Prompt Status Prompt 1-4. The first four greetings or messages are defaults. If you change a default, then the screen will show the new prompt's duration in milliseconds. Prompt 5-10. For each prompt, the screen shows its duration in milliseconds. Space Remaining. Shown here is the number of milliseconds available.

Current AA. Shown here is the auto-attendant in use. When you have finished making changes, click the Submit All Changes button to save the changes, or click the Undo All Changes button to undo your changes. Figure 6-12: Voice - Info Screen - Auto Attendant Prompt Status Chapter 6: Using the Web-based Utility The Voice Tab 33 IP Telephony System The Voice - System Screen This screen lets you configure system settings. IMPORTANT: In most cases, you should not change these settings unless instructed to do by your ITSP.

System Configuration Figure 6-13: Voice - System Screen Restricted Access Domains. Enter the domain names permitted to access the System. Enable Web Admin Access. This setting lets you enable or disable local access to the Web-based Utility. Select yes or no from the drop-down menu.

The default is yes. Admin Passwd. Enter the password for the administrator. (By default, there is no password.) User Password. Enter the password for the user. (By default, there is no password.) Miscellaneous Settings Syslog Server. Enter the IP address of the syslog server, which logs system information and critical events of the System. Debug Server.

Enter the IP address of the debug server, which logs debug information of the System. Debug Level. This determines the level of debug information that will be generated. Select 0, 1, 2, or 3 from the drop-down menu. The higher the debug level, the more debug information will be generated. The default is 0, which indicates that no debug information will be generated. When you have finished making changes, click the Submit All Changes button to save the changes, or click the Undo All Changes button to undo your changes.

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