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Instant Wireless® Series

Dual-Band Wireless A + G Access Point



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Manual abstract:

@@@LIMITED WARRANTY Linksys guarantees that every Instant Wireless Dual-Band Wireless A + G Access Point will be free from physical defects in material and workmanship for three year from the date of purchase, when used within the limits set forth in the Specifications section of this User Guide. If the product proves defective during this warranty period, go to the Linksys website at www.linksys.com for complete Return Merchandise Authorization (RMA) assistance. You can also call Linksys Technical Support in order to obtain a RMA Number. **BE SURE TO HAVE YOUR PROOF OF PURCHASE AND A BARCODE FROM THE PRODUCT'S PACKAGING ON HAND WHEN CALLING. RETURN REQUESTS CANNOT BE PROCESSED WITHOUT PROOF OF PURCHASE.** When returning a product, mark the RMA Number clearly on the outside of the package and include a copy of your original proof of purchase. All customers located outside of the United States of America and Canada shall be held responsible for shipping and handling charges. **IN NO EVENT SHALL LINKSYS'S LIABILITY EXCEED THE PRICE PAID FOR THE PRODUCT FROM DIRECT, INDIRECT, SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES RESULTING FROM THE USE OF THE PRODUCT, ITS ACCOMPANYING SOFTWARE, OR ITS DOCUMENTATION.**

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Box 18558, Irvine, CA 92623. **SAFETY AND REGULATORY NOTICES FCC STATEMENT** The Instant Wireless Dual-Band Wireless A + G Access Point has been tested and complies with the specifications for a Class B digital device, pursuant to Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) This device must accept any interference received, including interference that may cause undesired operation. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used according to the instructions, may cause harmful interference to radio communications.

However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which is found by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures: . . . FCC Caution: Any change or modification to the product not expressly approved by Linksys could void the user's authority to operate the device. FCC Caution: Operation within the 5150 to 5250GHz band is restricted to indoor use only. FCC RF Radiation Exposure Statement To comply with the FCC and ANSI C95.1 RF exposure limits, the antenna(s) for this device must comply with the following: . Access points with 2.4 GHz or 5 GHz integrated antenna must operate with a separation distance of at least 20 cm from all persons using the cable provided and must not be co-located or operating in conjunction with any other antenna or transmitter. End-users must be provided with specific operations for satisfying RF exposure compliance.

Note: Dual antennas used for diversity operation are not considered co-located. Canadian Department of Communications Industry Canada (IC) Notice This Class B digital apparatus complies with Canadian ICES-003 and RSS-210. Cet appareil numérique de la classe B est conforme à la norme NMB-003 et CNR-210 du Canada.

"To prevent radio interference to the licensed service, this device is intended to be operated indoors and away from windows to provide maximum shielding. Equipment (or its transmit antenna) that is installed outdoors is subject to licensing." " Pour empêcher que cet appareil cause du brouillage au service faisant l'objet d'une licence, il doit être utilisé à l'intérieur et devrait être placé loin des fenêtres afin de fournir un écran de blindage maximal. Si le matériel (ou son antenne d'émission) est installé à l'extérieur, il doit faire l'objet d'une licence. " **EC DECLARATION OF CONFORMITY (EUROPE)** Linksys Group declares that the Instant Wireless® Series products included in the Instant Wireless® Series conform to the specifications listed below, following the provisions of the European R&TTE directive 1999/5/EC, EMC directive 89/336/EEC, and Low Voltage directive 73/23/EEC: For 11Mbps, 2.4 GHz access points with 100 mW radios, the following standards were applied: . ETS 300-826, 301 489-1 General EMC requirements for Radio equipment. . EN 609 50 Safety . ETS 300-328-2 Technical requirements for Radio equipment. For 54 Mbps, 5 GHz access points with 40 mW radios, the following standards were applied: . ETS 301 489-1, 301 489-17 General EMC requirements for Radio equipment. . EN 609 50 Safety . ETS 301-893 Technical requirements for Radio equipment. Caution: The frequencies used by 802.

11a wireless LAN devices are not yet harmonized within the European community, 802.11a products are designed for use only in specific countries, and are not allowed to be operated in countries other than those of designated use. Contact local Authority for procedure to follow. Caution: This equipment is intended to be used in all EU and EFTA countries. Outdoor use may be restricted to certain frequencies and/or may require a license for operation.

Contact local Authority for procedure to follow. Reorient or relocate the receiving antenna Increase the separation between the equipment or devices Connect the equipment to an outlet other than the receiver's Consult a dealer or an experienced radio/TV technician for assistance Dual-Band Wireless A + G Access Point Note: Combinations of power levels and antennas resulting in a radiated power level of above 100 mW equivalent isotropic radiated power (EIRP) are considered as not compliant with the above mentioned directive and are not allowed for use within the European community and countries that have adopted the European R&TTE directive 1999/5/EC and/or the CEPT recommendation Rec 70.03. For more details on legal combinations of power levels and antennas, contact Linksys Corporate Compliance. . Linksys Group vakuuttaa täten että Instant Wireless Dual-Band Wireless A + G Access Point tyyppinen laite on direktiivin 1999/5/EY, direktiivin 89/336/EEC ja direktiivin 73/23/EEC oleellisten vaatimusten ja sitä koskevien näiden direktiivien muiden ehtojen mukainen.



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Linksys Group déclare que la Instant Wireless Dual-Band Wireless A + G Access Point est conforme aux conditions essentielles et aux dispositions relatives à la directive 1999/5/EC, la directive 89/336/EEC, et à la directive 73/23/EEC. Belgique B L'utilisation en extérieur est autorisé sur le canal 11 (2462 MHz), 12 (2467 MHz), et 13 (2472 MHz). Dans le cas d'une utilisation privée, à l'extérieur d'un bâtiment, au-dessus d'un espace public, aucun enregistrement n'est nécessaire pour une distance de moins de 300m. Pour une distance supérieure à 300m un enregistrement auprès de l'IBPT est requise. Pour une utilisation publique à l'extérieur de bâtiments, une licence de l'IBPT est requise. Pour les enregistrements et licences, veuillez contacter l'IBPT. France F: 2.4 GHz Bande : les canaux 10, 11, 12, 13 (2457, 2462, 2467, et 2472 MHz respectivement) sont complètement libres d'utilisation en France (en utilisation intérieure). Pour ce qui est des autres canaux, ils peuvent être soumis à autorisation selon le département. L'utilisation en extérieur est soumis à autorisation préalable et très restreint.

5 GHz Bande: Conformément aux décisions de la CEPT, l'utilisation des fréquences de la bande 5150 MHz - 5350 MHz est autorisée à l'intérieur des bâtiments avec une puissance maximale de 200 mW, et interdite en extérieur. La bande 5470 MHz - 5725 MHz n'est pas ouverte aujourd'hui. Vous pouvez contacter l'Autorité de Régulation des Télécommunications (<http://www.art-telecom.fr>) pour de plus amples renseignements. 2.4 GHz Band: only channels 10, 11, 12, 13 (2457, 2462, 2467, and 2472 MHz respectively) may be used freely in France for indoor use. License required for outdoor installations. 5 GHz Band: frequencies in the 5150 MHz - 5350 MHz band may be used indoor with maximum power of 200 mW. Their use is forbidden outdoors. The 5470 MHz 5725 MHz band is not currently open. Please contact ART (<http://www.art-telecom.fr>) for procedure to follow. Deutschland D: Anmeldung im Outdoor-Bereich notwendig, aber nicht genehmigungspflichtig.

Bitte mit Händler die Vorgehensweise abstimmen. Germany D: License required for outdoor installations. Check with reseller for procedure to follow. Italia I: E' necessaria la concessione ministeriale anche per l'uso interno. Verificare con i rivenditori la procedura da seguire.

L'uso per installazione in esterni non e' permessa. Italy I: License required for indoor use. Use with outdoor installations not allowed. The Netherlands NL License required for outdoor installations. Check with reseller for procedure to follow. Nederlands NL Licentie verplicht voor gebruik met buitenantennes. Neem contact op met verkoper voor juiste procedure. Table of Contents Chapter 1: Introduction The Instant Wireless Dual-Band Wireless A + G Access Point Features Chapter 2: Planning Your Wireless Network Network Topology Roaming Chapter 3: Getting to Know the Dual-Band Wireless A + G Access Point The Access Point's Back Panel The Access Point's Front Panel Chapter 4: Connecting the Dual-Band Wireless A + G Access Point Chapter 5: Setting Up the Dual-Band Wireless A + G Access Point Chapter 6: Configuring the Dual-Band Wireless A + G Access Point The Setup Tab WEP Encryption The Password Tab The Status Tab The Statistics Tab The Log Tab The Help Tab The Filters Tab The Advanced Wireless Tab The SNMP Tab Appendix A: Troubleshooting Frequently Asked Questions 1 1 1 2 2 2 . . . 3 3 4 . 5 6 14 14 16 18 19 19 20 20 21 22 25 26 26 UG-WAP55AG-30214NC KL Instant Wireless® Series Appendix B: Setting Up the TCP/IP and IPX Protocols Setting Up TCP/IP in Windows TCP/IP Setup for Windows 95, 98, and Millennium IPX Setup for Windows 95, 98, and Millennium TCP/IP Setup for Windows NT 4.0 IPX Setup for Windows NT 4.0 TCP/IP Setup for Windows 2000 IPX Setup for Windows 2000 TCP/IP Setup for Windows XP Appendix C: Glossary Appendix D: Specifications Environmental Appendix E: Warranty Information Appendix F: Contact Information 31 31 32 32 33 33 34 34 35 36 46 47 48 49 Dual-Band Wireless A + G Access Point Chapter 1: Introduction The Instant Wireless Dual-Band Wireless A + G Access Point The Linksys Dual-Band Wireless A+G Access Point gives you universal wireless connectivity.

It's the best way to add wireless capability to your existing wired network, or to add bandwidth to your wireless installation. The Dual-Band Wireless A+G Access Point actually contains two separate wireless connectivity radio transceivers, which support all three popular wireless networking specifications. The first transceiver uses the 2.4GHz radio band, supporting both the widely-used and inexpensive Wireless-B (802.11b) standard at 11Mbps, and the new, almost five times faster, Wireless-G (draft 802.11g) at 54Mbps. The second radio operates in the 5GHz band, and supports defaults from the password tab in the Access Point's Web-Based Utility. Important: Resetting the Access Point will erase all of your settings (WEP Encryption, Wireless and LAN settings, etc.) and replace them with the factory defaults. Do not reset the Access Point if you want to retain these settings 2 3 Instant Wireless® Series T The Access Point's Front Panel The LEDs on the Access Point's front panel, shown in Figure 3-2, display network activity.

Dual-Band Wireless A + G Access Point Chapter 4: Connecting the DualBand Wireless A + G Access Point 1. Locate an optimum location for the Access Point. The best place for the Access Point is usually at the center of your wireless network, with line of sight to all of your mobile stations. 2. Fix the direction of the antenna.

Try to place it in a position which can best cover your wireless network. Normally, the higher you place the antenna, the better the performance will be. The antenna's position enhances the receiving sensitivity. 3. Connect a standard Ethernet network cable to the Access Point.

Then, connect the other end to a PC or to your wired network. 4. Connect the AC Power Adapter to the Access Point's Power Socket. Only use the power adapter supplied with the Access Point. Use of a different adapter may result in product damage. Now that the hardware installation is complete, proceed to

Chapter 5: Setting Up the Dual-Band Wireless A + G Access Point for directions on how to set up the Access Point. Note: In order for all other wireless devices to communicate with the Access Point, those devices must be operating in the Infrastructure Mode. If any wireless devices are configured in the Ad Hoc Mode, they will not be recognized by the Access Point.



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Figure 3-2 Power Diag Green. The Power LED lights up when the Access Point is powered on.

Red. The Diag LED indicates the Access Point's self-diagnosis mode during boot-up and restart. It will turn off upon completing the diagnosis. If this LED stays on for an abnormally long period of time, refer to the Troubleshooting Appendix. Green. If the WLAN's Act LED is flickering, the Access Point is actively sending or receiving data to or from one of the devices on the network. Green. The WLAN's Link LED lights whenever there is a successful wireless connection. WLAN Act WLAN Link LAN Act/Link Green. The LAN's LINK LED serves two purposes.

If the LED is continuously lit, the Access Point is successfully connected to a device through the LAN port. If the LED is flickering, it is an indication of any network activity. LAN Full/Col Green. The LAN's Full/Col LED also serves two purposes. When this LED is continuously lit, the connection made through the corresponding port is running in Full Duplex mode.

A flickering LED indicates that the connection is experiencing collisions. Infrequent collisions are normal. If this LED blinks too often, there may be a problem with your connection. Refer to the Troubleshooting Appendix if you think there is a problem. LAN 100 Orange.

The LAN's 100 LED indicates when a successful 100Mbps connection is made through the LAN port. 4 5 Instant Wireless® Series Dual-Band Wireless A + G Access Point 3. The following screen, shown in Figure 5-2, displays how to connect the Access Point. You can also configure the Access Point through one of your PC's ethernet ports. Click the Next button to continue. Chapter 5: Setting Up the DualBand Wireless A + G Access Point Have You: Connected the Access Point to a PC or available port on your wired network as described in Chapter 4: Connecting the Dual-Band Wireless A + G Access Point? Now that you've connected the Access Point to your wired network, you are ready to begin setting it up. This Setup Wizard will take you through all the steps necessary to configure the Access Point. Note: While the Access Point has been designed to work correctly right out of the box, setting it up on a wireless computer will require you to use the Linksys default settings. These settings can then be changed with the Setup Wizard or Web-based Browser Utility. 1.

Insert the Setup Wizard CD into your PC's CD-ROM drive. Your PC must be on your wired network to set up the Access Point. 2. The screen in Figure 5-1 should appear on your monitor. If it does not, this means the autorun is not functioning. Start the Setup Wizard manually by clicking the Start button, selecting Run, and typing d:\setup.exe (where "D" is your PC's CD-ROM drive). Click the Setup button to continue this Setup Wizard. Clicking the User Guide button opened this User Guide. To access the Linksys web site on an active Internet connection, click the Linksys Web button or to exit this Setup Wizard, click the Exit button.

Figure 5-2 4. The next screen to appear, shown in Figure 5-3, will display a list of access points on your network along with the status information for each access point. Choose this Access Point for configuration and click the Yes button to continue. Figure 5-3 Figure 5-1 6 7 Instant Wireless® Series 5. You will be asked to sign onto the Access Point you've selected, as shown in Figure 5-4.

Enter the default password: admin. Then, click the OK button. (This password should be changed from the Web-based Utility's Password tab for greater security.) Figure 5-4 6. As shown in Figure 5-5, the IP Settings screen will appear next.

Enter an IP Address, Subnet Mask, and enter a unique access point name for the Access Point appropriate to your network. Then, click the Next button to continue. IP Address. This IP address must be unique to your network. (The default IP address is 192.168.1.246.) Subnet Mask. The Access Point's Subnet Mask must be the same as your Ethernet network.

Access Point Name. Assign a name to the Access Point. Unique, memorable names are helpful, especially if you are employing multiple access points on the same network. Dual-Band Wireless A + G Access Point 7. As shown in Figure 5-6, the Basic Settings screen for your 5 GHz/802.11a wireless products will appear. Enter your wireless network's SSID and select the channel at which the network broadcasts its wireless signal. Then, click the Next button to continue. SSID. The SSID is the unique name shared among all points in a wireless network.

The SSID must be identical for all points in the wireless network. It is case sensitive and must not exceed 32 characters, which may be any keyboard character. The default SSID, linksys-a, should be changed for greater security. Make sure this setting is the same for all points in your wireless network. Channel.

Select the appropriate channel from the list provided to correspond with your network settings, between 36 and 64. All points in your wireless network must use the same channel in order to function correctly. Figure 5-6 8. The Security Settings screen (Figure 5-7) for your 5 GHz/802.11a wireless products will appear next.

From this screen, you will set the Wired Equivalent Privacy (WEP) encryption, 64-bit/128-bit/152-bit, for your wireless network. Select a WEP configuration method and a WEP key. Figure 5-5 8 9 Instant Wireless® Series The WEP key can consist of the letters "A" through "F" and the numbers "0" through "9" and should be 10 characters in length for 64-bit encryption, 26 characters in length for 128bit encryption, or 32 characters in length for 152-bit encryption. All points in your wireless network must use the same WEP key to utilize WEP encryption. Click the Next button to continue. Dual-Band Wireless A + G Access Point Channel. Select the appropriate channel from the list provided to correspond with your network settings, between 1 and 11 (in North America). All points in your wireless network must use the same channel in order to function correctly. Figure 5-8 Figure 5-7 Note: WEP encryption should be used whenever networking wirelessly. WEP encryption helps increase security and make your wireless network safer to use.

10. The Security Settings screen (Figure 5-9) for your 2.4 GHz/802.11g-draft wireless products will appear next. From this screen, you will set the Wired Equivalent Privacy (WEP) encryption, 64-bit/128-bit, for your wireless network. Select a WEP configuration method and a WEP passphrase. WEP (Disable/64-bit WEP/128-bit WEP). In order to utilize WEP encryption, select the WEP setting from the pulldown menu. If you do not wish to utilize WEP encryption, make sure Disable is selected. 9.

As shown in Figure 5-8, the Basic Settings screen for your 2.4 GHz/802.11g wireless products will appear. Enter your wireless network's SSID and select the channel at which the network broadcasts its wireless signal. Then, click the Next button to continue.



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Network Mode. Since 802.11g-draft products are backwards compatible with 802.11b products, this mode is provided in the event you wish to incorporate 802.11b products into you 802.

11g-draft wireless network. If you are using both 802.11g-draft and 802.11b products in your network, select Mixed mode. You may experience reduced networking speeds in Mixed mode, as the speed must compensate for both types. If you are only using 802.11g-draft products in your network, select G-Only mode. SSID. The SSID is the unique name shared among all points in a wireless network. The SSID must be identical for all points in the wireless network.

It is case sensitive and must not exceed 32 characters, which may be any keyboard character. The default SSID, linksys-g, should be changed for greater security. Make sure this setting is the same for all points in your wireless network. Figure 5-9 10 11 Instant Wireless® Series Passphrase. This is a text string with a maximum of 16 alphanumeric characters used for generating a WEP Key. Type the passphrase here. This passphrase may not work with non-Linksys products due to possible incompatibility with other vendors' passphrase generators. If you'd rather not use a passphrase and would rather enter the WEP Key manually, click the Next button. Click the Next button to continue. Note: The Access Point's passphrase function when mixing products from other manufacturers into your wireless network.

Linksys products should always be used for optimum functionality. If another company's wireless product is used, however, the WEP key should be set manually. 11. The following Security screen, shown in Figure 5-7, will allow you to enter your WEP key if a passphrase was not entered on the previous screen. If a passphrase was used, the new WEP key will appear on this screen.

Each point in your wireless network must use the same WEP key for the network to function properly. Verify that the appropriate key is entered and click the Next button to continue. The WEP key can consist of the letters "A" through "F" and the numbers "0" through "9" and should be 10 characters in length for 64-bit encryption or 26 characters in length for 128-bit encryption. All points in your wireless network must use the same WEP key to utilize WEP encryption.

Dual-Band Wireless A + G Access Point 12.

You should now review the settings you've chosen, as shown in Figure 5.11. If these settings are correct, click the Yes button to save these settings. If you wish to change any of the settings, click the No button. You will exit the Setup Wizard and can start it again to revise your settings. Figure 5-11 13. At this point, the configuration performed with the Setup Wizard is complete, as shown in Figure 5-12. To configure any other Access Points in your network, you can run this Setup Wizard again. Click the Exit button to exit the Setup Wizard. Figure 5-12 Figure 5-10 12 13 Instant Wireless® Series Dual-Band Wireless A + G Access Point MAC Address. The MAC Address of the LAN interface - connected through the LAN Port - is displayed here.

Configuration Type. This selection tells the Access Point how IP Addresses are determined on your network. If you are using a DHCP server on your network to automatically generate different IP Addresses to each device, select Automatic Configuration - DHCP. Select Static IP Address if each device uses its own IP Address. The Access Point's default IP Address, Subnet Mask, and Default Gateway will appear in the appropriate fields. Chapter 6: Configuring the DualBand Wireless A + G Access Point Note: The Access Point is designed to function properly after using the Setup Wizard. This chapter is provided solely for those who wish to perform more advanced configuration or monitoring. The Access Point's settings can be configured through your web browser with the Web-Based Utility. This chapter explains how to configure the Access Point in this manner. Type the Access Point's IP Address into your web browser's address field.

(The default IP address is 192.168.1.246.) (Should you need to learn what IP Address the Access Point presently uses, run the Setup Wizard.

It will scan the Access Point and give you its IP Address.) Press the Enter key and the following screen, shown in Figure 6-1, will appear. Leave the User Name field Figure 6-1 blank. The first time you open the Web-Based Utility, use the default password admin. You can set a new password from the Password tab.

The Setup Tab The first screen that appears, shown in Figure 6-2, displays the Setup tab. This allows you to change the Access Point's general settings. These settings are described here. Click the Apply button to apply your changes or Cancel to cancel your changes. If you require online help, click the Help button.

Firmware. This will display the Access Point's current firmware version. Firmware can be upgraded from the Help tab. Access Point Name. You may assign any name to the Access Point, which is how the Access Point is identified on your network.

Unique, memorable names are helpful, especially if you are employing multiple access points on the same network. Verify this is the name you wish to use and click the Apply button to set it. 14 Figure 6-2 Fields for configuring your wireless connections, both 802.11a and 802.11gdraft are located under this information. You must configure any wireless standard you are using on your network. MAC Address. The first line of data provided about both wireless standards is the MAC Address of the wireless interface. 15 Instant Wireless® Series SSID. The SSID is the unique name shared among all points in a wireless network.

The SSID must be identical for all points in the wireless network. It is case sensitive and must not exceed 32 alphanumeric characters, which may be any keyboard character. Make sure this setting is the same for all points in your wireless network. Channel. Select the appropriate channel from the list provided to correspond with your network settings.

This should be between 1 and 11 (in North America) for 2.4GHz/802.11b devices and 36 and 64 (in North America) for 5GHz/802.11a devices. All points in your wireless network must use the same channel in order to function correctly.

WEP. The WEP Encryption method is Disabled by default. To enable WEP, click the WEP Key Setting button. Mode. This option works only for 802.11b and 802.11g-draft devices in your wireless network. Select Mixed and both Wireless-G and Wireless-B computers will be allowed on the network, but the speed will be reduced. Select GOnly for maximum speed, but no Wireless-B users will be allowed on the network. Click the Apply button to apply your changes or Cancel to cancel your changes.

If you require online help, click the Help button. WEP Encryption Setting WEP Encryption through the Web-based Browser Utility is done by clicking the WEP Key Setting button on the Setup Screen for any type of wireless device used on your network.



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This will open the WEP key setting screen. This screen is shown in Figure 6-3 for 802.11a wireless products and Figure 6-4 for 802.11g-draft wireless products. Select the WEP encryption for the type(s) of wireless technology you are using. From this screen, you can select the type of WEP encryption to use as well as set the WEP Key for that encryption. Important: Always remember that each point in your wireless network MUST use the same WEP Encryption method and encryption key or your wireless network will not function properly. Dual-Band Wireless A + G Access Point Figure 6-3 Figure 6-4 From the pull-down menu, select the type of WEP encryption you wish to use.

If you are using 802.11a wireless technology, you will need to enter the key manually. If you are using 802.11g-draft wireless technology and wish to use a WEP Passphrase, it can be a maximum of 16 alphanumeric characters. This passphrase may not work with non-Linksys products due to possible incompatibility with other vendors' passphrase generators.

The WEP Key can be generated using your Passphrase or you can enter it manually. Type that here. 16 17 Instant Wireless® Series The WEP key must consist of the letters "A" through "F" and the numbers "0" through "9" and should be 10 characters in length for 64-bit encryption or 26 characters in length for 128-bit encryption. (When using 802.11a wireless technology, 152-bit encryption is also available.)

The WEP key under this setting should be 32 characters in length.) All points in your wireless network must use the same WEP key to utilize WEP encryption.

Once the Passphrase is entered, click the Generate key to generate a WEP key. Click the Apply button to apply your changes and return to the Setup tab or Cancel to cancel your changes. To clear any of the information you've typed but not yet applied, click the Clear button. The Password Tab The Password tab, shown in Figure 6-5, allows you to change the Access Point's password and restore factory defaults. Changing the sign-on password for the Access Point is as easy as typing the password into the AP Password field. Then, type it again into the second field to confirm. Dual-Band Wireless A + G Access Point The Status Tab The Status tab, shown in Figure 6-6, displays current information on the Access Point, its settings and performance. The information displayed in these fields reflects the settings that you saved on the Setup tab.

For any information about what these settings mean, turn back to the appropriate heading in the section for the Setup tab. Figure 6-6 The Statistics Tab The Statistics tab, shown in Figure 6-7, displays information on how well the Access Point is transmitting data. It shows the amount of data packets dropped with those transmitted. Remember, some packet loss is common in networking. To update the statistics, click the Refresh button. Click the Help button for more information about this screen Figure 6-5 To restore the Access Point's factory default settings, click the Yes button beside Restore Factory Defaults. Click the

Apply button to apply your changes or Cancel to cancel your changes. If you require online help, click the Help button. Important: Restoring the Access Point's factory defaults will erase all of your settings (WEP Encryption, Wireless and LAN settings, etc.), and replace them with the factory defaults.

18 Figure 6-7 19 Instant Wireless® Series The Log Tab To view a log of the Access Point's activity, select the Log tab, shown in Figure 6-8. Log. To enable permanent logging activity, click Figure 6-8 the Enable radio button beside Log. The default setting for this function is Disable. If you have chosen to monitor the Access Point's traffic, then you can designate a PC that will receive permanent log files periodically.

In the Send Log to field, enter the IP address of this PC. To view these permanent logs, you must use Logviewer software, which can be downloaded free of charge from www.linksys.com. To see a temporary log of the Access Point's most recent activities, click the View Log button.

Click the Apply button to apply your changes or Cancel to cancel your changes. If you require online help, click the Help button. The Help Tab For help on the various tabs in this Webbased Utility, along with upgrading the Access Point's firmware and viewing this User Guide, click the Help tab, shown in Figure 6-9. Clicking the names of the tabs on the lefthand side of the screen brings up help for those tabs. 20 Dual-Band Wireless A + G Access Point The following resources require an Internet connection in order to access them. Click the Linksys Website link to connect to the Linksys homepage. For an Online Manual in PDF format, click that text link. The manual will appear in Adobe pdf format. If you do not have the Adobe PDF Reader installed on your computer, click the Adobe Website link to download this software. Firmware can be upgraded by clicking the Upgrade Firmware link.

Do not upgrade your firmware unless you are experiencing problems with the Access Point. UPGRADING FIRMWARE: Before upgrading the Access Point's firmware, be sure to download the firmware from Linksys's website at www.linksys.com. Once that is done, click the Upgrade Firmware link on the Help Tab.

This will bring up the screen shown in Figure 6-10. Type in the location of the firmware's file or click the Browse button to find the file. Then, click the Upgrade button to upgrade the firmware. To cancel the procedure, click Cancel or for more information, click Help. The Filters Tab The Filters tab, shown in Figure 6-11, allows you to block and allow certain computers, by their MAC Address, from communicating with the Access Point.

To enable filtering of computers by their MAC Addresses, click the Enable radio button. To disable this feature, click the radio button by Disable. Type the MAC Addresses for those PCs you wish to allow access to the Access Point in the MAC Address fields. As long as Filtering is enabled, PCs with MAC Addresses not entered in the MAC Address field will not be allowed to communicate with the Access Point. Figure 6-10 Figure 6-9 21 Instant Wireless® Series Dual-Band Wireless A + G Access Point Transmit Power.

The greater the transmit power used, the larger the area a wireless network covers. To minimize the likelihood of eavesdropping by unauthorized wireless users, do not use more transmit power than necessary to cover the range needed for your wireless network. Try using the Router at different levels of transmit power, and determine how much transmit power is needed to reach the wireless client, such as a PC, or access point that is farthest from the Router. Then select the appropriate level of transmit power (Full, Half, Quarter, Eighth, or Min) from the drop-down menu. The default value is Full.

Authentication Type. This setting allows the Access Point to authenticate communication with the wireless devices in your network.



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If a receiver is not tuned to the right frequency, a spread-spectrum signal looks like background noise.

There are two main alternatives, Direct Sequence Spread Spectrum (DSSS) and Frequency Hopping Spread Spectrum (FHSS). What is DSSS? What is FHSS? And what are their differences? Frequency Hopping Spread Spectrum (FHSS) uses a narrowband carrier that changes frequency in a pattern that is known to both transmitter and receiver. Properly synchronized, the net effect is to maintain a single logical channel. To an unintended receiver, FHSS appears to be short-duration impulse noise. Direct Sequence Spread Spectrum (DSSS) generates a redundant bit pattern for each bit to be transmitted.

This bit pattern is called a chip (or chipping code). The longer the chip, the greater the probability that the original data can be recovered. Even if one or more bits in the chip are damaged during transmission, statistical techniques embedded in the radio can recover the original data without the need for retransmission. To an unintended receiver, DSSS appears as low power wideband noise and is rejected (ignored) by most narrowband receivers. Would the information be intercepted while transmitting on air? WLAN features two-fold protection in security.

On the hardware side, as with Direct Sequence Spread Spectrum technology, it has the inherent security feature of scrambling. On the software side, the WLAN series offers the encryption function (WEP) to enhance security and access control. Users can set it up depending upon their needs. Dual-Band Wireless A + G Access Point Can Instant Wireless products support file and printer sharing? Instant Wireless™ products perform the same function as LAN products. Therefore, Instant Wireless™ products can work with Netware, Windows NT/2000, or other LAN operating systems to support printer or file sharing. What is WEP? WEP is Wired Equivalent Privacy, a data privacy mechanism based on a 40-bit shared-key algorithm, as described in the IEEE 802.11 standard. What is a MAC Address? The Media Access Control (MAC) address is a unique number assigned by the manufacturer to any Ethernet networking device, such as a network adapter, that allows the network to identify it at the hardware level. For all practical purposes, this number is usually permanent. Unlike IP addresses, which can change every time a computer logs on to the network, the MAC address of a device stays the same, making it a valuable identifier for the network.

How do I avoid interference? Using multiple Access Points on the same channel and in close proximity to one another will generate interference. When employing multiple Access Points, be sure to operate each one on a different channel (frequency). How do I reset the Access Point? Press the Reset button on the back of the Access Point for about ten seconds. This will reset the unit to its default settings. How do I resolve issues with signal loss? There is no way to know the exact range of your wireless network without testing. Every obstacle placed between an Access Point and wireless PC will create signal loss. Leaded glass, metal, concrete floors, water and walls will inhibit the signal and reduce range. Start with your Access Point and your wireless PC in the same room and move it away in small increments to determine the maximum range in your environment. You may also try using different channels, as this may eliminate interference affecting only one channel. Also, due to FCC regulations, more power may be transmitted, using 802.

11a, on channels 52, 56, 60 and 64, than on the lower channels. Lastly, check the Advanced tab of the Web-Based Utility and make sure that FULL is selected in the Transmission Rate field. Does the Turbo Mode work with Windows XP PCs? No. The Turbo Mode does not work with Windows XP PCs. 28 29 Instant Wireless® Series Does the Access Point function as a firewall? No.

The Access Point is only a bridge from wired Ethernet to wireless clients. I have excellent signal strength, but I cannot see my network. WEP is probably enabled on the Access Point, but not on your wireless adapter (or vice versa). Verify that the same WEP Keys and levels (64, 128 or 152) are being used on all nodes on your wireless network. What is the maximum number of users the Access Point facilitates? No more than 65, but this depends on the volume of data and may be less if many users create a large amount of network traffic.

How many channels/frequencies are available with the Access Point? Using 802.11a, there are eight available frequencies, ranging from 5.15GHz to 5.32GHz. Using 802.11b, there are eleven available channels, ranging from 1 to 11. What is Turbo mode? Turbo mode allows high-speed connections, but severely limits range. Turbo mode must be enabled on both the Access Point and the wireless PCs to function. Turbo mode is not compatible with Windows XP and may only function with Linksys 5GHz wireless adapters. What is the difference in range between 802.

11a and 802.11b products? Overall, range will be a little less in a typical environment, while higher speeds may be achieved with 802.11a, throughput degrades more quickly. (See Figure A-1.) Dual-Band Wireless A + G Access Point Appendix B: Setting Up the TCP/IP and IPX Protocols Setting Up TCP/IP in Windows Before a computer can communicate with the Access Point, it must be configured with the TCP/IP protocol. If you know how to set up TCP/IP on your computers, do so now. Otherwise, use the guidelines below to help get TCP/IP installed on all of the computers that need to communicate with the Access Point. If you are unable to successfully install TCP/IP on one or more computers after following the directions, contact the manufacturer of your computers' network operating system for further assistance. Check with your network administrator for your TCP/IP settings. The directions below provide general guidelines for coming up with IP addresses and subnet masks.

Check with your network administrator to see if you need to use specific IP addresses or DHCP settings. First, each computer on the network will require an IP address, which is a series of numbers, separated by periods, identifying the PC on the network. To make things simple, you should use the following numbering scheme: 192.168.1.

X In this example, X is a unique, arbitrarily assigned number from 1 to 254. Each computer must have its own unique X number. Note: Never use 0, 250 or 255 for X. These numbers are reserved by TCP/IP for other uses. For example, if you have three computers, you could number them as follows: 192.168.1.17 192.168.1.44 192.168.1.126 Figure A-1 In this case, 17, 44, and 126 are arbitrary numbers between 1 and 254. Each computer will also require a subnet mask, which is a numerical "filter" that tells a computer what kinds of TCP/IP data packets to accept.

If you're not sure which mask to use, the following mask is recommended: 255.255.255.0 30 31 Instant Wireless® Series The following instructions are provided as examples for reference only.



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For complete instructions on installing and troubleshooting TCP/IP and IPX, consult your Windows operating system documentation. TCP/IP Setup for Windows 95, 98, and Millennium 1. Click the Start button, select Settings, and open the Control Panel. Inside the Control Panel, double-click the Network icon. 2. If the TCP/IP Protocol is listed for your network adapter, go to step five.

Otherwise, click the Add button. 3. When the Component Type window appears, select Protocol and click the Add button. 4. Select Microsoft in the Manufacturers list and choose TCP/IP in the Network Protocols list.

Then, click the OK button. 5. When the Network window reappears, click TCP/IP. Then, click the Properties button. 6.

Select Specify an IP Address. 7. Enter an IP Address for the computer, along with a Subnet Mask. Click the OK button. If you do not have these values, consult your network administrator. 8. When the Network window reappears, click the OK button. Restart your machine. TCP/IP has now been successfully installed. IPX Setup for Windows 95, 98, and Millennium 1.

Click the Start button, select Settings, and open the Control Panel. Inside the Control Panel, double-click the Network icon. 2. If the TCP/IP Protocol is listed for your network adapter, go to step four. Otherwise, click the Add button. 3. When the Component Type window appears, select Protocol and click the Add button. 4. Select Microsoft in the Manufacturers list and choose IPX/SPX protocol in the Network Protocols list. Then, click the OK button.

Dual-Band Wireless A + G Access Point TCP/IP Setup for Windows NT 4.0 1. Click the Start button, select Settings, and open the Control Panel. Inside the Control Panel, double-click the Network icon. 2.

When the Network window appears, click the Protocols tab. Then, click the Add button. 3. Find the TCP/IP protocol in the Select Network Protocol field. Click it once and then click the OK button.

4. When asked if you want to use DHCP, choose No. 5. If asked to supply your Windows NT CD, do so. NT will copy the necessary files to your system. You may have to switch between the Access Point's Setup CD and the NT CD. 6. When TCP/IP appears in the Network Protocols window, click the Bindings tab. Windows will store your new bindings. 7.

Click the Protocols tab. Then, select TCP/IP. 8. Click the Properties button. Select the type of network adapter you have from the Adapters box and select Specify an IP Address. 9. Enter the computer's IP Address and Subnet Mask. Check with your network administrator for your settings. 10. Enter your Default Gateway if you have one.

Note: a Default Gateway is not required. Check with your network administrator. 11. When you finish, click the OK button. If NT asks about WINS, ignore it. 12. When the Network window reappears, click the Close button. Restart your computer when prompted. TCP/IP has now been successfully installed. IPX Setup for Windows NT 4.

0 1. Click the Start button, select Settings, and open the Control Panel. Inside the Control Panel, double-click the Network icon. 32 33 Instant Wireless® Series 2. When the Network window appears, click the Protocols tab. Then, click the Add button. 3. Find the IPX/SPX protocol in the Select Network Protocol field. Click it once and click the OK button. TCP/IP Setup for Windows 2000 1.

At the Windows 2000 desktop, right click My Network Places and select Properties. Then, right click Local Area Connection. Choose Properties. 2. If the TCP/IP Protocol is listed for your network adapter, go to step five. Otherwise, click the Install button. 3. When the Component Type window appears, select Protocol, and click the Add button. 4. Select Internet Protocol (TCP/IP) from the list and click the OK button.

5. When the Local Area Connection Properties window reappears, select TCP/IP, and click the Properties button. 6. Select Use the following IP Address. Dual-Band Wireless A + G Access Point 4.

Select NWLink IPX/SPX/NetBIOS Compatible Transport Protocol from the list and click the OK button. 5. When the Network window reappears, click the OK button. Restart your computer. NWLink IPX/SPX/NetBIOS Compatible Transport Protocol has now been successfully installed.

TCP/IP Setup for Windows XP 1. Click the Start button and open the Control Panel. 2. Double click the Network and Internet Connections icon. 3. Double click the Network Connections icon. 4. Right click the Local Area Connection icon and select Properties. 5. If the TCP/IP Protocol is listed for your network adapter, go to step five.

Otherwise, click the Install button. 6. When the Component Type window appears, select Protocol, and click the Add button. 7. Select Internet Protocol (TCP/IP) from the list and click the OK button. 7. Enter an IP Address for the computer, along with a Subnet Mask and Default Gateway. Then, click the OK button. If you do not have these values, consult your network administrator. 8.

When the Local Area Connection Properties window reappears, click the OK button. TCP/IP has now been successfully installed. IPX Setup for Windows 2000 1. At the Windows 2000 desktop, right click My Network Places. Then right click Local Area Connection.

Choose Properties. 2. If the NWLink IPX/SPX/NetBIOS Compatible Transport Protocol is listed for your network adapter, click the Cancel button. Otherwise, click the Install button. 3.

When the Component Type window appears, select Protocol and click the Install button. 8. When the Local Area Connection Properties window reappears, select TCP/IP, and click the Properties button. 9. Select Use the following IP Address. 10. Enter an IP Address for the computer, along with a Subnet Mask and Default Gateway. Then, click the OK button. If you do not have these values, consult your network administrator. 11.

When the Local Area Connection Properties window reappears, click the OK button. TCP/IP has now been successfully installed.. 34 35 Instant Wireless® Series Dual-Band Wireless A + G Access Point Beacon Interval - A beacon is a packet broadcast by the Access Point to keep the network synchronized. A beacon includes the wireless LAN service area, the AP address, the Broadcast destination addresses, a time stamp, Delivery Traffic Indicator Maps, and the Traffic Indicator Message (TIM). Bit - A binary digit. The value - 0 or 1-used in the binary numbering system. Also, the smallest form of data. Boot - To cause the computer to start executing instructions. Personal computers contain built-in instructions in a ROM chip that are automatically executed on startup.

These instructions search for the operating system, load it and pass control to it. Bridge - A device that interconnects different networks together. Browser - A browser is an application program that provides a way to look at and interact with all the information on the World Wide Web or PC. The word "browser" seems to have originated prior to the Web as a generic term for user interfaces that let you browse text files online. BSS (Basic Service Set) - An infrastructure network connecting wireless devices to a wired network using a single access point.



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Buffer - A buffer is a shared or assigned memory area used by hardware devices or program processes that operate at different speeds or with different sets of priorities. The buffer allows each device or process to operate without being held up by the other. In order for a buffer to be effective, the size of the buffer and the algorithms for moving data into and out of the buffer need to be considered by the buffer designer. Like a cache, a buffer is a "midpoint holding place" but exists not so much to accelerate the speed of an activity as to support the coordination of separate activities. CSMA/CA (Carrier Sense Multiple Access/Collision Avoidance) - In local area networking, this is the CSMA technique that combines slotted time-division multiplexing with carrier sense multiple access/collision detection (CSMA/CD) to avoid having collisions occur a second time.

This works best if the time allocated is short compared to packet length and if the number of situations is small. CTS (Clear To Send) - An RS-232 signal sent from the receiving station to the transmitting station that indicates it is ready to accept data. Appendix C: Glossary 802.11a - One of the IEEE standards for wireless networking hardware. Products that adhere to a specific IEEE standard will work with each other, even if they are manufactured by different companies. It specifies a maximum data transfer rate of 54Mbps and an operating frequency of 5GHz. The 802.11a standard uses the Orthogonal Frequency Division Multiplexing (OFDM) transmission method. Additionally, the 802.11a standard supports 802.

11 features such as WEP encryption for security. 802.11b - One of the IEEE standards for wireless networking hardware. Products that adhere to a specific IEEE standard will work with each other, even if they are manufactured by different companies. The 802.11b standard specifies a maximum data transfer rate of 11Mbps, an operating frequency of 2.4GHz, and WEP encryption for security. 802.11b networks are also referred to as Wi-Fi networks. 802.

11g - A proposed, but as yet unratified extension of the IEEE 802.11 standard for wireless networking hardware. The draft 802.11g specifications used by Linksys specify a maximum data transfer rate of 54Mbps using OFDM modulation, an operating frequency of 2.4GHz, backward compatibility with IEEE 802.

11b devices, and WEP encryption for security. Adapter - Printed circuit board that plugs into a PC to add to capabilities or connectivity to a PC. In a networked environment, a network interface card is the typical adapter that allows the PC or server to connect to the intranet and/or Internet. Ad-hoc Network - An ad-hoc network is a group of computers, each with a wireless adapter, connected as an independent 802.11 wireless LAN.

Ad-hoc wireless computers operate on a peer-to-peer basis, communicating directly with each other without the use of an access point. Ad-hoc mode is also referred to as an Independent Basic Service Set (IBSS) or as peer-to-peer mode, and is useful at a departmental scale or SOHO operation. Backbone - The part of a network that connects most of the systems and networks together and handles the most data. Bandwidth - The transmission capacity of a given facility, in terms of how much data the facility can transmit in a fixed amount of time; expressed in bits per second (bps). 36 37 Instant Wireless® Series Database - A database is a collection of data that is organized so that its contents can easily be accessed, managed, and updated. Data Packet - One frame in a packet-switched message. Most data communications is based on dividing the transmitted message into packets. For example, an Ethernet packet can be from 64 to 1518 bytes in length. Default Gateway - The routing device used to forward all traffic that is not addressed to a station within the local subnet.

DHCP (Dynamic Host Configuration Protocol) - A protocol that lets network administrators manage centrally and automate the assignment of Internet Protocol (IP) addresses in an organization's network.

Using the Internet's set of protocol (TCP/IP), each machine that can connect to the Internet needs a unique IP address. When an organization sets up its computer users with a connection to the Internet, an IP address must be assigned to each machine. Without DHCP, the IP address must be entered manually at each computer and, if computers move to another location in another part of the network, a new IP address must be entered. DHCP lets a network administrator supervise and distribute IP addresses from a central point and automatically sends a new IP address when a computer is plugged into a different place in the network. DHCP uses the concept of a "lease" or amount of time that a given IP address will be valid for a computer. The lease time can vary depending on how long a user is likely to require the Internet connection at a particular location. It's especially useful in education and other environments where users change frequently. Using very short leases, DHCP can dynamically reconfigure networks in which there are more computers than there are available IP addresses. DHCP supports static addresses for computers containing Web servers that need a permanent IP address. Download - To receive a file transmitted over a network.

In a communications session, download means receive, upload means transmit. DSSS (Direct-Sequence Spread Spectrum) - DSSS generates a redundant bit pattern for all data transmitted. This bit pattern is called a chip (or chipping code). Even if one or more bits in the chip are damaged during transmission, statistical techniques embedded in the receiver can recover the original data without the need for retransmission. To an unintended receiver, DSSS appears as low power wideband noise and is rejected (ignored) by most narrowband receivers.

However, to an intended receiver (i.e. another wireless LAN end38 Dual-Band Wireless A + G Access Point point), the DSSS signal is recognized as the only valid signal, and interference is inherently rejected (ignored). DTIM (Delivery Traffic Indication Message) - A DTIM field is a countdown field informing clients of the next window for listening to broadcast and multicast messages. When the AP has buffered broadcast or multicast messages for associated clients, it sends the next DTIM with a DTIM Interval value.

AP Clients hear the beacons and awaken to receive the broadcast and multicast messages. Encryption - A security method that applies a specific algorithm to data in order to alter the data's appearance and prevent other devices from reading the information. ESS (Extended Service Set) - A set of more than two or more BSSs (multiple access points) forming a single network. Ethernet - IEEE standard network protocol that specifies how data is placed on and retrieved from a common transmission medium. Has a transfer rate of 10 Mbps. Forms the underlying transport vehicle used by several upper-level protocols, including TCP/IP and XNS. FHSS (Frequency Hopping Spread Spectrum) - FHSS continuously changes (hops) the carrier frequency of a conventional carrier several times per second according to a pseudo-random set of channels.



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