802.11g WIRELESS LAN CARDBUS ADAPTER

802.11g Wireless Cardbus Adapter

CB555WG

Instruction Guide

* Actual product may vary from photo

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FCC COMPLIANCE STATEMENT

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. 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 in accordance with 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 can be determined 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:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Federal Communications Commission (FCC) Radiation Exposure Statement

This equipment complies with FCC radiation exposure set forth for an uncontrolled environment. In order to avoid the possibility of exceeding the FCC radio frequency exposure limits, human proximity to the antenna shall not be less than 2.5cm (1 inch) during normal operation.

R&TTE Compliance Statement

This equipment complies with all the requirements of DIRECTIVE 1999/5/EC OF THE EUROPEAN PARLIAMENT AND THE COUNCIL of March 9, 1999 on radio equipment and telecommunication terminal Equipment and the mutual recognition of their conformity (R&TTE).

EU Countries Intended for Use

The ETSI version of this device is intended for home and office use in Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, the Netherlands, Portugal, Spain, Sweden, and the United Kingdom.

The ETSI version of this device is also authorized for use in EFTA member states: Iceland, Liechtenstein, Norway, and Switzerland.

EU Countries Not intended for use

None.

Table of Contents

Introduction

Thank you for purchasing a StarTech.com 54 Mbits/sec 802.11g wireless cardbus adapter. Based on the IEEE 802.11g wireless standard, the CB555WG instantly provides your notebook computer with wireless LAN (WLAN) access. The adapter comes with both WPA and WEP protection to keep your wireless network secure and works with 802.11b wireless devices to ensure compatibility with your network. The card requires no external power source and uses low levels of power to help preserve your notebook battery life.

Features

- Provides your laptop computer with wireless LAN access
- Offers high data transfer rate up to 54 Mbits/sec
- Uses low levels of power to preserve notebook battery life
- Compatible with IEEE 802.11g and 802.11b devices
- Uses enhanced WPA (Windows XP only) and 64/128 bit WEP data encryption for high level of security
- Complies with draft of IEEE 802.11e EDCF and HCF polling for multimedia over WLAN applications
- Supports 32-bit Cardbus specifications
- Supports Windows Plug and Play installation
- Uses automatic fallback data rate to increases data security and reliability

Before You Begin

System Requirements

- An IBM (or compatible) computer running Windows XP/2000/Me/98SE
- An open Cardbus slot

Package Contents

- 1 x wireless Cardbus adapter
- 1 x driver/utility disk

Installation

Note: Depending on your OS and the configuration of your system, the instructions below may not be identical to what you see on your screen.

Note: You must install the software **BEFORE** you plug the adapter into your notebook.

1. Insert your driver/utility disk into the disk drive and run the **setup.exe** file.
2. Click **Next**.
3. Review the License Agreement Select and select "I accept...", then click **Next**.
4. On the "Ready to Install the Program" screen, click **Install**.
5. Windows will install the driver and utility of the card automatically. Click **Finish** to complete the installation.

Note: Windows XP users may see the Windows Logo Testing warning. This is normal. This message is generated by any driver not written or tested by Microsoft. The driver has not passed because it has never been tested by Microsoft. You can safely install this driver on Windows XP.

6. When installation has been completed, insert the adapter into your notebook's cardbus slot.
7. The system will automatically detect the card as a new device and display the "Found New Hardware Wizard" dialog box. Follow the installation wizard to complete the device setup.

Using the Configuration Utility

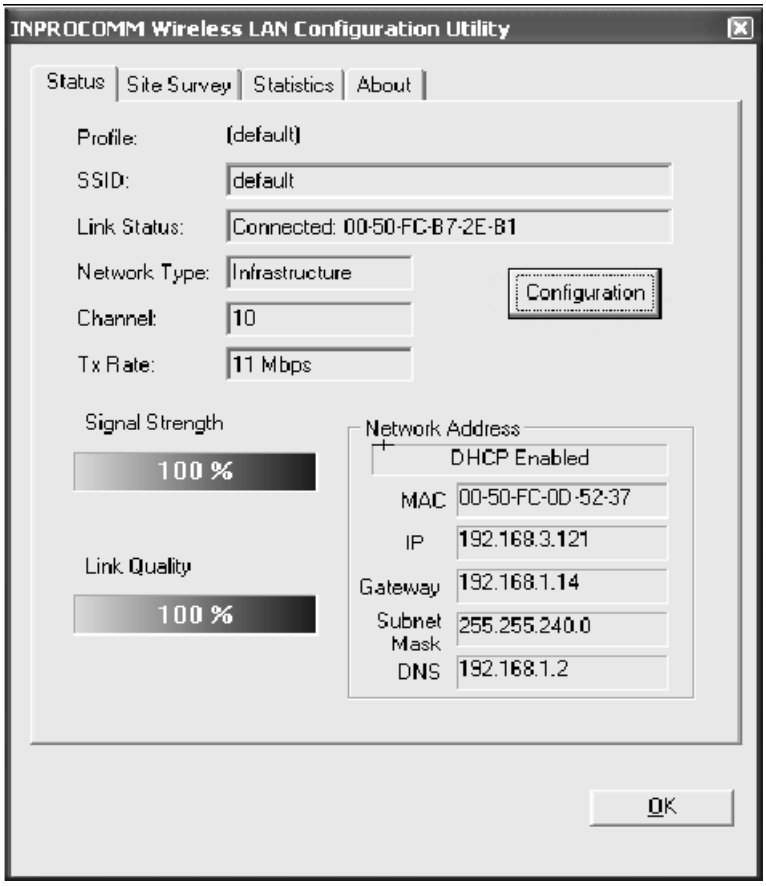
After completing the installation, a new icon will be displayed in the system tray at the bottom of the screen. The icon appears as a bar diagram, with different colors and levels representing different levels of connection. When the adapter is not associated with other wireless stations or an access point, the icon will appear as an empty (blank) bar diagram. Once the adapter is associated, the bar diagram will appear in different colors depending on the signal strength. There are three colors that represent signal strength: Green (signal strength from 100%-50%), Yellow (50%-25%), or Red (below 25%).

You can open the Configuration Utility by clicking on the icon. If you right-click the icon, you can access the following options:

- **Connect**: Brings up a profile list. If you want to connect to one of the networks immediately, click the network.
- **Radio**: Select “On” to enable the card, select “Off” to disable the card temporarily.
- **Open**: Click “Open” to maximum the screen of the Configuration Utility tool.
- **Minimize**: Click “Minimize” to minimize the screen of the Configuration Utility tool.
- **Exit**: Click “Exit” to close the Configuration Utility tool.

Status

The Status screen lets you view information about the network you are connected to.



Parameter	*Description*
Profile	Displays the profile name of the network.
SSID	Displays the SSID of the wireless network the adapter is connecting to (up to 32 printable ASCII characters).
Link Status	Displays the status of the connection: Scanning, Connected, or Disconnected.
Network Type	Displays the mode the device is operating in. There are two sorts of network types: Infrastructure and Ad Hoc.
Channel	Displays the radio channel used by the device.
Tx Rate	Displays the transmission rate of the network.

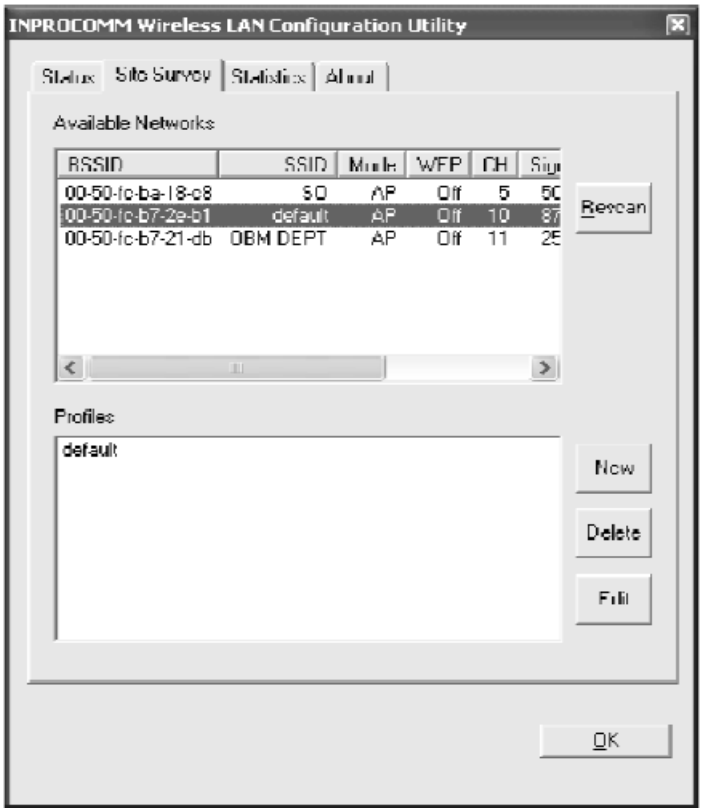
Status, continued

Parameter	*Description*
Signal Strength	Displays the signal strength. The higher the percentage, the better the signal. This indicator can help you find the best position for your wireless devices.
Link Quality	Displays the quality of the link. The higher the percentage, the better the quality.
Network Address	The Network Address section shows information about your network: whether DHCP is enabled, and the adapter's MAC address, IP address, Gateway Address, Subnet Mask address, and DNS server address.

From the Status screen, you can also click on the Configuration button to configure the network you are connecting to. See **Profile Configuration** on **page 8** for details.

Site Survey

The Site Survey screen gives you information on all your available networks.

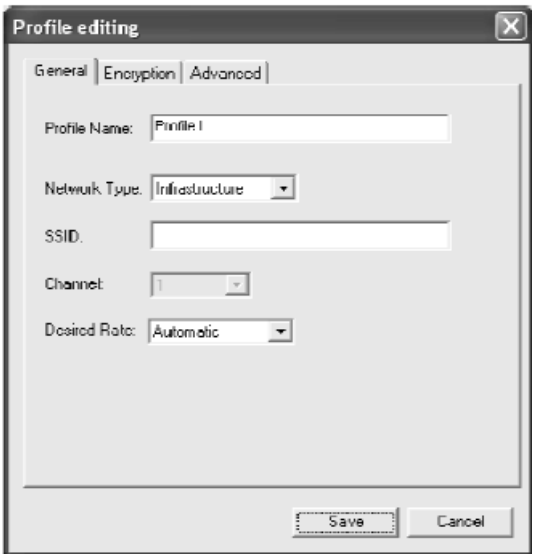


Parameter	*Description*
Available Networks	This list shows you available networks, along with information about them. You can see the network's link quality, network name, network mode, security settings, etc. Use this information to decide which network to connect to.
Rescan Button	Click Rescan to get the latest information of all the wireless networks nearby.
Profiles	This Profiles list shows all the profiles (up to 32 sets) with their current configurations. To change the connection, double-click on the profile you want to connect to. You can also Add, Delete, and Edit profiles from this screen. For more information on creating and editing profiles, see **Profile Configuration** on **page 8**.

Profile Configuration

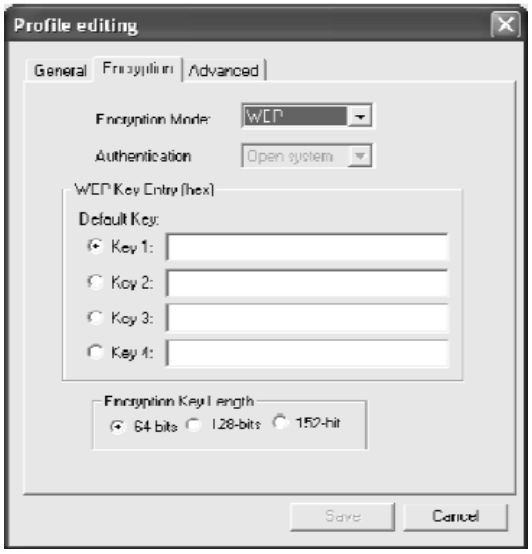
You can make it quick and easy to connect to your wireless networks by setting each network up with a profile. You can set up a profile for each wireless network you frequently use. You can configure your profiles by clicking on the **Configuration** button from the Status screen or by selecting **New** or **Edit** from the Site Survey screen.

General



Parameter	*Description*
Profile Name	Assign a recognizable profile name for the wireless network.
Network Type	Choose the type of network this profile uses: **Infrastructure** – Choose Infrastructure if the network uses an Access Point for communication. **Ad-Hoc** – Choose Ad Hoc if the network is another wireless station that will communicate directly with the CB555WG.
SSID	Enter the SSID (up to 32 printable ASCII characters) of the wireless network.
Channel	(This setting is only available in Ad Hoc mode.) Choose the channel the network communicates on.
Desired Rate	Select a desired data transfer rate from the list. When Automatic is selected, the device will choose the most suitable transmission rate automatically. The higher the data rate you designate, the shorter distance is allowed between the card and the other wireless stations. (When in Ad Hoc mode, the maximum rate will be 11 Mbits/sec. See **Appendix A** for information on improving this performance.)

Profile Configuration: Encryption



Parameter	*Description*
Encryption Mode	**None** – Disable WEP data encryption. **WEP –** Enable WEP data encryption. If you enable WEP, you also have to set the WEP Keys.
Authentication	Open System – No authentication is needed. Shared Key – Only wireless stations using a shared WEP key are allowed to connect to each other. Auto Switch – Switches the authentication algorithm depending on the wireless networks that the adapter is connecting to.
Encryption Key	Select the default encryption key using the radio buttons. Fill the text box by following the rules below: **64-bit –** Input a 10-digit Hex value (in the "A-F," "a-f" and "0-9" range) for each encryption key. For example: "0123456aef" **128-bit –** Input a 26-digit Hex value (in the "A-F", "a-f" and "0-9" range) for each encryption key. For example: "01234567890123456789abcdef" 152-bit – Input a 32-digit Hex value (in the "A-F", "a-f" and "0-9" range) for each encryption key. For example: "0123456789012345678 90abcdefabcdef"
Encryption Key Length	**Choose a key length. Longer key lengths provide better security but lessen throughput.**

Instead of WEP, Windows XP users can choose to enable WPA. For more information, see **WPA** on the following page.

WPA

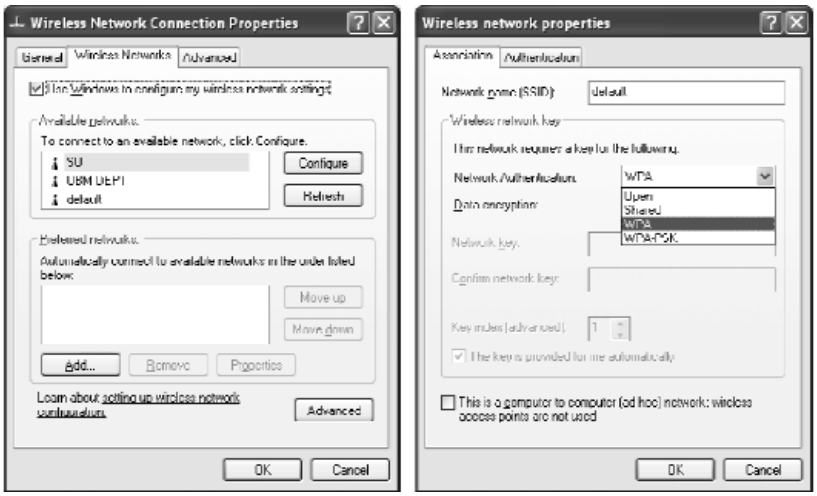
Wi-Fi Protected Access (WPA) is a set of standards-based, interoperable security enhancements that strongly increase encryption and authentication for wireless LAN systems. The technical components of WPA include Temporal Key Integrity Protocol (TKIP) for dynamic key exchange, and 802.1x for authentication.

WPA function is enabled in the following software systems only:

- Windows XP with Service Pack 1 and the Windows XP Support Patch for Wi-Fi Protected Access program.
- Configure the card by wireless built-in utility (Wireless Zero Configuration).

1. Right-click the networking icon in your taskbar and select "View Available Wireless Networks."

2. Click **Advanced**.
3. From the Wireless Networks tab, click **Configure**.

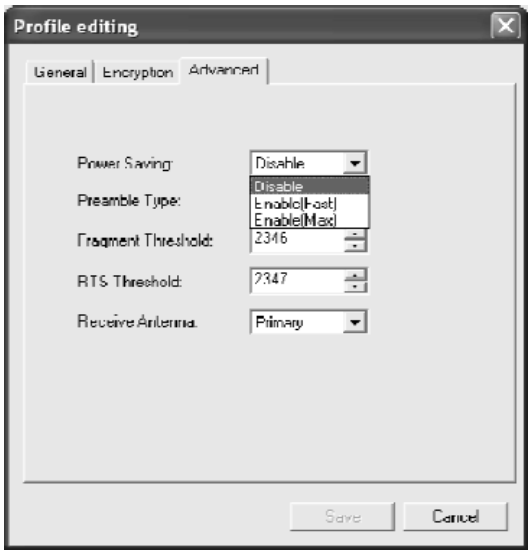


WPA, continued

Parameter	*Description*
Network Authentication	**Open** – No authentication is needed. **Shared** – Only wireless stations using a shared key (WEP Key identified) are allowed to connect to each other. **WPA** – This mode is for enterprise users with an authentication server (Radius Server), WPA-enabled access point, and a WPA-enabled client. Once WPA is enabled, all clients and access points on the network must be WPA-enabled in order to access the network. **WPA-PSK** – This is a special mode designed for home and small business users who do not have access to network authentication servers. In this mode, known as Pre-Shared Key, the user manually enters the starting password in their access point or gateway, as well as in each PC on the wireless network. WPA takes over automatically from that point, keeping unauthorized users that don't have the matching password from joining the network, while encrypting the data traveling between authorized devices.
Data Encryption	**WEP –** In WPA or WPA-PSK mode, WEP is also able to be the encryption method for the transmission data. **TKIP** – TKIP (Temporal Key Integrity Protocol) changes the temporal key every 10,000 packets (a packet is a kind of message transmitted over a network.) This insures much greater security than the standard WEP security. AES – AES has been developed to ensure the highest degree of security and authenticity for digital information. It is the most advanced solution defined by IEEE 802.11i for security in the wireless network.

Note: All devices in the network should use the same encryption method to ensure communication.

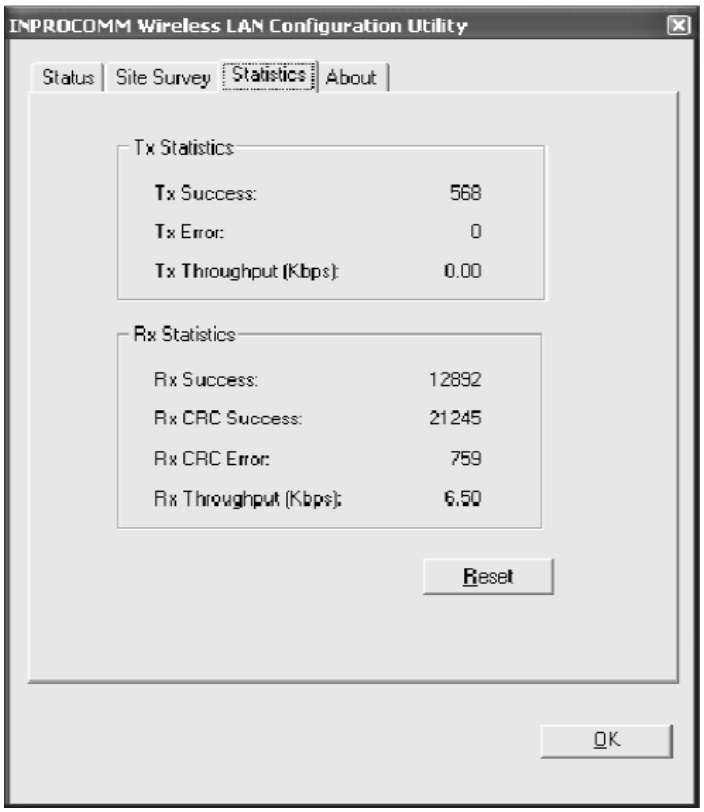
Profile Configuration: Advanced



Parameter	*Description*
Power Saving	**Disable** – The card will always be in Active mode. **Enable (Fast) –** The card will be in Power Saving mode when idle, but some components remain alive. In this mode, power consumption is greater than Max mode. **Enable (Max) –** The card will go into Power Saving mode when idle.
Preamble Type	Preamble Type defines the length of the CRC block for communication among the wireless networks. There are three modes: Long, Short, and Auto. High network traffic areas should use the shorter preamble type. If Auto is selected, the card will automatically switch the preamble type depending on the wireless network the card is connecting to.
Fragment Threshold	The value defines the maximum size of packets. Any packet larger than this value will be fragmented. Select a setting in the range of 256 to 2346 bytes. Minor change is recommended.
RTS Threshold	This value defines the minimum packet size needed for an RTS (Request To Send). For packets smaller than this value, an RTS is not sent and the packet is transmitted directly to the wireless network. Select a setting in the range of 0 to 2347 bytes. Minor change is recommended.
Receive Antenna	Define the receive antenna. If Diversity is selected, the card will automatically switch to the antenna with the highest signal strength.

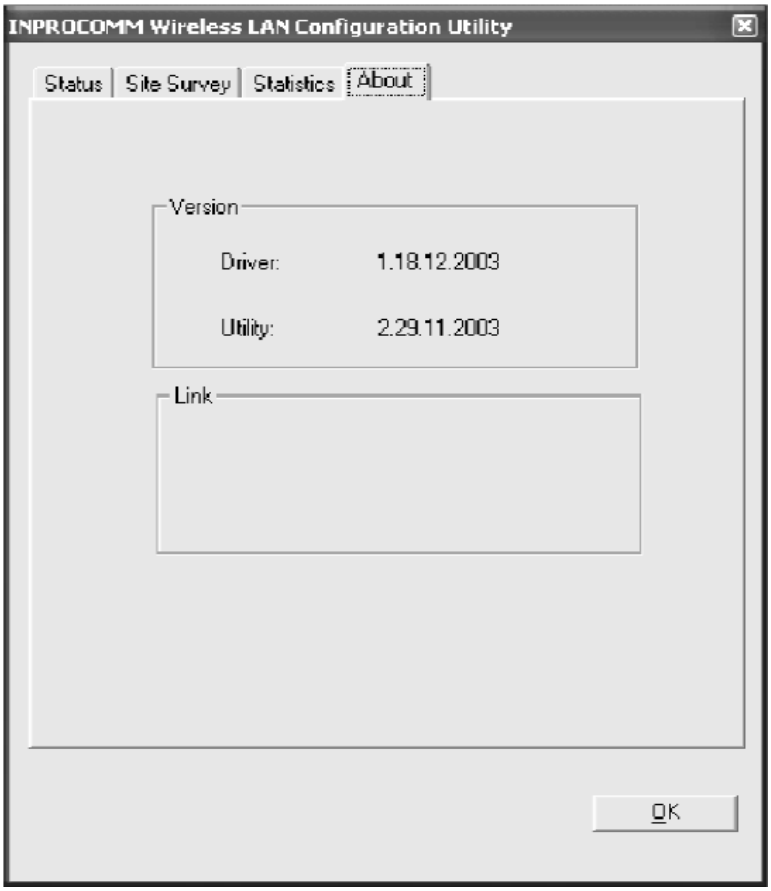
Statistics

The Statistics screen gives you information about your network communication. You can view the available statistic information with its Transfer counts (Tx Success, Tx Error) and Throughput, and its Receiving counts (Rx success, Rx error) and Throughput. You may reset the counters by pressing its **Reset** button.



About

By choosing this option, you can view basic information about the configuration utility, such as the Driver and Utility Version.



Appendix A: Installation Considerations

- The adapter will work in 802.11b mode when in Ad Hoc mode (this is defined in the 802.11g wireless standards). To increase the data rate up to 54 Mbits/sec, please follow the steps listed below:

  a. Go to "Network Connections."

  b. Right-click "Wireless Network Connection" and select "Properties."

  c. From the pop-up screen, click "Configure."

  d. Click on the "Advanced" tab on the "Properties" screen.

  e. Change the setting of "IBSS Originator Phy-Mode" from "802.11b" to "802.11g."

There are some things to keep in mind when attempting to set up a wireless connection. The wireless signal range can be limited by the number, location, thickness, and material of ceilings, walls or similar that the signal must pass through. To maximize your wireless range, keep the following considerations in mind:

- Try to minimize the number of walls, ceilings, and similar between your wireless devices. Each wall or ceiling the signal must cross can reduce the signal range by up to 90 feet (30m). Position your receiving devices so that the path between them is as unobstructed as possible.

- The type of material the wireless signal must cross through also affects its range. A solid metal door or concrete wall can decrease the signal's range. Whenever possible, position the adapters so that the signal can pass through drywall or open doors.

- Make sure that you are aware of the line the signal must take to travel between devices. The angle that the signal is on as it travels through a door, wall, or ceiling affects how thick the obstruction is. For example, if a wall is 1.5 feet thick and the signal passes through it at a 45-degree angle, the signal must pass through 3 feet (1m) of wall. At a 2-degree angle, the wall appears to be 42 feet (14m) thick. Always try to position your devices so that the signal can travel at 90-degree angles.

- Electrical devices or appliances that generate RF noise (such as microwaves, electric motors or computer monitors) can interfere with the wireless signal. Try to keep your adapter at least 3-6 feet (1-2 m) away from these types of devices.

Glossary

802.11b: A family of IEEE-defined specifications for wireless networks. The 802.11b standard supports data transfer rates up to 11 Mbits/sec in the 2.4 GHz band using DSSS technology. Also known as WiFi.

802.11g: A family of IEEE-defined specifications for wireless networks. The 802.11g standard supports data transfer rates up to 54 Mbit/sec in the 2.4GHz band using OFDM technology. 802.11g is backwards-compatible with the slower 802.11b standard.

Access Point: See wireless access point.

Ad Hoc: A wireless computer-to-computer LAN. An Ad Hoc network can consist of two devices with wireless adapters, and does not require a WAP, wireless router, or wireless gateway. Also known as peer-to-peer mode.

BSS (Basic Service Set): In Infrastructure mode, a BSS consists of a Wireless Access Point and the adapters associated with it.

DSSS (Direct Sequence Spread Spectrum): A transmission technology used as the basis for 802.11b wireless transmissions. DSSS helps increase a signal's resistance to interference and allows for some data bit recovery.

Encryption: The transformation of data into encoded ciphertext to ensure data transmission can not be accessed by users outside the network. Encryption uses an encryption algorithm and encryption keys to encode and decode the information. See also WEP.

Encryption Algorithm: A formula used to convert data from understandable "plaintext" into encoded "ciphertext." Each algorithm uses a key (a string of bits) to perform the calculations. The larger the key (most are 64 or 128-bits in length), the more difficult to break the code.

ESS (Extended Service Set): In Infrastructure mode, the ESS consists of two or more BSSes in the same subnet.

IBSS (Independent Basic Service Set): In Ad Hoc mode, an IBSS consists of two or more wireless devices that communicate directly and do not use a wireless access point.

Infrastructure: A network configuration that typically combines both wired and wireless elements. Wireless devices communicate with a WAP in order to communicate with each other and with the wired elements of the network.

IP Address (Internet Protocol Address): An assigned number used to identify a computer on a network. An IP address consists of four numbers less than 255 separated by periods (for example, 192.168.2.1).

LAN (Local Area Network): A group of computers and devices connected together in a relatively small area (such as a house or an office).

MAC Address (Media Access Control Address): A unique serial number that identifies a piece of hardware connected to a network.

OFDM (Orthagonal Frequent Division Multiplexing): An FDM modulation technique for transmitting large amounts of digital data over a radio wave. OFDM splits a signal into several narrowband channels at different frequencies.

Plug and Play: A set of specifications that allows a computer to automatically detect and configure hardware devices. With Plug and Play computers, any new hardware device that is connected to a computer will automatically be recognized without the user having to tell the computer the device has been added.

SSID (Service Set Identifier): A name that uniquely identifies a WLAN. In order for wireless devices to communicate with each other, they must have the same SSID.

Subnet: An identifiably separate part of a network that is interconnected with, but still independent from, the rest of the network. Subnets can help improve network security and performance and typically use a router.

Subnet Mask: A technique used by the IP protocol to filter messages into a particular network segment or subnet. Subnet masks are expressed as four decimal numbers between 0 and 255 separated by periods. (Example: 255.255.255.1) It is used to create private IP addresses for use within a particular network. Also known as a network mask.

WAN (Wide Area Network): A network that connects computers in geographically separated areas. The Internet is an example of a WAN.

WAP (Wireless Access Point): A networking device that seamlessly connects wired and wireless networks. Used in Infrastructure networks, a wireless access point is capable of connecting to an Ethernet network as well as an 802.11 network.

WEP (Wired Equivalent Protocol): A security protocol designed to provide a wireless network with the same level of security as a wired LAN. WEP offers protection primarily by encrypting the information that flows between adapters.

Wi-Fi: See 802.11b.

WLAN (Wireless Local Area Network): A local area network that transmits wirelessly through the air, typically in an unlicensed frequency such as the 2.4GHz band.

Technical Specifications

Interface bus type	32-bit Cardbus
Compliant standards	IEEE 802.11g/b
Radio technology	2.4000 ~ 2.4835 GHz Industrial Scientific Medical Band
Modulation	OFDM with BPSK, QPSK, 16QAM, 64QAM (11g) BPSK, QPSK, and CCK (11b)
Security	64/128/152-bit WEP Encryption, WPA (TKIP with IEEE 802.1x), and AES
Antenna	Printed Antenna with Diversity System
LED indicators	Tx/Rx, Link
Data transfer rate	Up to 54 Mbits/sec (802.11g), 11 Mbits/sec (802.11b)
Supported bit rates	54/48/36/24/18/12/11/9/6/5.5/2/1 Mbits/sec
Power consumption	Tx: 300mA, Rx: 330mA
Transmit Power	16 dBm ~ 18 dBm
Operating temperature	32 ~ 131ºF (0 ~ 55ºC)
Storage temperature	-77 ~ 158ºF (-25C ~ 70ºC)
Humidity	Max. 95% (Non condensing)
OS support	Windows 98SE/Me/2000/XP
Certification	FCC and CE

Technical Support

The following technical resources are available for this StarTech.com product:

On-line help:

We are constantly adding new information to the *Tech Support* section of our web site. To access this page, click the *Tech Support* link on our homepage, **www.startech.com**. In the tech support section there are a number of options that can provide assistance with this product.

Knowledge Base - This tool allows you to search for answers to common issues using key words that describe the product and your issue.

FAQ - This tool provides quick answers to the top questions asked by our customers.

Downloads - This selection takes you to our driver download page where you can find the latest drivers for this product.

Call StarTech.com tech support for help:
USA/Canada: 1-800-265-1844
UK/Ireland/Europe: 00-800-7827-8324
Support hours: Monday to Friday 9:00AM to 5:00PM EST (except holidays)

Warranty Information

This product is backed by a one-year warranty. In addition, StarTech.com warrants its products against defects in materials and workmanship for the periods noted, following the initial date of purchase. During this period, the products may be returned for repair, or replacement with equivalent products at our discretion. The warranty covers parts and labor costs only. StarTech.com does not warrant its products from defects or damages arising from misuse, abuse, alteration, or normal wear and tear.

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Revised: February 23, 2004