NETGEAR®

802.11a Wireless CardBus Adapter
54 Mbps   HA501

Reference Guide

Trademarks

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Statement of Conditions

In the interest of improving internal design, operational function, and/or reliability, NETGEAR reserves the right to make changes to the products described in this document without notice. NETGEAR does not assume any liability that may occur due to the use or application of the product(s) or circuit layout(s) described herein.

Certificate of the Manufacturer/Importer

It is hereby certified that the Model HA501 Wireless Adapter has been suppressed in accordance with the conditions set out in the BMPT-AmtsblVfg 243/1991 and Vfg 46/1992. The operation of some equipment (for example, test transmitters) in accordance with the regulations may, however, be subject to certain restrictions. Please refer to the notes in the operating instructions.
Federal Office for Telecommunications Approvals has been notified of the placing of this equipment on the market and has been granted the right to test the series for compliance with the regulations.

Federal Communications Commission (FCC) Compliance Notice: Radio Frequency Notice

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:
This device may not cause harmful interference.
This device must accept any interference received, including interference that may cause undesired operation.

NETGEAR Model HA501 Wireless PC Card
FCC Tested to Comply with FCC Standards
FOR HOME OR OFFICE USE

➲ Note: 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: (1) Reorient or relocate the receiving antenna, (2) Increase the separation between the equipment and receiver, (3) Connect the equipment into an outlet on a circuit different from that to which the receiver is connected, (4) 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 limits 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 20 cm (8 inches) during normal operation.

Radio Frequency Interference Requirements

This device is restricted to indoor use due to its operation in the 5.15 to 5.25 GHz frequency range. FCC requires this product to be used indoors for the frequency range 5.15 to 5.25 GHz to reduce the potential for harmful interference to co-channel Mobile Satellite systems. High power radars are allocated as primary users of the 5.25 to 5.35 GHz and 5.65 to 5.85 GHz bands. These radar stations can cause interference with and /or damage this device.

Canadian Department of Communications Radio Interference Regulations

This digital apparatus (Model HA501 Wireless Adapter) does not exceed the Class B limits for radio-noise emissions from digital apparatus as set out in the Radio Interference Regulations of the Canadian Department of Communications.

SM-HA501NA-0

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CHAPTER 1: INTRODUCTION

Congratulations on your purchase of NETGEAR's HA501 802.11a Wireless 32-bit CardBus Adapter, which gives you the ultimate in office mobility. This high-speed wireless device lets you quickly network multiple PCs together without laying any new cabling, and gives users the freedom to roam throughout the workplace and stay connected to corporate resources, e-mail, and the intranet. It provides built-in capacity and flexibility for growing networks so it's easy to add new clients and/or move your entire network to a new office site. Equipped with auto-sensing capability, it allows packet transfer at up to 54 Mbps for maximum throughput, or speed reduction to the lower 6 Mbps speed for distance or for operating in a noisy environment.

Benefits

*   Blazing speeds – up to 54 Mbps, 72 Mbps in turbo mode
*   Ultra-reliable, standards-based IEEE 802.11a wireless LAN networking
*   Free from interference, it coexists with IEEE 802.11b and Bluetooth™ devices
*   Supports the vast majority of notebook PCs equipped with a CardBus slot

Features

The key features of the HA501 Wireless Adapter are:

*   Reliable IEEE 802.11a standards-based wireless technology
*   Roaming support between access points when configured in infrastructure mode
*   Up to 72 Mbps high-speed rate in Turbo mode. Wireless nodes negotiate to operate in the optimal data transfer rate. In a noisy environment or when the distance between the wireless nodes is far, the wireless nodes automatically fall back to operate at the lowest transfer rate of 6 Mbps
*   Highest level of data encryption using 152-bit Shared Key data encryption method. Lower level of data encryption or no data encryption is available to simplify your network setup or to improve data transfer rate
*   Designed for notebook PCs running Microsoft Windows® 98, Me, NT 4.0, 2000, and XP operating systems
*   Extensive coverage and available bandwidth with eight (8) non-overlapping channels in the 5 GHz band (5.15 to 5.35 GHz)

Related NETGEAR IEEE 802.11a products

*   HE102 802.11a Wireless Access Point
*   HE301 802.11a PCI Wireless Adapter
*   HR814 802.11a Cable/DSL Router

CHAPTER 2: WIRELESS NETWORK FUNDAMENTALS

Wireless Network Configuration

Ad-hoc Mode (Peer-to-Peer Workgroup)

The Institute of Electrical and Electronics Engineers (IEEE) standard for wireless LANs (WLANs), 802.11- offers two methods for configuring a wireless network — ad-hoc and infrastructure. In an ad-hoc network, computers are brought together as needed; thus, there is no structure or fixed points to the network — each node can generally communicate with any other node. There is no access point involved in this configuration. It enables you to quickly set up a small wireless workgroup and allows workgroup members to exchange data or share printers as supported by Microsoft Networking in the various Windows operating systems. Some vendors also refer to ad-hoc networking as peer-to-peer workgroup networking.

In this configuration, network packets are directly sent and received by the intended transmitting and receiving stations. As long as the stations are within range of one another, this is the easiest and least expensive way to set up a wireless network.

To set up an ad-hoc workgroup operating with standard protocols, do the following:
• Set all stations to connect in Ad-hoc mode (or Peer-to-Peer workgroup mode).
• Set all stations to use the same network name (or SSID).
• Set all stations to use no WEP encryption key or an identical WEP encryption key.
• Set all stations to use the same wireless channel for communication.

Infrastructure Mode

With a wireless access point, you can put the wireless LAN into the infrastructure mode. It provides wireless connectivity to multiple wireless network devices within a fixed range or area of coverage, interacting with a wireless node via an antenna.

In the infrastructure mode, the wireless access point converts airwave data into wired Ethernet data, acting as a bridge between the wired LAN and wireless clients. Connecting multiple HA501 Access Points via a wired Ethernet backbone can further extend the wireless network coverage. As a mobile computing device moves out of the range of one access point, it moves into the range of another. As a result, wireless clients can freely roam from one Access Point domain to another and still maintain seamless network connection.

To set up an infrastructure network operating with standard protocols, do the following:
• Set all wireless stations to connect in infrastructure mode
• Set all stations to use the same network name (or SSID).
• Set all wireless access points to use the same network name (or ESSID).
• Set all stations to use no WEP encryption key or an identical WEP encryption key as the one used in Access points.
• Set up wireless channels used by individual access points. (It is not necessary to set channels on the stations as the stations will automatically scan through all channels for the nearest access point.)

Service Set Identification (SSID)

The Service Set Identification (SSID) is a thirty-two alphanumeric character (maximum) string identifying the wireless local area network. Some vendors refer to the SSID as "network name". In order for stations to communicate with each other, all stations must be configured with the same SSID.

A wireless LAN consisting of nodes operating in ad-hoc configuration without an access point is called a Basic Service Set (BSS). All nodes in a BSS must use the same Basic Service Set ID (BSSID).

In an infrastructure configuration with access points, multiple BSS can be configured to form an Extended Service Set (ESS). In this configuration, the access points are configured with the same Extended Service Set ID (ESSID). Wireless clients configured with the same ESSID can freely roam from one Access Point domain to another and still maintain seamless connection to the network

Authentication and WEP Encryption

The absence of a physical connection between nodes makes the wireless links vulnerable to information theft. To provide a certain level of security, IEEE 802.11 standard has defined two types of authentication methods, Open System and Shared Key. Open System authentication is a null algorithm. Shared Key authentication is an algorithm where both the transmitting node and the receiving node share an authentication key to perform a checksum on the original message. By default, IEEE 802.11 wireless devices operate in an open system network.

Wired Equivalent Privacy (WEP) data encryption is utilized when the wireless nodes or access points are configured to operate in Shared Key authentication mode. There are three shared key methods implemented in Netgear's 802.11a solutions: the standard based forty-bit WEP data encryption and 128-bit WEP data encryption plus the extended 152-bit WEP data encryption.

The forty-bit WEP data encryption method allows for a five-character (forty-bit) input. Additionally, 24 factory-set bits are added to the forty-bit input to generate a 64-bit encryption key. (The 24 factory-set bits are not user configurable.) This encryption key will be used to encrypt/decrypt all data transmitted via the wireless interface. Some vendors may refer to the forty-bit WEP data encryption as 64-bit WEP data encryption since the actual encryption key used in the encryption process is 64 bits wide.

The 128-bit WEP data encryption method consists of 104 configurable bits and the 152-bit WEP data encryption method consists of 128 configurable bits Similar to the forty-bit WEP data encryption method, the remaining 24 bits are factory set and not user configurable.

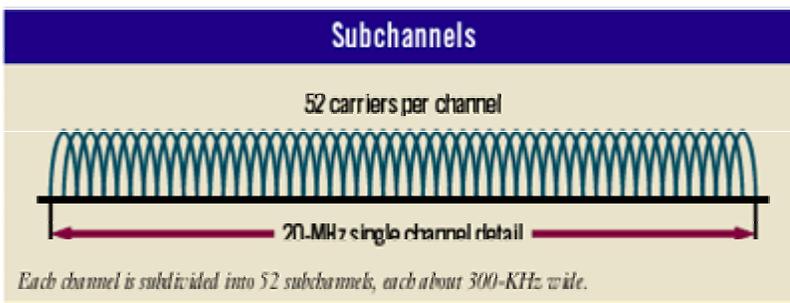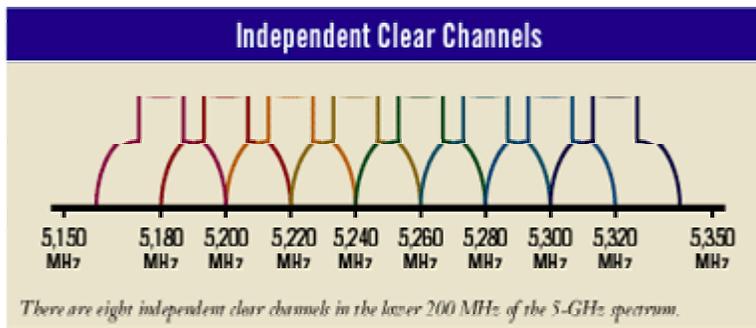| EncryptionKey Size	# of Hexadecimal Digits	Example of Hexadecimal Key Content
64-bit (24+40)	10	4C72F08AE1
128-bit (24+104)	26	4C72F08AE19D57A3FF6B260037
152-bit (24+1280)	32	4C72F08AE19D57A3FF6B26003715DAC2

Wireless Channel Selection

IEEE 802.11a utilizes 300 MHz of bandwidth in the 5 GHz Unlicensed National Information Infrastructure (U-NII) band. Though the lower 200 MHz is physically contiguous, the FCC has divided the total 300 MHz into three distinct domains, each with a different legal maximum power output.

U-NII Band	Low	Middle	High
Frequency (GHz)	5.15 – 5.25	5.25 – 5.35	5.725 – 5.825
Max. Power Output	50 mW	250 mW	1W

Note: The high band is not supported in HA501 Wireless Adapter.

IEEE 802.11a uses Orthogonal Frequency Division Multiplexing (OFDM), a new encoding scheme that offers certain benefits over a spread spectrum in channel availability and data rate. The 802.11a uses OFDM to define a total of 8 non-overlapping 200 MHz channels across the 2 lower bands; each of these is divided into 52 subcarriers and each carrier is approximately 300 KHz wide. By comparison, 802.11b uses only 3 non-overlapping channels.

Independent Clear Channels

There are eight independent clear channels in the lower 200 MHz of the 5-GHz spectrum.

Subchannels

52 carriers per channel

20-MHz single channel detail

Each channel is subdivided into 52 subchannels, each about 300-KHz wide.

The HA501 user can use eight channels in non-turbo mode.

Turbo mode: OFF	
Channel	**Frequency**
36	5.18 GHz
40	5.20 GHz
44	5.22 GHz
48	5.24 GHz
52	5.26 GHz
56	5.28 GHz
60	5.30 GHz
64	5.32 GHz

The HA501 user can use three channels in turbo mode.

Turbo mode: ON	
Channel	Frequency
42	5.21 GHz
50	5.25 GHz
58	5.29 GHz

➔**Note:** The available channels supported by the wireless products in various countries are different.

CHAPTER 3: HARDWARE INSTALLATION

Package Contents

The product package should contain:
- HA501 802.11a Wireless Adapter
- *HA501 Wireless Adapter Resource* CD-ROM
- HA501 Installation Guide
- Support Information Card
- Warranty and registration card

Please call your reseller or customer support in your area if there are any wrong, missing, or damaged parts. You can refer to the Support Information Card for the telephone number of customer support in your area. You should keep the Support Information Card, along with the original packing materials, and use the packing materials to repack the HA501 Wireless Adapter if you need to return it for repair.

To qualify for product updates and product warranty registrations, register online on the NETGEAR Web page at: http://www.NETGEAR.com.

Hardware Description

The HA501 Wireless Adapter has two interfaces: a 32-bit 68-Pin CardBus connector that connects to any notebook PC with an available CardBus slot, and a wireless interface that remains outside of the notebook PC chassis when the Wireless Adapter is inserted into a notebook. There are two green LEDs, Network and Power, that indicate the wireless link condition of the HA501 Wireless Adapter with another wireless node or the associated access point.

Wireless Adapter Installation

The HA501 802.11a Wireless Adapter is hot swappable, which means that you can insert it into a notebook PC that is either powered on or shut down. You may insert the HA501 Wireless Adapter into any available CardBus slot at any time. Some notebook computers have two CardBus slots; the HA501 Wireless Adapter can be inserted into either slot. Since the HA501 Wireless Adapter transmits and receives radio frequency signals through its antenna, there is no cable needed in the installation.

CHAPTER 4: DRIVER INSTALLATION

Windows 98 Driver Software

Installing Driver Software

To install the NETGEAR HA501 Wireless Adapter driver for the first time in Windows 98:
1. Follow the procedure described in the hardware installation chapter to install the HA501 Wireless Adapter into your notebook system. Power up the system if the wireless adapter was inserted with the power off.
2. Upon power up, Windows 98 automatically detects the existence of the HA501 Wireless Adapter. An Add New Hardware Wizard dialog box opens. Click "Next" to continue.
3. In the next Add New Hardware Wizard dialog box, select "Search for the best driver for your device (Recommended)." Click "Next".
4. The next Add New Hardware Wizard dialog box opens prompting for the location of the driver. Insert the *HA501 Wireless Adapter Resource* CD-ROM into the CD-ROM drive. Click "Browse".
5. Double-click the CD-ROM drive letter to look into the content of the CD-ROM.
6. Click "OK".
7. After returning to the original Add New Hardware Wizard dialog box, make sure that the "Specify a location:" entry field shows "D:\" assuming that D: is the driver letter for the CD-ROM drive. Click "Next".
8. The dialog box indicates that a Windows driver file is found. Windows is ready to install the best driver for this device. Click "Next".
9. Click "Finish" when informed that the driver installation is complete.
10. Click "Yes" when asked if you want to reboot the system.

The HA501 Wireless Adapter driver is now installed into your Windows 98 system.

Verifying Driver Installation

1. From the Windows 98 desktop, double-click the My Computer icon.
2. Double-click the Control Panel icon, and then double-click the System icon.
3. Click on the Device Manager folder tab.
4. Double-click Network Adapters. There should be no yellow exclamation mark or red cross-sign on the HA501 Wireless Adapter selection.
5. Double-click HA501 Wireless Adapter. The Device Status dialog box should indicate that the PC card is working properly.

The installation of the HA501 Wireless Adapter driver in Windows 98 is now completed. Proceed to install the HA501 802.11a Configuration Utility.

Windows Millennium Driver Software

Installing Driver Software

To install the NETGEAR HA501 Wireless Adapter driver for the first time in Windows Millennium:
1. Follow the procedure described in the hardware installation chapter to install the HA501 Wireless Adapter into your notebook system. Power up the system if the Wireless Adapter was inserted with the power off.
2. Upon power up, Windows Millennium automatically detects the existence of the HA501 Wireless Adapter. An Add New Hardware Wizard dialog box opens and indicates that new hardware has been found. Insert the *HA501 Wireless Adapter Resource* CD-ROM into the CD-ROM drive. Make sure that "Automatic search for a better driver (Recommended)" is selected. Click "Next" to continue.
3. Windows Millennium looks into the floppy disk drive and the CD-ROM drive for the appropriate driver. Windows Millennium automatically installs the appropriate driver from the CD-ROM for the HA501 Wireless Adapter. Click "Finish".
4. Click "Yes" when asked if you want to reboot the system.

The HA501 Wireless Adapter driver is now installed into your Windows Millennium system.

Verifying Driver Installation

1. From the Windows Millennium desktop, double-click the My Computer icon.
2. Double-click the Control Panel icon, then double-click the System icon.
3. Click on the Device Manager folder tab.
4. Double-click Network Adapters. There should be no yellow exclamation mark or red cross-sign on the NETGEAR HA501 Wireless Adapter selection.
5. Double-click the HA501 Wireless Adapter. The Device Status dialog box should indicate that the Wireless Adapter is working properly.

The installation of the HA501 Wireless Adapter driver in Windows Millennium is now completed. Proceed to install the HA501 802.11a Configuration Utility.

Windows NT 4.0 Driver Software

Microsoft Windows NT 4.0 is not a plug-and-play operating system and does not automatically detect and prompt you for installation of the Wireless Adapter driver. The driver installation has to be initiated manually.

Installing Driver Software

To install the NETGEAR HA501 Wireless Adapter driver for the first time in Windows NT 4.0:
1. Follow the procedure in the hardware installation chapter to install the HA501 Wireless Adapter into your notebook system. Power on the system if the Wireless Adapter was inserted with the power off.
2. From the Windows NT desktop, double-click the My Computer icon.
3. Double-click the Control Panel icon, and then double-click the Network icon.
4. Click on the "Adapter" tab and click the "Add" button to continue.
5. The Select Network Adapter dialog box opens listing a number of network adapter cards. Insert the *HA501 Wireless Adapter Resource* CD-ROM into the CD-ROM drive. Click "Have Disk…"
6. In the Insert Disk dialog box, enter "D:\" in the field provided assuming that D: is the driver letter for the CD-ROM drive. Click "OK".
7. The Select OEM Option dialog box opens listing the drivers from which to choose. Select "NETGEAR HA501 Wireless Adapter" and click "OK".
8. The Resources and Properties dialog box opens. Modify the IRQ or Memory Base if necessary. Click "OK".
9. The system returns back to the Network dialog box. Click "Close".
10. If TCP/IP is enabled, the system will prompt you for an IP address or use DHCP. Answer accordingly.
11. Click "Yes" when prompted if you want to reboot the system.

Verifying Driver Installation

1. From the Windows NT desktop, double-click the My Computer icon.
2. Double-click the Control Panel icon, and then click on the Devices tab.
3. A list of devices installed in the system will be shown. Scroll down the list to locate the *NETGEAR HA501 driver* entry. The Wireless Adapter entry should indicate that the Wireless Adapter is started.

Note: You may need to install the HA501 Wireless Adapter driver in a different CardBus slot if it's available.

The installation of the HA501 Wireless Adapter driver in Windows NT 4.0 is now completed. Proceed to install the HA501 802.11a Configuration Utility.

Windows 2000 Driver Software

Installing Driver Software

To install the NETGEAR HA501 Wireless Adapter driver for the first time in Windows 2000:
1. Follow the procedure described in the hardware installation chapter to install the HA501 Wireless Adapter. Power up the system if the Wireless Adapter was inserted with the power off.
2. Upon power up, Windows 2000 automatically detects the existence of the HA501 Wireless Adapter. A Found New Hardware Wizard dialog box opens and indicates that new hardware has been found. Click "Next".
3. In the next Found New Hardware Wizard dialog box, click to select "Search for a suitable driver for my device (recommended)". Click "Next" to continue.
4. The next Found New Hardware Wizard dialog box opens prompting for the location of the driver. Insert the *HA501 Wireless Adapter Resource* CD-ROM into the CD-ROM drive. Select "CD-ROM drives" and click "Next".
5. Windows searches the driver CD-ROM and locates the driver for the HA501 Wireless Adapter. Verify that Windows has found the driver in the "D:\" directory assuming that D: is the driver letter for the CD-ROM drive. Click "Next".
6. Click "Yes" to continue when Windows indicates that the Digital Signature is not found.
7. Windows indicates that the software for the HA501 Wireless Adapter is now installed. Click "Finish".

Verifying Driver Installation

1. From the Windows 2000 desktop, double-click the My Computer icon.
2. Double-click the Control Panel icon, then double-click the System icon.
3. Click on the Hardware folder tab. Double-click the Device Manager button.
4. Double-click Network Adapters. There should be no yellow exclamation mark or red cross-sign on the NETGEAR HA501 Wireless Adapter selection.
5. Double-click the HA501 Wireless Adapter. The Device Status dialog box should indicate that the Wireless Adapter is working properly.

The installation of the HA501 Wireless Adapter driver in Windows 2000 is now completed. Proceed to install the HA501 802.11a Configuration Utility.

Windows XP Driver Software

Installing Driver Software

To install the ireless Adapter driver for the first time in Windows XP:
1. Follow the procedure described in the hardware installation chapter to install the HA501 Wireless Adapter into your notebook system. Power up the system if the Wireless Adapter was inserted with the power off.
2. Upon power up, Windows XP automatically detects the existence of the HA501 Wireless Adapter. A Found New Hardware Wizard dialog box opens and indicates that new hardware has been found. Insert the *HA501 Wireless Adapter Resource* CD-ROM into the CD-ROM drive. Make sure that "Automatic search for a better driver (Recommended)" is selected. Click "Next" to continue.
3. Click "Continue Anyway" to continue when Windows XP indicates that the HA501 Wireless adapter has not passed Windows Logo testing.
4. Windows XP looks into the floppy disk drive and the CD-ROM drive for the appropriate driver. Windows XP automatically installs the appropriate driver from the CD-ROM for the HA501 Wireless Adapter. Click "Finish".
5. Click "Yes" when asked if you want to reboot the system.

The HA501 Wireless Adapter driver is now installed into your Windows XP system.

Verifying Driver Installation

1. From the Windows XP desktop, double-click the My Computer icon.
2. Double-click the Control Panel icon, and then double-click the Hardware icon.
3. Click on the Device Manager tab.
4. Double-click Network Adapters. There should be no yellow exclamation mark or red cross-sign on the NETGEAR HA501 Wireless Adapter selection.
5. Double-click HA501 Wireless Adapter. The Device Status dialog box should indicate that the Wireless Adapter is working properly.

The installation of the HA501 Wireless Adapter driver in Windows XP is now completed. If you want to setup your wireless network to use turbo mode with Windows XP, do not install the HA501 802.11a Configuration Utility now. If you do not want to use turbo mode, proceed to the Netgear 802.11a HA501 Configuration Utility installation instructions.

CHAPTER 5: WIRELESS LAN CONFIGURATION

Wireless Adapter Configuration Utility

NETGEAR supplies you with a wireless LAN configuration utility program to give you information on your wireless network, such as signal quality and link conditions, and to let you modify the various configurable wireless parameters.
➔**Note:** Users of Windows 98 or Me must reboot after making any configuration changes in the HA501 Configuration Utility.

➔**Note:** Users of Windows 98 or Me need to install the Windows Message Interface (WMI) to complete the installation of the HA501 Configuration Utility

➔**Note:** Users of Windows XP will have increased configuration capability if they use the HA501 802.11a Configuration Utility instead of using Windows XP to configure the wireless network settings. The Zero Configuration feature can be disabled in the Wireless Network Connection Properties window by uncheck the "**Use windows to configure my wireless network settings**" default setting.

Wireless Adapter Configuration Utility Installation

1. Insert the *HA501 Wireless Adapter Resource* CD-ROM into the CD-ROM drive. From the Windows desktop, double-click the My Computer icon. Double-click the CD-ROM drive letter to look into the content of the CD-ROM.
2. Double-click the SETUP application icon to start the installation procedure. The InstallShield Wizard opens. Click "Next" to continue.
3. Click "Yes" in the Software License Agreement dialog box to accept the agreement.
4. InstallShield starts copying files into your system.
5. Click "Finish" to complete the installation.

SysTray Application

The SysTray (System Tray) resides on one end of the taskbar in the Microsoft Windows desktop. It displays interface icons for memory-resident applications that execute in the background continuously, such as the clock, speaker volume, and virus detection. The wireless LAN configuration utility installation for the HA501 Wireless Adapter adds a configuration and status reporting utility icon in the SysTray.

HA501 Wireless Adapter SysTray icon

Once you have completed the utility installation, the Windows SysTray should show the icon in different colors. The table below explains the meaning of each color.

Icon color	Ad-hoc mode	Infrastructure mode
Red	The wireless adapter has not initiated communication with any other wireless node.	Either the wireless adapter is not able to link to any access point, or the link between the wireless adapter and the access point is lost.
Yellow	N/A	The link condition between the wireless adapter and the associated access point is weak.
Green	The wireless adapter has communicated successfully with another wireless node.	The wireless adapter has established good communication with an access point and the signal is strong.

Double-clicking the wireless adapter SysTray icon activates the wireless LAN configuration utility for the HA501 Wireless Adapter. You can click on any of the folder tabs in the NETGEAR HA501 802.11a Configuration Utility dialog box to view current status or modify the operational parameters.

Wireless LAN - Status

The Status section of the NETGEAR HA501 802.11a Configuration Utility dialog box shows you the current condition of the wireless LAN.
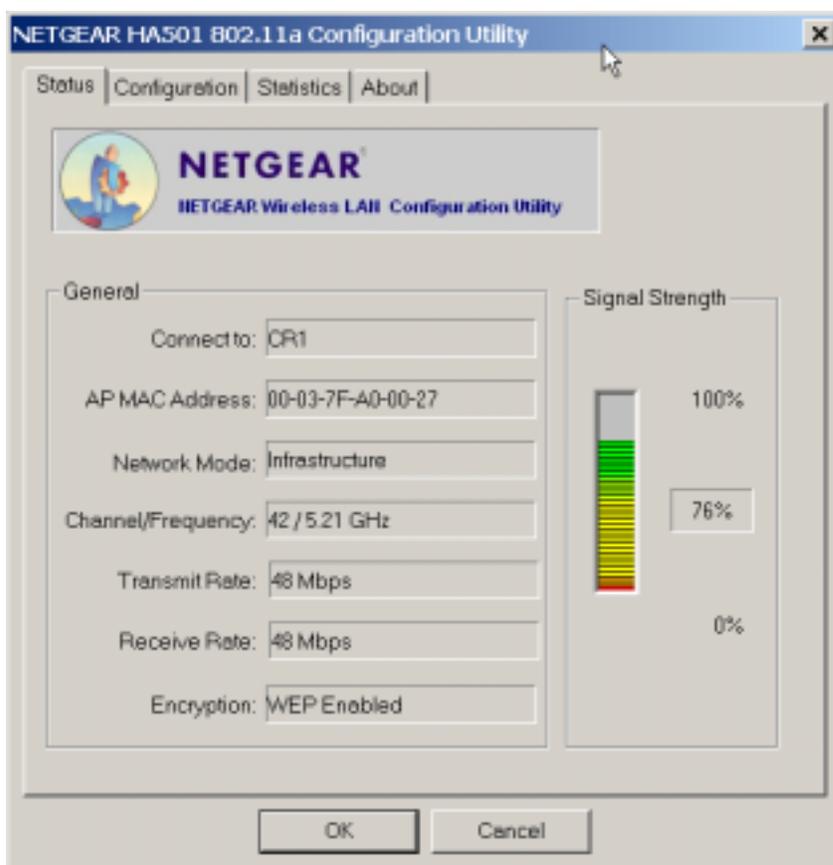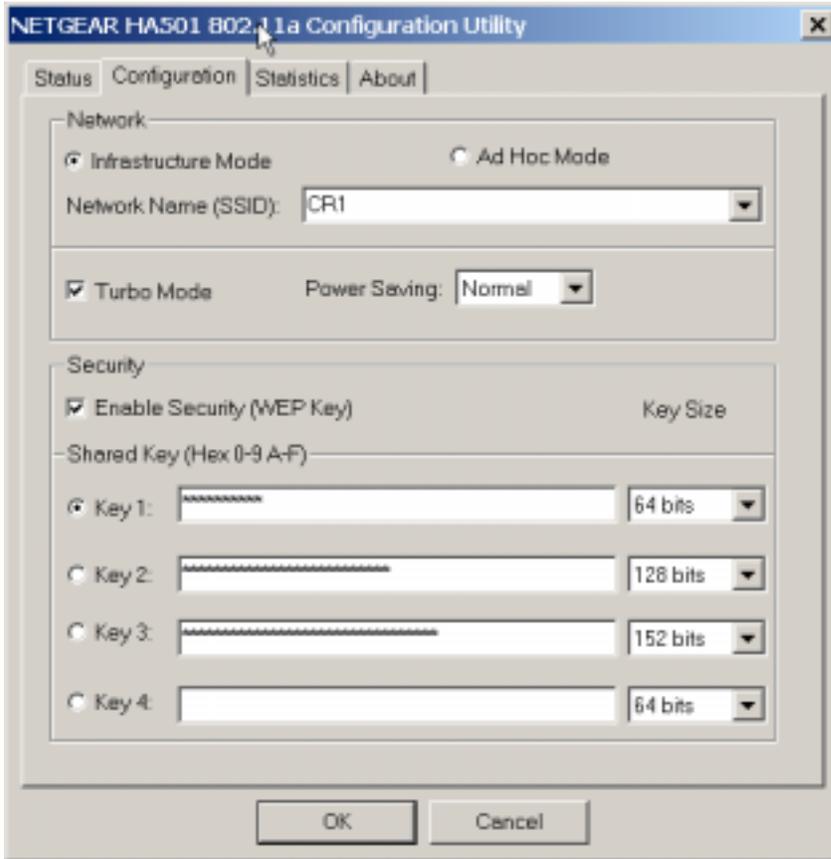

The table below describes the information displayed in the Status section of the dialog box.

Status	Description
Connect to	Displays the association of the access point or other wireless node in ad-hoc mode.
AP MAC Address	Shows the MAC address of the associated access point when the HA501 Wireless Adapter is configured in infrastructure mode.
Network Mode	Indicates the configuration mode used -- 802.11a ad-hoc mode, ad-hoc mode, or infrastructure mode. • *802.11a ad-hoc mode*: the wireless nodes form their own local network where the end nodes communicate peer-to-peer without an access point. • *Ad-hoc mode*: offers higher data throughput than 802.11a ad-hoc mode, but does not use beaconing or authentication. • *Infrastructure mode*: the wireless node searches all available wireless channels to associate with an access point. The default value for Network mode is Infrastructure.

Channel/Frequency	Shows the current channel and frequency in use. The wireless channel in use will be between 36 and 64.
Transmit Rate	Shows the current maximum transmit data rate of the wireless node. The possible data rates supported are: 54 Mbps, 48 Mbps, 36 Mbps, 24 Mbps, 18 Mbps, 12 Mbps, 9 Mbps, and 6 Mbps. It can go up to 72 Mbps if the turbo mode is enabled.
Receive Rate	Shows the current receive data transfer rate of the wireless node.
Encryption	Indicates if the WEP encryption is enabled or disabled.
Signal Strength	Displays the signal strength of the radio frequency signal received by the wireless node.

Wireless LAN - Configuration

The Configuration section of the NETGEAR HA501 802.11a Configuration Utility dialog box shows you the configuration parameters of the wireless LAN and allows you to modify them.


The table below describes the information displayed in the Configuration section of the NETGEAR HA501 802.11a Configuration Utility dialog box.

Configuration	Description
Network	Configurable between ad-hoc and infrastructure modes. In 802.11 ad-hoc mode, the wireless nodes form their own local network where the end nodes communicate peer-to-peer without an access point. In infrastructure mode, the wireless node searches all available wireless channels to associate with an access point.
Network Name (SSID)	Enter a 32-character (maximum) service set ID in this field; the characters are case sensitive. When the wireless node is operating in ad-hoc mode, this field operates as the basic service set ID (BSSID). All wireless nodes in the same network should use the same BSSID. When in infrastructure mode, this field defines the extended service set ID (ESSID). The ESSID assigned to the wireless node is required to match the access point ESSID in order for the wireless node to communicate with the access point.
Turbo Mode	Enabling turbo mode allows the wireless node to transmit or receive at a higher rate, up to 72 Mbps.

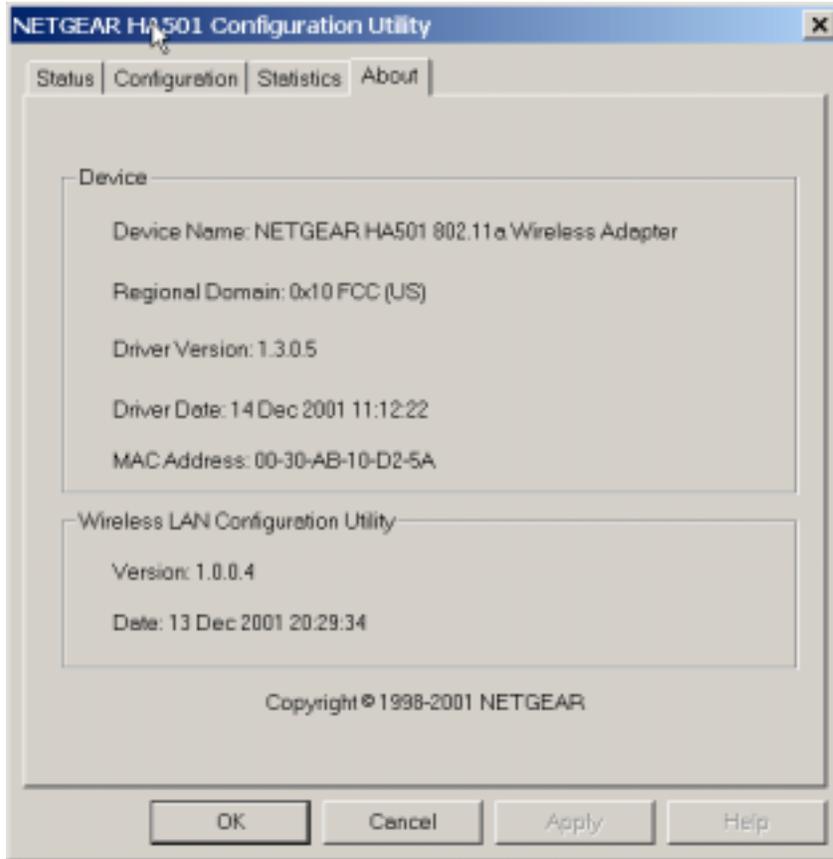|	
Power Saving	Supports optional power management to conserve battery life in Infrastructure mode. The three possible settings are off, normal, and maximum. The HA501 "wakes up" every 10-beacon interval to listen to the normal mode, but "wakes up" every 100-beacon interval in the maximum power saving mode.
Security: Enable Security	Sets the data encryption level for the wireless node. The data encryption level must be the same between all wireless nodes and access points within the same network. The possible values for the data encryption level are Disable, 64 bits, 128 bits, and 152 bits. (The 64-bit data encryption is also called 40-bit data encryption by some vendors.) For more Information on data encryption, please refer to the Wireless Network Fundamentals chapter at the beginning of this reference guide. Unchecking the Enable Security (WEP Key) box or setting the data encryption level to Disable is to not use any encryption; this is also called Open System data encryption. Setting the data encryption level to 64-bit configures the wireless node to use the 40-bit (also called 64-bit) Shared Key data encryption method. Use of 128-bit and 152-bit Shared Key data encryption methods are also possible.
Shared Key Entries	The HA501 device with WEP enabled uses a WEP key to encrypt and decrypt information. An HA501 Wireless adapter can support up to four WEP keys.

Wireless LAN - Statistics

The Statistics section of the NETGEAR HA501 802.11a Configuration Utility dialog box indicates the real-time Rx/Tx packets performance in graph form and also displays the performance statistics in figures.
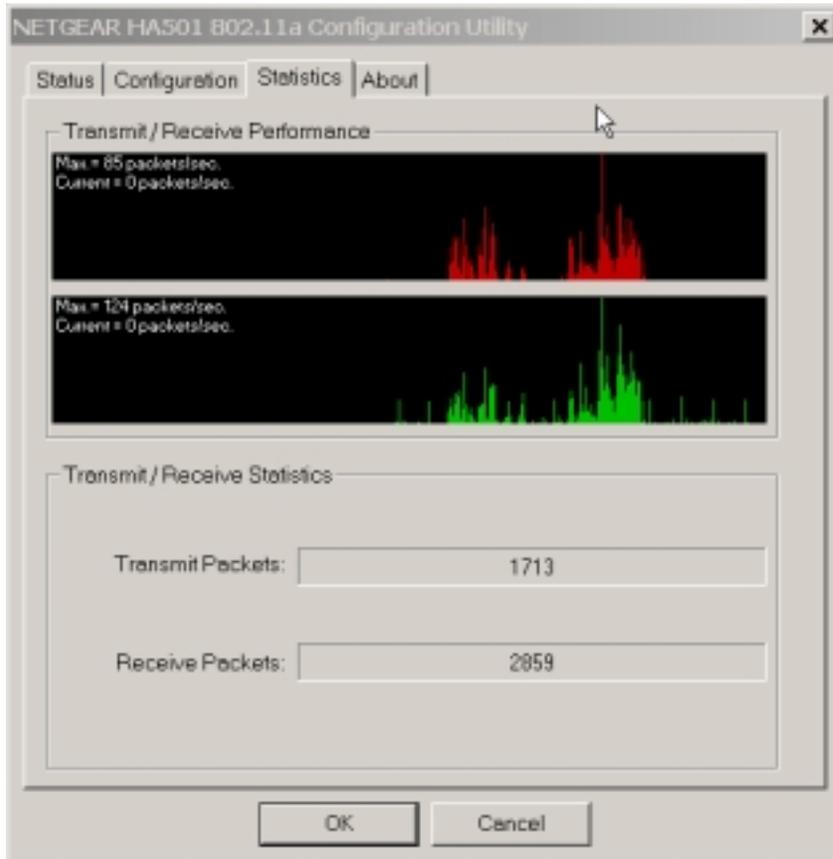
Wireless LAN - About

The About section of the NETGEAR HA501 802.11a Configuration Utility dialog box shows the release information of both the device driver for the wireless adapter and the wireless LAN configuration utility software.

CHAPTER 6: TROUBLESHOOTING

Problem	Cause	Solution
No lights are lit on the wireless adapter	The wireless card driver is not inserted into the CardBus PC card slot properly Or the proper HA501 wireless adapter driver is not loaded.	• Remove and reinsert the wireless adapter. • Check the device manager in Windows to see if the adapter card is properly recognized in the Windows operating system. Reload the driver if necessary. • Try to install the driver in different CardBus PC card slot on your Windows NT system if it's available.
The two LED's are blinking alternately	The wireless adapter is not associated to any access point properly. You may not have configured the wireless parameters of the wireless nodes to be the same as the access point.	• The access point may not be powered on. • The access point and the PC card are not configured with the same wireless parameters. Check into the SSID, Turbo mode option and WEP encryption settings. • The access point may be out of range. Try moving the system closer to the access point or readjusting the antenna on the access point. You may also move the access point to a higher location for better signal reception by the wireless adapter.
I am associated and connected to an access point, but I cannot see the other computers on the Ethernet side of the network	This could be a physical layer problem or a network configuration problem.	• Check to make sure that the access point is physically connected to the Ethernet network. • Make sure that the IP addresses and the Windows networking parameters are all configured correctly.

HARDWARE SPECIFICATIONS

Model	HA501 802.11a Wireless 32-bit CardBus Adapter		
Radio Data Rate	6, 9, 12, 18, 24, 36, 48, 54, 72 for Turbo mode (Auto rate capable)		
Frequency	5.15 ~ 5.25 GHz (lower band) for US/Canada, Japan 5.25 ~ 5.35 GHz (middle band) for US/Canada		

Range:
    @ 6 Mbps
    @ 54 Mbps
	Outdoor environment
	1200 ft.
	100 ft.
		Indoor environment
		300 ft.
		60 ft.	

Encryption	40-bit (also called 64-bit), 128-bit or 152-bit WEP data encryption		
Maximum computers per network	Limited by the amount of wireless network traffic generated by each node; typically 30 to 70 nodes.		
Bus interface	PCMCIA type II PC Card		
Provided drivers	Microsoft Windows 98, NT 4.0, 2000, Millennium, XP		
Dimensions	W: 88 mm (3.4 in) D: 54 mm (2.1 in) H: 5 mm (0.2 in)		
Weight	43.4 g (1.6 oz)		
Status LEDs	Power/Network		
Electromagnetic Compliance	FCC Part 15 Class B and Class E		
Environmental Specifications	Operating temperature: 0 to 60° C Operating humidity: 5-95%, noncondensing		
Warranty	Limited 5-year warranty		