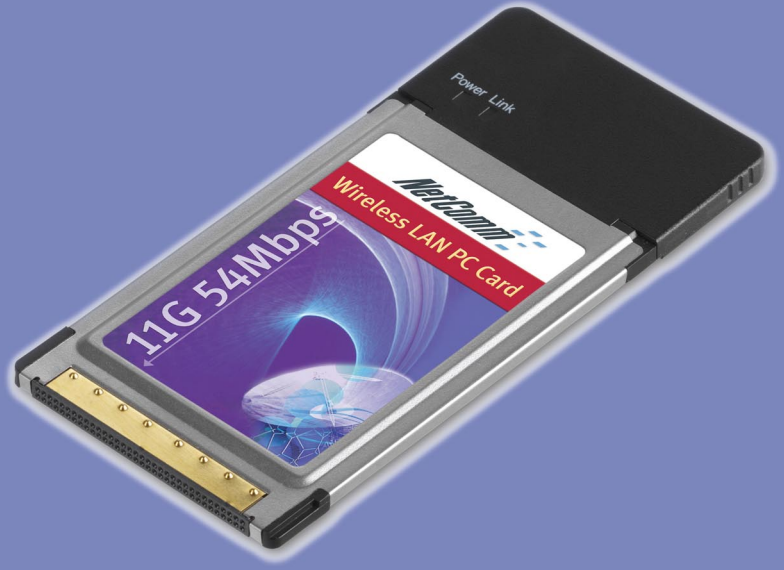
AUSTRALIA CONNECTS WITH NetComm®

NP5430

Wireless LAN PC Card

11G 54Mbps WIRELESS LAN PC CARD



User Guide

Contents

Chapter 1 - Introduction

Thank you for purchasing the NetComm Wireless LAN PC Card. This high-speed Wireless LAN PC Card provides you with an innovative wireless networking solution. The Adapter is easy to set up and use and, with innovative wireless technology of 11G, you can share files and printers on the network-without wires!

Wireless-G (802.11g) is the 54Mbps wireless networking standard that's almost five times faster than the widely deployed Wireless-B (802.11b) products found in homes, businesses, and public wireless hotspots around the country - but since they share the same 2.4GHz radio band, Wireless-G devices can also work with existing 11Mbps Wireless-B equipment. The new NetComm 11g PC Card Adapter from NetComm has both standards built in, so you can connect your notebook to existing 802.11b infrastructure, and also the new screaming fast Wireless-G networks.

Along with the device Drivers for Windows Operating Systems, your are also provided with a utility for the configuration of the Adapter. The Utility, as well as the installation steps of the plug-and-play procedure for the Windows operating systems, is described in this document.

Features

The NetComm Wireless LAN PC Card offers compliance with the IEEE 802.11g specification. This feature allows them to communicate with other wireless devices that support the standard. Features of the Adapter are:

- High-speed Wireless-G (802.11g) networking for your notebook computer
- Data rates up to 54Mbps -- 5 times faster than Wireless-B (802.11b)
- Also interoperates with Wireless-B networks (at 11Mbps)
- Wireless security -- up to 128-bit WEP encryption

What is Wireless LAN?

Wireless Local Area Network (WLAN) systems offer a great number of advantages over traditional wired systems. WLAN is flexible and easy to setup and manage. They are also more economical than wired LAN systems.

Using radio frequency (RF) technology, WLAN transmit and receive data through the air. WLAN combine data connectivity with user mobility. For example, users can roam from a conference room to their office without being disconnected from the LAN.

Using WLAN, users can conveniently access-shared information, and network administrators can configure and augment networks without installing or moving network cables.

WLAN technology provides users with many convenient and cost saving features:

- **Mobility:** WLAN provide LAN users with access to real-time information anywhere in their organization, providing service opportunities that are impossible with wired networks.

- **Ease of Installation:** Installing is easy for novice and expert users alike, eliminating the need to install network cables in walls and ceilings.
- **Scalability:** WLAN can be configured in a variety of topologies to adapt to specific applications and installations. Configurations are easily changed and range from peer-to-peer networks suitable for a small number of users to full infrastructure networks of thousands of users roaming over a broad area.

Wireless LAN Modes

Wireless LANs can be configured in one of two ways:

Ad-hoc Networking

Also known as a peer-to-peer network, an ad-hoc network is one that allows all workstations and computers in the network to act as servers to all other users on the network. Users on the network can share files, print to a shared printer, and access the Internet with a shared modem. However, with ad-hoc networking, users can only communicate with other wireless LAN computers that are in the wireless ad-hoc workgroup, and are within range.

Infrastructure Networking

Infrastructure networking differs from ad-hoc networking in that it requires an access point. Unlike the ad-hoc structure where users on the LAN contend the shared bandwidth, on an infrastructure network the access point can manage the bandwidth to maximize bandwidth utilization. Additionally, the access point enables users on a wireless LAN to access an existing wired network, allowing wireless users to take advantage of the wired networks resources, such as Internet, email, file transfer, and printer sharing. Infrastructure networking has the following advantages over ad-hoc networking:

- Extended range: each wireless LAN computer within the range of the access point can communicate with other wireless LAN computers within range of the access point.
- Roaming: the access point enables a wireless LAN computer to move through a building and still be connected to the LAN.
- Wired to wireless LAN connectivity: the access point bridges the gap between wireless LANs and their wired counterparts.

Notes on Wireless LAN Configuration

When configuring a wireless LAN (WLAN), be sure to note the following points:

- Optimize the performance of the WLAN by ensuring that the distance between access points is not too far. In most buildings, WLAN Adapters operate within a range of 30 - 100 meters, depending on the thickness and structure of the walls.
- Radio waves can pass through walls and glass but not metal. If there is interference in transmitting through a wall, it may be that the wall has reinforcing metal in its structure. Install another access point to circumvent this problem.
- Floors usually have metal girders and metal reinforcing struts that interfere with WLAN transmission.

Chapter 2 - Hardware Installation

This chapter covers installing your NetComm Wireless LAN PC Card into a CardBus slot in your notebook.

Package Contents

Please make sure that items below are included on package.

- One NetComm Wireless LAN PC Card
- One CD containing drivers and documentation
- One User Guide

System Requirements for the Adapter

- Operating System: Microsoft Windows 98/ME/2000/XP
- Notebook with CD-ROM drive
- One free CardBus slot
- Pentium-Class 90MHz or higher

Hardware description

The Wireless LAN PC Card is encased in a stainless compact frame and has a 68-pin connector for attaching to the CardBus port of notebook.

Inserting the Wireless LAN PC Card

Note! These instructions apply to most notebook computers. For detailed information on inserting PC cards into your notebook, consult the notebook manual.

Follow the procedure below to install the Wireless LAN PC Card.

1. With 68-pin connector of the card facing the CardBus slots on notebook, slide the card all the way into an empty slot.
2. If this is the first time the card has been inserted you will be prompted to install drivers. See Chapter 3 for details.

LED Indicators

The following table describes the meaning of LED indicators:

LED	MEANING
POWER	Indicates that the Adapter is powered on (solid green).
LINK	Indicates link status. It is normally blinking. When blinking, indicates that the card is scanning the channels, and the link is not active. When lit, indicates that the card is locked to a channel, and the link is active.

Ejecting the Wireless LAN PC Card

After disconnecting from the LAN, you can eject the Wireless LAN PC Card from the PC Card slot of notebook.

Note! In Windows XP/2000/ME/98 operating systems, you do not have to power down the notebook to remove the card. The card is hot-swappable - you can remove the card when the notebook is powered on. However, Microsoft recommends that you stop the card. Refer to your Windows 2000/ME/98 online help for information on stopping the Wireless LAN PC Card.

Most notebooks have an eject lever or button for ejecting PC cards from the PC slots. Consult your notebook manual for details.

Warning! To prevent data loss, do not eject the Wireless LAN PC Card when a data transmission is taking place. Exit your communications program normally, stop the card if necessary, and then remove the card.

After hardware installation is completed, please go to Chapter 3 to install driver on different Operating System.

Chapter 3 - Driver Installation for Windows

The following sections cover NetComm Wireless LAN PC Card driver installation in the Windows Operating Systems.

Note! You have to install your hardware first before you begin to install the drivers.

Driver installation for Windows 98

Follow the steps below to install the NetComm Wireless LAN PC Card drivers for Windows 98.

1. Insert the NetComm Wireless LAN PC Card into a CardBus slot in the notebook. (Refer to Chapter 2 - Hardware installation.)
2. After Windows 98 detects the NetComm Wireless LAN PC Card, the Add New Hardware Wizard window appears. Clicks Next to continue the installation.
3. A screen appears prompting you to select an installation method. Select Search for the best driver for your device. (Recommended) and click Next to continue.
4. Ensure that the CD-ROM drive is selected. Insert the driver CD-ROM into your CD-ROM drive and click Next to continue.
5. Click Next to continue the installation.
6. Windows 98 copies files to your hard disk. Click Finish to finish the installation.
7. You will be instructed to restart your computer to complete the installation. Click Yes to reboot the system. After a system reboot, the Wireless LAN Utility will be installed automatically. Please go to Chapter 4 to install the utility.

Note! In most cases, Windows will automatically copy all of the files needed for networking. If Windows asks you for the files and prompts you to input the path to the files. Follow the instructions on your screen, and then click OK to continue.

Driver installation for Windows 2000

Follow the steps below to install the NetComm Wireless LAN PC Card drivers for Windows 2000.

1. Insert the NetComm Wireless LAN PC Card into a CardBus slot in the notebook. (Refer to Chapter 2 - Hardware installation.)
2. After Windows 2000 detects the NetComm Wireless LAN PC Card, the Found New Hardware Wizard window appears. Click Next to start the installation.
3. A screen appears prompting you to select an installation method. Select Search for a suitable driver for my device (recommended) and click Next to continue.
4. Ensure that the CD-ROM driver is selected and insert the driver CD-ROM into your CD-ROM drive and click Next to continue.
5. Follow the on screen instructions to complete the driver installation

Then system will start to install Wireless LAN Utility. Please refer to procedures at Chapter 4.

Driver installation for Windows ME

Follow the steps below to install the NetComm Wireless LAN PC Card drivers for Windows ME.

1. Insert the NetComm Wireless LAN PC Card into a CardBus slot in the notebook. (Refer to Chapter 2 - Hardware installation.)
2. After Windows ME detects the NetComm Wireless LAN PC Card, the Add New Hardware Wizard window appears. Select Automatic search for a better driver (Recommended) and insert the driver CD-ROM into CD-ROM drive and click Next to continue.
3. The system will find the setup files and follow the instruction to copy files to your hard disk. Click Finish to finish the installation.
4. You will be instructed to restart your computer to complete the installation. Click Yes to reboot the system. After a system reboot, the Wireless LAN Utility will be installed automatically. Please go to Chapter 4 to install the utility.

Note! In most cases, Windows will automatically copy all of the files needed for networking. If Windows asks you for the files and prompts you to input the path to the files. Follow the instructions on your screen, and then click OK to continue.

Driver installation for Windows XP

Follow the steps below to install the NetComm Wireless LAN PC Card drivers for Windows XP.

1. Insert the NetComm Wireless LAN PC Card into a CardBus slot in the notebook. (Refer to Chapter 2 - Hardware installation.)
2. After Windows XP detects the NetComm Wireless LAN PC Card, the Found New Hardware Wizard window appears. Select Install the software automatically [Recommended] and insert the driver CD-ROM into CD-ROM drive and click Next to continue.
3. Windows will warn you that the driver is not signed. Click Continue Anyway to continue the installation.
4. When Windows has finished installing software for the device, click Finish to finish the installation.

Then system will start to install Wireless utility automatically. Please refer to procedures in Chapter 4.

Chapter 4 - Installing and Using the Wireless Utility

The following sections cover the NetComm Wireless LAN PC Card utility installation and configuration.

Installation in Windows

After you have installed driver, your system will start to install Wireless LAN Utility. Please follow the steps below to install the utility.

1. When the InstallShield begins, click Next to continue.
2. The screen will show you the default destination chosen by the utility. Click Next to continue or click the Browse button to select an alternate destination.
3. The InstallShield will add program icons to the Program Folder. You may type a new folder name or select one from the existing folders list. Click Next to continue or click Back to review or change any settings.
4. The settings of the Wireless LAN PC Card will be displayed. Click Next to continue or click Back to change the Destination Folder in step 3.
5. Once Windows has finished installing Wireless LAN Utility a screen will be displayed advising you to restart your computer to finish the installation. Click Finish to reboot the system.

After you have installed the utility, you will see the Wireless LAN Utility icon in the Windows taskbar.

Configuring the Wireless LAN PC Card

There are two ways to configure the NetComm Wireless LAN PC Card. One is via the Wireless LAN Utility; and the other is via the Windows Wireless Network Configuration (Windows XP only).

Using the Windows Wireless Network Configuration (Windows XP only)

1. Click the right key of the mouse and Exit Wireless LAN Utility.
2. Click Windows Wireless Network Configuration icon.
3. Click Advanced… button.
4. Make sure "Use Windows to configure my wireless network settings" is checked and click OK.
5. Click the Windows Wireless Network Configuration icon again to open the Windows Wireless Network Configuration.
6. Select an available network and click Connect button.
7. The Windows Wireless Network Configuration will be enabled. Click the Windows Wireless Configure icon. Windows Wireless Network Configuration is enabled
8. Click Properties to start Windows Wireless Network Configuration.

Using the Wireless LAN PC Card Utility (Windows XP only)

1. Exit the Wireless LAN Utility.
2. Click Windows Wireless Network Configuration icon.
3. Click Advanced… button.
4. Make sure "Use Windows to configure my wireless network settings" is unchecked and click OK button.
5. Click Start -> All Programs -> Click Start -> All Programs -> "54Mbps WLAN Card Utility" then click "NetComm NP5430 WLAN utility" to restart the NetComm WLAN PC Card.
6. The Wireless LAN Utility will appear, Double-click the icon to open the configuration utility.
7. Click Re-Scan button to start Wireless LAN Utility. (Refer to Configuring the NetComm Wireless LAN PC Card.)

Using the Wireless LAN Utility In Windows 98, 2000 and ME

Wireless LAN Utility icon

Icon	**Meaning**
Green:	indicates a connection is linked to a wireless network.
Red:	indicates that the Wireless LAN PC Card is looking for an available access point.

Double-click the icon to open the Wireless LAN Utility. (Refer to the section on Configuring the Wireless LAN PC Card.)

Using the Wireless LAN PC Card

1. When the Wireless LAN Utility launches, the first screen will identify the status of your current connection. Click Re-Scan to search for wireless connection (the adapter will search for the connection automatically when it is activated).
2. Select the "Configuration" tab.

   The profile setting allows you to save configurations in different profiles for different working environments. The default profile will contain the initial configuration setting when you install the Card.

   Under the Operating Mode drop-box, you may choose either Infrastructure or Ad-Hoc. The Infrastructure mode allows a wireless adapter to communicate with a wired network employing an Access Point, while the Ad-Hoc mode allows wireless-to-wireless, peer-to-peer communication.

   If you choose Infrastructure, the SSID should have the same name as the Access Point. If you choose Ad-Hoc, all clients should share the same SSID name. You may also select which Transfer Rate you wish to use: 1, 2, 5.5, 11Mbps or Auto Rate.

   Under Power Saving Mode, you can select Enabled to allow your adapter to go to sleep mode while the adapter doesn't precede the data transmission. Or select Disabled to make the adapter never go to sleep mode.

   Click Apply to save the settings.
3. Select the "Site Survey" tab.

   The list shows you available Access Points and their features. Click on the desired Access Point, and then click Connect to connect or Search to search for more Access Points.

   Click OK when you are finished.
4. Click on the "Encryption" tab.

   Under the drop-box, you can choose to have WEP encryption Disabled, 64-Bit, or 128-Bit. Wired Equivalent Privacy (WEP) is an encryption scheme used to protect wireless data communication.

   The Disabled setting prevents the sharing of data with other computers on the WEP network.

   For data sharing to be enabled, select the level of encryption desired, either 64 or 128-bit.
5. Select the "Advanced" tab.

   You can choose the fragmentation threshold to define the maximum data frame size your adapter will transmit. When the packet error rate is high, you may set the threshold value to transmit shorter frames.

   You may select RTS/CTS threshold to define when will your adapter send out RTS/CTS frames to reserve bandwidth for transmission. By using the RTS/CTS function, you may request bandwidth from AP to allow you have better chance to send out your data.

For the Security, it's only applicable while WEP is enabled.

For the Authentication Type, the current supported algorithms are Open System, Shared Key, and Auto. The algorithm will be invoked when associated to Access Point. To associate to the desired Access Point you must set the same algorithm as the one of the desired Access Point.

When selecting Auto mode, the driver can auto detect the Authentication Type of the Access Point you are going to associate.

You can also select Preamble Type, which is for framing synchronization. The possible setting are Long and Short. The setting must be the same as the setting of the Access Point you are going to associate.

6. The "About" tab shows you copyright and version information about the driver, the configuration utility, and the firmware.

   Click OK to complete the configuration.

Chapter 5 - Installing Network Protocols

Protocols are necessary for computers to be recognized on your network. Windows 2000 users need to check their Windows User Guides for protocol installation.

Installing the Network Protocols for Windows 98 and Millennium

1. From the Start Menu, select Settings and bring up the Control Panel. From the Control Panel, double-click on the Network icon.

Note! Before adding any network protocols, verify that the protocol is not already installed. Never install duplicate protocols.

2. Select NetComm NP5430 - 11G Wireless PC card sfrom the list and click the Add button.
3. Highlight Protocol and click the Add button.
4. Select Microsoft from the list of "Manufacturers" and TCP/IP from the list of "Network" Protocols" and click the OK button to finish the installation.

Appendix A: Troubleshooting

Common Problems and Solutions

This appendix provides solutions to problems that may occur during the installation and operation of the NetComm 11g PC Card Adapter. Read the descriptions below to solve your problems.

1. My computer does not recognize the Adapter.
   - Make sure the Adapter is properly inserted into the CardBus slot. Note that the Adapter can be inserted either way, but is correctly only when it is inserted so that the "Instant Wireless" logo on the front of the Adapter cannot be seen. If in doubt, try inserting the Adapter both ways. The Adapter will slide in further when it is correct.
2. The Adapter does not work properly.
   - Reinsert the Adapter into your notebook's CardBus slot. A beep should be heard if the Adapter is properly inserted.
   - For non-Windows environments, make sure that a PCMCIA card service driver is installed on your PC.
   - Open the Control Panel and click the PC Card. Check whether it has a PCMCIA card in one of the sockets or not. If you find the Adapter in one of the sockets, it means that the Adapter has been detected properly. If you see a yellow question mark, the resources are in conflict.
   - Right-click My Computer and select Properties. Select Device Manager and click the Network Adapter. You will find the NetComm 11g PC Card Adapter if it is installed successfully. If you see the yellow exclamation mark, the resources are in conflict. Click PCMCIA card and then click PCMCIA card service. You will see the status of the Adapter. If there is a yellow question mark please check the following:
   - Make sure that your notebook has a free IRQ.
   - Make sure that you have inserted the right Adapter and installed the proper driver.

     If the Adapter does not function after attempting the above steps, remove the Adapter and do the following:
   - Uninstall the driver software from your PC.
   - Restart your PC and repeat the hardware and software installation as specified in this User Guide.
3. I cannot communicate with a wired computer linked via an access point in the infrastructure configuration.
   - Make sure that the notebook PC is powered on.
   - Make sure that the Adapter is configured with the same SSID and security options as the other computers in the infrastructure configuration.

Frequently Asked Questions

Can I run an application from a remote computer over the wireless network?

This will depend on whether or not the application is designed to be used over a network. Consult the application's user guide to determine if it supports operation over a network.

Can I play computer games with other members of the wireless network?

Yes, as long as the game supports multiple players over a LAN (local area network). Refer to the game's user guide for more information.

What is the IEEE 802.11b standard?

It is one of the IEEE standards for wireless networks. The 802.11b standard allows wireless networking hardware from different manufacturers to communicate, provided that the hardware complies with the 802.11b standard. The 802.11b standard states a maximum data transfer rate of 11Mbps and an operating frequency of 2.4GHz.

What IEEE 802.11b features are supported?

The product supports the following IEEE 802.11b functions:

- CSMA/CA plus Acknowledge protocol
- Multi-Channel Roaming
- Automatic Rate Selection
- RTS/CTS feature
- Fragmentation
- Power Management

What is ad-hoc mode and what is Infrastructure mode?

An Ad-hoc wireless LAN is a group of computers, each with a WLAN adapter, connected as an independent wireless LAN. An Ad-hoc wireless LAN is applicable when no AP is available or you wish to run a private network not joined to the corporate network.

An integrated wireless and wired LAN is called an Infrastructure configuration. Infrastructure is applicable to enterprise scale for wireless access to a wired network via an AP.

What is roaming?

Roaming is the ability of a portable computer user to communicate continuously while moving freely throughout an area greater than that covered by a single access point. Before using the roaming function, the workstation must make sure that it is the same channel number with the access point of dedicated coverage area.

To achieve true seamless connectivity, the wireless LAN must incorporate a number of different functions. Each node and access point, for example, must always acknowledge receipt of each message. Each node must maintain contact with the wireless network even when not actually transmitting data. Achieving these functions simultaneously requires a dynamic RF networking technology that links access points and nodes. In such a system, the user's end node undertakes a search for the best possible access to the system. First, it evaluates such factors as signal

strength and quality, as well as the message load currently being carried by each access point and the distance of each access point to the wired backbone. Based on that information, the node next selects the right access point and registers its address. Communications between end node and host computer can then be transmitted up and down the backbone.

As the user moves on, the end node's RF transmitter regularly checks the system to determine whether it is in touch with the original access point or whether it should seek a new one. When a node no longer receives acknowledgment from its original access point, it undertakes a new search. Upon finding a new access point, it then re-registers, and the communication process continues.

What is ISM band?

The FCC and their counterparts outside of the U.S. have set aside bandwidth for unlicensed use in the ISM (Industrial, Scientific and Medical) band. Spectrum in the vicinity of 2.4 GHz, in particular, is being made available worldwide. This presents a truly revolutionary opportunity to place convenient high-speed wireless capabilities in the hands of users around the globe.

What is Spread Spectrum?

Spread Spectrum technology is a wideband radio frequency technique developed by the military for use in reliable, secure, mission-critical communications systems. It is designed to trade off bandwidth efficiency for reliability, integrity, and security. In other words, more bandwidth is consumed than in the case of narrowband transmission, but the trade-off produces a signal that is, in effect, louder and thus easier to detect, provided that the receiver knows the parameters of the spread-spectrum signal being broadcast. 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, WLAN offers the encryption function (WEP) to enhance security and access control.

What is WEP?

WEP is Wired Equivalent Privacy, a data privacy mechanism based on a shared key algorithm, as described in the IEEE 802.11 standard.

Appendix B: Glossary

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	Refers to the extension of the IEEE 802.11 standard for wireless networking. The 802.11g specifications used by NetComm specifies 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.
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.
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.
Default Gateway	The router 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. DNS - The domain name system (DNS) is the way that Internet domain name are located and translated into Internet Protocol (IP) addresses. A domain name is a meaningful and easy-to-remember "handle" for an Internet address.
DSSS	(Direct-Sequence Spread Spectrum) - DSSS generates a redundant bit pattern for all transmitted data. 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 endpoint), the DSSS signal is recognized as the only valid signal, and interference is inherently rejected (ignored).
Dynamic IP Address	An IP address that is automatically assigned to a client station in a TCP/IP network, typically by a DHCP server. Network devices that serve multiple users, such as servers and printers, are usually assigned static IP addresses.
ESS	(Extended Service Set) - A set of more than two or more BSSs (multiple access points) forming a single network.
Firmware	Code that is written onto read-only memory (ROM) or programmable read-only memory (PROM). Once firmware has been written onto the ROM or PROM, it is retained even when the device is turned off.
IEEE	The Institute of Electrical and Electronics Engineers. The IEEE describes itself as "the world's largest technical professional society-promoting the development and application of electrotechnology and allied sciences for the benefit of humanity, the advancement of the profession, and the wellbeing of our members." The IEEE fosters the development of standards that often become national and international standards. The organization publishes a number of journals, has many local chapters, and several large societies in special areas, such as the IEEE Computer Society.

Infrastructure Network	An infrastructure network is a group of computers or other devices, each with a wireless adapter, connected as an 802.11 wireless LAN. In infrastructure mode, the wireless devices communicate with each other and to a wired network by first going through an access point. An infrastructure wireless network connected to a wired network is referred to as a Basic Service Set (BSS). A set of two or more BSS in a single network is referred to as an Extended Service Set (ESS). Infrastructure mode is useful at a corporation scale, or when it is necessary to connect the wired and wireless networks.
IP Address	In the most widely installed level of the Internet Protocol (IP) today, an IP address is a 32-binary digit number that identifies each sender or receiver of information that is sent in packet across the Internet. When you request an HTML page or send e-mail, the Internet Protocol part of TCP/IP includes your IP address in the message (actually, in each of the packets if more than one is required) and sends it to the IP address that is obtained by looking up the domain name in the Uniform Resource Locator you requested or in the e-mail address you're sending a note to. At the other end, the recipient can see the IP address of the Web page requester or the e-mail sender and can respond by sending another message using the IP address it received.
IPCONFIG	A utility that provides for querying, defining and managing IP addresses within a network. A commonly used utility, under Windows NT and 2000, for configuring networks with static IP addresses.
ISP	An ISP (Internet service provider) is a company that provides individuals and companies access to the Internet and other related services such as Web site building and virtual hosting.
LAN	A local area network (LAN) is a group of computers and associated devices that share a common communications line and typically share the resources of a single processor or server within a small geographic area (for example, within an office building).
MACAddress	The MAC (Media Access Control) address is your computer's unique hardware number.
mIRC	mIRC runs under Windows and provides a graphical interface for logging onto IRC servers and listing, joining and leaving channels.
Network Mask	also known as the "Subnet Mask."

OFDM	Developed for wireless applications, Orthogonal Frequency Division Multiplexing (OFDM) technology offers superior performance-increased data rates and more reliable transmissions-than previous technologies, such as DSSS. OFDM is a scheme in which numerous signals of different frequencies are combined to form a single signal for transmission on the medium. OFDM works by breaking one high-speed data stream into a number of lower-speed data streams, which are then transmitted in parallel. Each lower speed stream is used to modulate a subcarrier. Essentially, this creates a multi-carrier transmission by dividing a wide frequency band or channel into a number of narrower frequency bands or sub-channels. OFDM is also used for other applications, including powerline networking.
Plug-and-Play	The ability of a computer system to configure expansion boards and other devices automatically without requiring the user to turn off the system during installation.
Roaming	In an infrastructure mode wireless network, this refers to the ability to move out of one access point's range and into another and transparently reassociate and reauthenticate to the new access point. This reassociation and reauthentication should occur without user intervention and ideally without interruption to network connectivity. A typical scenario would be a location with multiple access points, where users can physically relocate from one area to another and easily maintain connectivity.
SSID	(Service Set Identifier) - An identification name that wireless devices use to make connections. In order for wireless devices to communicate, they must all be set to the same channel and they all must use the same SSID. For instance, if you are using an access point to connect two computers using wireless devices, the access point and each of the wireless devices must use the same SSID. Even if they are set to the same channel, they cannot communicate unless the SSID is the same.
Static IP Address	A permanent IP address that is assigned to a node in a TCP/IP network.
Subnet Mask	The method used for splitting IP networks into a series of subgroups, or subnets. The mask is a binary pattern that is matched up with the IP address to turn part of the host ID address field into a field for subnets.

TCP	(Transmission Control Protocol) - A method (protocol) used along with the IP (Internet Protocol) to send data in the form of message units (datagram) between network devices over a LAN or WAN. While IP takes care of handling the actual delivery of the data (routing), TCP takes care of keeping track of the individual units of data (called packets) that a message is divided into for efficient delivery over the network. TCP is known as a "connection oriented" protocol due to requiring the receiver of a packet to return an acknowledgment of receipt to the sender of the packet resulting in transmission control.
TCP/IP	(Transmission Control Protocol/Internet Protocol) - The basic communication language or set of protocols for communications over a network (developed specifically for the Internet). TCP/IP defines a suite or group of protocols and not only TCP and IP.
UDP	(User Datagram Protocol) - A method (protocol) used along with the IP (Internet Protocol) to send data in the form of message units (datagram) between network devices over a LAN or WAN. While IP takes care of handling the actual delivery of the data (routing), UDP takes care of keeping track of the individual units of data (called packets) that a message is divided into for efficient delivery over the network. UDP is known as a "connection-less" protocol due to NOT requiring the receiver of a packet to return an acknowledgment of receipt to the sender of the packet (as opposed to TCP).
WEP	(Wired Equivalent Privacy) - A data privacy mechanism based on a 64-bit shared key algorithm, as described in the IEEE 802.11b standard.
WINIPCFG	Configuration utility based on the Win32 API for querying, defining and managing IP addresses within a network. A commonly used utility under Windows 95, 98SE, and Me.
WLAN	(Wireless Local Area Network) - A group of computers and associated devices that communicate with each other wirelessly.

Specifications

PHYSICAL SPECIFICATIONS

Type	Cardbus32 interface
Standards	IEEE802.11g WLAN Standard
Antenna	PCB antenna
Power	DC3.3V
Dimensions	115 x 54 x 7.5 mm
Weight	41.5g

RADIO SPECIFICATIONS

Media Access Protocol	IEEE802.11
Bit Error Rate	-68.9dBm @ 54Mbps OFDM, 10% PER - 86.1dBm @ 11Mbps CCK , 8% PER
Frequency	2.4-2.4835GHz (Industrial Scientific Medical Band)
Channels	11 Channels (USA, Canada) 13 Channels (Europe & Australia) 14 Channels for 802.11b, 13 Channels for 802.11g (Japan & Australia)
Data Rate	54Mbps/48Mbps/36Mbps/24Mbps/12Mbps/11Mbps/9Mbps/ 6Mbps/ 5.5Mbps/2Mbps/1Mbps
Modulation Technique	BPSK / QPSK / CCK / OFDM
Output Power	18 dBm (typical) at 11Mbps CCK 13 dBm (typical) at 54Mbps OFDM
Receiver Sensitivity	-88dBm @ 11M CCK -68dBm @ 54M OFDM
Coverage Area	Indoor 100mOutdoor 400m

SOFTWARE SPECIFICATIONS

Device Drivers	Support Windows 98/ 2000/XP/ME
Roaming	802.11 compliant
WEP	Support 64-bit & 128-bit encryption

ENVIRONMENTAL

Temperature	0 to 55 ° C
Relative humidity	10% to 90%

Registering your NetComm Product

To ensure that the conditions of your warranty are complied with, please go to the NetComm web site for quick and easy registration of your product at

www.netcomm.com.au

Alternatively, you can complete the Warranty Registration Form on the following page and mail it to NetComm Limited, PO Box 1200, Lane Cove NSW 2066.

Trademarks and Notices

Please note that the images used in this document may vary slightly from those of the actual product. Specifications are accurate at the time of the preparation of this document but are subject to change without notice.

Cut along the line

Warranty Registration Form

Date of Purchase .....

Name .....

Company .....

Address .....

..... Post Code .....

Tel No ( ) ..... Fax No ( ) .....

E-mail .....

The following information is vital for your warranty

Please make sure it's correct and complete.

Serial No .....

Model .....

Product Type:

- ☐ PC Card
- ☐ External
- ☐ Internal
- ☐ Other

! Make sure you fill this section in!

I intend to use this modem at:

- ☐ Home
- ☐ School/College/University
- ☐ Business
- ☐ Government Office

Dealer's Name .....

Dealer's Address .....

..... Post Code .....

Tel No ( ) ..... Fax No ( ) .....

How did you find out about our products?

.....

.....

Product Warranty

The warranty is granted on the following conditions:

1. This warranty extends to the original purchaser (you) and is not transferable;
2. This warranty shall not apply to software programs, batteries, power supplies, cables or other accessories supplied in or with the product;
3. The customer complies with all of the terms of any relevant agreement with NetComm and any other reasonable requirements of NetComm including producing such evidence of purchase as NetComm may require;
4. The cost of transporting product to and from NetComm's nominated premises is your responsibility; and,
5. NetComm does not have any liability or responsibility under this warranty where any cost, loss, injury or damage of any kind, whether direct, indirect, consequential, incidental or otherwise arises out of events beyond NetComm's reasonable control. This includes but is not limited to: acts of God, war, riot, embargoes, acts of civil or military authorities, fire, floods, electricity outages, lightning, power surges, or shortages of materials or labour.
6. The customer is responsible for the security of their computer and network at all times. Security features may be disabled within the factory default settings. NetComm recommends that you enable these features to enhance your security.

The warranty is automatically voided if:

1. You, or someone else, use the product, or attempts to use it, other than as specified by NetComm;
2. The fault or defect in your product is the result of a voltage surge subjected to the product either by the way of power supply or communication line, whether caused by thunderstorm activity or any other cause(s);
3. The fault is the result of accidental damage or damage in transit, including but not limited to liquid spillage;
4. Your product has been used for any purposes other than that for which it is sold, or in any way other than in strict accordance with the user manual supplied;
5. Your product has been repaired or modified or attempted to be repaired or modified, other than by a qualified person at a service centre authorised by NetComm; and,
6. The serial number has been defaced or altered in any way or if the serial number plate has been removed.

Limitations of Warranty

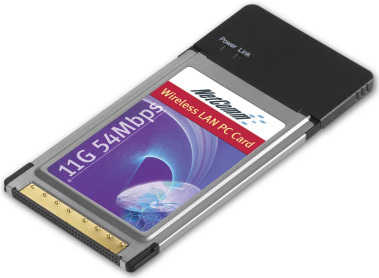
The Trade Practices Act 1974 and corresponding State and Territory Fair Trading Acts or legalisation of another Government ("the relevant acts") in certain circumstances imply mandatory conditions and warranties which cannot be excluded. This warranty is in addition to and not in replacement for such conditions and warranties.

To the extent permitted by the Relevant Acts, in relation to your product and any other materials provided with the product ("the Goods") the liability of NetComm under the Relevant Acts is limited to, at the option of NetComm to:

- Replacement of the Goods; or
- Repair of the Goods; or
- Payment of the cost of replacing the Goods; or
- Payment of the cost of having the Goods repaired.

All NetComm ACN 002 490 486 products have a standard 12 months warranty from date of purchase. However some products have an extended warranty option (refer to packaging). To be eligible for the extended warranty you must supply the requested warranty information to NetComm within 30 days of the original purchase by registering on-line via the NetComm web site at www.netcomm.com.au.

NetComm reserves the right to request proof of purchase upon any warranty claim.



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AUSTRALIA CONNECTS WITH NetComm®

Wireless LAN PC Card

11G 54Mbps WIRELESS LAN PC CARD

NP5430