

NetComm[®]
Broadband Solutions

User Guide



NP643

Super-G 108Mbps Wireless PC Card

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INTRODUCTION

Congratulations on your purchase of the NP643 108Mbps IEEE 802.11g Wireless PC Card Adapter.

This manual is designed to help familiarise users with the product and offers detailed operational and installation instructions, so please keep it for future reference.

With the NP643 Wireless (IEEE 802.11g) PC Card Adapter, a laptop or notebook computer can communicate with another computer wirelessly. User friendly Utility software is bundled with the NP643 product providing configuration, monitoring and diagnostic options.

The NP643 can wirelessly transmit and receive data at a speed of 108 megabits per second, which is up to 15 times the speed of previous wireless devices. The NP643 is designed to handle bandwidth intensive applications and heavy multimedia content. Its compact design reduces cable and wire clutter around the workspace while providing fast secure network transfer rates.

The NP643 has the most advanced security features available today with 128 Bit WEP encryption and WPA security.

The Wireless PC Card Adapter is easy to configure for peer-to-peer networks, suitable for a small number of users, or for full infrastructure networks that allow broad area roaming.

System Requirements

- Laptop computer with an available 32 bit Cardbus slot
- Windows 98SE/ME/2000/XP/2003
- 128 MB memory and a 500MHz Processor
- CR-ROM Drive
- 20Mb spare disk storage

Wireless Terminology

Wireless Standards

802.11, 802.11b and 802.11g all refer to a series of standards which govern a common method of creating wireless local area networks (WLANs).

802.11b and 11g are the most common WLAN types, with 11g being the later and faster of the two standards with a maximum transmission rate of 54Mbps.

The NP643 is faster again as it is built around a processor which ‘turbo-charges’ transmission rates up to 108Mbps.

802.11g is ‘backward compatible’ with 802.11b, which means that the two standards are able to communicate, albeit at the lower 11Mbps rate of the 11b standard.

The NP643 can communicate with both kinds of device at their maximum rate, and with other ‘turbo-charged’ devices at the much higher rate of 108Mbps.

Wireless Security Terms

The Advanced Features of the NP643 include the ability to select from several types of Wireless Security.

WEP

WEP stands for Wired Equivalent Privacy. Introduced with 802.11b, WEP uses encryption to protect data confidentiality by way of pre-shared keys (passwords or pass-phrases) that are entered at both ends. Superseded by WPA and 802.11i but still in use.

WPA

WPA stands for Wi-Fi Protected Access - authorizes and identifies users based on a secret key that changes automatically at a pre-defined interval. This is called TKIP (Temporal Key Integrity Protocol) to change the temporal key every 10,000 packets (= unit of data.) Keys can either be pre-shared or established by a RADIUS Server.

RADIUS

RADIUS is part of 802.11i security; this is a wireless standard which is only concerned with wireless security standards. Authentication is based around a secure server with a challenge-and-response method of interaction which verifies the identity of the client wishing to connect to the network. If you wish to connect to a RADIUS server ask the Network Administrator for details. RADIUS servers are not usually used as part of home networks.

GETTING TO KNOW YOUR NP643

This chapter provides unpacking and setup information for the NP643 Wireless PC Card Adapter.

Package Contents

Open the box of the Wireless PC Card Adapter and carefully unpack it. The box should contain the following items:

- One 108Mbps IEEE 802.11g Wireless PC Card Adapter

- One Driver & Utility with User's Guide CD-ROM



If any item is found missing or damaged, please contact your local reseller for replacement.

NP643 LED Indicators



LED	Indicator
Power (PWR)	The PWR indicator lights green to indicate that it is receiving power from the PC Card slot. If the PWR indicator light is off, it is not receiving power.
ACT (Activity)	The ACT indicator blinks green while the Wireless PC Card is transmitting data.

SOFTWARE INSTALLATION

This section will guide you through the driver and utility installation procedure for the NP643.

Windows 98se/ME/2000/XP Utility and Driver Installation

1. Insert the Driver & Utility CD-ROM into the CD-ROM Drive. The driver and utility setup menu should start up and install the driver. In some cases you may need to install the software manually. This depends on your operating system settings. Go to your Windows Start menu and choose Run, type “D:\Utility\Setup.exe” in the dialog box (where D:\ will depend on where your CD-ROM drive is located) and click OK.
2. If you need to install the driver manually, refer your Windows Operating System (OS) to the following CD-Rom directory path: D:\Driver\<<Windows OS>\net5211.inf.
Note: (D:\ will depend on where the CD-ROM drive is located and <Windows OS> will depend on the Windows OS you are using).
3. The Install Shield Wizard screen will appear. Click “Next” to continue.
4. The installation program will help you setup the Wireless PC Card utility.
Note: Windows XP has its own Wireless Utility; you can either use the utility of Windows XP or the provided utility.
5. Once the Wireless PC Card Adapter is installed, you will find a new icon on the windows task bar. The colour of the icon represents the strength of the wireless signal.

Icon	Description
	If the icon is completely green, you have excellent coverage and performance.
	If the icon is yellow, the signal strength has a fair coverage and performance.
	If the icon has no color, signal strength is poor.



HARDWARE INSTALLATION

Installation Check

The LEDs of the Wireless PC Card Adapter are clearly visible and the status of the network link can be seen instantly:

1. Once the device is plugged in to the PC Card slot, the Power LED will light up indicating a normal status.
2. Once the driver is installed, the ACTIVE and POWER LED's will start flashing. This means the adapter is starting to scan for other wireless devices within its range.
3. While the Wireless PC Card Adapter is connected and transmitting data to an Access Point or to another Wireless LAN station, the Active LED will start blinking.

USING THE WIRELESS UTILITY

I. Link Information

Launch the utility program by double clicking the utility icon in the Windows task bar.

The default page is as below after launching the Utility program.

108Mbps Wireless LAN Adapter Configuration Utility

Link Info

- Configuration
- Advanced
- Site Survey
- About

Status: Associated BSSID=00-0D-88-EB-B3-88

SSID: Default

Frequency: 2437 MHz

Wireless Mode: Infrastructure

Encryption: WEP Disable

Tx Rate: 12 Mbps

Channel: 6

Rescan

Link Quality/Signal Strength

Link Quality: 73%

Signal Strength: 100%

Data Rate

Transmit: 0 Kbps

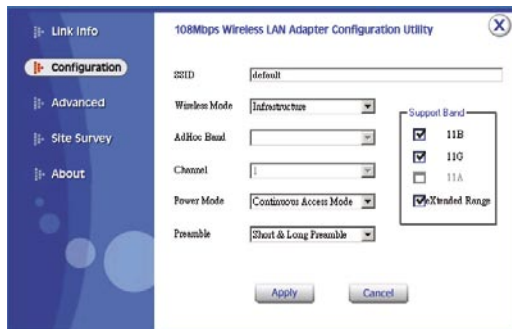
Receive: 0 Kbps

Field	Description
Status:	Shows the BSSID (or Mac address) of the adaptor, which can be used to identify it on the wireless network.
SSID:	Shows current SSID, which must be the same for the all wireless devices in order for communication to be established.
Frequency:	Shows the current frequency used for the wireless network.

Field	Description
Wireless Mode:	Shows the current wireless mode used for wireless communication.
Encryption:	Shows the current encryption mode used in the wireless network.
TxRate:	Shows the current data rate used for transmitting.
Channel:	Shows the current communication channel.
Link Quality:	Shows the link quality of the NP643 Wireless PC card with the Access Point when operating under Infrastructure mode.
Signal Strength:	Shows the strength of the wireless signal between the NP643 Wireless PC card and the Access Point.
Data Rate:	Shows the statistics of the data transfer rate. The calculation is based on the number of packets transmitted and received.

II. Configuration

In the configuration page you can change the basic settings of the PC card to implement a secure wireless network.



Field	Description
-------	-------------

SSID: Service Set Identifier, which is a unique name shared among all clients and nodes in a wireless network. The SSID must be identical for each client and node in the wireless network. Give your network a name which you will remember but which does not obviously identify it to the outside world.

Wireless Mode: There are two types available for selection:

- **Infrastructure** – to establish wireless communication with the LAN and other wireless clients through the use of Access Points.

Field Description

- **Ad-Hoc** – to establish peer-to-peer wireless communication directly with other wireless client devices such as other computers with wireless cards.

Ad-Hoc Band: There are three bands available for selection- 11B, 11G and 11G Turbo. Choice depends on the type of wireless equipment you wish to connect to. Check the documentation of the associated equipment to verify details.

Channel: The channel value that the PC card will operate in. Australian Users should select the Channel Range 1-13 and all stations on the WLAN need to be on the same channel if they are to communicate.

Tx Rate: Select the data rate for data transmission.

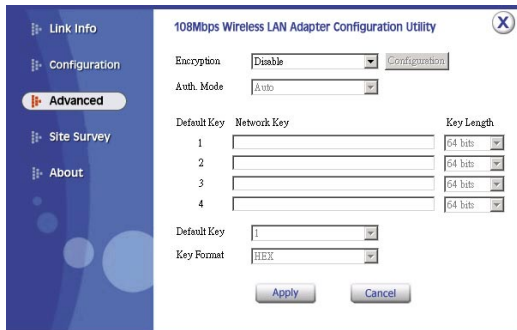
Power Mode: There are 3 modes to choose from:

- **Continuous Access Mode (default)** – the PC card is constantly operating with full power and it consumes the most power.
- **Maximum Power Save** – the PC card consumes the least power and only operates when there is wireless network activity.
- **Power Save** – the PC card consumes a moderate level of power.

Field	Description
Preamble:	Select Long Preamble or Short & Long Preamble type. Leave as default unless advised otherwise by your Network Administrator.
Support Band:	There are three functions for you to select, including 11B, 11G and eXtended Range. The default setting is 11B, 11G and eXtended Range enabled, which is interoperable with both 11B and 11G devices, and provides a connectivity range of 500m.
Note:	You must select at least 11B or 11G to support your wireless connection.

III. Advanced

In the Advanced page you can configure advanced settings for the 108Mbps wireless LAN PC card.



Field

Description

Encryption:

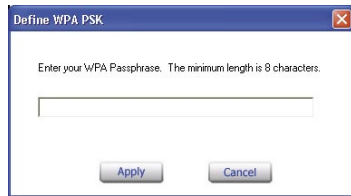
There are four options available: Disable (WEP), Enable (WEP), WPA and WPA-PSK. The default setting is set to “Disable”. Enable and Disable refer to WEP data encryption feature. If Enable is selected, you will be required to select the Authentication mode from the drop down list. If WPA is selected, configuration is enabled. Select the “configuration” button.

You will then be prompted with the following pop up window.



Select the certificate that you wish to use and enter the server name and login name; this refers to RADIUS Server technology which is generally not in use in the home environment; check with your Network Administrator if you are required to enter this in order to log on to a secure network.

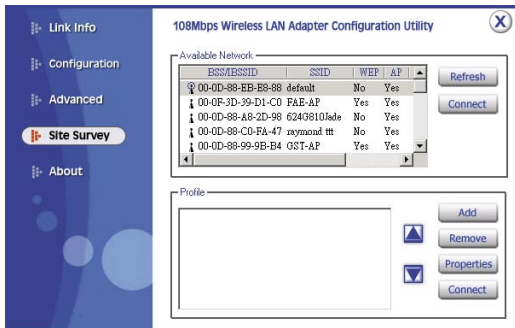
If WPA-PSK is selected, click the configuration button. You will then be prompted with the following pop up window.



Field	Description
	<p>Please enter a key. If you are joining an existing network, ask the Administrator for the key. If you are setting up the network, create a key; any combination of letters and numbers up to 32 characters with no spaces.</p>
Auth. Mode:	<p>There are three modes available to choose from:</p> <ul style="list-style-type: none">• Open Authentication – the sender and receiver do not share a secret Key for communication. Instead, each party generates its own key-pairs and asks the other party to accept it. The key is regenerated when the connection is established every time.• Shared Authentication – the sender and receiver shares the common key for data communication, and the key is used for extended length of time.• Auto – requires communication to be established, and automatically use the proper authentication mode. <p>The following will only be activated to allow for configuration when Encryption is enabled.</p>
Default Key:	Select one of the 4 keys to use.
Network Key:	Choose the encryption, either in HEX or ASCII formats, and enter the password in the blank space.
Key Length:	Select 64 or 128 bits as the length of the keys
Key Format:	ASCII or HEX

IV. Site Survey

This page allows you to enable the site survey function, which scans for available wireless networks (wireless clients & access points) and establishes a wireless communication with one.



Field

Description

Available Network: Displays the wireless networks (wireless clients and Access Points) that are in your signal range.

Select any one of them to establish communications by simply double-clicking or by clicking on the “Connect” button.

Click the “Refresh” button to start scanning for available networks again.

Field	Description
Profile:	You can create and manage profiles for Home, offices or public areas. Double-Click on one of the created profiles. The settings will adapt to the configuration such as SSID, channel, and WEP settings saved by that particular profile.
Remove:	To remove the selected profile
Properties:	To view and change settings.
Add:	To add a profile. You will be prompted with the following popup screen. You can enter the necessary information required for accessing Access Points or Wireless Router.

Add New Profile

Profile Name: DesignF22

SSID: DesignF22

Wireless Mode: Infrastructure

Channel: 11

Tx Rate: 1100

Power Mode: Continuous Access Mode

Data Encryption WPA WPA2

Auth Mode: 802.11

Default Key: Network Key Key Length

Key 1: [14 bits]

Key 2: [14 bits]

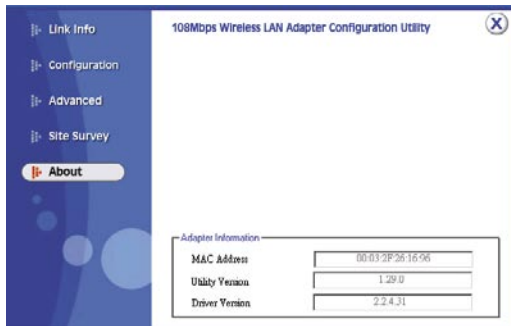
Key 3: [14 bits]

Key 4: [14 bits]

Key Format: HEX

V. About

This page displays some information about the NP643 108Mbps Wireless PC Card Adapter. It contains the Driver & Utility Version as well as the MAC address. This feature is useful when you need to identify utility and driver versions as updates become available.



APPENDIX A: Glossary

Access Point:	An internetworking device that seamlessly connects wired and wireless networks.
Ad-Hoc:	An independent wireless LAN network formed by a group of computers, each with a network adapter.
AP Client:	One of the additional AP operating modes offered by a 54Mbps Access Point, which allows the Access Point to act as an Ethernet-to-Wireless Bridge, thus a LAN or a single computer station can join a wireless ESS network through it.
ASCII:	American Standard Code for Information Interchange, ASCII, is one of the two formats that you can use for entering the values for WEP key. It represents English letters as numbers from 0 to 127.
Authentication Type:	Indication of an authentication algorithm which can be supported by the Access Point. Open System: Open System authentication is the simplest of the available authentication algorithms. Essentially it is a null authentication algorithm. Any station that requests authentication with this algorithm may become authenticated if 802.11 Authentication Type at the recipient station is set to Open System authentication.

Shared Key: Shared Key authentication supports authentication of stations as either a member of those who knows a shared secret key or a member of those who does not.

Backbone: The core infrastructure of a network, which transports information from one central location to another where the information is unloaded into a local system.

Bandwidth: The transmission capacity of a device, which is calculated by how much data the device can transmit in a fixed amount of time expressed in bits per second (bps).

Beacon: A beacon is a packet broadcast by the Access Point to keep the network synchronized. Included in a beacon are information such as wireless LAN service area, the AP address, the Broadcast destination addresses, time stamp, Delivery Traffic Indicator Maps, and the Traffic Indicator Message (TIM).

Bit: A binary digit, which is either -0 or -1 for value, is the smallest unit for data.

Bridge: An internetworking function that incorporates the lowest 2 layers of the OSI network protocol model.

Browser: An application program that enables one to read the content and interact in the World Wide Web or Intranet.

BSS: BSS stands for “Basic Service Set”. It is an Access Point and all the LAN PCs that associated with it.

- Channel:** The bandwidth which wireless Radio operates is divided into several segments, which we call them “Channels”. AP and the client stations that it associated work in one of the channels.
- CSMA/CA:** In local area networking, this is the CSMA technique that combines slotted time -division multiplexing with carrier sense multiple access/collision detection (CSMA/CD) to avoid having collisions occur a second time. This works best if the time allocated is short compared to packet length and if the number of situations is small.
- CSMA/CD:** Carrier Sense Multiple Access/Collision Detection, which is a LAN access method used in Ethernet. When a device wants to gain access to the network, it checks to see if the network is quiet (senses the carrier). If it is not, it waits a random amount of time before retrying. If the network is quiet and two devices access the line at exactly the same time, their signals collide. When the collision is detected, they both back off and wait a random amount of time before retrying.
- DHCP:** Dynamic Host Configuration Protocol, which is a protocol that lets network administrators manage and allocate Internet Protocol (IP) addresses in a network. Every computer has to have an IP address in order to communicate with each other in a TCP/IP based infrastructure network. Without DHCP, each computer must be entered in manually the IP address. DHCP enables the network administrators to assign the IP from a central location and each computer receives an IP address upon plugged with the Ethernet cable everywhere on the network.

DSSS:	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.
Dynamic IP Address:	An IP address that is assigned automatically to a client station in a TCP/IP network by a DHCP server.
Encryption:	A security method that uses a specific algorithm to alter the data transmitted, thus prevent others from knowing the information transmitted.
ESS:	ESS stands for "Extended Service Set". More than one BSS is configured to become Extended Service Set. LAN mobile users can roam between different BSSs in an ESS.
ESSID:	The unique identifier that identifies the ESS. In infrastructure association, the stations use the same ESSID as AP's to get connected.
Ethernet:	A popular local area data communications network, originally developed by Xerox Corp., that accepts transmission from computers and terminals. Ethernet operates on a 10/100 Mbps base transmission rate, using a shielded coaxial cable or over shielded twisted pair telephone wire.

Fragmentation:	When transmitting a packet over a network medium, sometimes the packet is broken into several segments, if the size of packet exceeds that allowed by the network medium.
Fragmentation Threshold:	The Fragmentation Threshold defines the number of bytes used for the fragmentation boundary for directed messages. The purpose of "Fragmentation Threshold" is to increase the transfer reliability through cutting a MAC Service Data Unit (MSDU) into several MAC Protocol Data Units (MPDU) in smaller size. The RF transmission cannot allow to transmit too big frame size due to the heavy interference caused by the big size of transmission frame. But if the frame size is too small, it will create the overhead during the transmission.
Gateway:	A device that interconnects networks with different, incompatible communication protocols.
HEX:	Hexadecimal, HEX, consists of numbers from 0 – 9 and letters from A – F.
IEEE:	The Institute of Electrical and Electronics Engineers, which is the largest technical professional society that promotes the development and application of electrotechnology and allied sciences for the benefit of humanity, the advancement of the profession. The IEEE fosters the development of standards that often become national and international standards.
Infrastructure:	An infrastructure network is a wireless network or other small network in which the wireless network devices are made a part of the network through the Access Point which connects them to the rest of the network.

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 2.4GHz, in particular, is being made available worldwide.
MAC Address:	Media Access Control Address is a unique hex number assigned by the manufacturer to any Ethernet networking device, such as a network adapter, that allows the network to identify it at the hardware level.
Multicasting:	Sending data to a group of nodes instead of a single destination.
Multiple Bridge:	One of the additional AP operating modes offered by 54Mbps Access Point, which allows a group of APs that consists of two or more APs to connect two or more Ethernet networks or Ethernet enabled clients together. The way that multiple bridge setups is based on the topology of Ad-Hoc mode.
Node:	A network junction or connection point, typically a computer or workstation.
Packet:	A unit of data routed between an origin and a destination in a network.
PLCP:	Physical layer convergence protocol
PPDU:	PLCP protocol data unit

Preamble:	The 'preamble' is a sequence of bits transmitted at 1Mbps that synchronises wireless transmission within the network. The Short Preamble and header may be used to minimize overhead and, thus, maximize the network data throughput. However, the Short Preamble is supported only by the IEEE 802.11b (High- Rate) standard and not by the original IEEE 802.11 standard; meaning that stations using Short-Preamble cannot communicate with stations implementing the original version of the protocol.
PSDU:	PLCP service data unit
Roaming:	A LAN mobile user moves around an ESS and enjoys a continuous connection to an Infrastructure network.
RTS: Request	To Send. An RS-232 signal sent from the transmitting station to the receiving station requesting permission to transmit.
RTS Threshold:	Transmitters contending for the medium may not be aware of each other. RTS/CTS mechanism can solve this "Hidden Node Problem". If the packet size is smaller than the preset RTS Threshold size, the RTS/CTS mechanism will NOT be enabled.
SSID:	Service Set Identifier, which is a unique name shared among all clients and nodes in a wireless network. The SSID must be identical for each clients and nodes in the wireless network.
Subnet Mask:	The method used for splitting IP networks into a series of sub-groups, 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/IP:** Transmission Control Protocol/ Internet Protocol. The basic communication language or protocol of the Internet. It can also be used as a communications protocol in a private network, i.e. intranet or internet. When you are set up with direct access to the Internet, your computer is provided with a copy of the TCP/IP program just as every other computer that you may send messages to or get information from also has a copy of TCP/IP.
- Throughput:** The amount of data transferred successfully from one point to another in a given period of time.
- WEP:** Wired Equivalent Privacy (WEP) is an encryption scheme used to protect wireless data communication. To enable the icon will prevent other stations without the same WEP key from linking with the AP.
- Wireless Bridge:** One of the additional AP operating modes offered by 54mpbs Access Point, which allows a pair of APs to act as the bridge that connects two Ethernet networks or Ethernet enabled clients together.

APPENDIX B: Registration and Warranty Information

All NetComm Limited (“NetComm”) products have a standard 12 month warranty from date of purchase against defects in manufacturing and that the products will operate in accordance with the specifications outlined in the User Guide. However some products have an extended warranty option (please refer to your 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

Contact Information

If you have any technical difficulties with your product, please do not hesitate to contact NetComm’s Customer Support Department.

Email: support@netcomm.com.au
Fax: (+612) 9424-2010
Web: www.netcomm.com.au

Copyright Information

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NetComm Limited reserves the right to change the specifications and operating details of this product without notice. NetComm is a registered trademark of NetComm Limited. All other trademarks are acknowledged the property of their respective owners.

Customer Information

ACA (Australian Communications Authority) requires you to be aware of the following information and warnings:

- (1) This unit shall be connected to the Telecommunication Network through a line cord which meets the requirements of the ACA TS008 Standard.
- (2) This equipment has been tested and found to comply with the Standards for C-Tick and or A-Tick as set by the ACA. These standards are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio noise and, if not installed and used in accordance with the instructions detailed within this manual, may cause interference to radio communications. However, there is no guarantee that interference will not occur with the installation of this product in your home or office. If this equipment does cause some degree of interference to radio or television reception, which can be determined by turning the equipment off and on, we encourage the user to try to correct the interference by one or more of the following measures:
 - Change the direction or relocate the receiving antenna.
 - Increase the separation between this equipment and the receiver.
 - Connect the equipment to an alternate power outlet on a different power circuit from that to which the receiver/TV is connected.
 - Consult an experienced radio/TV technician for help.
- (3) The power supply that is provided with this unit is only intended for use with this product. Do not use this power supply with any other product or do not use any other power supply that is not approved for use with this product by NetComm. Failure to do so may cause damage to this product, fire or result in personal injury.

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 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.



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