NetComm

NETWORKING & COMMUNICATIONS CONVERGED

CORPORATE SERIES
10/100 Mbps ETHERNET SWITCH

NP2160 ProSwitch 16-Port

Quick Start Guide

Contents

ABOUT THIS GUIDE

Congratulations on your purchase of the NetComm 16-port 10/100Mbps Fast Ethernet ProSwitch. This device integrates 100Mbps Fast Ethernet and 10Mbps Ethernet network capabilities in a highly flexible package.

Purpose

This guide discusses how to install your NetComm 16-port 10/100Mbps Fast Ethernet ProSwitch.

Terms/Usage

In this guide, the term "ProSwitch" or "Switch" (first letter upper case) refers to your NetComm16-port 10/100Mbps Fast Ethernet ProSwitch, and "switch" (first letter lower case) refers to other Ethernet switches.

Overview of this User's Guide

Introduction.

Describes the Switch and its features.

Unpacking and Installation.

Helps you get started with the basic installation of the Switch.

Identifying External Components.

Describes the front panel, rear panel and LED indicators of the Switch.

Using the ProSwitch

Describes the different applications of the NetComm16-port 10/100Mbps Fast Ethernet ProSwitch.

Trouble Shooting

Provided to assist you in the event that you experience difficulties.

Cabling Guidelines

Gives the guidelines for the different cables used when building a network.

Technical Specifications.

Lists the technical (general, physical and environmental, and performance) specifications of the Switch.

INTRODUCTION

This chapter describes the features of the Switch and some background information about Ethernet/Fast Ethernet switching technology.

Fast Ethernet Technology

The growing importance of LANs and the increasing complexity of desktop computing applications are fueling the need for high performance networks. A number of high-speed LAN technologies have been proposed to provide greater bandwidth and improve client/server response times. Among them, 100BASE-T (Fast Ethernet) provides a non-disruptive, smooth evolution from the current 10BASE-T technology. The non-disruptive and smooth evolution nature, and the dominating potential market base, virtually guarantee cost effective and high performance Fast Ethernet solutions in the years to come.

100Mbps Fast Ethernet is a new standard specified by the IEEE 802.3 LAN committee. It is an extension of the 10Mbps Ethernet standard with the ability to transmit and receive data at 100Mbps, while maintaining the CSMA/CD Ethernet protocol. Since the 100Mbps Fast Ethernet is compatible with all other 10Mbps Ethernet environments, it provides a straightforward upgrade and takes advantage of the existing investment in hardware, software, and personnel training.

Switching Technology

Another approach to pushing beyond the limits of Ethernet technology is the development of switching technology. A switch bridge Ethernet packets at the MAC address level of the Ethernet protocol transmitting among connected Ethernet or Fast Ethernet LAN segments.

Switching is a cost-effective way of increasing the total network capacity available to users on a local area network. A switch increases capacity and decreases network loading by dividing a local area network into different segments, which don't compete with each other for network transmission capacity.

The switch acts as a high-speed selective bridge between the individual segments. The switch, without interfering with any other segments, automatically forwards traffic that needs to go from one segment to another. By doing this the total network capacity is multiplied, while still maintaining the same network cabling and adapter cards.

For Fast Ethernet networks, a switch is an effective way of eliminating problems of chaining hubs beyond the "two-repeater limit." A switch can be used to split parts of the network into different collision domains, making it possible to expand your Fast Ethernet network beyond the 205-meter network diameter limit for 100BASE-TX networks. Switches supporting both traditional 10Mbps Ethernet and 100Mbps Fast Ethernet are also ideal for bridging between the existing 10Mbps networks and the new 100Mbps networks.

Switching LAN technology is a marked improvement over the previous generation of network bridges, which were characterized by higher latencies. Routers have also been used to segment local area networks, but the cost of a router, the setup and maintenance required make routers relatively impractical. Today switches are an ideal solution to most kinds of local area network congestion problems.

Features

The ProSwitch is designed for easy installation and high performance in an environment where traffic on the network and the number of user increase continuously.

The ProSwitch with its rack size is specifically designed for middle to large workgroups. The Switch provides immediate access to a rapidly growing network through a wide range of user-reliable functions.

The ProSwitch is ideal for deployment with multiple high-speed servers for shared bandwidth 10Mbps or 100Mbps workgroups. With the highest bandwidth 200Mbps (100Mbps full-duplex mode), any port can provide workstations with a congestion-free data pipe for simultaneous access to the server.

The ProSwitch is expandable by cascading two or more switches together. As all ports support 200Mbps, the Switch can be cascaded from any port and to any number of switches.

The ProSwitch is a perfect choice for site planning to upgrade to Fast Ethernet in the future. Ethernet workgroups can connect to the Switch now, and change adapters and hubs anytime later without needing to change the Switch or reconfigure the network.

The ProSwitch combine dynamic memory allocation with store-and-forward switching to ensure that the buffer is effectively allocated for each port, while controlling the data flow between the transmit and receive nodes to guarantee against all possible packet loss.

The ProSwitch is an unmanaged 10/100 Fast Ethernet Switch that offers solutions in accelerating small Ethernet workgroup bandwidth. Other key features are:

- 16-port 10/100BASE EthernetProSwitch with RJ-45 connectors
- Support Auto-negotiation for speed and duplex modes for each port
- Supports Auto-MDI/MDI-X for each port
- Wire speed reception and transmission
- Store-and-Forward switching method
- Integrated address Look-Up Engine, supports 8K absolute MAC addresses
- Supports 512Kbytes RAM for data buffering
- Front-panel diagnostic LEDs
- Broadcast storm protection
- IEEE 802.3x flow control for full-duplex
- Back pressure flow control for half-duplex
- Standard 19" Rack-mountable size

UNPACKING AND INSTALLATION

This chapter provides unpacking and setup information for the Switch.

Unpacking

Open the shipping cartons of the Switch and carefully unpacks its contents. The carton should contain the following items:

- One NetComm16-port 10/100Mbps Fast Ethernet ProSwitch
- One AC power cord, suitable for your area's electrical power connections
- Four rubber feet to be used for shock cushioning
- Screws and two mounting brackets
- This Guide

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

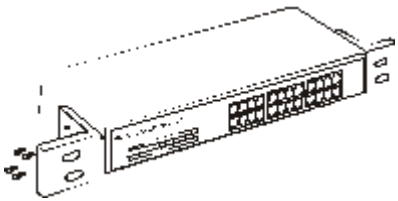
Installation

The site where you install the Switch stack may greatly affect its performance. When installing, consider the following pointers:

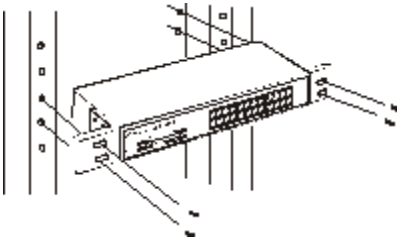
- Install the Switch in a fairly cool and dry place. See Specifications for the acceptable temperature and humidity operating ranges.
- Install the Switch in a site free from strong electromagnetic field generators (such as motors), vibration, dust, and direct exposure to sunlight.
- Leave at least 10cm of space at the front and rear of the hub for ventilation.
- Install the Switch on a sturdy, level surface that can support its weight, or in an EIA standard-size equipment rack. For information on rack installation, see the next section, Rack Mounting.
- When installing the Switch on a level surface, attach the rubber feet to the bottom of each device. The rubber feet cushion the hub and protect the hub case from scratching.

Rack Mounting

The switch can be mounted in an EIA standard-size, 19-inch rack, which can be placed in a wiring closet with other equipment. Attach the mounting brackets at the switch's front panel (one on each side), and secure them with the provided screws.



Then, use screws provided with the equipment rack to mount each switch in the rack.



IDENTIFYING EXTERNAL COMPONENTS

This section identifies all the major external components of the switch.

Front Panel

The figure below shows the front panels of the 16-port 10/100Mbps Fast Ethernet ProSwitch.

LED Indicator Panel

Refer to the detailed information about each of the switch's LED indicators.

- **Power (PWR)**

  This indicator lights green when the switch is receiving power, otherwise, it is off.

- **Link / Activity (green)**

  This indicator light green when the port is connected to a Fast Ethernet or Ethernet station, if the indicator blinking green will be transmission or received data .

- **100Mbps (green)**

  This LED indicator light green when the port is connected to a 100Mbps Fast Ethernet station. Otherwise, the LED is off when the port is connected to 10Mbps Ethernet station.

Twisted-Pair Ports

These ports supports automatic MDI/MDIX crossover detection function which gives true 'plug and play' capability without the need of confusing crossover cables or crossover ports.

With the Auto-MDI function, you just need to plug-in a network cable to the switch and the other end of the cable into a NIC (Network Interface Card) or another switch or hub.

Rear Panel

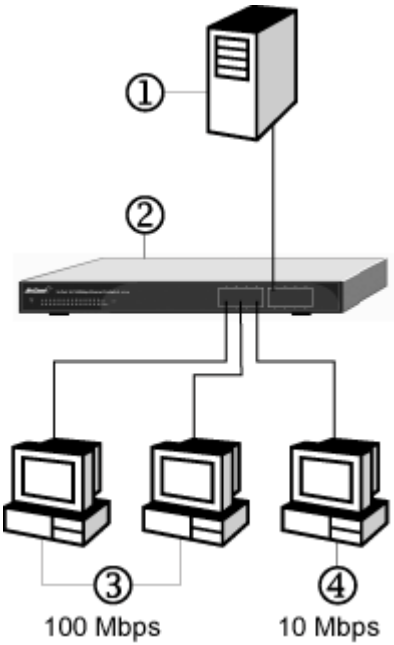
The rear panel of the ProSwitch has an AC Power Connector socket.

USING THE PROSWITCH

The NetComm16-port 10/100Mbps Fast Ethernet ProSwitch can be used to split parts of the network into different collision domains, making it possible to expand your Fast Ethernet network beyond the 205-meter network diameter limit for 100BASE-TX networks. Switches supporting both traditional 10Mbps Ethernet and 100Mbps Fast Ethernet are also ideal for bridging between the existing 10Mbps networks and the new 100Mbps networks.

Desktop Switching

The 16-Port ProSwitch can be used as a desktop switch to build a small network that enables users to have 100 Mbps access to a file server.



Key:

1 = Server with 100 Mbps connection

2 = NetComm 16-Port ProSwitch

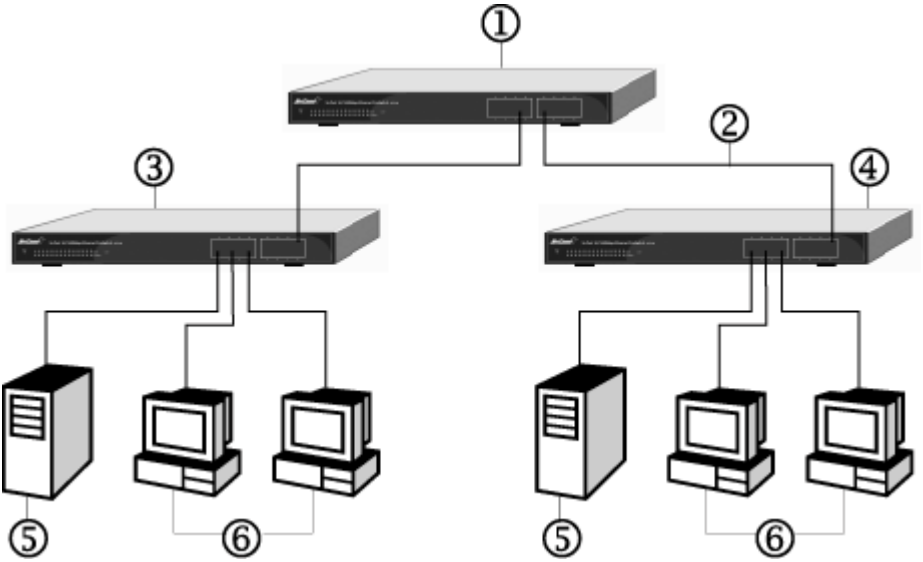
3 = PCs with 100 Mbps Ethernet adapter cards installed

4 = PC with 10 Mbps connection

Note: If a full-duplex adapter card is installed in the server or PC, a 200 Mbps connection is possible on the port where the server or PC is connected.

Segment Switching

The 16-Port ProSwitch can segment a network into multiple connected pieces, increasing overall bandwidth and throughput.The following diagram illustrates the NetComm 16-Port ProSwitch segmenting networks that are built with the NetComm Swtich.



Key:

1 = NetComm16-port 10/100Mbps Fast Ethernet ProSwitch

2 = 100 Mbps connection

3 = NetComm Switch

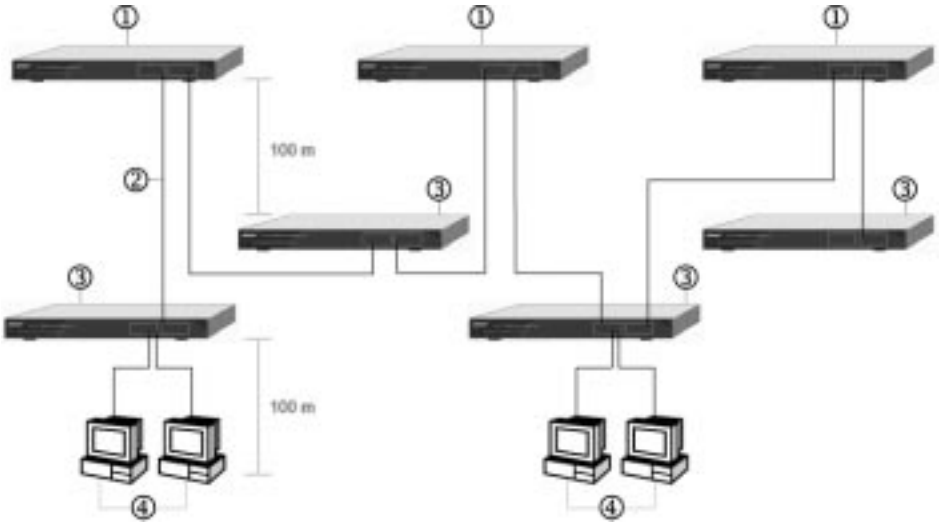
4 = NetComm Switch

5 = Servers with 100 Mbps connection

6 = PCs with network adapter installed, enabling 100 Mbps Connection

Extending a Network

Ethernet specifications limit the length of cable between hubs and PCs to 100 meters for a total diameter of 200 meters. By adding Fast Ethernet switches between hubs, the network is expanded by 200 Mbps with the addition of each switch. The follow diagram illustrates a network of NetComm Switch.



Key:

1 = NetComm16-port 10/100Mbps Fast Ethernet ProSwitch

2 = 100 Mbps connection

3 = NetComm Fast Ethernet Switch

4 = PCs with 100 Mbps connection

TROUBLE SHOOTING

Symptom	Cause	Solution
Power LED is off.	Power not received at Switch	Check the power cord connections for the switch and the connected device. Check for a defective adapter card, cable, or port by testing them in an alternate environment where all products are functioning. Make sure all cables used are correct and comply with Ethernet specifications.
Link LED is off or intermittent.	Port connection is not functioning.	Check the crimp on the RJ-45 connectors and make sure that the plug is properly inserted and locked into the port at both the switch and the connecting device. Make sure all cables used are correct and comply with Ethernet specifications.
A segment or device is not recognized as part of the network.	One or more devices are not properly connected or cabling does not meet Ethernet guidelines.	Verify that the cabling is correct (refer to Cabling Guidelines"). Be sure all cable connectors are securely positioned in the required ports. Straight-through cables should be used for all standard twisted pair connections. Make sure all devices are connected to the network. Equipment may have been accidentally disconnected.

Network Adapter Cards

Make sure the network adapter cards installed in the PCs are in working condition and the software driver has been installed.

Configuration

If problems occur after altering the network configuration, restore the original connections and determine the problem by implementing the new changes, one procedure at a time. Make sure that cable distances, repeater limits, and other physical aspects of the installation do not exceed the Ethernet limitations.

CONNECTOR PIN ASSIGNMENTS

This appendix provides information about the RJ-45 plug and the vista RJ-45 connector used for the 16-Port Fast Ethernet ProSwitch.

RJ-45 Plug

In a Fast Ethernet network, it is important that all 100BASE-T certified Category 5 cabling use RJ-45 plugs. The RJ-45 plug accepts 4-pair unshielded twisted pair (UTP) or shielded twisted pair (STP) 100-ohm cable and connects into the vista RJ-45 connector.

The RJ-45 plug connector is illustrated below.

Key:
1 to 8 = Pin numbers

The follow table lists the pin assignments for the RJ-45 plug and the vista RJ-45 connector.

Pin Assignments

PIN	Normal Assignment on Ports 1 to 16
1	Input Receive Data +
2	Input Receive Data –
3	Output Transmit Data +
6	Output Transmit Data –
4, 5, 7, 8	Internal termination, not used for data transmission

CABLING GUIDELINES

Fast Ethernet Cable Guidelines

Fast Ethernet uses UTP cable, as specified in the IEEE 802.3u standard for 100BASE-TX. The specification requires Category 5 UTP cable consisting of either 2-pair or 4-pair twisted insulated copper conductors bound in a single plastic sheath. Category 5 cable is certified up to 100 MHz bandwidth. 100BASE-TX operation uses one pair of wires for transmission and the other pair for receiving and for collision detection.

When installing Category 5 UTP cabling, use the following guidelines to ensure that your cables perform to the following specifications:

- **Certification**

  Make sure that your Category 5 UTP cable has completed the Underwriters Laboratories (UL) or Electronic Testing Laboratories (ETL) certification process.

- **Termination method**

  To minimize crosstalk noise, maintain the twist ratio of the cable up to the point of termination; untwist at any RJ-45 plug or patch panel should not exceed 0.5 inch (1.5 cm).

Cable Lengths

Category 5 distributed cable that meets ANSI/EIA/TIA-568-A building wiring standards can be a maximum of 328 feet (100 meters) in length, divided as follows:

- 20 feet (6 meters) between the hub and the patch panel (if used)
- 295 feet (90 meters) from the wiring closet to the wall outlet
- 10 feet (3 meters) from the wall outlet to the desktop device

The patch panel and other connecting hardware must meet the requirements for 100 Mbps operation (Category 5). Only 0.5 inch (1.5 cm) of untwist in the wire pair is allowed at any termination point.

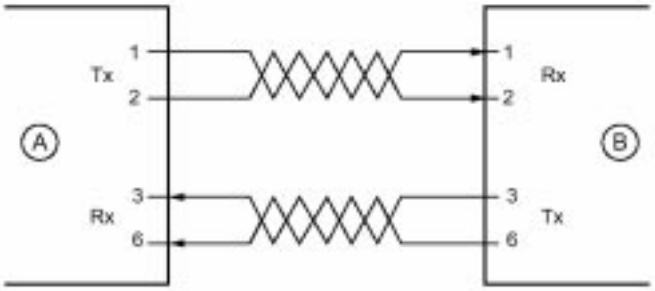
Cable Specifications

The following lists he electrical requirements of Category 5 cable.

Specification	Category 5 Cable
Number of pairs	Four
Impedance	100 & ± 15%
Mutual capacitance at 1 KHz	£ 5.6 nF per 100 m
Maximum attenuation	at 4 MHz: 8.2
(dB per 100 m, at 20° C)	at 31 MHz: 11.7
	at 100 MHz: 22.0
NEXT loss (dB minimum)	at 16 MHz: 44
	at 31 MHz: 39
	at 100 MHz: 32

Twisted Pair Cables

For two devices to communicate, the transmitter of each device must be connected to the receiver of the other device. The crossover function is usually implemented internally as part of the circuitry in the device. Computers and workstation adapter cards are usually media-dependent interface ports, called MDI or uplink ports. Most repeaters and switch ports are configured as media-dependent interfaces with built-in crossover ports, called MDI-X or normal ports.



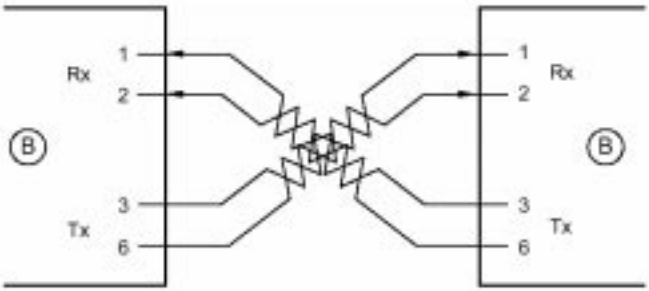
Key:

A = Uplink or MDI port (as on a PC)

B = Normal or MDI-X port (as on a hub or switch)

1, 2, 3, 6 = Pin numbers

The following diagram illustrates crossover twisted pair cable.



Key:

B = Normal or MDI-X port (as on a hub or switch)

1, 2, 3, 6 = Pin numbers

TECHNICAL SPECIFICATION

General

Standards	IEEE 802.3 10BASE-T Ethernet IEEE 802.3u 100BASE-TX Fast Ethernet
Protocol	CSMA/CD
Data Transfer Rate	Ethernet: 10Mbps (half duplex), 20Mbps (full-duplex) Fast Ethernet: 100Mbps (half duplex), 200Mbps (full- duplex)
Topology	Star
Network Cables	10BASET: 2-pair UTP Cat. 3,4,5, EIA/TIA- 568 100-ohm STP100BASE-TX: 2-pair UTP Cat. 5, EIA/TIA-568 100-ohm STP
Number of Ports	16 x 10/100Mbps Auto-MDI ports

Physical and Environmental

AC inputs	100 to 240 VAC, 50 or 60 Hz internal universal power supply
Power Consumption	6 watts. (max.)
Temperature	Operating: 0° ~ 40° C, Storage: -10° ~ 70° C
Humidity	Operating: 10% ~ 90%, Storage: 5% ~ 90%
Dimensions	440 x 140 x 44 mm (W x H x D)
EMI:	C-Tick, FCC Class A, CE Mark Class A, VCCI Class A
Safety	CUL, CB

Performance

Transmits Method:	Store-and-forward
RAM Buffer:	512KBytes per device
Filtering Address Table:	8K entries per device
Packet Filtering/ Forwarding Rate:	10Mbps Ethernet: 14,880/pps100Mbps Fast Ethernet: 148,800/pps
MAC Address Learning:	Automatic update

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 print out a copy of the Warranty Registration Form and mail it to NetComm Limited, PO Box 1200, Lane Cove NSW 2066.

Note: ***The Warranty Registration Form can be found at "D:\Manuals\Warranty Registration Form.pdf" where D:\ is the letter of your CD-ROM drive.***

Contact Information

If you have any technical difficulties with the device, please do not hesitate to contact NetComm's Customer Support Department.

Email: support@netcomm.com.au

Fax: (02) 9424-2010

Web: www.netcomm.com.au

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.

The warranty is automatically voided if:

1. You, or someone else uses 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 modem either by 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 modem has been used for any other purposes than that for which it is sold, or in any way other than in strict accordance with the user manual supplied;
5. Your modem 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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10/100 Mbps ETHERNET SWITCH

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THE HIGH-SPEED NETWORK SWITCH YOUR BUSINESS NEEDS

NetComm is Australia's dynamic data communications and networking solutions provider.
For more information on this and other NetComm products, please visit www.netcomm.com.au

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www.netcomm.com.au

Product Code: NP2160

3 YEAR WARRANTY*
1 year warranty out of the box.
Extra 2 years **FREE** with online registration at www.netcomm.com.au
*Conditional upon registration online.