

User Guide

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Overview

Thank you for purchasing the NetComm NB5Plus4/W ADSL/ADSL2 Modem Router. NetComm brings you the Next Generation of ADSL technology with ADSL-2*, which boosts ADSL's performance, improves interoperability, and supports new applications, services and deployment conditions.

NetComm's implementation of ADSL-2* and ADSL-2+* ensures that the NB5Plus4/W operates with existing ADSL services while delivering optimal performance in all modes of operation. Powered by the latest ADSL-2* TI chipset, NetComm's NB5Plus4/W increases downstream data rates by up to 50% (12Mbps) and 100% (25Mbps) for ADSL2 Plus* mode ensuring that you can surf the net or download your files quicker than ever before.

Security is a key issue with Broadband users and NetComm's NB5Plus4/W does not leave you exposed. Employing the latest Active Firewall technology, the NB5Plus4/W checks every packet of data that comes in ensuring your defences are rock-solid against hackers, unauthorised entries, probes and even Denial of Service attacks. What's more, the NB5Plus4/W is equipped with a VPN pass-through feature allowing you to use a standard VPN client for Point-to-Point communication even while your Firewall is active.

The NB5Plus4/W delivers the connection versatility needed to cater for today's ADSL users. You can simply attach the NB5Plus4/W to a single PC by using the USB port or Ethernet port. Alternatively, should you wish to share your Internet connection, the NB5Plus4/W is equipped with an in-built Router and four 10/100 Ethernet ports for connection to a network. If you have the NB5Plus4W modem, you can share your Internet connection wirelessly.

The NB5Plus4/W's Port Forwarding and UPnP functions have made it easier for today's Internet users to configure and setup the myriad of Network Port Rules needed by Internet applications such as On-Line Gaming, Peer-To-Peer file sharing and Messenger services to operate. NB5Plus4/W has a number of pre-configured rules for several games, just click on the game you wish to play on-line and the rest is done for you.

Added to this, the NB5Plus4/W introduces a QoS (Quality of Service) feature that gives you control over which types of outgoing data are given priority by the router. With QoS you can tailor your router settings to ensure that you can keep gaming or browsing even though your upstream bandwidth may be saturated by applications such as Peer-To-Peer file sharing.

* Your ISP must support and provide you with an ADSL-2 or ADSL-2+ service for these features to be available. This product will operate as a standard ADSL Modem Router when an ADSL-2 service is not available.

This reference manual assumes that the reader has an installed Ethernet card in the computer to be connected and has basic to intermediate computer and Internet skills. However, basic Computer Networking, Internet, and Firewall technology information is available from the NetComm Web site. See www.netcomm.com.au.

NB5Plus4/W Package Contents

Your NB5Plus4/W Package contains the following items:



- The NB5Plus4 or NB5Plus4/W Modem Router (both models shown above)



- Telephone Cable (RJ-11)



- RJ-11 to 605 Adaptor



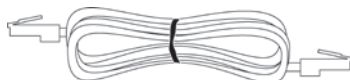
- Driver and Manual CD



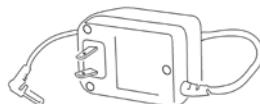
- USB Cable



- NB5Plus4/W Quick Start Guide and Package Contents Note



- CAT-5 UTP Straight Ethernet Network Cable (RJ-45)



- Power Adaptor (AC 15V)

If any of the above items are damaged or missing, please contact your dealer immediately.

Minimum System Requirements

Before continuing with the installation of your NB5Plus4/W, please confirm that you comply with the minimum system requirements.

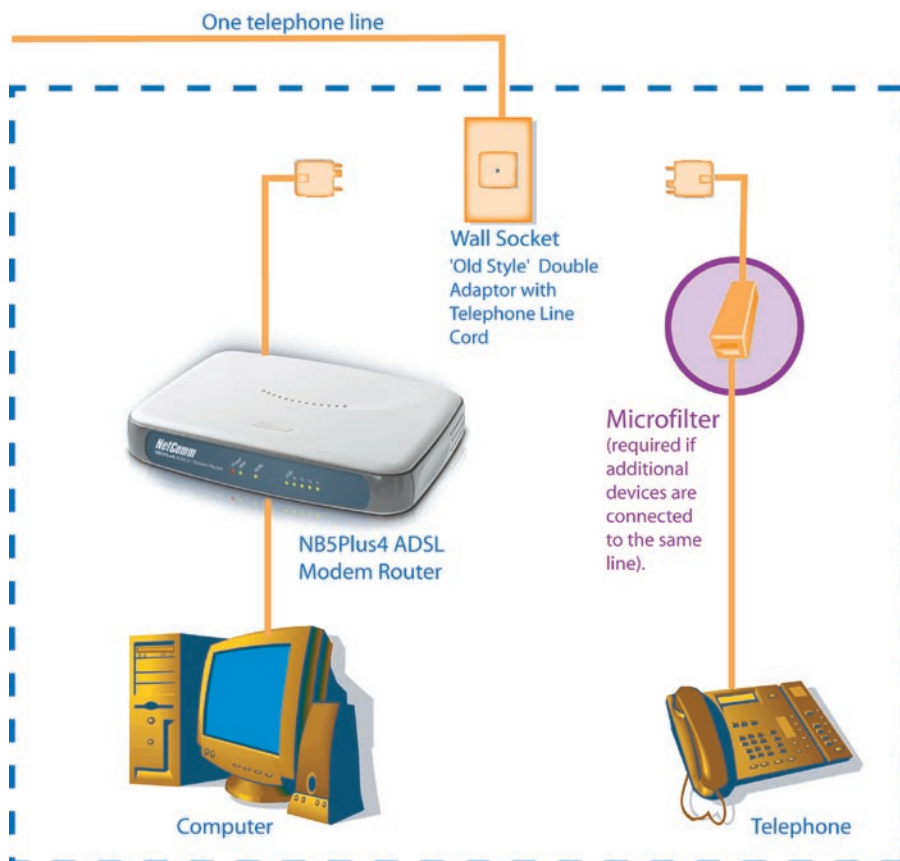
- Pentium® MMX 233MHz
- A CD-ROM Drive
- Ethernet card installed with TCP/IP Protocol (required only if you are connecting to the ETHERNET port of your ADSL Router)
- USB Port (required only if you are connecting to the USB Port of your ADSL Router)
- Host Operating Systems support for USB:
 - Windows® 98 Second Edition
 - Windows® 2000
 - Windows® Me
 - Windows® XP (recommended)
- OS independent for Ethernet
- Web Browser support:
 - Microsoft Internet Explorer 5.0 (or later versions)
 - Netscape® Navigator 4.0 (or later versions)
 - Most popular browsers

Do I need a Micro filter?

Micro filters are used to prevent common telephone equipment, such as phones, answering machines and fax machines, from interfering with your ADSL service. If your ADSL enabled phone line is being used with any other equipment other than your ADSL Modem then you will need to use one Micro filter for each phone device.

Splitters may be installed when your ADSL line is installed or when your current phone line is upgraded to ADSL. If your telephone line is already split you will not need to use a Microfilter - check with your ADSL service provider if you are unsure.

Each micro filter is connected in-line with your telephone or fax machine so that all signals pass through it. Telephones and/or facsimiles in other rooms that are using the same extension will also require Microfilters. The following diagram gives an example of connecting your ADSL Modem/Router using a Microfilter.



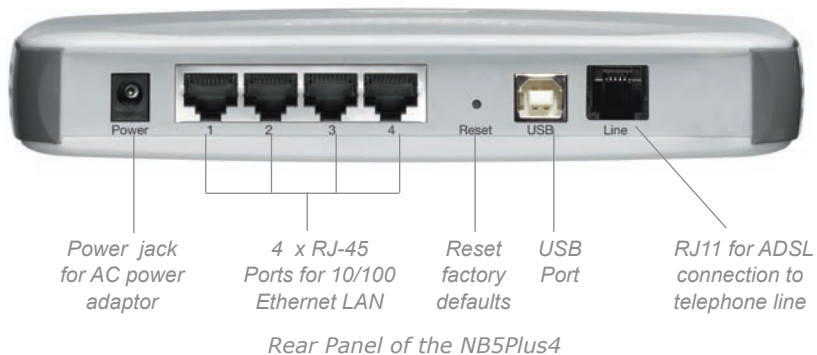
LED Indicators

The LED Indicators are located on the front of the unit, they are green in colour, except the Power LED which is red. The meanings are as follows:



| Label | Status | Indicates |
|----------------------------|----------|--|
| Power | On | Power is on. |
| | Off | Power is off. |
| PPP | Flashing | Trying to authenticate with ISP's PPP server. |
| | On | PPP link is up. |
| | Off | No PPP link available. |
| ADSL | On | A valid ADSL connection. |
| | Flashing | An active WAN session. |
| WLAN (NB5Plus4W) | On | Wireless link is enabled on NB5Plus4W. |
| | Flashing | Data is being transmitted wirelessly. |
| USB | On | PC connected to USB port. |
| | Flashing | Data is being transmitted between NB-5Plus4/W and PC. |
| LAN 4, 3, 2 & 1 | Flashing | Flashes when data is being sent or received on the LAN connection. |
| | On | Indicates a link to your LAN or Network card is active. |
| | Off | Indicates no link to LAN. |

Back Panel Ports



Power

Connect the Power Adaptor that comes with your package.

1, 2, 3, 4

4 x 10/100 Base-T Ethernet jack (RJ-45) to connect to your Ethernet Network card or Ethernet Hub / Switch.

Reset

To reset your ADSL Router to factory default settings. (All customised settings that you have saved will be lost!)

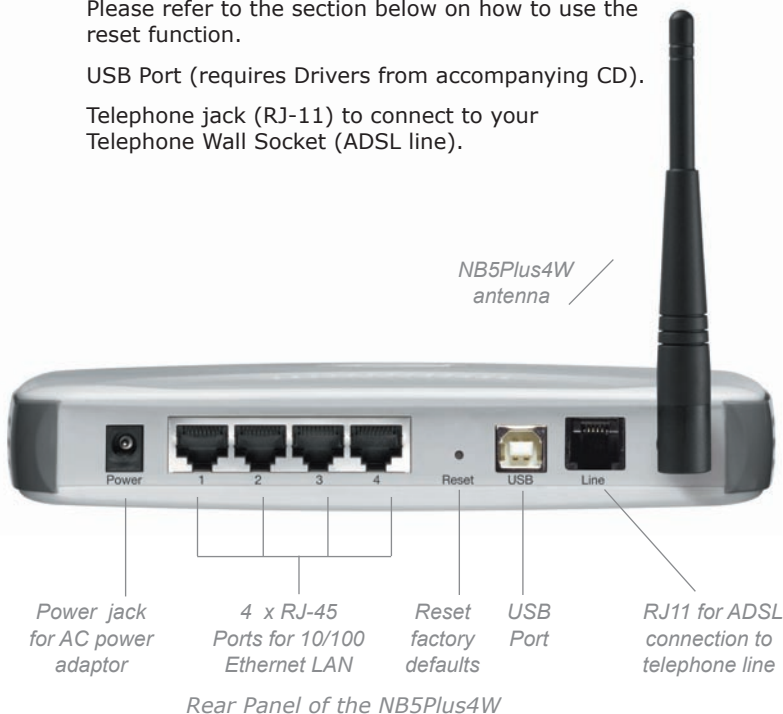
Please refer to the section below on how to use the reset function.

USB

USB Port (requires Drivers from accompanying CD).

Line

Telephone jack (RJ-11) to connect to your Telephone Wall Socket (ADSL line).



Restoring Factory Defaults

This feature will reset the Modem to its factory default configuration. Occasions may present themselves where you need to restore the factory defaults on your modem. Typical situations are:

- You have lost your username and password and are unable to login to the modem.
- You have purchased the modem from someone else and need to reconfigure the device to work with your ISP.
- You are asked to perform a factory reset by a member of the NetComm Support staff.

In order to restore your modem to its factory default settings, please follow these steps:

- Ensure that your Modem is powered on (for at least 10 seconds).
- Use a paper clip or a pencil tip to depress the reset button for ten seconds and release. At this point, the reset is in progress. Do not power off the unit at this point.
- When indicator lights return to steady green, reset is complete. The default settings are now restored. The entire process takes about 45 seconds to complete.
- Once you have reset the modem to its default settings you will be able to access the device's configuration web interface using <http://192.168.1.1> with username 'admin' and password 'admin'.

Default Settings

LAN (Management)

| Field | Setting Details |
|--------------------|-----------------|
| Static IP Address: | 192.168.1.1 * |
| Subnet Mask: | 255.255.255.0 * |
| Default Gateway: | blank |

WAN (Internet)

| Field | Setting Details |
|------------------|-----------------|
| User Name: | username@isp |
| Password: | **** |
| Protocol: | PPPoE |
| VPI: | 8 * |
| VCI: | 35 * |
| IP Address: | 192.168.1.1 * |
| Subnet Mask: | 255.255.255.0 * |
| Default Gateway: | 0.0.0.0 * |

Modem Access

| Field | Setting Details |
|------------|-----------------|
| User Name: | admin |
| Password: | admin |

* **Default Setting.** Although in most cases you will not be required to alter these default settings for your NB5Plus4/W, your ISP may identify specific settings to enable connection to their service. Please refer to your ISP or Network Administrator for further information.

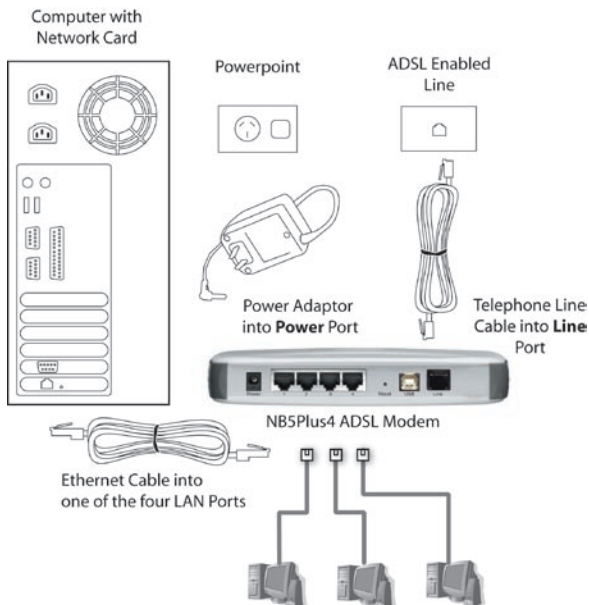
Connecting your NB5Plus4/W

The NB5Plus4/W can be connected via a USB cable or an Ethernet cable or both. The USB connection is simply an ethernet simulation. As far as your computer is concerned the USB connection is an Ethernet connection, hence DHCP and other protocols will work the same as for Ethernet.

To connect to your ADSL Router, you need to have either an Ethernet Port or a USB Port present on your Computer/Notebook.

Connecting your NB5Plus4/W ADSL Modem via ETHERNET

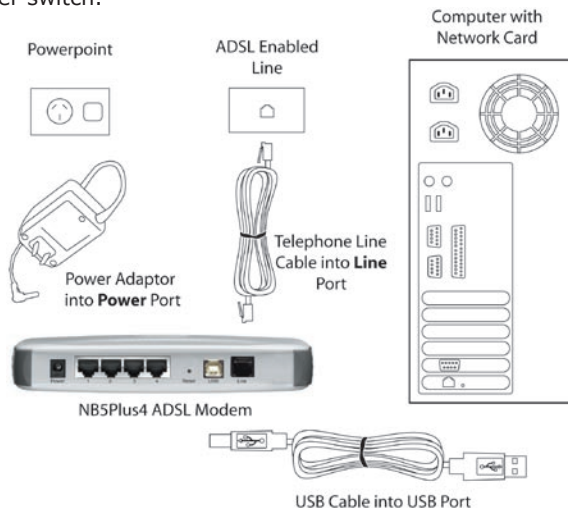
1. Connect your NB5Plus4/W to either a computer directly or a network hub or switch using CAT5 ethernet cables.



2. Connect the power pack to the ADSL Modem and switch on the power switch.
3. Ensure that there is a LAN link light on the NB5Plus4/W.
4. Ensure that the computer you intend to use has an IP address in the same subnet as the NB5Plus4/W ADSL Modem. (e.g. the NB5Plus4/W's default IP is 192.168.1.1 - your computer should be on 192.168.1.100 or similar.) If you have DHCP enabled on your computer, the NB5Plus4/W will assign your computer a suitable IP address.
5. Ensure that your computer has a LAN link light.
6. Connect one end of the ADSL phone line to the NB5Plus4/W ADSL Modem and the other end to the wall socket.

Connecting your NB5Plus4/W ADSL Modem via USB

1. Connect the power pack to the NB5Plus4/W ADSL Modem and switch on the power switch.



2. Connect your NB5Plus4/W to a computer directly via USB cable.
3. When the computer is booted, the Add New Hardware Wizard will launch and prompt you to provide a driver for your NB5Plus4/W ADSL Modem. Insert the CD provided.
4. Follow the on-screen prompts to load the driver. Refer to the section below for more detailed information. (You may need to restart your computer).
5. Connect one end of the ADSL phone line to the NB5Plus4/W ADSL Modem and the other end to the wall socket.

Installing the USB driver (Windows 98/Me/2000/XP only)

When you install the USB driver on your computer it creates a Virtual Ethernet Adapter, which can be configured in the same way as a Network Interface card with DHCP or static IP address. To install the USB driver please follow the steps below:

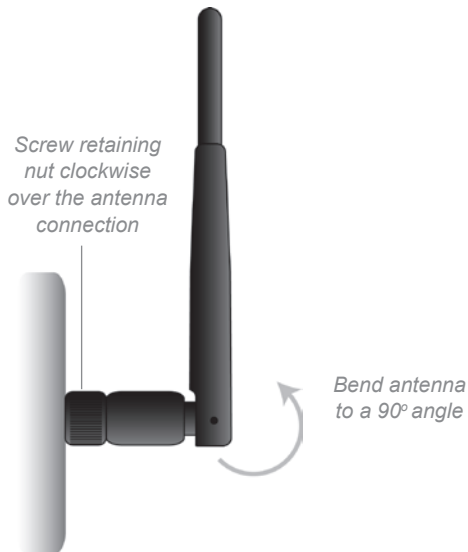
1. Boot your machine into Windows 98/Me/2000/XP.
2. Insert your NetComm NB5Plus4/W CD into your CD-ROM drive.
3. Plug power up to your NB5Plus4/W and switch ON.
4. Plug a USB cable from the back of the unit into a spare USB socket on your computer.
5. The Windows "Add New Hardware Wizard" should appear. Click Next to continue.
6. Ensure the option "Search for the best driver..." is chosen and click Next.
7. Choose "Specify location", untick any other boxes and click on the Browse button. Open the CD-ROM drive location of your NetComm NB5Plus4/W CD and then select the 'USBdriver' folder. The USB driver will be installed.

NB5Plus4W Antenna Instructions

Before continuing with the Hardware installation, you may need to connect the Antenna

1. The antenna has a retaining nut which must be screwed into the SMA connector on the back of the modem. Place the screw retaining nut over the antenna connection on the rear of the NB5Plus4W and turn it clockwise.

Note: Do not over-tighten the attaching nut - but do make sure that you have screwed it all the way to its end.



2. Bend the antenna to a 90° angle.

Note: Please note that you may have to rotate the complete antenna assembly to do this and have the antenna pointing vertically.

Configuring your NB5Plus4/W

You will need to log directly into the configuration page of the modem and configure the basic settings for your Internet connection. Your ISP should provide you with the necessary information to complete this step.

The settings that you most likely need to change to access the Internet are grouped onto a single EasyConfig page.

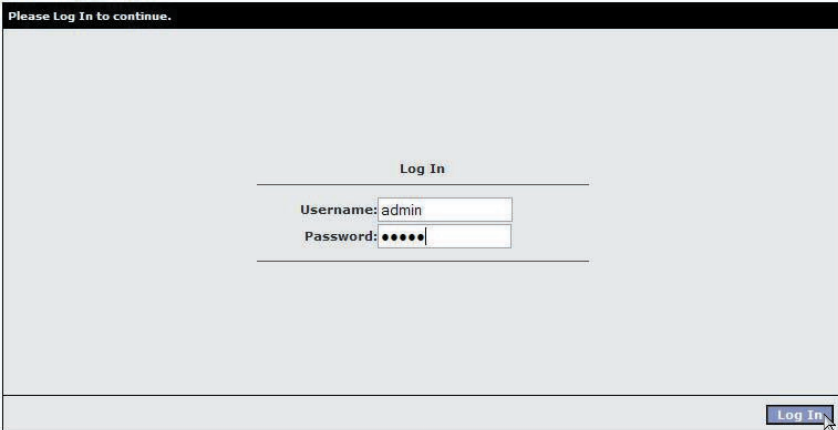
To configure your modem follow the steps below:

Note: Ensure that your PC is setup as a DHCP client. Refer to the [Computer Hardware Configuration](#) section for instructions on how to set this up with different Operating Systems.

1. Insert the CD into your CD-ROM drive. An autorun screen will appear. Click on **Configure Modem**.

(Alternatively, if the CD-ROM is not available, you can open a web browser and type <http://192.168.1.1> in the location bar to access the modem's EasyConfig setup screen directly.)

2. The login page will be displayed. Enter the modem's username and password.
The default username is **admin**.
The default password is **admin**.



Please Log In to continue.

Log In

Username: admin

Password: ●●●●

Log In

Click on **Log In**.

3. The EasyConfig page will be displayed.

The screenshot shows the 'EasyConfig' web interface. At the top, it says 'EasyConfig'. Below that is a section titled 'Quick Settings'. Inside this section, there are several input fields: 'Protocol' is a dropdown menu set to 'PPPoE'; 'User ID' is a text box containing 'username@isp'; 'Password' is a text box with ten dots; 'VPI' is a text box containing '8'; and 'VCI' is a text box containing '35'. Below these fields is a 'Status:' label with a small red light icon. At the bottom of the 'Quick Settings' section are two buttons: 'Apply' and 'Cancel'. Below the 'Quick Settings' section is a section titled 'Advanced Settings' which is currently collapsed.

4. Check with your ISP what Protocol your modem needs to use to connect to the Internet. If unsure, leave the default selection of PPPoE.
 5. In the User ID field, enter the Username that your ISP has provided. In the password field, enter the password that your ISP has given you.
- Note:** If your ISP has provided you with Static addressing details you will need to access the Advanced Settings of your modem to configure these. Please refer to the section on Advanced Settings in this manual for instructions.
6. The default VPI / VCI settings for most connections is 8 / 35 in Australia. Do not change these unless your ISP has instructed you to do so.
 7. Click on the Apply button to save the settings you have entered. The modem will automatically reboot. Refresh the web page after 20 seconds.
 8. If the settings you entered were correct and you have an ADSL connection established the Status light will change to green.
 9. You should now be able to access the Internet with a web browser, email client or other Internet application.
 10. If the status light remains red after 45 seconds and you have refreshed your web page several times, check the following:
 - ADSL Link light on your modem is solid green; If not, you do not have a connection established with your local DSLAM. Please call your ISP who will assist in resolving this.
 - If you have a solid green light on your modem for the ADSL Link, check that the username / password you entered are correct and try again;
 - If the above two suggestions don't resolve the issue, please contact your ISP;
- TIP:** To test your Internet connection while the modem is attempting to apply the settings, you can open a DOS prompt (Start > Run > cmd) and execute a continual ping command to a public server's IP address on the Internet. Once you receive a reply from the server you know that you are connected. This can take up to 30 seconds. e.g: `c:/ ping 210.0.111.111 -t`

Computer Hardware Configuration

This section provides instructions for configuring the TCP/IP (Network) settings on your computer to work with your Modem. These steps are only required if you are having trouble accessing your Modem.

Windows® XP PCs

1. In the Windows task bar, click the **Start** button, and then click **Control Panel**.
2. Click on **Network & Internet Connections** icon. (Category mode only).
3. Click the **Network Connections** icon.
4. In the LAN or High-Speed Internet window, right-click on the icon corresponding to your network interface card (NIC) and select **Properties**. (Often, this icon is labelled **Local Area Connection**).
5. The Local Area Connection dialog box displays with a list of currently installed network items. Ensure that the check box to the left of the item labelled **Internet Protocol (TCP/IP)** is checked. Select **Internet Protocol TCP/IP** and click on **Properties**.
6. In the Internet Protocol (TCP/IP) Properties dialog box, click the radio button labelled **Obtain an IP address automatically**. Also click the radio button labelled **Obtain DNS server address automatically**.
7. Click **OK** twice to confirm your changes, and close the **Control Panel**.

Windows 2000 PCs

First, check for the IP protocol and, if necessary, install it:

1. In the Windows task bar, click the **Start** button, point to **Settings**, and then click **Control Panel**.
2. Double-click the **Network and Dial-up Connections** icon.
3. In the **Network and Dial-up Connections** window, right-click the **Local Area Connection** icon, and then select **Properties**.
4. In the **Local Area Connection Properties** dialog box, select Internet Protocol (TCP/IP), and then click Properties
5. In the **Internet Protocol (TCP/IP) Properties** dialog box, click the radio button labelled Obtain an IP address automatically. Also click the radio button labelled Obtain DNS server address automatically.
6. Click **OK** twice to confirm and save your changes, and then close the **Control Panel**.

Windows Me PCs

1. In the Windows task bar, click the **Start** button, point to **Settings**, and then click **Control Panel**.
2. Click on **View All Control Panel Options**.
3. Double-click the **Network** icon.
4. The **Network Properties** dialog box displays with a list of currently installed network components. If the list includes Internet Protocol (TCP/IP), then the protocol has already been enabled. Skip to step 10.
5. If Internet Protocol (TCP/IP) does not display as an installed component, click **Add...**
6. In the **Select Network Component Type** dialog box, select **Protocol**, and then click **Add...**

7. Select Microsoft in the **Manufacturers** box.
8. Select Internet Protocol (TCP/IP) in the **Network Protocols** list, and then click **OK**. You may be prompted to install files from your Windows ME installation CD or other media. Follow the instructions to install the files. If prompted, click **OK** to restart your computer with the new settings.
Next, configure the PC to accept IP information assigned by the modem:
9. Follow steps 1 – 4 above..
10. In the **Network Properties** dialog box, select TCP/IP, and then click Properties. If you have multiple TCP/IP listings, select the listing associated with your network card or adapter.
11. In the **TCP/IP Settings** dialog box, click the radio button labelled **Obtain an IP address automatically**.
12. Click **OK** twice to confirm and save your changes, and then close the **Control Panel**.

Windows 95, 98 PCs

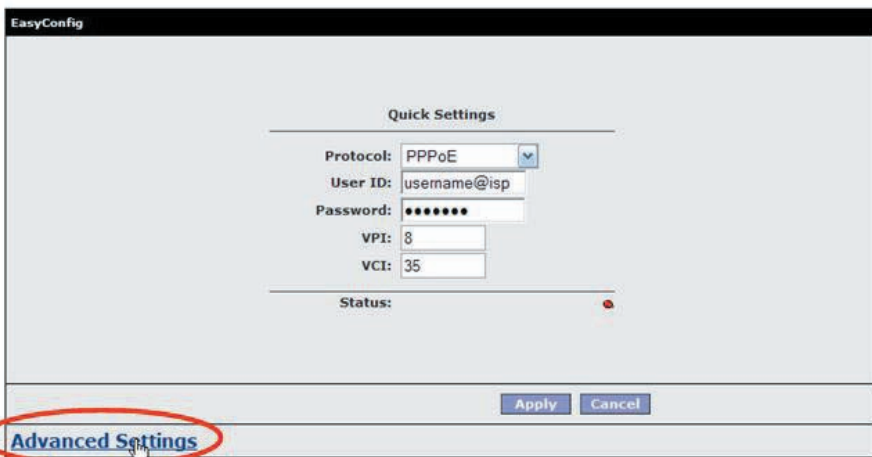
First, check for the IP protocol and, if necessary, install it:

1. In the Windows task bar, click the **Start** button, point to **Settings**, and then click **Control Panel**.
2. Double-click the **Network** icon.
3. The **Network** dialog box displays with a list of currently installed network components. If the list includes TCP/IP, and then the protocol has already been enabled. Skip to step 9.
4. If TCP/IP does not display as an installed component, click Add... The **Select Network Component Type** dialog box displays.
5. Select Protocol, and then click Add... The **Select Network Protocol** dialog box displays.
6. Click on Microsoft in the **Manufacturers** list box, and then click TCP/IP in the **Network Protocols** list box.
7. Click **OK** to return to the **Network** dialog box, and then click **OK** again. You may be prompted to install files from your Windows 95/98 installation CD. Follow the instructions to install the files.
8. Click **OK** to restart the PC and complete the TCP/IP installation.
Next, configure the PCs to accept IP information assigned by the Modem:
9. Follow steps 1 – 3 above.
10. Select the network component labelled **TCP/IP**, and then click **Properties**. If you have multiple TCP/IP listings, select the listing associated with your network card or adapter.
11. In the **TCP/IP Properties** dialog box, click the **IP Address** tab.
12. Click the radio button labelled **Obtain an IP address automatically**.
13. Click **OK** twice to confirm and save your changes. You will be prompted to restart Windows.
14. Click **Yes**.

Note: For detailed information regarding the advanced features of this product, please refer to the configuring sections in the NB5Plus4/W User Guide on the supplied CD-ROM.

Advanced Settings

To access the Advanced Settings of your modem you click on the Advanced Settings link on the EasyConfig web page. To access this page, enter `http://192.168.1.1` and login with username 'admin' and password 'admin'.



The screenshot displays the EasyConfig web interface. At the top, the title "EasyConfig" is visible. The main content area is titled "Quick Settings" and contains the following fields:

- Protocol: PPPoE (dropdown menu)
- User ID: username@isp
- Password: [masked with dots]
- VPI: 8
- VCI: 35

Below these fields is a "Status:" label with a red indicator light. At the bottom right of the form are "Apply" and "Cancel" buttons. At the bottom left of the page, the text "Advanced Settings" is highlighted with a red oval and a mouse cursor is pointing at it.

Setup

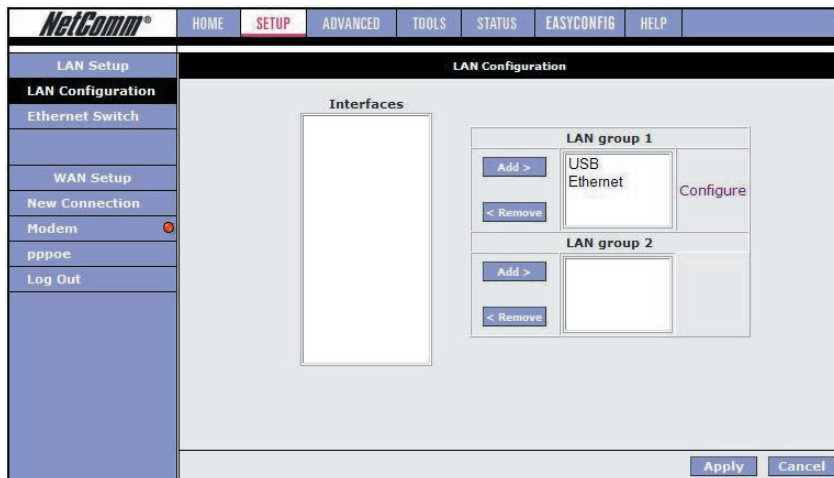
Click the Setup tab.

The Setup screen allows you to change current settings for your LAN (Local Area Network), Ethernet Switch and WAN (Wide Area Network). You can also create new connection profiles.

| NetComm® | | HOME | SETUP | ADVANCED | TOOLS | STATUS | EASYCONFIG | HELP |
|-------------------|---|------|-------|----------|-------|--------|------------|------|
| LAN Setup | Setup | | | | | | | |
| LAN Configuration | The Setup section allows you to create new connections, edit existing connections, and configure other basic settings. | | | | | | | |
| Ethernet Switch | <div style="text-align: center;"> LAN Setup </div> <hr/> <p>LAN Configuration Select to assign physical interfaces to LAN and configure LAN IP address, LAN DHCP Server.</p> <hr/> <p>Ethernet Switch Select to configure ethernet switch settings.</p> <hr/> <div style="text-align: center;"> WAN Setup </div> <hr/> <p>New Connection Select to configure a new connection.</p> <hr/> <p>Modem Select to setup your modem.</p> | | | | | | | |
| WAN Setup | | | | | | | | |
| New Connection | | | | | | | | |
| Modem | | | | | | | | |
| pppoe | | | | | | | | |
| Log Out | | | | | | | | |

Setup → LAN Configuration

Click on the LAN Configuration link under the Setup menu to configure your Local Area Network settings.



Interfaces

This section displays the available interfaces on your modem that have yet to be configured. The default setting is to have all interfaces in LAN group 1.

It is possible to have separate LAN groups:

- three if you have the NB5Plus4W:
 - i) USB;
 - ii) Ethernet;
 - iii) WLAN (Wireless LAN);
- two if you have the NB5Plus4:
 - i) USB;
 - ii) Ethernet;

LAN Groups

Configuring LAN Groups with static IP addresses must be done in such a way that the range of assignable IP addresses in each of the LAN groups should not overlap with other LAN groups. A rule of thumb would be that each LAN group should be on its own network or subnet. For example, say you have 3 LAN groups each being setup with static IP addressing. Below is a sample configuration:

LanGroup #1

IP Address 192.168.1.1
NetMask 255.255.255.0

LanGroup #2

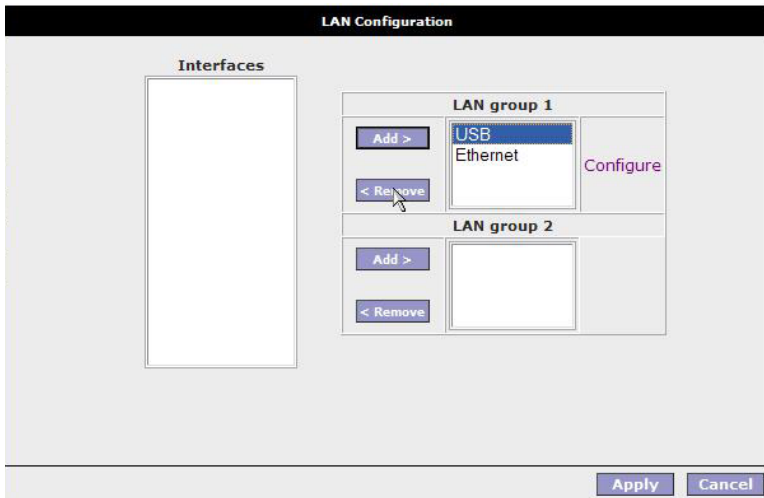
IP Address 192.168.2.1
NetMask 255.255.255.0

LanGroup #3

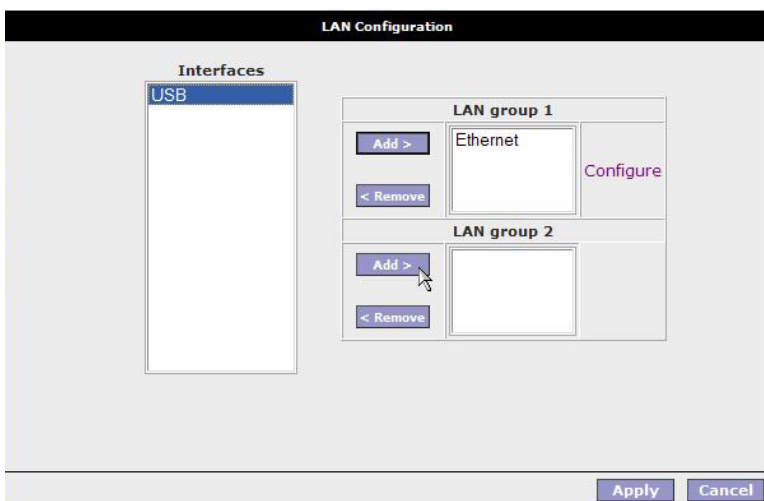
IP Address 192.168.3.1
 NetMask 255.255.255.0

The above example shows that each LAN group is on its own network and that there is no overlap in assignable IP address based on netmask.

To remove an interface from LAN group 1, click on the interface (e.g. USB) and click the Remove button:

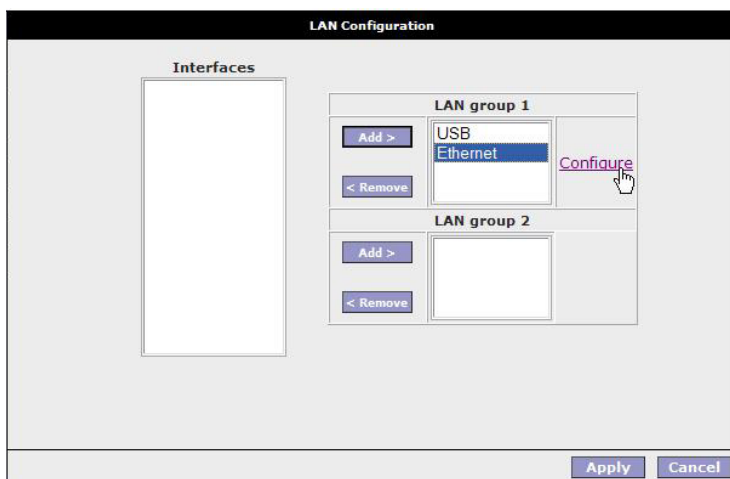


To add the available interface from the Interfaces section to a LAN group, highlight the interface and click the Add button of the appropriate LAN group. To add the available USB interface to LAN group 2 highlight the USB interface in the Interfaces section and click the Add button for LAN group 2:

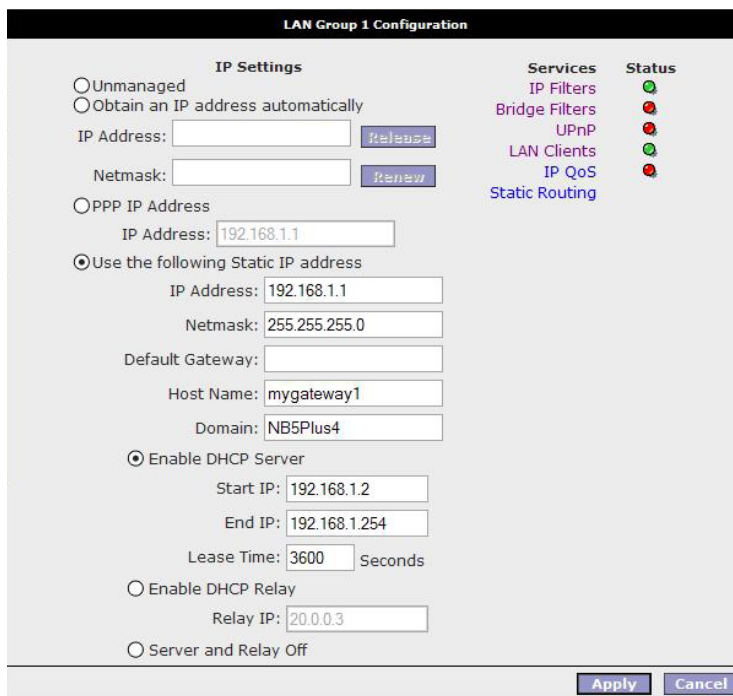


Configuring LAN Groups

To configure an interface of a LAN group click the interface and click the Configure hyperlink. E.g. to configure the Ethernet interface for LAN group 1 click the Ethernet interface and click the Configure hyperlink:



You will be presented with the following screen:



IP Settings

The IP address is usually 192.168.1.1 but you can change it to another suitable number (e.g. 192.168.0.1 or 10.0.0.1 or 172.16.1.1) to suit any existing network devices you already have installed. The NetMask describes how big your network is, the default 255.255.255.0 will allow for 253 computers and generally does not need to be changed unless to suit existing network requirements.

Note: If you change your IP address the DHCP server in your modem will automatically change the IP address range (DHCP pool) it hands out accordingly.

| Option | Description |
|-------------------------|---|
| IP Address: | Private IP address for connecting to a local private network (Default: 192.168.1.1). |
| Netmask: | Netmask for the local private network (Default: 255.255.255.0). |
| Default Gateway: | This field is optional. Enter in the IP address of the router on your network. |
| Host Name: | Required by some ISPs. If the ISP does not provide the Host name, please leave it blank. |
| Domain Name: | www.dyndns.org will provide you with a Domain Name. Enter this name in the "Domain Name" field. |
| Apply: | Click Apply to save the changes. |

DHCP stands for Dynamic Host Configuration Protocol. Your Modem has its DHCP Server enabled by default. This means it will assign valid IP addresses to each computer connected to it and will direct those computers to use the Modem as the gateway to the Internet. Having the DHCP server enabled is the recommended choice.

When selecting certain radio buttons you will notice that some of the options available for configuration will be greyed out. For example, when selecting 'Unmanaged' you will notice that all fields under IP Settings are greyed out. This means that no settings are configurable if the interface is unmanaged.

| Option | Description |
|---|---|
| Unmanaged | Interface is ignored. |
| Obtain an IP Address automatically | Interface will be allocated an IP address by a DHCP server. |
| IP Address | The IP address assigned to the interface by a DHCP server on your network. |
| Netmask: | The subnet mask assigned to the interface by a DHCP server on your network. |
| Release button | It is possible to release the IP address by clicking the Release button. |

| Option | Description |
|--|--|
| Renew button | It is possible to renew the IP address by clicking the Release button. |
| PPP IP Address | The IP address to be used during a PPP session. This defaults to the IP address of the interface. |
| Use the following static IP address | (Default) This is the IP address of your Modem on your local network. This IP address is specified on all computers on your network as the Gateway IP address. The IP address is also the IP address you type into your browser location bar to login to your modem's web interface. |

Note: If Server and Relay are turned off you need to assign IP addresses within the same range to the PCs connected to the modem else they will not be able to communicate with the modem. For example, if your modem's Ethernet interface address is 192.168.1.1 with a subnet mask of 255.255.255.0 you need to assign static addresses starting at 192.168.1.2 up to 192.168.1.253.

If you disable the DHCP server in the Modem you will need to either manually (statically) assign IP address information to each computer or use another device/computer as DHCP server.

Note: It is not recommended that you have more than one DHCP server enabled on your network.

| Option | Description |
|---------------------------|---|
| Server On: | Enables the DHCP server. |
| Start IP: | Sets the start IP address of the IP address pool. |
| End IP: | Sets the end IP address of the IP address pool. |
| Lease time: | The lease time is the amount of time an IP address issued by the DHCP service of your modem is valid before being updated. If all fields are 0, the allocated IP address will be effective forever. |
| Enable DHCP Relay: | Allow PCs on LAN to request IP address from other DHCP server. |

Services

It is possible to set the services for an interface by clicking on the hyperlink which will take you to the page to configure them. Please refer to the relevant section in this manual for information on the settings for these services.

Ethernet Switch

The 4-port Ethernet switch of your modem is set to automatically adapt to the type of connection plugged into a specific port. To force a port to connect at a specific speed, select the setting from the dropdown menu of a port.

Ethernet Switch Configuration

| | Set Value | Fallback Value |
|-----------------|---|-----------------|
| Physical Port1: | Auto | Disabled |
| Physical Port2: | Auto | Disabled |
| Physical Port3: | <div style="border: 1px solid gray; padding: 2px;"> Auto 10/Half Duplex 10/Full Duplex 100/Half Duplex 100/Full Duplex </div> | Disabled |
| Physical Port4: | 100/Full Duplex | 100/Full Duplex |

WAN Setup → New Connection

If you click 'New Connection' you will see the screen shown below.

The Connection setup page requires you to choose the correct settings to work with your ADSL connection as specified by your ISP. The screen will add or remove non-applicable choices as you change options. There are a few main settings you will need to confirm with your ISP before you can complete this page, these are;

- Type of Connection (e.g. PPPoE, PPPoA, Static, DHCP, Bridge, CLIP)
- Username & Password (usually only required for PPPoE or PPPoA types)
- VPI & VCI (usually VPI=8 and VCI =35)
- Authentication (Usually AUTO will work otherwise check with your ISP)

Most other choices on this screen are personal preference and not critical to getting your connection working.

Note: The Username & Password you need to type in here is for your ISP's account and it will be supplied to you by your ISP.

PPPoE Connection Setup Fields

| Option | Description |
|----------------|--|
| Name | You need to provide for a connection (e.g. MyISP) |
| Type | Select the type of connection for this profile. |
| Sharing | Decide whether you want to share this connection. You can share a connection using a VLAN (Virtual LAN) or by a PVC (Private Virtual Circuit). |

| Option | Description |
|--------------------------------|---|
| Options: NAT / Firewall | NAT (Network Address Translation) allows you to share the public IP address assigned to the WAN (Wide Area Network) interface of your modem with multiple clients on your LAN (Local Area Network). NAT also acts as a basic firewall. The firewall feature protects the PCs on your LAN from malicious attacks from people on the Internet (e.g. DOS attacks). |
| VLAN ID | If you decide to share this connection with a VLAN, this field will be enabled and you need to select your VLAN ID. For example, if you have your Ethernet interface in LAN Group 1 and your USB interface in LAN Group 2 you can create a VLAN for both groups to access each other. ¹ |
| Priority Bits | Set the priority bit of the Ethernet frame if using a VLAN. |

¹ For more information on VLANs visit <http://www.javvin.com/protocol/VLAN.html>.

PPPoE Connection Setup

PPPoE Connection Setup

Name: Type: Sharing:

Options: NAT Firewall VLAN ID: Priority Bits:

PPP Settings

Username:

Password:

Idle Timeout: secs

Keep Alive: min

Authentication: Auto CHAP PAP

MTU: bytes

On Demand: Default Gateway:

Enforce MTU: Debug:

PPP Unnumbered: LAN:

PVC Settings

PVC:

VPI:

VCI:

QoS:

PCR: cps

SCR: cps

MBS: cells

CDVT: usecs

Auto PVC:

PPP Settings

| Option | Description |
|------------------------|---|
| Username: | Enter the username provided by your ISP. |
| Password: | Enter the password provided by your ISP. |
| Idle Timeout: | Idle timeout means the router will disconnect after being idle for a preset amount of time. The default is 60 seconds. If you set the time to 0, the ADSL connection will remain always connected to the ISP. |
| Keep Alive: | If mode is LCP, This is the Keep Alive timer. If a reply to the LCP echo is not received in this amount if time, the connection is dropped. The Default is 10. |
| Authentication: | Default is Auto. However, if your ISP asks you to specify the authentication type, you can select it here (CHAP or PAP). |
| MTU | Maximum Transmission Unit indicates the largest packet size in bytes that the modem transmits. Any packets larger than the MTU setting are fragmented into smaller packets before being transmitted. |

| Option | Description |
|-------------------------|--|
| On Demand: | If enabled the Idle Timeout field can be modified. On Demand specifies that the modem will connect to the Internet on demand. |
| Default Gateway: | Specifies that this connection will be the default gateway for other LAN groups to access the Internet. |
| Enforce MTU: | Specifies that the MTU setting will be enforced. |
| Debug: | Enable to turn on the debugging mode of your modem. Your ISP may ask you to do this should you be experiencing problems connecting to the Internet. |
| PPP Unnumbered: | An unnumbered interface does not have an IP address assigned to it. An unnumbered interface is often used in point-to-point connections where an IP address is not required. You'll notice that once PPP Unnumbered is enabled you need to choose the LAN group to which this applies. |

PVC (Private Virtual Circuit) Settings

| Option | Description |
|----------------------------|---|
| VPI: | (Virtual Path Identifier) If instructed to change this, type in the VPI value for the initial connection (using PVC 0). Default = 0. |
| VCI: | (Virtual Channel Identifier) If instructed to change this, type in the VCI value for the initial connection (using PVC 0). Default = 0. Your modem can support up to 8 PVCs. For example, you could have one PVC (8/35) for your Internet traffic, and another PVC (9/35) for your VoIP traffic. Contact your ISP for further details. |
| QoS: | Default is UBR (Unspecified Bit Rate). Change this setting if your ISP instructs you to do so. The other settings are CBR (Constant Bit Rate) and VBR (Variable Bit Rate). |
| PCR: | Divide the DSL line rate (bps) by 424 (the size of an ATM cell) to find the Peak Cell Rate (PCR). This is the maximum rate at which the sender can send cells. |
| SCR: | The Sustain Cell Rate (SCR) sets the average cell rate (long-term) that can be transmitted. |
| MBS: | Maximum Burst Rate. Represents the maximum number of cells accepted over a period of time. When the cell rate exceeds the MBS cells can be dropped. |
| CDVT: | Cell Delay Variation Tolerance. If your PVC is a CBR service you need to set the PCR and CDVT parameters. Ask your ISP what the best settings are for these on their network. |
| Auto PVC: | If enabled your modem will automatically detect your PVC (VPI/VCI) settings. |
| Connect / | |
| Disconnect Buttons: | Click Connect button to attempt to connect using the settings you have specified. Click Disconnect button to disconnect the current profile. |
| Apply: | Click Apply to save the changes. |

PPPoA Connection Setup

When specifying your connection Type to be PPPoA you are able to change the Encapsulation to either LLC (Logical Link Control) or VC (Virtual Circuit) encapsulation. The default is LLC so do not change this setting unless your ISP instructs you to do so.

PPPoA Connection Setup

Name: Type: Sharing:

Options: NAT Firewall VLAN ID: Priority Bits:

| | |
|--|---|
| <p style="text-align: center;">PPP Settings</p> <p>Encapsulation: <input checked="" type="radio"/> LLC <input type="radio"/> VC</p> <p>Username: <input type="text" value="username"/></p> <p>Password: <input type="text" value="••••"/></p> <p>Idle Timeout: <input type="text" value="60"/> secs</p> <p>Keep Alive: <input type="text" value="10"/> min</p> <p>Authentication: <input checked="" type="radio"/> Auto <input type="radio"/> CHAP <input type="radio"/> PAP</p> <p>MTU: <input type="text" value="1500"/> bytes</p> <p>On Demand: <input type="checkbox"/> Default Gateway: <input checked="" type="checkbox"/></p> <p>Debug: <input type="checkbox"/></p> <p>PPP Unnumbered: <input type="checkbox"/> LAN: <input type="text" value="LAN group 1"/></p> | <p style="text-align: center;">PVC Settings</p> <p>PVC: <input type="text" value="New"/></p> <p>VPI: <input type="text" value="0"/></p> <p>VCI: <input type="text" value="0"/></p> <p>QoS: <input type="text" value="UBR"/></p> <p>PCR: <input type="text" value="0"/> cps</p> <p>SCR: <input type="text" value="0"/> cps</p> <p>MBS: <input type="text" value="0"/> cells</p> <p>CDVT: <input type="text" value="0"/> usecs</p> <p>Auto PVC: <input type="checkbox"/></p> |
|--|---|

Static Connection Setup

Option

Description

Encapsulation:

Select the method of encapsulation used by your ISP. The default is LLC, so only change this to VC if your ISP asks you to.

IP Address:

If your ISP has issued you with a static public IP address, you need to specify it here. (e.g. 210.1.123.123).

Mask:

The subnet mask specified by your ISP.

Default Gateway:

The default gateway specified by your ISP.

DNS:

You have the choice to specify up to three DNS (Domain Name Service) servers. The function of a DNS server is to map URL names (e.g. www.google.com.au) to their IP addresses (e.g.66.102.7.147). If DNS 1 is down, your modem will use DNS 2.

Mode:

Bridged and Routed

DHCP Connection Setup

Option

Description

Encapsulation:

Select the method of encapsulation used by your ISP from the drop-down list box. Choices vary depending on the mode you select in the Mode field.

IP Address:

The IP address assigned by an external DHCP server.

Mask:

The subnet mask assigned by an external DHCP server.

Gateway:

The gateway assigned by your DHCP server.

Default Gateway:

Enable this if you want to use this profile connection as the default gateway for clients to connect to the Internet.

Bridge Settings

Encapsulation:

Select the method of encapsulation used by your ISP from the drop-down list box. Choices vary depending on the mode you select in the Mode field.

Select LAN:

Select the LAN group to which you want to bridge this connection to. Having a Bridged Connection places the modem into a 'dumb' mode. The modem connects to the ISP, but does not perform authentication, routing or firewalling functions. You will need to have an additional router plugged into a LAN port of your modem to perform these functions.

CLIP Connection Setup

Option

Description

IP Address:

The public IP address assigned by your ISP for the Classical IP over ATM connection.

Mask:

The subnet mask issued by your ISP for the CLIP connection.

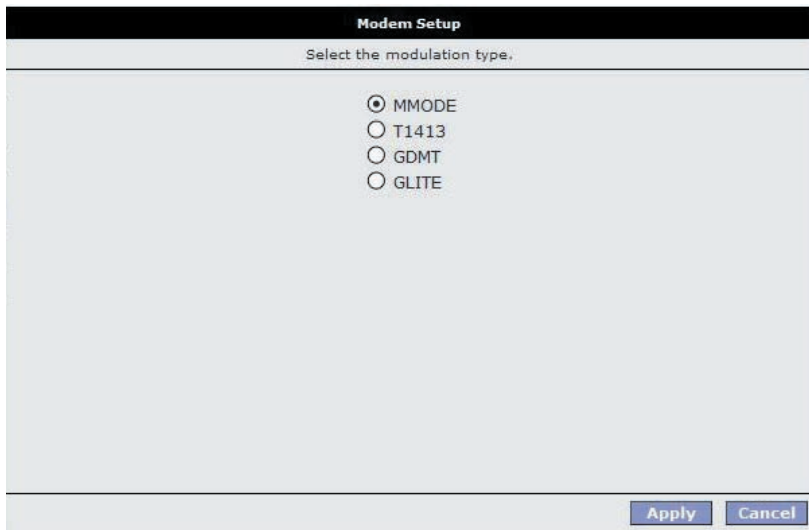
ARP Server:

The ARP (Address Resolution Protocol) server used by your modem.

Default Gateway:

Specify the default gateway used by your modem (issued by your ISP).

WAN Setup → Modem



Here you can choose one of four ADSL handshake types, typically MMode (Multi-mode) will work on Australian ADSL lines. You should not need to change this setting unless advised by your ISP.

| Option | Description |
|---------------|--|
| T1413: | Full-Rate (ANSI T1.413 Issue 2) with line rate support of up to 8 Mbps downstream and 832 Kbps upstream. |
| GDMT: | Full-Rate (G.dmt, G992.1) with line rate support of up to 8 Mbps downstream and 832 Kbps upstream. |
| GLITE: | G.lite (G.992.2) with line rate support of up to 1.5 Mbps downstream and 512 Kbps upstream. |
| MMODE: | Support Multi-Mode standard (ANSI T1.413 Issue 2; G.dmt(G.992.1); G.lite(G.992.2)). |

Click Apply to save the changes.

Logout



Click Log Out to logout of the modem's configuration interface.

Advanced

The Advanced menu allows you to configure a number of features of your modem. This section deals with these features.

| NetComm® | | HOME | SETUP | ADVANCED | WIRELESS | TOOLS | STATUS | EASYCONFIG | HELP | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|------------------------|---|--|-------|----------|----------|-------|--------|------------|------|-------------|---|-------------|--|-------------|----------------------------|---------------|--|------------------------|--|-------------------|---|--------------------|------------------------|----------------------|-------------------------------|-----------------------|---------------------------------|--------------------|------------------------------|------------------|---|-----------------------|--------------------------|------------------------|----------------|-----------------------|--------------------------------|
| UPnP | ⊗ | Advanced The Advanced section lets you configure advanced features like RIP, Firewall, NAT, UPnP, IGMP, Bridge Filters, and LAN clients. <table border="1"> <tr> <td>UPnP</td> <td>Configure UPnP for different connections.</td> </tr> <tr> <td>SNTP</td> <td>Configure SNTP to configure time server on Internet.</td> </tr> <tr> <td>SNMP</td> <td>Configure SNMP Management.</td> </tr> <tr> <td>IP QoS</td> <td>Configure IP Quality of Service for different connections.</td> </tr> <tr> <td>Port Forwarding</td> <td>Configure Firewall and NAT pass-through to your hosted applications.</td> </tr> <tr> <td>IP Filters</td> <td>Configure Firewall to block your LAN PCs from accessing the Internet.</td> </tr> <tr> <td>LAN Clients</td> <td>Configure LAN Clients.</td> </tr> <tr> <td>LAN Isolation</td> <td>Disable traffic between LANs.</td> </tr> <tr> <td>Bridge Filters</td> <td>Select to setup Bridge Filters.</td> </tr> <tr> <td>Web Filters</td> <td>Select to setup Web Filters.</td> </tr> <tr> <td>Multicast</td> <td>Configure Multicast pass-through for different connections.</td> </tr> <tr> <td>Static Routing</td> <td>Configure Static routes.</td> </tr> <tr> <td>Dynamic Routing</td> <td>Configure RIP.</td> </tr> <tr> <td>Access Control</td> <td>Configure access control list.</td> </tr> </table> | | | | | | | | UPnP | Configure UPnP for different connections. | SNTP | Configure SNTP to configure time server on Internet. | SNMP | Configure SNMP Management. | IP QoS | Configure IP Quality of Service for different connections. | Port Forwarding | Configure Firewall and NAT pass-through to your hosted applications. | IP Filters | Configure Firewall to block your LAN PCs from accessing the Internet. | LAN Clients | Configure LAN Clients. | LAN Isolation | Disable traffic between LANs. | Bridge Filters | Select to setup Bridge Filters. | Web Filters | Select to setup Web Filters. | Multicast | Configure Multicast pass-through for different connections. | Static Routing | Configure Static routes. | Dynamic Routing | Configure RIP. | Access Control | Configure access control list. |
| UPnP | Configure UPnP for different connections. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SNTP | Configure SNTP to configure time server on Internet. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SNMP | Configure SNMP Management. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| IP QoS | Configure IP Quality of Service for different connections. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Port Forwarding | Configure Firewall and NAT pass-through to your hosted applications. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| IP Filters | Configure Firewall to block your LAN PCs from accessing the Internet. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| LAN Clients | Configure LAN Clients. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| LAN Isolation | Disable traffic between LANs. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Bridge Filters | Select to setup Bridge Filters. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Web Filters | Select to setup Web Filters. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Multicast | Configure Multicast pass-through for different connections. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Static Routing | Configure Static routes. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Dynamic Routing | Configure RIP. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Access Control | Configure access control list. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SNTP | ⊙ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SNMP | ⊙ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| IP QoS | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Port Forwarding | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| IP Filters | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| LAN Clients | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| LAN Isolation | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Bridge Filters | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Web Filters | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Multicast | ⊗ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Static Routing | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Dynamic Routing | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Access Control | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Log Out | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

Advanced → UPnP

Your modem is Universal Plug 'n Play Capable, for security this feature is disabled by default. UPnP is a method of allowing devices and computer software on your Network to be able to configure 'unblocked' ports through your modem (and through your modem's firewall). This makes it easier to run Network games and Programs like Microsoft Messenger etc.

To Enable UPnP click the Enable UPnP box and choose the WAN connection (usually 'PPPoE'). Select the LAN Connection (e.g. LAN Group 1) to which UPnP is to be applied to.

The screenshot shows a dialog box titled "UPnP". At the top, it says "To enable UPnP, check the Enable UPnP box and select a connection below." Below this is a checkbox labeled "Enable UPnP" which is currently unchecked. Underneath the checkbox are two dropdown menus: "WAN Connection:" with "pppoe" selected, and "LAN Connection:" with "LAN group 1" selected. At the bottom right of the dialog box are "Apply" and "Cancel" buttons.

| Option | Description |
|---------------------|------------------|
| Enable UPnP: | Enable the UPnP. |

Click Apply to save the changes.

² For more information on Universal Plug and Play, see <http://www.microsoft.com/technet/prodtechnol/winxppro/evaluate/upnpxp.mspx>.

Advanced → SNTP

| HOME | SETUP | ADVANCED | TOOLS | STATUS | EASYCONFIG | HELP |
|--|-------|----------|-------|--------|------------|------|
| SNTp | | | | | | |
| To enable SNTp, check the Enable SNTp box and enter a time server. | | | | | | |
| <input type="checkbox"/> Enable SNTp | | | | | | |
| Primary SNTp Server: <input type="text" value="0.0.0.0"/> | | | | | | |
| Secondary SNTp Server: <input type="text" value="0.0.0.0"/> | | | | | | |
| Tertiary SNTp Server: <input type="text" value="0.0.0.0"/> | | | | | | |
| Timeout: <input type="text" value="5"/> Secs | | | | | | |
| Polling Interval: <input type="text" value="30"/> Mins | | | | | | |
| Retry Count: <input type="text" value="2"/> | | | | | | |
| Time Zone: <input type="text" value="(GMT+10:00) Brisbane, Sydney"/> | | | | | | |
| Day Light: <input type="checkbox"/> | | | | | | |
| <input type="button" value="Apply"/> <input type="button" value="Cancel"/> | | | | | | |

SNTp (Simple Network Time Protocol) allows your modem to update its time automatically using an SNTp server. To enable this feature, click the Enable SNTp tick box.

| SNTp | | | | | | |
|--|--|--|--|--|--|--|
| To enable SNTp, check the Enable SNTp box and enter a time server. | | | | | | |
| <input checked="" type="checkbox"/> Enable SNTp | | | | | | |
| Primary SNTp Server: <input type="text" value="0.0.0.0"/> | | | | | | |
| Secondary SNTp Server: <input type="text" value="0.0.0.0"/> | | | | | | |
| Tertiary SNTp Server: <input type="text" value="0.0.0.0"/> | | | | | | |
| Timeout: <input type="text" value="5"/> Secs | | | | | | |
| Polling Interval: <input type="text" value="30"/> Mins | | | | | | |
| Retry Count: <input type="text" value="2"/> | | | | | | |
| Time Zone: <input type="text" value="(GMT+10:00) Brisbane, Sydney"/> | | | | | | |
| Day Light: <input type="checkbox"/> | | | | | | |
| <input type="button" value="Apply"/> <input type="button" value="Cancel"/> | | | | | | |

| Option | Description |
|--|---|
| Primary, Secondary, Tertiary SNTP Servers | This allows you to enter three different SNTP server addresses. If one of these servers is unavailable your modem will use an alternative. An example of an NTP server on the Internet is 128.250.36.3. |
| Timeout: | The number of seconds your modem will attempt to connect to an SNTP server before trying an alternative server should the server you are trying to connect to be unavailable. |
| Polling Interval: | The interval that your modem will update its time with an SNTP server. |
| Retry Count: | The number of attempts at connecting to an SNTP server. |
| Time Zone: | Select the time zone you are in. |
| Day Light: | Enable this to enable daylight savings for the time on your modem. |

Click Apply to save the settings.

To check that your NB5Plus4/W modem is talking to an NTP server, follow these instructions for Windows Operating Systems:

1. Open a Command Prompt (Start > Run > cmd).
2. Type telnet 192.168.1.1 (or the IP address of your modem) and enter.
3. Type your login and password.
Login: admin
Password: admin
4. date [ENTER key]
5. Note that the date is set correctly.

Advanced IPQoS

IP QoS (Quality of Service) allows you to set priorities for traffic travelling through your modem. For example, you may want to prioritize your UDP traffic over your TCP traffic. Typical UDP traffic would be your VoIP (Voice over Internet Protocol) traffic. This section describes how to make use of your modem's IPQoS feature.

The NB5Plus4/W should have two primary sections for setting up IP QoS services:

1. A QoS setup page to configure the upstream/downstream connection queue priorities, and
2. A Rules configuration page.

QoS Setup Page

The QoS setup page will have 2 primary fields:

1. Connection name selection,
2. A table to select queue weights for the system transmit queues.

IP QoS traffic shaping is associated with any transmitted traffic from the perspective of the NB5Plus4/W. Each interface has 3 priority queues associated with transmit data. The web UI will allow the user to choose any interface connection and select the priority weights associated with that connection. For Example; the user could have a connection named WAN1 or a connection named LAN1. If the user selects WAN1 the transmit queues will be associated with that connection, and likewise with LAN1 (Refer to the following diagrams). All interfaces on the LAN are currently bridged and therefore the only connection name is that name associated with the LAN.

Transmit queues associated with WAN connection

Transmit queues associated with LAN connection

The high priority queue has strict priority over the medium and low priority queue, and therefore can exhaust all available bandwidth. The web UI will allow the user to select the weights of the medium and low priority queues in increments of 10 percent so that the sum of the weights of the 2 queues is equal to 100 percent. These queues will be serviced on a Round Robin priority basis according to the weights assigned, after the high priority queue has been completely serviced.

Rules Configuration Page

The Rules configuration page will allow the user to define IP matching fields to associate with the priority queues associated with the named connections selected above in the "QoS Setup Page" section.

There will be three primary fields for the user to select: 1.) A Trusted mode check box. 2.) A traffic priority choice (High, Medium, Low), and 3.) An IP rules matching selection area.

The NB5Plus4/W has two primary modes of operation with regard to queue traffic prioritization; Trusted, and Un-trusted. The Web UI will provide one check box to enable trusted mode. In trusted mode all rules will be applied first regardless of the setting of the TOS bits. After the rules have been exhausted the existing TOS bit settings will be honoured. If the "Trusted mode" box is unchecked this will indicate the "Un-trusted mode." "Un-trusted" mode will match first against all rules as in "Trusted" mode. The difference is that if there is no match then a default rule will be used. The default rule will have an associated queuing priority.

Rule definitions will be defined by the user by allowing the user to select matching based on Source IP, Destination IP, IP Protocol, Source Port, Destination Port, and Incoming Mac Port (switched LAN Port). These selections will define a rule and be associated with a particular queue priority: High, Medium, and Low.

Traffic Queuing Configuration

Based on the TOS (DSCP) marking, the NB5Plus4/W shall prioritize the traffic servicing on the outgoing interface (facing the Access Network) using a 3-band priority mechanism as described below.

Queue Priorities:

One Expedited Forwarding (EF) Queue: High Priority queue with non-preemptible service. The EF queue is always scheduled first prior to the medium and low priority queues and runs to completion

Two Queues (Medium and Low Priority) with Weighted Round Robin service. Based on the associated weights, packets on these queues share the remaining link bandwidth (after the EF service). The low priority queue corresponds to Best Effort

service. Looking forward, the medium priority queue will play the role of Assured Forwarding Queue.

Configuration:

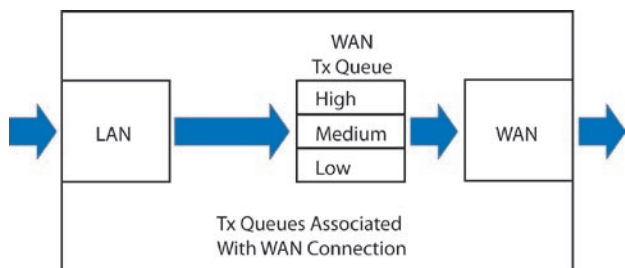
a.) The Medium, and Low Priority Queue weights will be selectable via the Web UI. User weights for these two queues are entered as a percentage in increments of 10%. The sum of the 2 weights must be equal to 100 percent.

En-queuing Policy

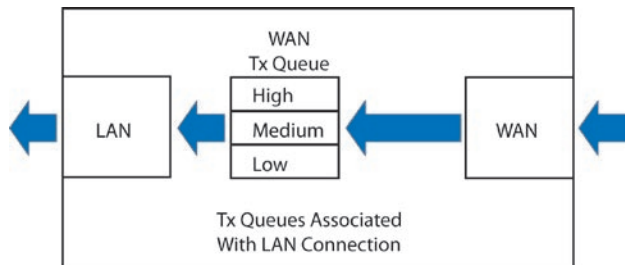
Inter-queue isolation to make greed work on the Residential Gateway: the transmit interface buffer (a common pool for all queues) can be monopolized by a greedy flow on the low priority queue thus preventing en-queuing high priority traffic. To prevent such conditions the en-queuing process is using a simple configurable allocation of per-queue lengths, adding up to the total queue length.

Configuration:

The Expedited Forwarding queue (fast service queue) length will be configurable via the config.xml file. This parameter will not be configurable via the Web UI. Please call NetComm Support and request to speak with an engineer should you require this XML file to edit.



The Medium and Low priority queue lengths will be proportionally calculated via the



queue weights selected in 1.) Queue Priorities above.

Total queue length for all three queues will sum to the transmit queue length set in the system.

Packets overflowing their queues will be tail-dropped, penalizing stochastically the greediest flow within each queue.

Future implementations may introduce a "buffer stealing" policy. This policy will remove the fixed buffer limits and allow a particular queue buffer to decrease to some predefined minimum limit.

De-queuing Policy

Expedited Forwarding Queue (High Priority) is always serviced first at each packet scheduling cycle and serviced to extinction. Therefore, the EF queue is non-preemptible by the Medium and Low priority queues.

WRR Queue Scheduler for Medium and Low priority queues

The L and M weights will be configured from the Web UI as stated above in 1.) Queue Priorities.

A service scheduling array will be pre-computed for the Medium and Low priority queues based on the user configurable weights assigned to these queues. Each array slot corresponds to a scheduling cycle. The pre-computed algorithm will allocate scheduling slots for each queue based on the Medium and Low priority queue weights and uniformly interleave them through the scheduling array. This array will provide an O(1) scheduler with a minimum possible average latency for each of the two queues.

Configuration:

The weighted values used for the WRR scheduler will be calculated based on the percentage weights the user inputs in the Web UI as stated above in 1.) Queue Priorities.

Example: User selects a Medium Queue Weight = 60 %, and Low Queue Weight = 40%. Then the O(1) scheduling array will look like {L, M, M, L, M, M, L, M, M, L} where L and M represents a scheduling cycle for the respective Low and Medium queues.

Low Latency Queue (Fragmentation and Interleaving) for Voice Traffic

With Voice traffic shared over same PVC with Data traffic, the simple packet classification and prioritization will not suffice to achieve the low latency required by voice. In this case, a voice call triggers dynamic flushing of existing data packets from device queues (including DSL device driver) for Head of Line Blocking removal, and IP MTU resizing based on uplink bandwidth for fragmentation and packet interleaving of voice and data. Below is an example of MTU calculations:

| VIF | Total delay PSTN delay end-to-end budget | | | Maximum Data Fragment size based on upstream bandwidth (bytes) | | |
|------|--|------|---------|--|---------|---------|
| | (ms) | (ms) | 100kbps | 150kbps | 200kbps | 250kbps |
| 10ms | 200 | 100 | 207 | 363 | 519 | 675 |
| 20ms | 200 | 100 | 82 | 175 | 269 | 363 |
| 30ms | 200 | 100 | x | x | 19 | 50 |

For Voice traffic priority an extra EF queue was added to PRIOWRR. This extra queue should not be exposed via WebUI config for data usage. Its use is triggered internally by the voice app using the socket options system calls. Voice packets are using this EF queue. Signalling for Voice uses the next EF queue that's also exposed on the web config. This means that voice signalling can be mixed with data if user configures data for High Priority.

TOS-to-Priority Mapping

High Priority Marking for Expedited Forwarding Queue: DSCP Mark: xx1000

Medium Priority Marking: DSCP Mark: xx0100

Low Priority Marking for Best Effort: DSCP Mark: xx0000

The four TOS bits (the 'TOS field') are defined as:

| Binary | Meaning |
|--------|------------------------------|
| 1000 | Minimize delay (md) |
| 0100 | Maximize throughput (mt) |
| 0010 | Maximize reliability (mr) |
| 0001 | Minimize monetary cost (mmc) |
| 0000 | Normal Service |

| TOS | Bits | Means | Linux Priority | Queue Priority | Band |
|-----|------|------------------------|----------------|----------------|------|
| 0x0 | 0 | Normal Service | 0 | Best Effort | 2 |
| 0x2 | 1 | Minimize Monetary Cost | 1 | Filler | 2 |

| | | | | | |
|------|----|----------------------|---|-------------|---|
| 0x4 | 2 | Maximize Reliability | 0 | Best Effort | 2 |
| 0x6 | 3 | mmc+mr | 0 | Best Effort | 2 |
| 0x8 | 4 | Maximize Throughput | 2 | Bulk | 1 |
| 0xa | 5 | mmc+mt | 2 | Bulk | 1 |
| 0xc | 6 | mr+mt | 2 | Bulk | 1 |
| 0xe | 7 | mmc+mr+mt | 2 | Bulk | 1 |
| 0x10 | 8 | Minimize Delay | 6 | Interactive | 0 |
| 0x12 | 9 | mmc+md | 6 | Interactive | 0 |
| 0x14 | 10 | mr+md | 6 | Interactive | 0 |
| 0x16 | 11 | mmc+mr+md | 6 | Interactive | 0 |
| 0x18 | 12 | mt+md | 4 | Int. Bulk | 1 |
| 0x1a | 13 | mmc+mt+md | 4 | Int. Bulk | 1 |
| 0x1c | 14 | mr+mt+md | 4 | Int. Bulk | 1 |
| 0x1e | 15 | mmc+mr+mt+md | 4 | Int. Bulk | 1 |

The Default queue priority for non-mapped TOS values is Best Effort.

Advanced → LAN Clients

LAN Client names are a way of applying specific Port-forwarding and Access Control rules to individual computers on the LAN. If DHCP is used, all DHCP clients are automatically assigned and are designated as a LAN client.

To add a LAN client, click Advanced > LAN Clients.

| Option | Description |
|--------------------------|---|
| Select LAN Group: | Select the LAN group you would like to add a LAN client to. |
| Enter IP Address: | Enter the IP address of the LAN client to be added. |
| Hostname: | Enter the Hostname. |
| MAC Address: | Enter the MAC address of the new client. To find out the MAC address of the client, open a command prompt and execute an ipconfig/all command (Windows 2000/XP). Note, it is optional to add the MAC address of the device. The format to add the MAC address is xx:xx:xx:xx:xx:xx:xx:xx. |
| Apply: | Click Apply to save the changes. |

Advanced → LAN Isolation

You are able to restrict communication between clients in different LAN groups. If you have the NB5Plus4 you can restrict traffic between two LAN groups. If you have the NB5Plus4W you can restrict traffic between three LAN groups (Ethernet, USB, Wireless).

Advanced Bridge Filters

Bridge filtering enables rules to be defined which allow or deny data to pass through the Router based on the source and destination Bridge address and data type of each data frame.

To access Bridge Filters Control, click on Advanced>Bridge Filters.

Usage examples of Bridge Filter Rules are: to specify which computers on a network are allowed Internet access; or to determine which particular computers are allowed to access services provided by the Router (the last point is particularly relevant for routers serving Wireless Networks as it can be used to prevent unauthorised people from attaching themselves to a wireless LAN).

Enable/Disable Bridge Filtering

To enable Bridge filtering, navigate to the Bridge Filter Control Screen and select the Enable Bridge Filters check box.

If the check box is selected, Bridge filtering is enabled according to the list of Bridge Filter Rules that has been created.

If the box is de-selected, Bridge Filtering will not be enabled, even if Bridge Filter Rules have been created.

Create Bridge Filter Rules

Enter the Source Bridge and Destination Bridge details. Entering zeros or blanks into the Source or Destination fields enters a null value.

'Protocol' provides the choice of protocol type for the rule.

'Mode' provides the choice of Allow or Deny for the rule.

When all selections are made, click on Add to add the rule to the list of rules. A maximum of 20 Bridge Filter Rules can be defined and saved.

To save changes, click on Apply.

Edit or Delete Bridge Filter Rules

Option

Description

WAN Connection:

Refers to the active Connection Profile.

Allow Incoming Ping:

Enabling this feature allows users on the WAN side of your modem to receive replies to an ICMP ping command. Useful for testing remote connection to your modem.

Select LAN Group:

Select the LAN group for which you are setting up the port forwarding rules for.

LAN IP:

Select the device (PC) to which you will be port forwarding data to. The default will be the LAN device currently logged in to the modem's web interface. For example, if you had a web server with IP address 192.168.1.100, you would select this from the drop-down list.

New IP:

If you wish to manually add a LAN client so that you can apply rules to it, click on the New IP Button and enter Host Name, MAC Address and IP Address. Note: The MAC address needs to be entered in the format xx:xx:xx:xx:xx:xx. You do not need to enter a MAC address.

DMZ Settings

A DMZ (demilitarized zone) is a computer host or small network inserted as 'neutral territory' between a private LAN and the Internet. It prevents outside users from

getting direct access to LAN computers while still being able to access services hosted on the designated DMZ Computer.

When using NAPT to share your internet connection, LAN computers will still be able to access the Internet when the DMZ host is enabled. Any direct communication to the WAN port of your Modem that is not a reply to the original NAPT request is forwarded to the DMZ host.

| Option | Description |
|--------------------------|---|
| Select your WAN | |
| Connection: | Select the connection to which your DMZ client is connected to. |
| Select LAN group: | Select the LAN group in which you want to place the DMZ client. |
| Select a LAN IP | |
| Address: | Select the LAN IP address of the DMZ client. |
| LAN Clients: | Click the LAN clients hyperlink to manually add a LAN client. |

Click the Apply button to save the settings. To remove a rule from the Applied Rules box, select the Rule and click on the Remove Button.

To save changes, click on Apply.

Advanced Port Forwarding: Creating Custom Rules

Click the Custom Port Forwarding link to setup a custom rule.

If there is no pre-defined Port Forwarding Rule for a particular application, a User Rule can be created which defines the required Port(s), Protocol(s) and Internal Port forwarding rules.

To create a custom rule you will need to know the specific port number(s) and port type [UDP or TCP] that the application requires. These will be the outside port num-

bers. Some applications specify a range of ports in which case you will need to know both the starting and ending port numbers in the range, which are mapped by the start port and end port fields.

The Destination Port Map field specifies the internal port that the data will be directed to on the LAN Client. When dealing with port ranges, the Internal Port (designated by the Port Map field) will be the same as the first port in the range. When you simply want to forward a single port from outside (i.e. WAN side) to inside (i.e. LAN side), then all three fields (Port Start, Port End and Port Map) will have the same port number.

| Option | Description |
|--------------------------------|--|
| Connection: | Choose the connection to which the rule is to be applied to. |
| Application: | Provide a name for the application (e.g. Azureus). The name must be unique, must not contain spaces and cannot begin with a number. |
| Protocol: | Can be either TCP or UDP, or both. |
| Option | Description |
| Source IP Address: | The client on the Internet sending the data (e.g. 202.44.55.66). Note, if you do not know the IP address of the client use 0.0.0.0 for any client on the Internet. |
| Source Netmask: | The subnet mask of the client connecting to you. Note, if you do not know the Netmask use 0.0.0.0. |
| Destination IP Address: | The LAN IP address of the device on your network to which packets of data will be forwarded to (e.g. 192.168.1.2). |
| Destination Netmask: | The subnet mask of the LAN device. |

Destination Port Start & Destination Port End.

The ports on the remote client from which data is being sent to your modem's corresponding ports. These will be the same if you are forwarding only a single port. If there is a range, then port start is the first number in the range, and port end will be the last number.

Destination Port Map:

This is the port number that the data should be forwarded to on the specified LAN IP (i.e. the inside port). This is usually the same as the port start figure.

TIP: It is possible to map outside port numbers, or ranges [i.e. port start...port end] to a different inside port numbers [port map] for reasons of security or convenience.

Click 'Apply'.

The Port Rule settings defined by this process will then be displayed in a table at the bottom of the Rule Management panel.

If you wish to add more ports to this rule, leave the text name in the Rule Name field and enter the new port settings. Click 'Apply' and the new settings will be added to the list.

Adding Custom Rules to Applied Rules List

When you have assigned all necessary ports to the Rule and they appear in the

table, click on the Port Forwarding menu item to return to the main Port Forwarding screen.

User-created rules will be shown in the Available Rules list when the User Category

Custom Port Forwarding

| | | | | | |
|-------------------------|------------------------------------|-----------------------|--|-------------------------------------|--|
| Connection: | <input type="text" value="pppoe"/> | | Enable | <input checked="" type="checkbox"/> | |
| Application: | <input type="text"/> | Protocol: | <input type="text" value="TCP"/> | | |
| Source IP Address: | <input type="text"/> | Source Netmask: | <input type="text"/> | | |
| Destination IP Address: | <input type="text"/> | Destination Netmask: | <input type="text" value="255.255.255.255"/> | | |
| Destination Port Start: | <input type="text"/> | Destination Port End: | <input type="text"/> | | |
| Destination Port Map: | <input type="text"/> | | | | |

| | Enabled | Name | Source IP Mask | Destination IP Mask | Port Start | Port End | Protocol | Edit | Delete |
|--|---------|------|----------------|---------------------|------------|----------|----------|------|--------|
| | | | | | | | | | |

radio button is selected. You can now apply the rule(s) by selecting it and clicking Add. This will add the rule to list of applied rules.

Advanced ➤ IP Filters

The IP filters page allows you to specify Normal Port Forwards, Block ALL traffic to specific LAN Clients or specify Custom IP filters that will control the flow of data across the router.

Custom IP Filters (often also referred to as 'Access Control Lists') allow you to specify individual rules that will deny traffic by defining the following:

- Source IP address or IP Subnet
- Destination IP address or Subnet
- Port or Port range
- Protocol

Custom IP filters are different from Port forwards, or Block All traffic because they allow greater scopes of IP addresses to be included in the block.

Note: You must have at least one LAN Client in your LAN clients table before IP filters can be created. To create a LAN Client, see the section below on LAN Clients under the Advanced Menu.

Advanced ➤ Access Control

Use Access Control to configure advanced security functions by customising the

Modem Firewall. The default 'Firewall On' setting blocks all anonymous Internet traffic. Access control enables the user to selectively direct such traffic, for example to a Web Host in the DMZ or to specific ports opened for such applications as Web, Telnet or FTP.

CAUTION: This dialog box indicates that you should not disable LAN Web Access or else you might not be able to connect to the device. If you become locked out of the device perform a Restore Factory Default as detailed earlier in this manual.

To configure Access Control, click on Advanced>Access Control. This will reveal the Enable Access Control screen. The default configuration enables Telnet, Web, FTP and SSH access FROM the LAN TO the WAN. Access FROM the WAN to the LAN is not available in the default configuration.

Enable Access Control: check this box to enable selective access from the WAN to your LAN for applications of the class indicated by the relevant check boxes. If Access Control is not enabled, the individual check boxes cannot be checked.

If Access Control is enabled, and an Enable WAN checkbox is selected, then WAN access to the matching service is enabled. In other words, for example, if you were to enable Telnet access on the WAN you could then manage and configure your modem from anywhere on the Internet via Telnet.

Caution: Enabling WAN access to your modem reduces security.

IP Access List: This enables you to specify which LAN/WAN IP addresses are allowed access to the modem configuration services specified.

Tools

The Tools section allows you to save the configuration, restart the gateway, update the gateway firmware, setup user and remote log information and run Ping and Modem tests.

Tools → System Commands

System commands allow you to carry out basic system actions. Press the button to execute a command. Here you will find the following functions:

- Save All
- Restart
- Restore Defaults (same as pressing and holding the button on the back to clear and reset to factory default).

Note: If you Restore Defaults you will need to reconfigure your internet connection settings, ISP Username & Password etc.

Tools → User Management

User Management is used to change your NB5Plus4/W's User Name or Password.

| Option | Description |
|-------------------|---------------------|
| User Name: | Default is 'admin'. |
| Password: | Default is 'admin'. |

Idle Timeout:

If there is no activity by the admin user logged into the modem for the number of minutes specified in this field, the user will be required to login again.

Apply:

Click Apply to save the changes.

The screenshot shows the 'IP Filters' configuration window. At the top, there's a title bar 'IP Filters'. Below it, 'Select LAN Group' is set to 'LAN group 1'. 'LAN IP' is set to '192.168.1.2' with a 'New IP' button next to it. There are two checkboxes: 'Block All Traffic' (unchecked) and 'Block Outgoing Ping' (unchecked), with a link to 'Custom IP Filters'. The main area is divided into three sections: 'Category' with radio buttons for Games (selected), VPN, Audio/Video, Apps, Servers, and User; 'Available Rules' with a list of game titles (Alien vs Predator, Asheron's Call, Dark Rein 2, Delta Force, Doom, Dune 2000, DirectX (7.8) Games, EliteForce, EverQuest, Fighter Ace II) and 'Add >' and '< Remove' buttons; and 'Applied Rules' which is currently empty. At the bottom right are 'Apply' and 'Cancel' buttons.

WARNING: It is strongly recommended that you change the default username and password to something unique.

Tools → Update Firmware

To update your NB5Plus4/W's firmware, browse an update image file or configuration file and then click the Update Gateway button.

Additionally, you may download your configuration file from the system by clicking "Get Configuration" so that you can store a backup of your configuration to restore it at a later date.

Tools → Ping Test

The Ping test allows you to ping local and remote IP addresses to check for connec-

To edit an existing Bridge Filter Rule, click the radio button adjacent to the Filter Rule name. The Rule will then appear in the top half of the Bridge Filter control screen where it can be edited. When editing is complete, click 'Add' to return the Rule to the list of existing rules.

To delete Bridge Filter Rules, click on the 'Delete' tick box; multiple deletions can be made by shift-clicking Delete tick boxes; Select All will select every rule. When the desired selections are made, effect deletion by clicking on Apply.

LAN Clients

To add a LAN Client, Enter IP Address and Hostname, then click Apply.

Select LAN Connection: LAN group 1

Enter IP Address:

Hostname:

MAC Address:

Dynamic Addresses

| <u>Reserve</u> | <u>IP Address</u> | <u>Hostname</u> | <u>MAC</u> | <u>Type</u> |
|--------------------------|-------------------|-----------------|-------------------|-------------|
| <input type="checkbox"/> | 192.168.1.2 | samara | 00:c0:9f:27:b1:ca | Dynamic |

To save changes, click on Apply.

Hidden Bridge Filter Rules

The Bridge filter table contains three hidden rules. These rules are built into the Router to ensure the user does not become locked out by entering a rule which prevents further access to the router.

The first rule allows any and all ARP frames through the system.

The second rule allows all IPv4 frames with the destination Bridge address of the bridge to go through.

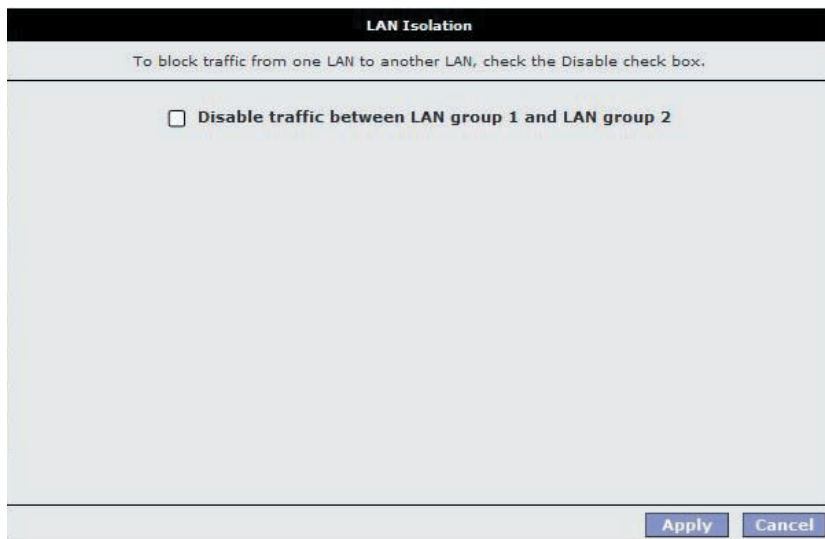
The third rule allows all IPv4 frames with the source MAC address of the bridge to go through.

TIP: To find the MAC address of a Windows-based computer, at the DOS prompt type: ipconfig /all.

Advanced Multicast

IGMP [=Internet Group Management Protocol] Multicast enables communication

between a single sender and multiple receivers on a network. It is used when data needs to be sent from one to many devices. Typical uses might include the updat-



ing of mobile personnel from a home office or the periodic publishing of an online newsletter. Multicasting provides efficiencies which enable it to use less network bandwidth than the sending of the same data by other means [e.g. SMTP].

To access Multicasting, click on Advanced>Multicast.

To enable Multicast, open the multicast screen and select the Enable IGMP Multicast.

If you have multiple connections setup on your modem you will be able to choose which connection to enable IGMP Multicast for.

Click the Apply button to save the settings.

Bridge Filters

Enable Bridge Filters
 Enable Bridge Filter Management Interface

Select LAN: LAN group 1
 Bridge Filter Management Interface: Ethernet

| Src MAC | Src Port | Dest MAC | Dest Port | Protocol | Mode |
|-------------------|----------|-------------------|-----------|---------------|------|
| 00-00-00-00-00-00 | ANY | 00-00-00-00-00-00 | ANY | PPPoE Session | Deny |

Add

| Edit | Src MAC | Src Port | Dest MAC | Dest Port | Protocol | Mode | Delete |
|------|---------|----------|----------|-----------|----------|------|--------|
|------|---------|----------|----------|-----------|----------|------|--------|

Apply Cancel

Advanced → Static Routing

If the Router is required to serve more than one network, you will need to set up a Static Route between the networks. Static routing can be used to allow users from one IP domain to access the Internet through the Router in another domain. A Static Route provides the defined pathway that network information must travel to reach the specific host or network which is providing Internet access .

To access the Static Routing controls, click on Advanced> Static Routing.

Configuring Static Routing:

Choose a Connection: presents list of Saved Connections. Select appropriate connection from list.

The New Destination IP is the address of the remote LAN network or host to which you want to assign a static route. Enter the IP address of the host for which you wish to create a static route here. For a standard Class C IP domain, the network address is the first three fields of the New Destination IP, while the last field should be 0. The Subnet Mask identifies which portion of an IP address is the network portion, and which portion is the host portion. For a full Class C Subnet, the Subnet Mask is 255.255.255.0. The Gateway IP address should be the IP address of the gateway device that allows for contact between the Gateway and the remote network or host.

Gateway: IP address refers to the IP address of the near device that is to connect with the remote network or host. If the Modem is fulfilling this function then its IP address will be entered in this field.

To save changes, click on Apply.

Advanced → Dynamic Routing

Dynamic Routing makes use of the RIP Protocol to allow the ADSL Router to automatically adjust to physical changes in the network. The NB5Plus4/W, using the RIP protocol, will determine the network packet route based on the least number of hops between the Source and the Destination. The RIP protocol regularly broadcasts routing information to other Routers on the network and is part of the IP Suite.

To access Dynamic Routing click Advanced>Dynamic Routing.

| Option | Description |
|-------------------------|--|
| Enable RIP: | If this box is checked, Dynamic Routing is enabled. |
| Protocol: | Choice is dependent upon the network environment. Most networks support Rip v1. If RIP v1 is selected, routing data will be sent in RIP v1 format. If Rip V2 is selected, routing data will be sent in RIP v2 format using Subnet Broadcasting. If Rip V1 Compatible is selected, routing data will be sent in RIP v2 format using Multicasting. |
| Enable Password: | Enable to password protect the Dynamic Routing settings. |
| Direction: | Determines the direction that RIP routes will be updated. |

Select 'In':

The NB5Plus4/W will only incorporate received RIP information.

Select 'Out':

The NB5Plus4/W will only send out RIP information.

Select 'Both':

The NB5Plus4/W will both incorporate received RIP information and send out updated RIP information.

Advanced Port Forwarding

Multicast

To enable Multicast, check Enable IGMP Multicast button and then select a connection.

Enable IGMP Multicast

| Select | Available Connections |
|-----------------------|-----------------------|
| <input type="radio"/> | pppoe |

Port Forwarding is necessary because NAT [=Network Address Translation] only forwards traffic from the Internet to the LAN if a specific port mapping exists in the NAT translation table. Because of this, the NAT provides a level of protection for computers that are connected to your LAN. However, this also creates a connectivity problem when you want to make LAN resources available to Internet clients, which you may want to do to play network games or host network applications.

Thus Port Forwarding is necessary to run certain games, chat clients, video-conferencing and other kinds of applications. You might also need to configure port-forwarding if you intend to host a web server or mail server that is to be visible outside your LAN.

TIP: In situations where you are hosting a Web Site or, for example, setting up a regular NetMeeting link, it is advisable to consider implementing a Fixed IP address, otherwise the dynamic IP address allocated by DHCP will need to be communicated prior to every user session.

More about Port Forwarding

The screenshot shows a 'Static Routing' configuration window. At the top, it says 'Choose a connection:' with a dropdown menu showing 'pppoe'. Below this are four input fields: 'New Destination IP:', 'Mask:' (with the value '255.255.255.0'), 'Gateway:', and 'Metric:' (with the value '0'). In the center of the window, it says 'The Routing Table is empty.' At the bottom right, there are two buttons: 'Apply' and 'Cancel'.

In TCP/IP and UDP networks a port is a 16-bit number used to identify which application program (usually a server) incoming connections should be delivered to. Some ports have numbers that are pre-assigned to them by the IANA (the Internet Assigned Numbers Authority), and these are referred to as "well-known ports". Servers follow the well-known port assignments so clients can locate them.

If you wish to run a server on your network that can be accessed from the WAN (i.e. from other machines on the Internet that are outside your local network), or any application that can accept incoming connections (e.g. Peer-to-peer/P2P software such as instant messaging applications and P2P file-sharing applications) and are using NAT (Network Address Translation), then you will usually need to configure your router to forward these incoming connection attempts using specific ports to the PC on your network running the application. You will also need to use port forwarding if you want to host an online game server.

The reason for this is that when using NAT, your publicly accessible IP address will be used by and point to your router, which then needs to deliver all traffic to the private IP addresses used by your PCs.

The Internet Assigned Numbers Authority (IANA) is the central coordinator for the assignment of unique parameter values for Internet protocols. Port numbers range

from 0 to 65535, but only ports numbers 0 to 1023 are reserved for privileged services and are designated as "well-known ports". The registered ports are numbered from 1024 through 49151. The remaining ports, referred to as dynamic ports or private ports, are numbered from 49152 through 65535.

Examples of well-known and registered port numbers are shown in Table 4, for further information, please see IANA's website at: <http://www.iana.org/assignments/port-numbers>

Well-know and registered Ports

| Port Number | Protocol | Description |
|-------------|-----------|---------------------------------------|
| 20 | TCP | FTP Data |
| 21 | TCP | FTP Control |
| 22 | TCP & UDP | SSH Remote Login Protocol |
| 23 | TCP | Telnet |
| 25 | TCP | SMTP (Simple Mail Transfer Protocol) |
| 53 | TCP & UDP | DNS (Domain Name Server) |
| 69 | UDP | TFTP (Trivial File Transfer Protocol) |
| 80 | TCP | World Wide Web HTTP |
| 110 | TCP | POP3 (Post Office Protocol Version 3) |
| 119 | TCP | NEWS (Network News Transfer Protocol) |
| 123 | UDP | NTP (Network Time Protocol) |
| 443 | TCP & UDP | HTTPS |
| 1503 | TCP | T.120 |
| 1720 | TCP | H.323 |
| 4000 | TCP | ICQ |
| 7070 | UDP | RealAudio |

Easy Port Forwarding: Applying Pre-Defined Rules

Available pre-defined rules are categorised according to the application type. Click the Radio Button adjacent to the appropriate Category, and then select the required application name. Click on the Add button to move the application into the Applied Rules box. In the example shown on the previous page, 'Delta Force' has been selected from the list of Available Rules and is about to be copied to Applied Rules. In the example, this will configure your Modem ports to use with 'Delta Force'.

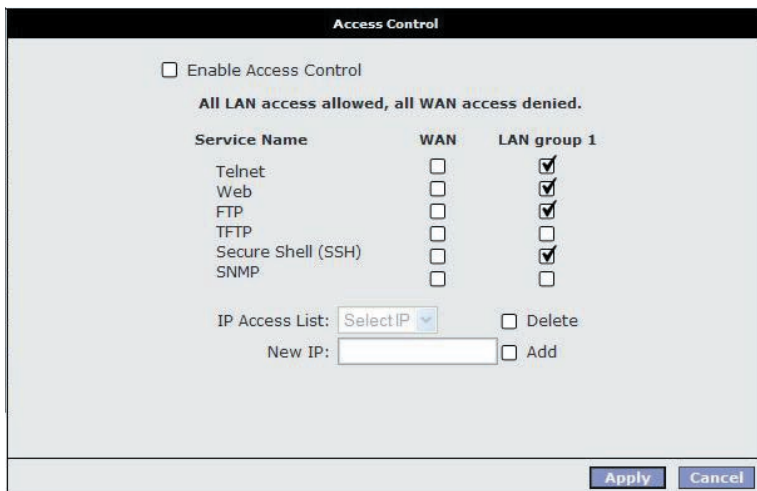
tivity directly from the NB5Plus4/W to the Internet or to a computer on your Network. You must make certain that the IP address that you ping will actually respond to a ping before interpreting the results of the ping.

Note: Computers and Network devices can be configured to communicate even though they do not respond to a ping, this can sometimes be done for security.



Tools → Modem Test

This test can be used to check whether your Modem is properly connected to the



Network. This test may take a few seconds to complete. To perform the test, select your connection from the list and press the Test button.

Note: Errors or failures on this test do not specifically mean your connection is faulty, only your ISP can tell you if these tests should pass or fail.

Status

The Status section allows you to view the Status/Statistics of different connections and interfaces.

Status → Network Statistics

You can view data statistics for your Ethernet ports combined or for your ADSL port in these pages.

Note: The statistics will be reset on loss of power or Reboot/Reset.

Status → Connection Status

Here you can view the connection status of your Internet connection (usually 'PP-PoE'). You can also see the Public IP address that has been assigned to your modem

| NetComm® | | HOME | SETUP | ADVANCED | TOOLS | STATUS | EASYCONFIG | HELP | |
|------------------------|---|--------------|-------|----------|-------|--------|------------|------|--|
| System Commands | | Tools | | | | | | | |
| Remote Log | The Tools section allows you to save the configuration, restart the gateway, update the gateway firmware, setup user and remote log information and run Ping and Modem tests. | | | | | | | | |
| User Management | | | | | | | | | |
| Update Gateway | | | | | | | | | |
| Ping Test | | | | | | | | | |
| Modem Test | | | | | | | | | |
| Log Out | | | | | | | | | |
| | <p>System Commands Save the current configuration, Restart the gateway and Restore to factory defaults.</p> <hr/> <p>Remote Log Setup Remote Log Information.</p> <hr/> <p>User Management Configure User Name and password.</p> <hr/> <p>Update Gateway Upgrade the Gateway Firmware.</p> <hr/> <p>Ping Test Run a Ping Test.</p> <hr/> <p>Modem Test Check whether the Modem with a specific Connection is properly connected to the Network.</p> | | | | | | | | |

as well as other information about the connection.

Status → DHCP Clients

The DHCP Clients page shows the MAC address, IP Address, Host Name and Lease

System Commands

System Commands allow you to carry out basic system actions. Press the button to execute a command.

| | |
|-------------------------|---|
| Save All | Press this button in order to permanently save the current configuration of the Gateway. If you do restart the system without saving your configuration, the Gateway will revert back to the previously saved configuration. |
| Restart | Use this button to restart the system. If you have not saved your configurations, the Gateway will revert back to the previously saved configuration upon restarting. NOTE: Connectivity to the unit will be lost. You can reconnect after the unit reboots. |
| Restore Defaults | Use this button to restore factory default configuration. NOTE: Connectivity to the unit will be lost. You can reconnect after the unit reboots. |

Time assigned to other computers in your network by the modem.

Status → Modem Status

The Modem Status page shows the modem status and DSL statistics.

Status → Product Information

The Product Information page shows the product information and software versions.

Status → System Log

The System Log page shows the events triggered by the system.

User Management

User Management is used to change your User Name or Password.

User Name:

Password:

Confirmed Password:

Idle Timeout: minutes

EasyConfig

The EasyConfig menu takes you to the EasyConfig page. This is the page you originally configured your modem with.

Help

This menu provides information on various features of your modem. Click the hyperlinks to access the information.

Appendix A: NB5Plus4W Wireless Features

The WLAN tab allows you to perform basic WLAN interface configuration functions including:

- Access to the WLAN web interface.
- Identify the function of each WLAN (Wireless Local Area Network) web interface page.
- Use the WLAN web interface to configure the NB5Plus4W as an Access Point (AP).

Wireless Main Screen

Update Gateway

To update your gateway firmware, choose an updated firmware image or configuration file in "Select a File", and then click the Update Gateway button. Additionally, you may download your configuration file from the system by clicking Get Configuration.

Select a File:

(Max file size 3.5 MB)
Firmware Image can be the combined single image with or without digital signature.

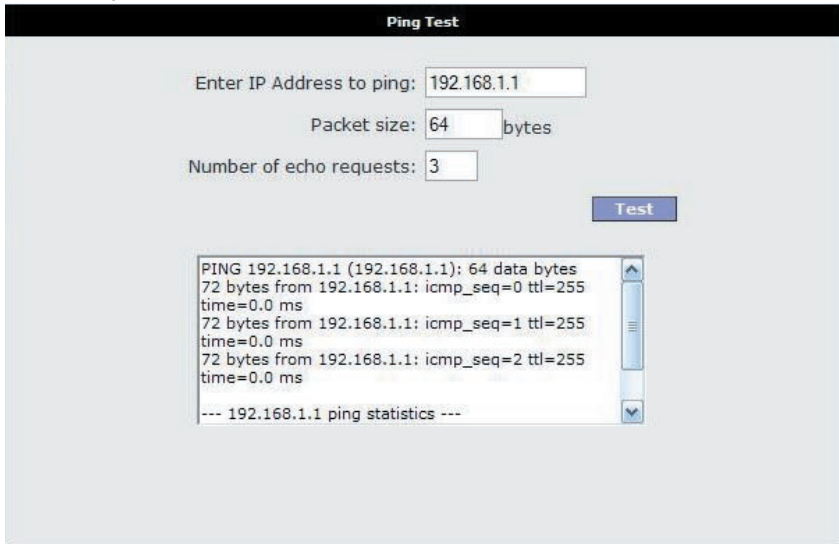
The system will be restarted automatically, after the Filesystem image is successfully updated. You will need to reconnect again to configure your setup.

The system will give the configuration file only if it was earlier saved by pressing "SaveAll" in System Command Menu.

Status: None

The screen below shows the Wireless main screen, which can be accessed by clicking on the Wireless tab from the top of the screen. This screen provides access to the following Wireless configuration screens:

- Setup
- Configuration
- Security



- Management
- Log Out

Wireless Setup

The screenshot below shows the default Wireless setup screen, which can be accessed by clicking on the Setup link. This screen provides basic local and Wireless networks parameter settings.

Modem Test

This test can be used to check whether your Modem is properly connected to the Network. This test may take a few seconds to complete. To perform the test, select your connection from the list and press the Test button.

| Connection | Type | VPI:VCI |
|-----------------------------|-------|---------|
| <input type="radio"/> pppoe | pppoe | |

Test Type:

Modem Test Result: No test is running

Following is a description of the Wireless Setup options:

Wireless Setup Field Descriptions

Option

Description

Enable AP

Enables/disables the access point.

SSID

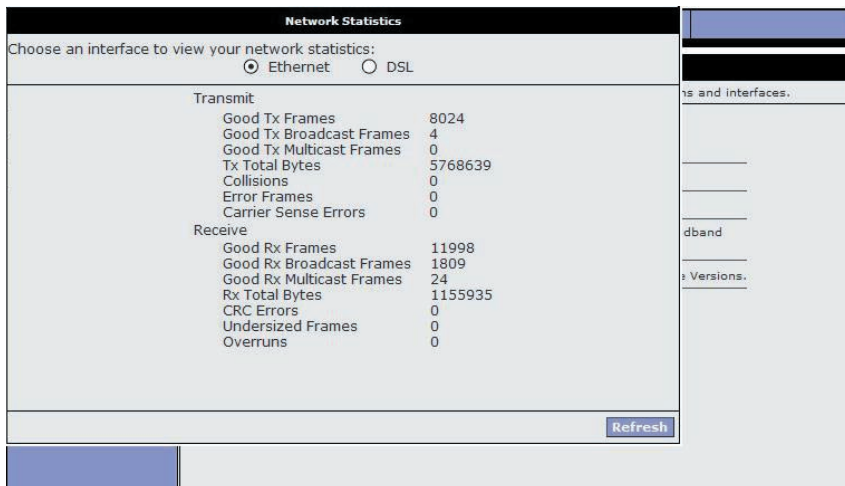
Service Set Identifier of the AP. The default is 'wireless' and you can assign

The screenshot shows the NetComm web interface. At the top, there is a navigation bar with the following tabs: HOME, SETUP, ADVANCED, TOOLS, STATUS (highlighted in red), EASYCONFIG, and HELP. Below the navigation bar is a sidebar menu on the left with the following items: Network Statistics, Connection Status, DHCP Clients, Modem Status, Product Information, System Log, and Log Out. The main content area is titled 'Status' and contains a list of status options with their descriptions:

- Network Statistics**: View the Statistics of different interfaces - Ethernet/DSL.
- Connection Status**: View the Status of different connections.
- DHCP Clients**: View the list of DHCP clients.
- Modem Status**: View the Status and Statistics of your broadband (DSL) connection.
- Product Information**: View the Product Information and Software Versions.
- System Log**: View the Log messages.

a unique SSID to your AP. The SSID

is the name of your wireless network. When scanning for wireless networks in your area this is what you will see displayed.



Hidden SSID

Enables/disables the Hidden SSID feature. The AP (Access Point) will not transmit beacon and thus will not be

seen by any other station. This adds an extra layer of security.

Channel B/G

The channel on which the AP and the wireless stations will communicate. Different domains will have different

| Connection Status (1) | | | | | |
|-----------------------|-------------|-----------|----------------------|---------------|--------------------------|
| <u>Description</u> | <u>Type</u> | <u>IP</u> | <u>State</u> | <u>Online</u> | <u>Disconnect Reason</u> |
| pppoe | pppoe | N/A | Not Connected | 0 | DSL Line is Disconnected |

ranges of channels. For ETSI (European Telecom Standardization Institution) in 2.4GHz, the default is 13.

Option

Description

| DHCP Clients (1) | | | |
|--------------------|-------------------|------------------|-------------------|
| Select LAN: | LAN group 1 | | |
| <u>MAC Address</u> | <u>IP Address</u> | <u>Host Name</u> | <u>Lease Time</u> |
| 00:c0:9f:27:b1:ca | 192.168.1.2 | samara | 0 days 0:37:42 |

Refresh

Channel B/G (cont'd)

The channel can be selected according to the band selection. It is good practise to have your wireless network transmitting on a different channel to

| Modem Status | |
|-----------------------------|-----------------|
| Modem Status | |
| Connection Status | Disconnected |
| Us Rate (Kbps) | 0 |
| Ds Rate (Kbps) | 0 |
| US Margin | 0 |
| DS Margin | 0 |
| Trained Modulation | Not Trained |
| LOS Errors | 0 |
| DS Line Attenuation | 0 |
| US Line Attenuation | 0 |
| Peak Cell Rate | 0 cells per sec |
| CRC Rx Fast | 0 |
| CRC Tx Fast | 0 |
| CRC Rx Interleaved | 0 |
| CRC Tx Interleaved | 0 |
| Path Mode | Interleaved |
| DSL Statistics | |
| Near End F4 Loop Back Count | 0 |
| Near End F5 Loop Back Count | 0 |
| Refresh | |

neighbouring wireless networks.

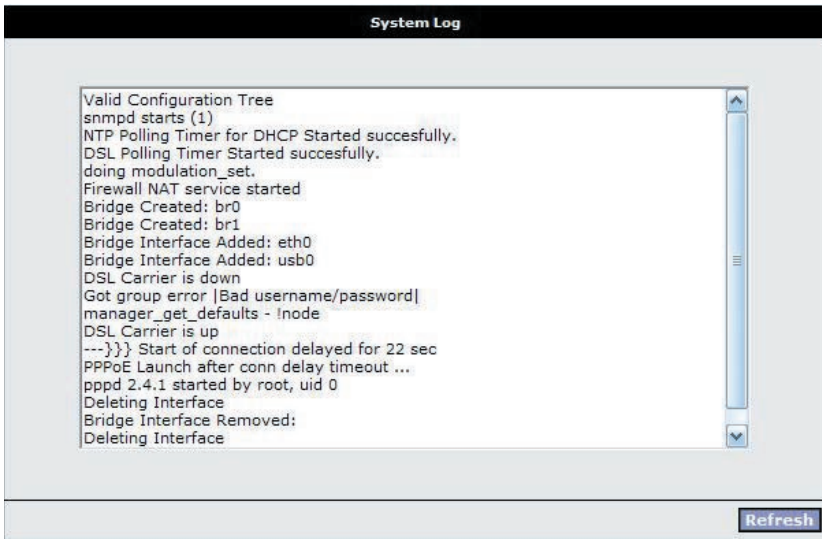
802.11 Mode

You can select from the following mode:

- Mixed mode: Both 11b and 11g

| Product Information | |
|----------------------------|--------------------|
| Product Information | |
| Model Number | NB5Plus4 |
| HW Revision | V0.3 |
| Ethernet MAC | 00:01:38:1F:65:F5 |
| DSL MAC | 00:01:38:1F:65:F6 |
| Software Versions | |
| Gateway | 1.C08NCT2.8227A |
| ATM Driver | 4.05.03.00 |
| DSL HAL | 3.02.04.00 |
| DSL Datapump | 3.02.06.00 Annex A |
| SAR HAL | 01.07.02 |
| PDSP Firmware | 0.49 |
| Boot Loader | 1.2.1.5 |

devices are able to connect to the NB5Plus4W. Beacon & Probe Response Frames are sent in "b" rate.



The image shows a 'System Log' window with a scrollable text area containing the following log entries:

```
Valid Configuration Tree
snmpd starts (1)
NTP Polling Timer for DHCP Started succesfully.
DSL Polling Timer Started succesfully.
doing modulation_set.
Firewall NAT service started
Bridge Created: br0
Bridge Created: br1
Bridge Interface Added: eth0
Bridge Interface Added: usb0
DSL Carrier is down
Got group error |Bad username/password|
manager_get_defaults - Inode
DSL Carrier is up
---}} Start of connection delayed for 22 sec
PPPoE Launch after conn delay timeout ...
pppd 2.4.1 started by root, uid 0
Deleting Interface
Bridge Interface Removed:
Deleting Interface
```

A 'Refresh' button is located at the bottom right of the log window.

- 11b only Mode: Only 11b devices are

able to connect to the NB5Plus4W.

- 11b+ Mode: Similar to the “802.11b-only” mode except that 22Mbps PBCC rate/modulation is included.

The screenshot shows the 'EasyConfig' window with a 'Quick Settings' section. The 'Protocol' dropdown is set to 'PPPoE'. Below it are input fields for 'User ID', 'Password', 'VPI', and 'VCI'. A 'Status' indicator shows a green dot. At the bottom of the window are 'Apply' and 'Cancel' buttons, and a link for 'Advanced Settings'.

EasyConfig

Quick Settings

Protocol: PPPoE

User ID:

Password:

VPI:

VCI:

Status: ●

[Apply](#) [Cancel](#)

[Advanced Settings](#)

4X

- 11g only Mode: Only 11g devices are able to connect to the NB5Plus4W.

Same as b+ mode, which enables/disables the 4x feature. This function is TI

| Help | |
|---|--|
| This section takes you to different Help Sections for Firewall, Bridge Filters, LAN Clients and PPP Connection. | |
| <u>Firewall</u> | Help for Port Forwarding, Access Control, and Advanced Security. |
| <u>Bridge Filters</u> | Help section for Bridge Filters. |
| <u>LAN Clients</u> | Help section for LAN Clients. |
| <u>LAN Group Configuration</u> | Help section for Configuring LAN Groups with static IP Address. |
| <u>PPP Connection</u> | Help for establishing a PPP Connection. |
| <u>UPnP</u> | Help pages for UPnP. |
| <u>IP QoS</u> | Help section for IP QoS. |
| <u>RIP Help</u> | Help section for RIP (Routing Information Protocol). |
| NetComm Support website: http://www.netcomm.com.au/Support/ | |

proprietary and is only available when both NetComm wireless cards (e.g. NP543 / NP542) and the NB5Plus4W are used.

User Isolation

When checked, wireless users will not be able to directly access other wireless users. More details on User Isolation are discussed in the "User Isolation" section below.

User Isolation

When User Isolation is enabled, wireless users will not be able to directly access other wireless users. Access can be controlled by the AP. This is enabled on the network side.

The figure below demonstrates the User Isolation feature.

1. AP disabled BSS (Basic Service Set) bridging
2. All data sent to WAN (Wide Area Network)
3. Enable/Disable flag

Save Your Changes

Follow these steps to save changes you have made on the Wireless Setup screen.

| NetComm® | | HOME | SETUP | ADVANCED | WIRELESS | TOOLS | STATUS | EASYCONFIG | HELP |
|---------------|--------------------------------------|---|-------|----------|----------|-------|--------|------------|------|
| Setup | Wireless | | | | | | | | |
| Configuration | The Wireless section allows you to . | | | | | | | | |
| Security | | | | | | | | | |
| Management | | | | | | | | | |
| Log Out | | | | | | | | | |
| | Setup | Select to setup basic wireless parameters. | | | | | | | |
| | Configuration | Select to configure advanced wireless parameters. | | | | | | | |
| | Channel Range | Configure Wireless range for different band. | | | | | | | |
| | Security | Configure Wireless Security. | | | | | | | |
| | Management | Configure Wireless Management. | | | | | | | |

CAUTION: Any changes you make to the WLAN screen do NOT get saved automatically. Clicking on the 'Apply' button on the individual page is not sufficient for the changes you made to take effect. For change(s) you made to any WLAN screen to take effect, you will need to perform these steps.

Wireless Setup

Enable AP:

SSID:

Hidden SSID:

Channel B/G:

802.11 Mode: ▼

4X:

User Isolation:

Note: you must [Restart Access Point](#) for Wireless changes to take effect.

1. Click the Apply button.
2. Click the Restart Access Point link at the bottom of the page, which will take you to the System Commands screen.

Note: An alternative way to access the System Commands Screen to click on the Tools tab, then select the System Commands option.

3. On the System Commands Screen, click Save All. This will save all the changes you have made. You will still need to restart the access point for any changes to take effect.
4. If you only made changes to the WLAN setting(s), click the Restart Access Point button for the changes to take effect. OR
5. If you also made changes to the DSL setting(s), click the Restart button for all changes to take effect.

Wireless Configuration

You can access the Configuration screen by clicking on the Configuration link. This screen provides an advanced wireless network parameter settings.

Following is a description of the Wireless Configuration fields:

| Option | Description |
|----------------------|---|
| Beacon Period | The time interval between beacon frame transmissions, which ranges from 0 - 65535 msec. |
| DTIM period | Delivery Traffic Identification Map |

RTS threshold

Period: The number of beacon frame transmissions before frames, targeted for stations operating in low-power mode will be transmitted

Fragmentation Threshold

Request To Send The number of bytes in an MPDU below which an RTS/CTS handshake will not be performed. The default value is 2347, however, when 4x is enabled on the setup page, the RTS threshold value changes to 4096.

Power Level

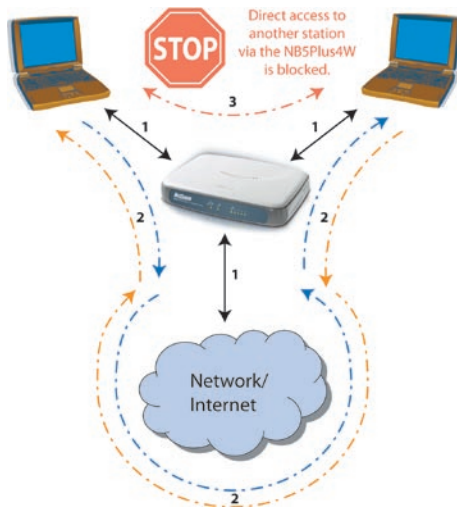
The minimum length of a frame that will be fragmented. The default value is 2346, however, when 4x is enabled on the setup page, the fragmentation threshold value changes to 4096.

The TX Output power percentage comparing to the maximum TX power: full, 50%, 25%, 12%, and 6%.

| Option | Description |
|--------------------------------|---|
| Multi Domain Capability | This feature can only be configured on a hidden page. It is not recommended for the end users to configure this feature. Please call NetComm support should you need to change any of these settings. |
| Country String | Please call NetComm support should you need to change any of these settings. |
| Current Reg. | Please call NetComm support should you need to change any of these settings. |
| Private Reg. | Please call NetComm support should you need to change any of these settings. |

Video Blast Support

When checked, priority is given to video in the traffic to and from the specified IP. This feature is only available if you are using a NetComm wireless card and the NB5Plus4W.



IP Address

The LAN-side IP with the preferred bandwidth. This field is related to the Video Blast Support and is enabled when Video Blast Support is checked. You can enter up to two IPs for the Video Blast Support features.

Protocol

The protocol used by the IP address. This field is related to the Video Blast Support and is enabled when Video Blast Support is checked. There are three options: None, TCP, and UDP. You will need to select TCP or UDP for each IP.

Destination Port

The port number used by the IP address. This field is related to the Video Blast Support and is enabled when Video Blast Support is checked.

Wireless Security

The screen below illustrates the security settings when no security is enabled.

| Option | Description |
|-------------|---|
| None | No security used. |
| WEP | (Wired Equivalent Privacy) Enable legacy stations to connect to the |

NB5Plus4W.

802.1x

Enable stations with 802.1x capability to connect to the NB5Plus4W.

Wireless Configuration

Beacon Period: msec DTIM Period:

RTS Threshold: Frag Threshold:

Power Level: ▾

Multi Domain Capability: Country String:

Band B/G

Current Reg. Domain: ▾

Private Reg. Domain:

Video Blast Support:

| IP Address | Protocol | Dest Port |
|----------------------|-------------------------------------|--------------------------------|
| <input type="text"/> | <input type="text" value="None"/> ▾ | <input type="text" value="0"/> |
| <input type="text"/> | <input type="text" value="None"/> ▾ | <input type="text" value="0"/> |

Note: you must Restart Access Point for Wireless changes to take effect.

WPA

(Wi-Fi Protected Access) Enable stations with WPA capability to connect to the NB5Plus4W.

Note: Currently VLAN (Virtual LAN) + Multiple SSID with different security options is not supported. If you have enabled multiple SSID with security turned off, when you enable any security option (WEP, 802.1x, or WPA), multiple SSID will be disabled.

Wireless → Security → WEP

WEP (Wired Equivalent privacy) is a security protocol for Wireless Local Area Networks (WLAN). WEP provides security by encrypting the data that is sent over the WLAN.

The NB5Plus4W supports 3 levels of WEP encryption:

- 64 Bit encryption
- 128Bit encryption
- 256 Bit encryption

With WEP, the receiving station must use the same key for decryption. Each radio NIC and access point, therefore, must be manually configured with the same key. The screen below illustrates the default setting of the WEP Wireless Security screen.

WEP is enabled by default.

1. Check Enable WEP Wireless Security.
2. Select Authentication Type

3. Enter Encryption key and select Cipher following instructions on screen. You will need to enter the same key for the first time configuration of each station
4. To save your settings, refer to the section above.

Following is a description of the WEP field settings.

| Option | Description |
|-------------------------------------|--|
| Enable WEP Wireless Security | Check this field to enable WEP wireless security. |
| Authentication Type | <p>Authentication algorithm to use when the security configuration is set to Legacy. When the security configuration is set to 802.1x or WPA, the authentication algorithm is always open. This field is enabled when the WEP security field is checked. There are three options:</p> <ul style="list-style-type: none"> • Open: In open-system authentication, the access point accepts any station without verifying its identify. • Shared: Shared-key authentication requires a shared key (WEP encryption key) be distributed to the stations before attempting authentication. • Both: If both is selected, the access point will perform shared-key authentication, then open-system authentication. |
| Encryption Key | This field is enabled when the WEP security field is checked. The key's value that is used when the security configuration is set to legacy. The key length must match the WEP cipher. This field is not used when the security configuration is set to 802.1x or WPA. |
| WEP Cipher | This field is enabled when the WEP security field is checked. You can select from 64 bits, 128 bits, and 256 bits. The WEP cipher that is used when the |

security configuration is set to Legacy or 802.1x. This field is not used when the security configuration is set to WPA.



Wireless → Security → 802.1x

802.1x is a security protocol for Wireless Local Area Networks (WLAN). It is a port-based network access control that keeps the network port disconnected until authentication is completed. 802.1x is based on the Extensible Authentication protocol (EAP). EAP messages from the authenticator to the authentication server typically use the RADIUS (Remote Authentication Dial-In User Service) protocol. The screenshot below illustrates the default setting of the 802.1x Wireless Security screen.

Following is a description of the 802.1x Security field settings.

| Option | Description |
|--------------------------|--|
| Server IP Address | The LAN-side RADIUS (Remote Authentication Dial-In User Service) server's IP address. Used for authentication. |
| Port | The RADIUS server's port. |
| Secret | The secret that the AP shares with the |

RADIUS server. You can enter up to 63 characters in this field.

Group Key Interval

The group key interval that is used to distribute the group key to 802.1x and WPA stations.

Wireless → Security → WPA

WPA (Wi-Fi Protected Access) is a security protocol for Wireless Local Area Networks (WLAN). WPA uses a sophisticated key hierarchy that generates new encryption keys each time a mobile device establishes itself with an access point. Protocols including 802.1X, EAP and RADIUS are used for strong authentication. Like WEP, keys can still be entered manually (preshared keys); however, using a RADIUS authentication server provides automatic key generation and enterprise-wide authentication. The screen below illustrates the default setting of the WPA (Wi-Fi Protected Access)

Wireless Security screen.

Following is a description of the WPA Security field settings.

| Option | Description |
|---------------|--|
| 802.1x | When selected, the WPA stations authenticate with the RADIUS server using EAP-TLS (Extensible Authentication Protocol - Transport Layer Security) over 802.1x. |
| Port | The RADIUS server's port |

| | |
|---------------|--|
| Secret | The secret that the AP shares with the RADIUS server |
| PSK | String Pre-Shared Key String. When selected, the WPA stations do not authenticate with the RADIUS server using EAP-TLS. Instead they share a pre-shared secret with the AP (ASCII format). The PSK string needs to be entered in the first time configuration with each station. |

Wireless → Management

The Wireless Management function gives another level of security to your AP. It allows you to create an allowed access list or a banned access list (not both), and view a list of stations associated with your access point.

Wireless → Management → Access List

By clicking on Management from the left-hand navigation list, you are taken to the default Access List screen.

You can create an allowed OR banned access list from the Access List screen by performing the following procedures.

1. Check Enable Access List.
2. Select Allow to create an allowed access list or Ban to create a banned list.

Note: You can not create both.

3. Enter a MAC (Medium Access Control) address of an allowed or banned station, then click the Add button. This station will appear in your allowed or banned access list.
4. Repeat this step for each station.
5. To save your settings, refer to the "Save Your Changes" section above.

Wireless → Management → Associated Stations

By clicking on the Associated Stations button under the 'Management' option, you are taken to the Associated Stations screen. This screen allows you to see a list of all associated stations with the access point. You can ban any station(s) on the list by clicking on the Ban Station button next to the MAC Address. To save your settings, refer to "Save Your Changes" section above.

Wireless → Management → Multiple SSID

You can access the Multiple SSID screen by clicking on the Multiple SSID button under the Management option. The Enable SSID field will enable you to create multiple SSIDs for the AP.

Note: Currently VLAN (Virtual LAN) + Multiple SSID with different security options is not supported. If security is enabled, you will not be able to enable multiple SSID. You can only enable multiple SSID if your security option is set to "None".

You can create multiple SSIDs by performing the following procedures.

Create an Access List

1. Check Enable Multiple SSID.
2. Enter the name of the first SSID in the SSID field, then click the Add button. Repeat this step for each additional SSID. The SSIDs will appear as shown in below.
3. To delete an SSID, check the SSID, then click Delete in the popup window. To delete all SSIDs, check Delete All.
4. To save your settings, refer to the "Save Your Changes" section above.

Status

You can access this screen by clicking on the Status button.

Use the following procedures to check your Wireless status.

1. Click on Status from the top of the screen.
2. Select Network Statistics from the left-hand column.
3. Click Wireless.

Log out

By clicking on Log Out, you will log out of the NB5Plus4W (not just the Wireless interface). Click the Log Out button will take you back to the login screen.

Use the following procedures to log out.

Wireless Security

Select a Wireless Security level:

None WEP 802.1x WPA

Group Key Interval:

Note: Group Key Interval is shared by all WPA options.

802.1x Server IP Address:

Port:

Secret:

PSK String String: (Max 63 characters)

Note: you must [Restart Access Point](#) for Wireless changes to take effect.

1. Select Log Out from the left-hand column. You will be prompted to confirm in the screen shown above.
2. Confirm by clicking the Log Out button at the bottom-right corner. You will be taken back to the login screen (cross-reference).

Appendix B: Specification

ADSL/ATM SUPPORT

- ANSI T1.413 issue 2
- ITU-T G.992.1 (G.dmt) and G.992.2 (G.lite) compliant
- ADSL2/2+, G.992.3/G.992.5
- Rate Adaptive modem at 32 Kbps steps

- Dynamic Adaptive Equalisation to improve Carrier's service area
- Bridge Tap Mitigation support
- Turbo DSL support improving packet throughout performance by 3 times
- ATM Layer with Traffic shaping QoS Support (UBR, CBR, VBR-rt, VBR-nrt)
- AAL ATM Attributes - AAL5
- Multiple PVC up to 8 support
- Spectral compatibility with POTS
- F5 OAM Loopbacks/Send and Receive

The screenshot shows the 'Wireless Management' interface with three tabs: 'Access List', 'Associated Stations', and 'Multiple SSID'. The 'Access List' tab is active. It contains the following elements:

- Access List** section with a checkbox for 'Enable Access List'.
- Radio buttons for 'Allow' and 'Ban'.
- A 'Mac Address:' label followed by an empty text input field and an 'Add' button.
- A note at the bottom: 'Note: you must Restart Access Point for Wireless changes to take effect.'
- 'Apply' and 'Cancel' buttons at the bottom right.

ENCAPSULATION SUPPORT

- RFC2684 Bridged and Routed LLC and VC Mux Support
- RFC2364 PPPoA Client Support
- RFC2516 PPPoE Client Support
- RFC2225/RFC1577 Classical IP Support
- Transparent Bridge Support
- PAP/CHAP/MS-CHAP for Password Authentication Support

NETWORK SUPPORT

- Port Forwarding rules for Popular Games/Applications
- Static IP, Dynamic RIP Routing Support

- IP/TCP/UDP/ICMP/ARP/RARP Application Support
- Network Address Translation (NAT)
- Port Mapping/Forwarding
- IGMP Multicast
- SNTP
- NAT Application Level Gateway for Popular Applications

Wireless Management

[Access List](#) [Associated Stations](#) [Multiple SSID](#)

Associated Stations

| <u>Ban Station</u> | <u>Mac Address</u> | <u>State</u> | <u>SSID</u> | <u>Active Rate</u> |
|-----------------------|--------------------|--------------|-------------|--------------------|
| <input type="radio"/> | 00-12-f0-29-e0-63 | Authorized | wireless | 48Mbps |

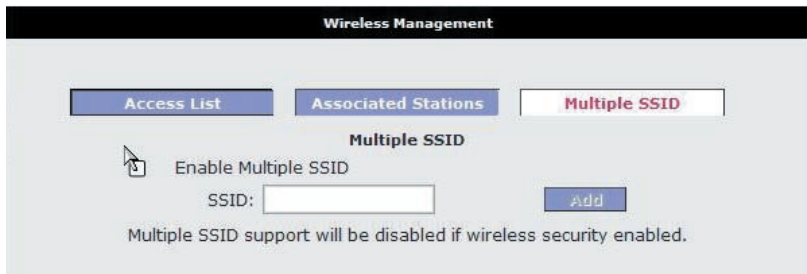
Note: you must [Restart Access Point](#) for Wireless changes to take effect.

[Apply](#) [Cancel](#)

- DHCP Server/Relay/Client
- DNS Relay Agent
- DMZ Support
- Single session IP Sec and PPTP/L2TP VPN pass-through support
- PPP Always on with configurable timeout

VoIP

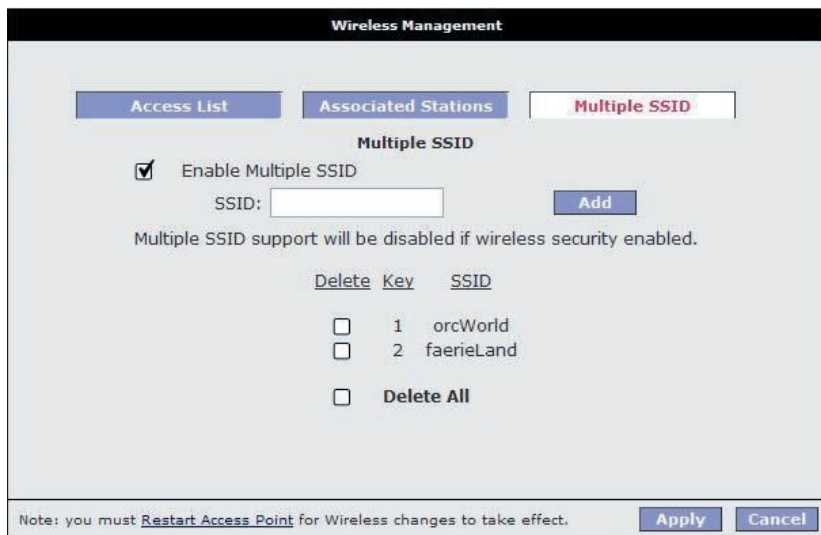
- SIP version 1 & 2, H.323, MGCP



- QoS support for voice packets

SECURITY

- NAT for Basic Firewall and sharing
- Packet Filtering Firewall Support
- Stateful Packet Inspection Support



- Protection against Denial of Service attacks
- Password Authentication to Modem

MANAGEMENT SUPPORT

- Web-based HTTP management GUI (LAN or Remote)
- TFTP/FTP Support For Firmware Upgrade
- Web-based Firmware Upgrade (Local)

Network Statistics

Choose an interface to view your network statistics:

Ethernet DSL Wireless

| | |
|---------------------|------|
| Transmit | |
| MPDUs | 1561 |
| MSDUs | 1561 |
| Multicast MSDUs | 116 |
| Failed MSDUs | 0 |
| Retry MSDUs | 0 |
| Receive | |
| MPDUs | 1624 |
| MSDUs | 1624 |
| Multicast MSDUs | 55 |
| FCS Error MPDUs | 133 |
| MIC Failure MSDUs | 0 |
| Decrypt Error MPDUs | 0 |

[Refresh](#)

- Soft Factory Reset Button via Web GUI
- Diagnostic Test (DSL, OAM, Network, Ping Test)
- Telnet/CLI (Read Only)
- Syslog Support

HARDWARE

- Texas Instrument TNETD7300 Single Chip Network Processor/AFE/Line Driver Chipset
- Dying Gasp Support



- A-Tick approval N367

PLATFORM SUPPORT

- For Ethernet – OS Independent: includes Windows®, Mac, Linux and UNIX
- For USB – Windows® 98SE, ME, 2000, XP, 2003

LED INDICATORS

- 1 x PPP LED

- 1 x Power LED
- 1 x ADSL Link Status LED
- 4 x Ethernet Link/Activity Status LED
- 1 x USB Status LED
- 1 x WLAN Status LED (NB5Plus4W Only)

Appendix C: Cable Connections

This cable information is provided for your reference only. Please ensure you only connect the appropriate cable into the correct socket on either this product or your computer.

If you are unsure about which cable to use or which socket to connect it to, please refer to the hardware installation section in this manual. If you are still not sure about cable connections, please contact a professional computer technician or NetComm for further advice.

RJ-45 Network Ports

RJ-45 Network Ports can connect any networking devices that use a standard LAN interface, such as a Hub/Switch Hub or Router. Use unshielded twisted-pair (UTP) or shield twisted-pair (STP) cable to connect the networking device to the RJ-45 Ethernet port. Depending on the type of connection, 10Mbps or 100Mbps, use the following Ethernet cable, as prescribed.

10Mbps: Use EIA/TIA-568-100-Category 3, 4 or 5 cable.

100Mbps: Use EIA/TIA-568-100-Category 5 cable.

Note: To prevent loss of signal, make sure that the length of any twisted-pair connection does not exceed 100 metres.

Figure 1

Figures 1 and 2 illustrate the use of straight-through and crossover twisted pair cables along with the connector.

Figure 2

RJ11 connector and cable

An RJ-11 connector is the small, modular plug used for most analog telephones. It has six pin slots in the head, but usually only two or four of them are used.

Figure 5

605 to RJ-11 adapter

The 605 to RJ-11 adaptor is provided to comply with the older 610 Telstra wall socket. The 605 to RJ-11 adapter may be used to convert the supplied RJ-11 cable, if the older connection is required.

Appendix D: Glossary

| | |
|---------------------|--|
| 10BASE-T | A designation for the type of wiring used by Ethernet networks with a data rate of 10 Mbps. Also known as Category 3 (CAT 3) wiring. See also data rate, Ethernet. |
| 100BASE-T | A designation for the type of wiring used by Ethernet networks with a data rate of 100 Mbps. Also known as Category 5 (CAT 5) wiring. See also data rate, Ethernet. |
| ADSL | Asymmetric Digital Subscriber Line. The most commonly deployed type of DSL for home users. The term asymmetrical refers to its unequal data rates for downloading and uploading (the download rate is higher than the upload rate). The asymmetrical rates benefit home users because they typically download much more data from the Internet than they upload. |
| analog | Of data, having a form is analogous to the data's original waveform. The voice component in DSL is an analog signal. See also digital. |
| ATM | Asynchronous Transfer Mode A standard for high-speed transmission of data, text, voice, and video, widely used within the Internet. ATM data rates range from 45 Mbps to 2.5 Gbps. See also data rate. |
| authenticate | To verify a user's identity, such as by prompting for a password. |
| binary | The "base two" system of numbers, that uses only two digits, 0 and 1, to represent all numbers. In binary, the number 1 is written as 1, 2 as 10, 3 as 11, 4 as 100, etc. Although expressed as decimal numbers for convenience, IP addresses in actual use are binary numbers; e.g., the IP address 209.191.4.240 is 11010001.10111111.00000100.11110000 in binary. See also bit, IP address, network mask. |
| bit | Short for "binary digit," a bit is a number that can have two values, 0 or 1. See also binary. |
| bps | bits per second |
| bridging | Passing data from your network to your ISP and vice versa using the hardware addresses of the devices at each location. Bridging contrasts with routing, which can add more intelligence to data transfers by using network addresses instead. The My ADSL Modem can perform |

both routing and bridging. Typically, when both functions are enabled, the device routes IP data and bridges all other types of data. See also routing.

broadband

A telecommunications technology that can send different types of data over the same medium. DSL is a broadband technology.

Broadcast

To send data to all computers on a network.

CO

Central Office A circuit switch that terminates all the local access lines in a particular geographic serving area; a physical building where the local switching equipment is found. xDSL lines running from a subscriber's home connect at their serving central office.

DHCP

Dynamic Host Configuration Protocol DHCP automates address assignment and management. When a computer connects to the LAN, DHCP assigns it an IP address from a shared pool of IP addresses; after a specified time limit, DHCP returns the address to the pool.

DHCP relay

Dynamic Host Configuration Protocol relay. A DHCP relay is a computer that forwards DHCP data between computers that request IP addresses and the DHCP server that assigns the addresses. Each of the My ADSL Modem's



| RJ-45 Connector Pin Assignment | Normal Assignment |
|--------------------------------|------------------------|
| 1 | Input Receive Data + |
| 2 | Input Receive Data - |
| 3 | Output Transmit Data + |
| 6 | Output Transmit Data - |
| 4,5,7,8 | Not used |

interfaces can be configured as a DHCP relay. See DHCP.

DHCP server

Dynamic Host Configuration Protocol server. A DHCP server is a computer that is responsible for assigning IP addresses to the computers on a LAN. See DHCP.



RJ-45 plug attached to cable

digital

Of data, having a form based on discrete values expressed as binary numbers (0's and 1's). The data com-

Straight and crossover cable configuration

There are two types of the wiring: Straight-Through Cables and Crossover Cables. Category 5 UTP/STP cable has eight wires inside the sheath. The wires form four pairs. Straight-Through Cables has same pinouts at both ends while Crossover Cables has a different pin arrangement at each end.

In a straight-through cable, wires 1,2,3,4,5,6,7 and 8 at one end of the cable are still wires 1~8 at the other end. In a crossover cable, the wires of 1,2,3,6 are reversed so that wire 1 become 3 at the other end of the cable, 2 becomes 6, and so forth.

To determine which wire is wire 1, hold the RJ-45 cable tip with the spring clip facing towards the ground and the end pointing away from you. The copper wires exposed upwards to your view. The first wire on the far left is wire 1. You can also refer to the illustrations and charts of the internal wiring on the following page.

Straight-Through Cabling



Figure 3

| Wire | Becomes |
|------|---------|
| 1 | 1 |
| 2 | 2 |
| 3 | 3 |
| 6 | 6 |

Cross-Over Cabling



Figure 4

| Wire | Becomes |
|------|---------|
| 1 | 3 |
| 2 | 6 |
| 3 | 1 |
| 6 | 2 |

Note: To prevent loss of signal, make sure that the length of any twisted-pair connection does not exceed 100 metres.

ponent in DSL is a digital signal. See also analog.

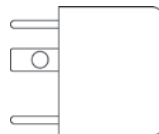
DNS

Domain Name System. The DNS maps domain names into IP addresses. DNS information is distributed hierarchically throughout the Internet among computers



| RJ-11 Connector Pin Assignment | Normal Assignment |
|--------------------------------|-------------------|
| 1 | Not Connected |
| 2 | Not connected |
| 3 | Line |
| 4 | Line |
| 5 | Not Connected |
| 6 | Not Connected |

called DNS servers. When you start to access a web site, a DNS server looks up the requested domain name to find its corresponding IP address. If the DNS server cannot find the IP address, it communicates with higher-level DNS servers to determine the IP address. See also domain name.



| | |
|-----------------------|--|
| domain name | A domain name is a user-friendly name used in place of its associated IP address. For example, www.globespan.net is the domain name associated with IP address 209.191.4.240. Domain names must be unique; their assignment is controlled by the Internet Corporation for Assigned Names and Numbers (ICANN). Domain names are a key element of URLs, which identify a specific file at a web site, e.g., http://www.globespan.net/index.html. See also DNS. |
| download | To transfer data in the downstream direction, i.e., from the Internet to the user. |
| DSL | Digital Subscriber Line A technology that allows both digital data and analog voice signals to travel over existing copper telephone lines. |
| Ethernet | The most commonly installed computer network technology, usually using twisted pair wiring. Ethernet data rates are 10 Mbps and 100 Mbps. See also BASE-T,100BASE-T, twisted pair. |
| Filtering | To screen out selected types of data, based on filtering rules. Filtering can be applied in one direction (upstream or downstream), or in both directions. |
| filtering rule | A rule that specifies what kinds of data a routing device will accept and/or reject. Filtering rules are defined to operate on an interface (or multiple interfaces) and in a particular direction (upstream, downstream, or both). |
| Firewall | Any method of protecting a computer or LAN connected to the Internet from intrusion or attack from the outside. Some firewall protection can be provided by packet filtering and Network Address Translation services. |
| FTP | File Transfer Protocol - A program used to transfer files between computers connected to the Internet. Common uses include uploading new or updated files to a web server, and downloading files from a web server. |
| GGP | Gateway to Gateway Protocol. An Internet protocol that specifies how gateway routers communicate with each other. |
| Gbps | Abbreviation for Gigabits (GIG-uh-bits) per second, or one billion bits per second. Internet data rates are often expressed in Gbps. |
| GRE | Generic Routing Encapsulation. TCP/IP protocol suite, transport layer encapsulation protocol. |
| hop | When you send data through the Internet, it is sent first from your computer to a router, and then from one router to another until it finally reaches a router that is directly connected to the recipient. Each individual "leg" of the data's journey is called a hop. |
| hop count | The number of hops that data has taken on its route to its |

destination. Alternatively, the maximum number of hops that a packet is allowed to take before being discarded , See also TTL.

| | |
|-----------------------|---|
| host | A device (usually a computer) connected to a network. |
| HTTP | Hyper-Text Transfer Protocol HTTP is the main protocol used to transfer data from web sites so that it can be displayed by web browsers. See also web browser |
| ICMP | Internet Control Message Protocol An Internet protocol used to report errors and other network-related information. The ping command makes use of ICMP. |
| IGMP | Internet Group Management Protocol An Internet protocol that enables a computer to share information about its membership in multicast groups with adjacent routers. A multicast group of computers is one whose members have designated as interested in receiving specific content from the others. Multicasting to an IGMP group can be used to simultaneously update the address books of a group of mobile computer users or to send company newsletters to a distribution list. |
| in-line filter | See Microfilter |
| Internet | The global collection of interconnected networks used for both private and business communications. |
| intranet | A private, company-internal network that looks like part of the Internet (users access information using web browsers), but is accessible only by employees. |
| IP | See TCP/IP. |
| IP address | Internet Protocol address The address of a host (computer) on the Internet, consisting of four numbers, each from 0 to 255, separated by periods, e.g., 209.191.4.240. An IP address consists of a network ID that identifies the particular network the host belongs to, and a host ID uniquely identifying the host itself on that network. A network mask is used to define the network ID and the host ID. Because IP addresses are difficult to remember, they usually have an associated domain name that can be specified instead. See also domain name, network mask. |
| ISP | Internet Service Provider A company that provides Internet access to its customers, usually for a fee. |
| LAN | Local Area Network A network limited to a small geographic area, such as a home, office, or small building. |
| LED | Light Emitting Diode An electronic light-emitting device. The indicator lights on the front of the My ADSL Modem are LEDs. |
| MAC address | Media Access Control address The permanent hardware address of a device, assigned by its manufacturer. MAC addresses are expressed as six pairs of characters. |
| mask | : See network mask. |

| | |
|----------------------|---|
| Mbps | Abbreviation for Megabits per second, or one million bits per second. Network data rates are often expressed in Mbps. |
| Microfilter | In splitterless deployments, a microfilter is a device that removes the data frequencies in the DSL signal, so that telephone users do not experience interference (noise) from the data signals. Microfilter types include in-line (installs between phone and jack) and wall-mount (telephone jack with built-in microfilter). See also splitterless. |
| NAT | Network Address Translation A service performed by many routers that translates your network's publicly known IP address into a Private IP address for each computer on your LAN. Only your router and your LAN know these addresses; the outside world sees only the public IP address when talking to a computer on your LAN. |
| NAT rule | A defined method for translating between public and private IP addresses on your LAN. |
| network | A group of computers that are connected together, allowing them to communicate with each other and share resources, such as software, files, etc.A network can be small, such as a LAN, or very large, such as the Internet. |
| network mask | A network mask is a sequence of bits applied to an IP address to select the network ID while ignoring the host ID. Bits set to 1 mean "select this bit" while bits set to 0 mean "ignore this bit." For example, if the network mask 255.255.255.0 is applied to the IP address 100.10.50.1, the network ID is 100.10.50, and the host ID is 1. See also binary, IP address, subnet |
| NIC | Network Interface Card An adapter card that plugs into your computer and provides the physical interface to your network cabling, which for Ethernet NICs is typically an RJ-45 connector. See Ethernet, RJ-45. |
| packet | Data transmitted on a network consists of units called packets. Each packet contains a payload (the data), plus overhead information such as where it came from (source address) and where it should go (destination address). |
| ping | Packet Internet (or Inter-Network) Groper A program used to verify whether the host associated with an IP address is online. It can also be used to reveal the IP address for a given domain name. |
| port | A physical access point to a device such as a computer or router, through which data flows into and out of the device. |
| POTS | Plain Old Telephone Service Traditional analog telephone service using copper telephone lines. Pronounced pots. See also PSTN. |
| POTS splitter | See splitter. |

| | |
|-----------------|---|
| PPP | Point-to-Point Protocol A protocol for serial data transmission that is used to carry IP (and other protocol) data between your ISP and your computer. The WAN interface on the My ADSL Modem uses two forms of PPP called PpPoA and PpPoE. See also PpPoA, PpPoE. |
| PPPoA | Point-to-Point Protocol over ATM One of the two types of PPP interfaces you can define for a Virtual Circuit (VC), the other type being PpPoE. You can define only one PpPoA interface per VC. |
| PPPoE | Point-to-Point Protocol over Ethernet One of the two types of PPP interfaces you can define for a Virtual Circuit (VC), the other type being PpPoA. You can define one or more PpPoE interfaces per VC. |
| protocol | A set of rules governing the transmission of data. In order for a data transmission to work, both ends of the connection have to follow the rules of the protocol. |
| remote | In a physically separate location. For example, an employee away on travel who logs in to the company's intranet is a remote user. |
| RIP | Routing Information Protocol The original TCP/IP routing protocol. There are two versions of RIP: version and version II. |
| RJ-11 | Registered Jack Standard-11 The standard plug used to connect telephones, fax machines, modems, etc. to a telephone jack. It is a 6-pin connector usually containing four wires. |
| RJ-45 | Registered Jack Standard-45 The 8-pin plug used in transmitting data over phone lines. Ethernet cabling usually uses this type of connector. |
| routing | Forwarding data between your network and the Internet on the most efficient route, based on the data's destination IP address and current network conditions. A device that performs routing is called a router. |
| rule | See filtering rule, NAT rule. |
| SDNS | Secondary Domain Name System (server) A DNS server that can be used if the primary DSN server is not available. See DNS. |
| splitter | A device that splits off the voice component of the DSL signal to a separate line, so that data and telephone service each have their own wiring and jacks. The splitter is installed by your telephone company where the DSL line enters your home. The CO also contains splitters that separate the voice and data signals, sending voice to the PSTN and data on high-speed lines to the Internet. See also CO, PSTN, splitterless, microfilter. |

| | |
|---------------------|--|
| splitterless | A type of DSL installation where no splitter is installed, saving the cost of a service call by the telephone company. Instead, each jack in the home carries both voice and data, requiring a microfilter for each telephone to prevent interference from the data signal. ADSL is usually splitterless; if you are unsure if your installation has a splitter, ask your DSL provider. See also splitter, microfilter. |
| subnet | A subnet is a portion of a network. The subnet is distinguished from the larger network by a subnet mask which selects some of the computers of the network and excludes all others. The subnet's computers remain physically connected to the rest of the parent network, but they are treated as though they were on a separate network. See also network mask. |
| subnet mask | A mask that defines a subnet. See also network mask. |
| TCP | See TCP/IP. |
| TCP/IP | Transmission Control Protocol/Internet Protocol The basic protocols used on the Internet. TCP is responsible for dividing data up into packets for delivery and reassembling them at the destination, while IP is responsible for delivering the packets from source to destination. When TCP and IP are bundled with higher-level applications such as HTTP, FTP, Telnet, etc., TCP/IP refers to this whole suite of protocols. |
| Telnet | An interactive, character-based program used to access a remote computer. While HTTP (the web protocol) and FTP only allow you to download files from a remote computer, Telnet allows you to log into and use a computer from a remote location. |
| TFTP | Trivial File Transfer Protocol. A protocol for file transfers, TFTP is easier to use than File Transfer Protocol (FTP) but not as capable or secure. |
| TTL | Time To Live A field in an IP packet that limits the life span of that packet. Originally meant as a time duration, the TTL is usually represented instead as a maximum hop count; each router that receives a packet decrements this field by one. When the TTL reaches zero, the packet is discarded. |
| twisted pair | The ordinary copper telephone wiring long used by telephone companies. It contains one or more wire pairs twisted together to reduce inductance and noise. Each telephone line uses one pair. In homes, it is most often installed with two pairs. For Ethernet LANs, a higher grade called Category 3 (CAT 3) is used for 10BASE-T networks, and an even higher grade called Category 5 (CAT 5) is used for 100BASE-T networks. See also 10BASE-T, 100BASE-T, Ethernet. |
| upstream | The direction of data transmission from the user to the |

| | |
|--------------------|--|
| | Internet. |
| USB | Universal Serial Bus A serial interface that lets you connect devices such as printers, scanners, etc. to your computer by simply plugging them in. The My ADSL Modem is equipped with a USB interface for connecting to a stand-alone PC. |
| VC | Virtual Circuit A connection from your ADSL router to your ISP. |
| VCI | Virtual Circuit Identifier Together with the Virtual Path Identifier (VPI), the VCI uniquely identifies a VC. Your ISP will tell you the VCI for each VC they provide. See also VC. |
| VPI | Virtual Path Identifier Together with the Virtual Circuit Identifier (VCI), the VPI uniquely identifies a VC. Your ISP will tell you the VPI for each VC they provide. See also VC. |
| WAN | Wide Area Network Any network spread over a large geographical area, such as a country or continent. With respect to the My ADSL Modem, WAN refers to the Internet. |
| Web browser | A software program that uses Hyper-Text Transfer Protocol (HTTP) to download information from (and upload to) web sites, and displays the information, which may consist of text, graphic images, audio, or video, to the user. Web browsers use Hyper-Text Transfer Protocol (HTTP). Popular web browsers include Netscape Navigator and Microsoft Internet Explorer. See also HTTP, web site, WWW. |
| Web page | A web site file typically containing text, graphics and hyperlinks (cross-references) to the other pages on that web site, as well as to pages on other web sites. When a user accesses a web site, the first page that is displayed is called the Home page. See also hyperlink, web site. |
| Web site | A computer on the Internet that distributes information to (and gets information from) remote users through web browsers. A web site typically consists of web pages that contain text, graphics, and hyperlinks. See also hyperlink, web page. |
| WWW | World Wide Web Also called (the) Web. Collective term for all web sites anywhere in the world that can be accessed via the Internet. |

Appendix E: Registering your NetComm Product

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 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

Note: NetComm Technical Support for this product only covers the basic installation and features outlined in the Quick Start Guide. For further information regarding the advanced features of this product, please refer to the configuring sections in this User Guide or contact a Network Specialist.

Appendix F: Legal & Regulatory Information

This manual is copyright. Apart from any fair dealing for the purposes of private study, research, criticism or review, as permitted under the Copyright Act, no part may be reproduced, stored in a retrieval system or transmitted in any form, by any means, be it electronic, mechanical, recording or otherwise, without the prior written permission of NetComm Limited. NetComm Limited accepts no liability or responsibility, for consequences arising from the use of this product.

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.

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.



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Broadband Solutions

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