NetComm®
Broadband Solutions

User Guide

NB1

ADSL2+ Modem Router

Contents

Overview

Thank you for purchasing the NetComm NB1 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 NB1 operates with existing ADSL services while delivering optimal performance in all modes of operation. Powered by the latest ADSL-2* TI chipset, NetComm's NB1 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 NB1 does not leave you exposed. Employing the latest Active Firewall technology, the NB1 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 NB1 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 NB1 delivers the connection versatility needed to cater for today's ADSL users. You can simply attach the NB1 to a single PC via the Ethernet port. Alternatively, should you wish to share your Internet connection, the NB1 is equipped with an in-built Router which will support multiple PCs with the addition of device such as a NetComm 5- or 8-port Network Switch.

The NB1'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. NB1 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 NB1 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.

Note that due to the fact that the NB1 is an adaption of the NB5 multi-port router, several functions belonging to the NB5 including LAN Groups are still represented by screens in the NB1 firmware. These screens to not have a corresponding function in this model which will be noted in the manual where applicable.

NB1 Package Contents

Your NB1 Package contains the following items:

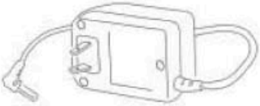
- The NB1 Modem Router

- Driver and Manual CD

- NB1 Quick Start Guide and Package Contents Note

- Telephone Cable (RJ-11)

- 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 NB1, please confirm that you comply with the minimum system requirements.

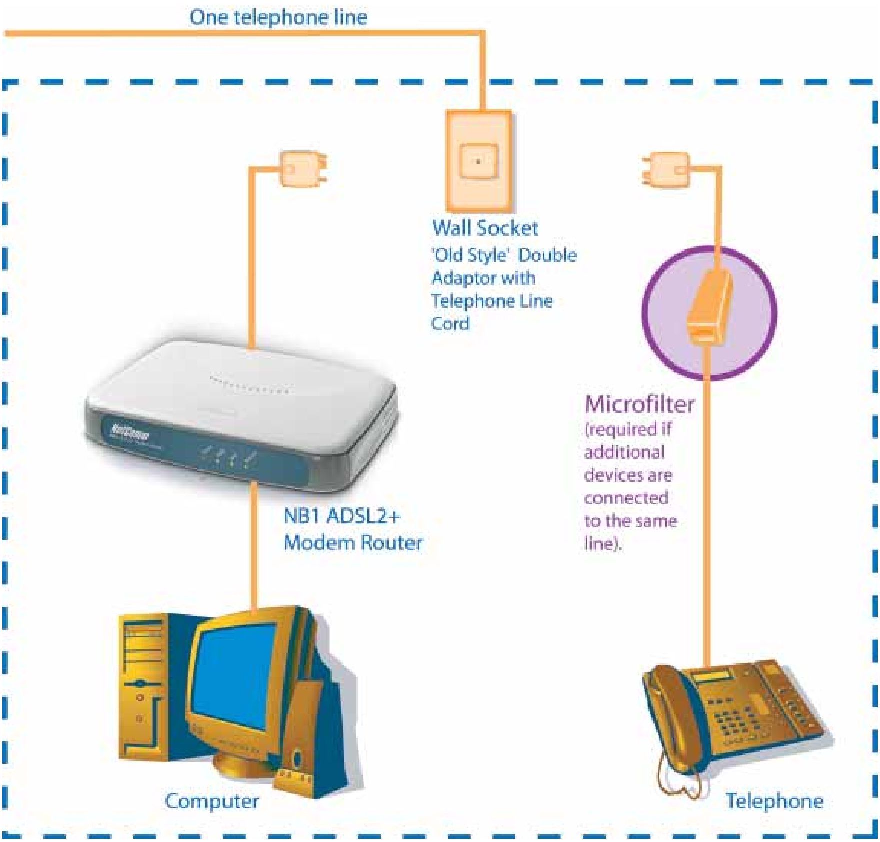
- Pentium® MMX 233MHz
- A CD-ROM Drive
- Ethernet card installed with TCP/IP Protocol
- OS independent for Ethernet
- Web Browser support:
    - Microsoft Internet Explorer 5.0 (or later versions)
    - Netscape® Navigator 4.0 (or later versions)
    - Most popular browsers

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.

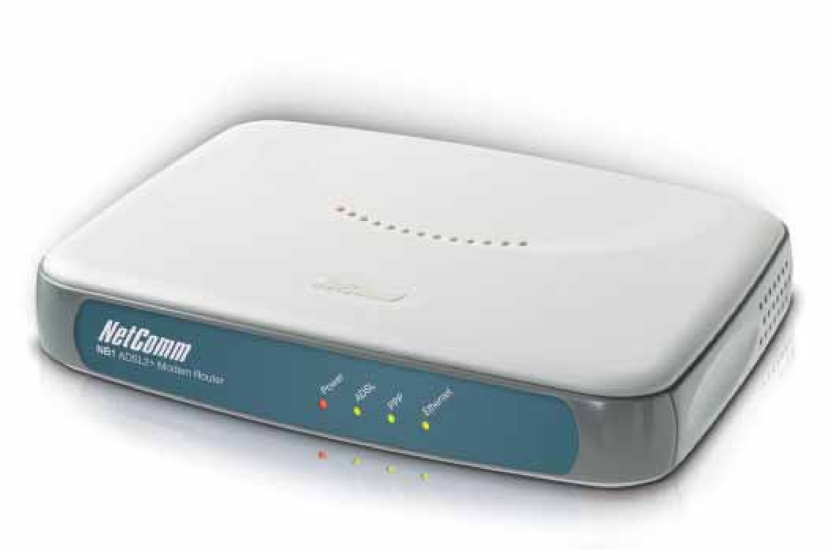
Splitters may be installed when your ADSL line is installed or when your current phone line is upgraded to ADSL. If your telephone line is already split you will not need to use a Microfilter - check with your ADSL service provider if you are unsure.

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.


One telephone line
Wall Socket
'Old Style' Double Adaptor with Telephone Line Cord
Microfilter
(required if additional devices are connected to the same line).
NB1 ADSL2+ Modem Router
Computer
Telephone

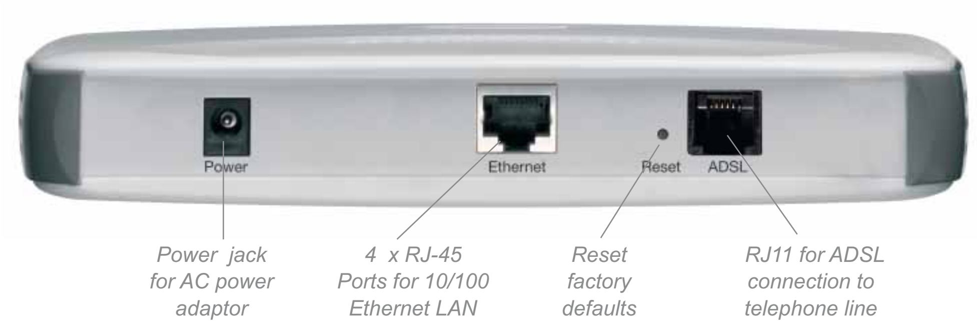
LED Indicators

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.
ADSL	On	A valid ADSL connection.
	Flashing	An active WAN session.
PPP	Flashing	Trying to authenticate with ISP's PPP server.
	On	PPP link is up.
	Off	No PPP link available.
Ethernet	Flashing	Flashes when data is being sent or received on the Ethernet (LAN) connection.
	On	Indicates a link to your LAN or Network card is active.
	Off	Indicates no link to your LAN.

Back Panel Ports


Power
Ethernet
Reset
ADSL
Power jack for AC power adaptor
4 x RJ-45 Ports for 10/100 Ethernet LAN
Reset factory defaults
RJ11 for ADSL connection to telephone line

Rear Panel of the NB1

Power	Connect the Power Adapt0r that comes with your package.
Ethernet	1 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.
ADSL	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

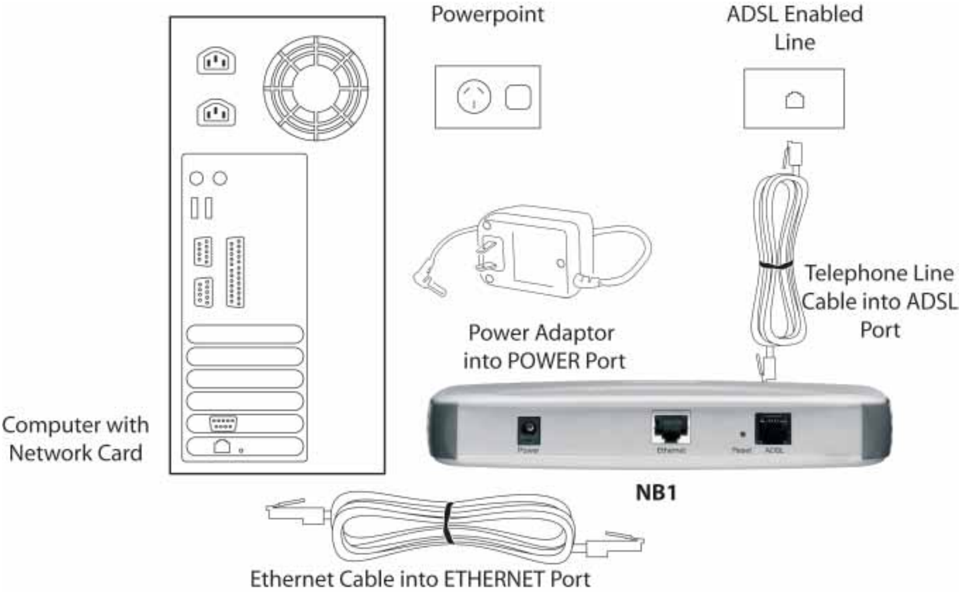
* **Default Setting.** Although in most cases you will not be required to alter these default settings for your NB1, your ISP may identify specific settings to enable connection to their service. Please refer to your ISP or Network Administrator for further information.

Connecting your NB1

The NB1 is connected via an Ethernet cable.

To connect to your NB1, you will need to have an available Ethernet Port present on your Computer/Notebook or on your network hub or switch.

1. Connect your NB1 to either a computer directly or a network hub or switch using a CAT5 ethernet cable.
2. Connect the power pack to the ADSL Modem and switch on the power switch.
3. Ensure that there is a ETHERNET link light on the NB1.


Powerpoint
ADSL Enabled Line
Telephone Line Cable into ADSL Port
Power Adaptor into POWER Port
Computer with Network Card
Power
Ethernet
Reset
ADSL
NB1
Ethernet Cable into ETHERNET Port

4. Ensure that the computer you intend to use has an IP address in the same sub-net as the NB1 ADSL Modem. (e.g. the NB1'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 NB1 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 NB1 ADSL port and the other end to the ADSL-enabled line wall socket.

Configuring your NB1

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:

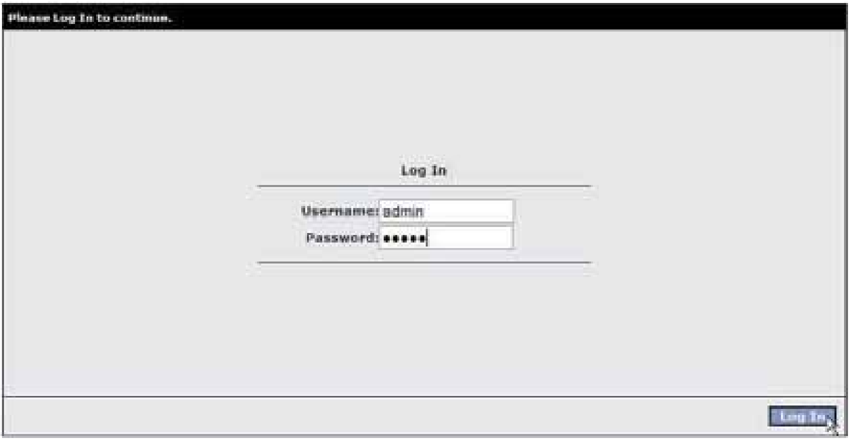
Note: Ensure that your PC is setup as a DHCP client. Refer to the Computer Hardware Configuration section for instructions on how to set this up with different Operating Systems.

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**.



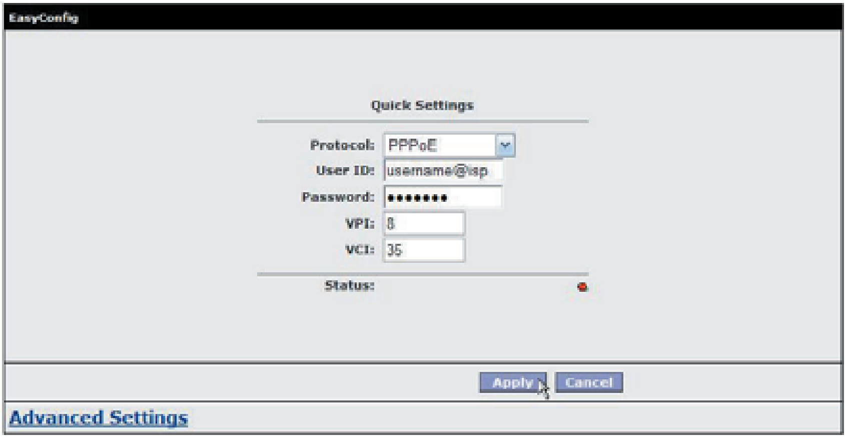
Please Log In to continue.

Log In

Username: admin
Password: •••••

   Click on **Log In**.

3. The EasyConfig page will be displayed.



EasyConfig

Quick Settings

Protocol: PPPoE

User ID: username@isp

Password: •••••••

VPI: 8

VCI: 35

Status: ●

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 an ADSL connection established. Contact your ISP who will assist in resolving this.
    - If you have a solid green light on your modem for the ADSL Link, but you can't access the Internet, 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:

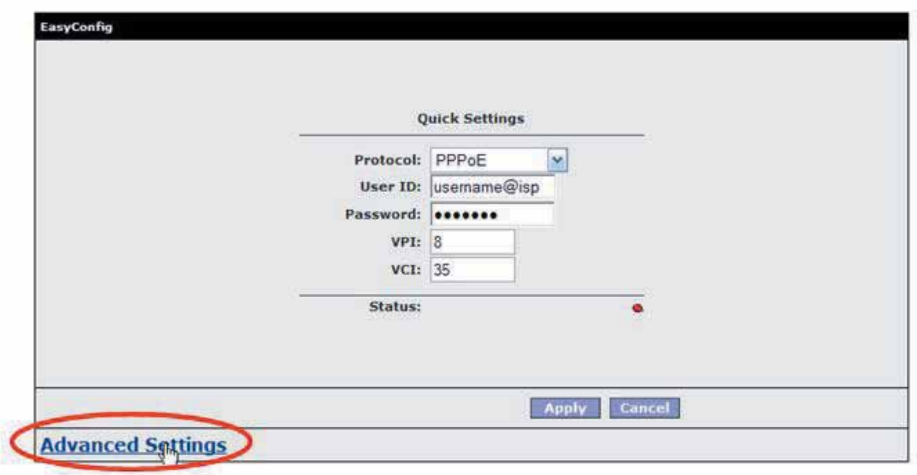
1. In the Windows task bar, click the **Start** button, point to **Settings**, and then click **Control Panel**.
2. Double-click the **Network** icon.
3. The **Network** dialog box displays with a list of currently installed network components. If the list includes TCP/IP, and then the protocol has already 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, refer to the Advanced Settings sections.

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'.



EasyConfig

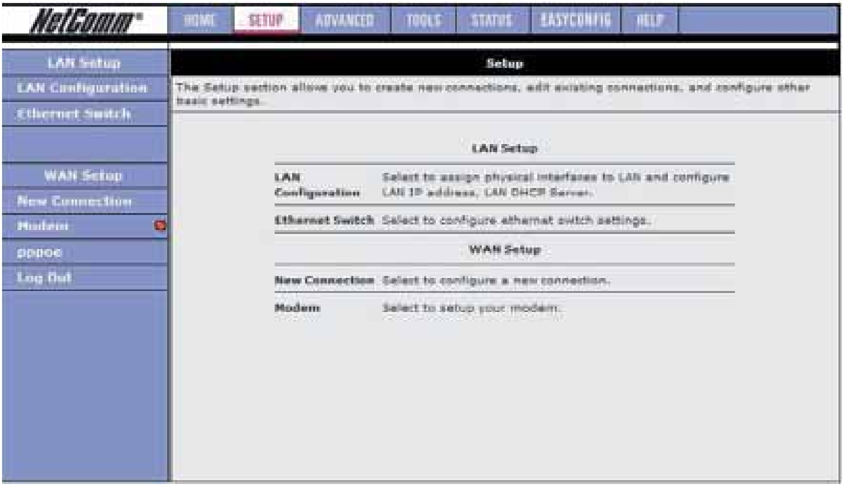
Quick Settings

Protocol:	PPPoE
User ID:	username@isp
Password:	•••••••
VPI:	8
VCI:	35
Status:	●

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.



Setup

The Setup section allow you to create new connections, edit existing connections, and configure other basic settings.

LAN Setup

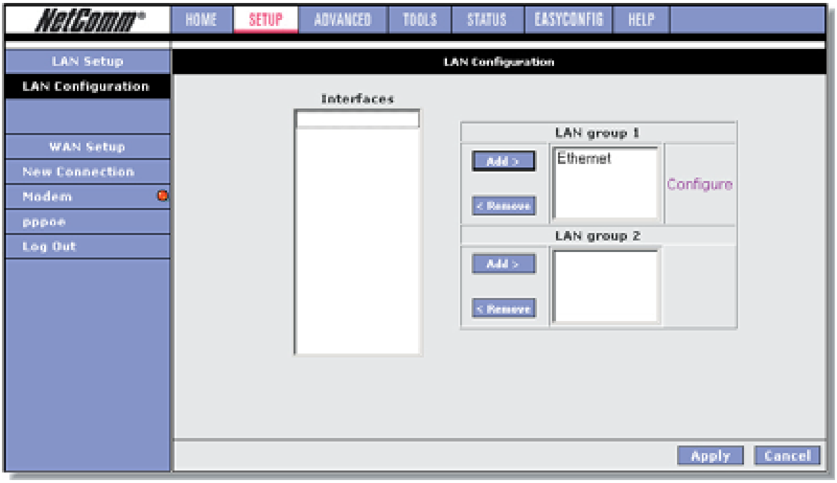
LAN Configuration	Select to assign physical interfaces to LAN and configure LAN IP address, LAN DHCP Server.
Ethernet Switch	Select to configure ethernet switch settings.

WAN Setup

New Connection	Select to configure a new connection.
Modem	Select to setup your modem.

Setup→LAN Configuration

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



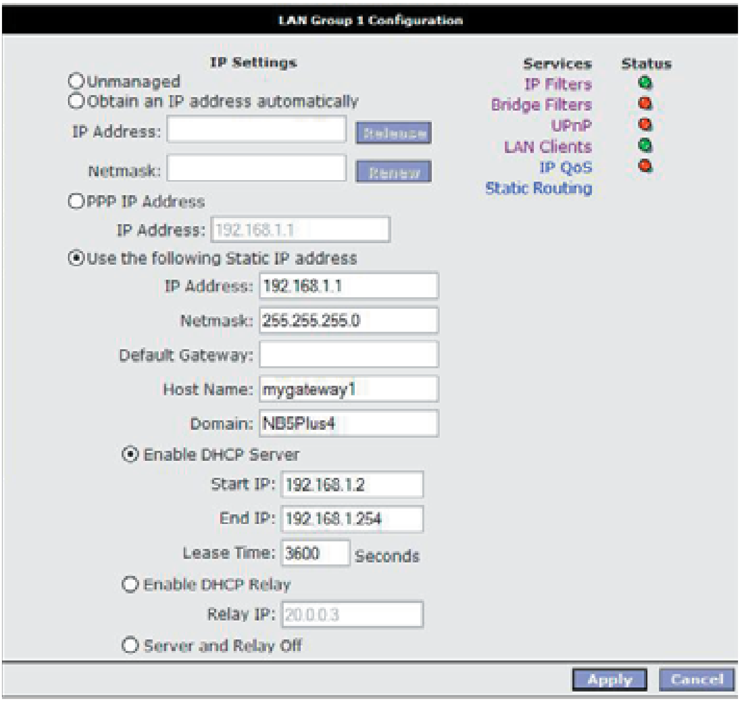
Interfaces

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.

Note: The interface is based on the related NB5 product which allows for LAN groups, however in the case of the NB1 only one LAN group is possible. Click on Configure to configure LAN settings.

Configuring LAN Groups

You will be presented with the following screen:



LAN Group 1 Configuration

IP Settings

○ Unmanaged

○ Obtain an IP address automatically

IP Address:

Netmask:

○ PPP IP Address

IP Address: 192.168.1.1

● Use the following Static IP address

IP Address: 192.168.1.1

Netmask: 255.255.255.0

Default Gateway:

Host Name: mygateway1

Domain: NB5Plus4

● Enable DHCP Server

Start IP: 192.168.1.2

End IP: 192.168.1.254

Lease Time: 3600 Seconds

○ Enable DHCP Relay

Relay IP: 20.0.0.3

○ Server and Relay Off

Services	Status
IP Filters	🟢
Bridge Filters	🔴
UPnP	🔴
LAN Clients	🟢
IP QoS	🔴
Static Routing	

IP Settings

The IP address is usually 192.168.1.1 but you can change it (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.

Option	Description
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.
Renew button	It is possible to renew the IP address by clicking the Renew 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.

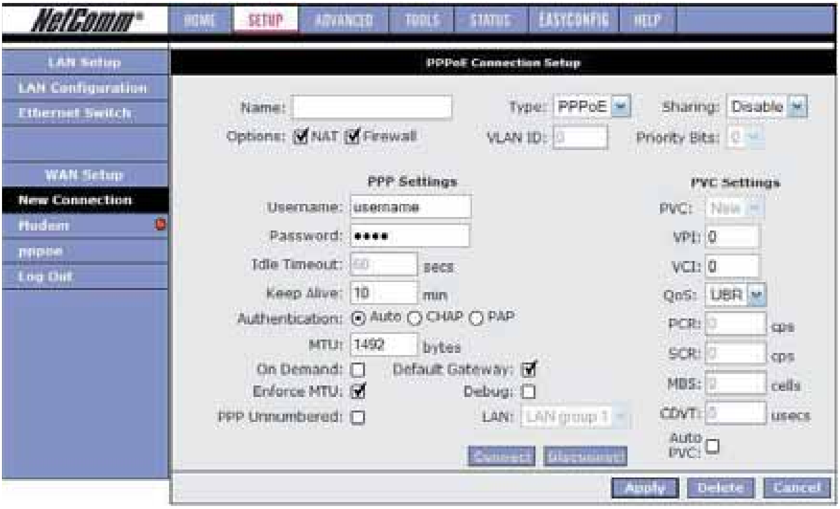
Option	Description
Server On:	Enables the DHCP server.
Start IP:	Sets the start IP address of the IP address pool.
End IP:	Sets the end IP address of the IP address pool.
Lease time:	The lease time is the amount of time an IP address issued by the DHCP service of your modem is valid before being updated. If all fields are 0, the allocated IP address will be effective indefinitely.
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.

WAN Setup⇢New Connection

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



PPPoE Connection Setup

Name:
Type: PPPoE
Sharing: Disable
Options: ☑ NAT ☑ Firewall
VLAN ID: 0
Priority Bits: 0

PPP Settings

Username: username
Password: ••••
Idle Timeout: 60 secs
Keep Alive: 10 min
Authentication: ● Auto ○ CHAP ○ PAP
MTU: 1492 bytes
On Demand: □
Default Gateway: ☑
Enforce MTU: ☑
Debug: □
PPP Unnumbered: □
LAN: LAN group 1

PVC Settings

PVC: New
VPI: 0
VCI: 0
QoS: UBR
PCR: 0 cps
SCR: 0 cps
MBS: 0 cells
CDVT: 0 usecs
Auto PVC: □

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 VPI =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 are for your ISP’s account and are supplied to you by your ISP.

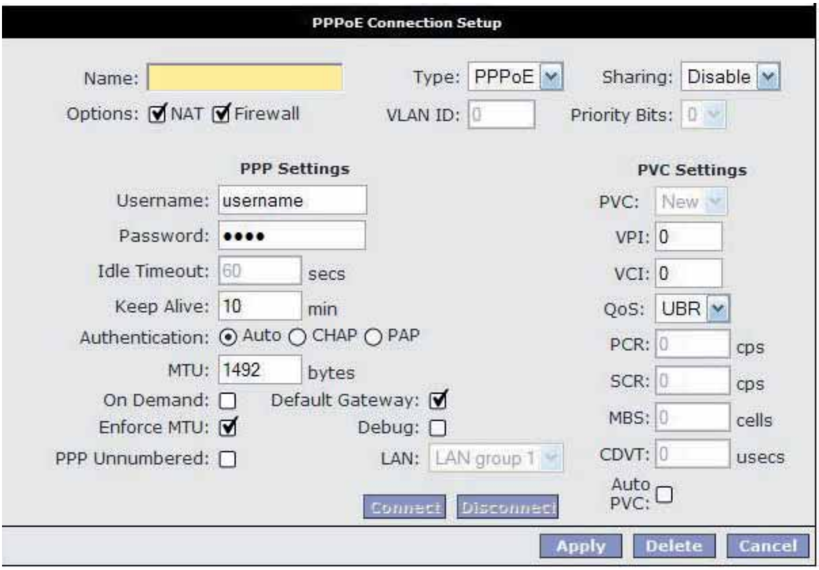
PPPoE Connection Setup Fields

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. [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: PPPoE 　Sharing: Disable

Options: ☑ NAT ☑ Firewall 　VLAN ID: 0 　Priority Bits: 0

PPP Settings

Username: username

Password: ••••

Idle Timeout: 60 secs

Keep Alive: 10 min

Authentication: ● Auto ○ CHAP ○ PAP

MTU: 1492 bytes

On Demand: □ 　Default Gateway: ☑

Enforce MTU: ☑ 　Debug: □

PPP Unnumbered: □ 　LAN: LAN group 1

PVC Settings

PVC: New

VPI: 0

VCI: 0

QoS: UBR

PCR: 0 cps

SCR: 0 cps

MBS: 0 cells

CDVT: 0 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.

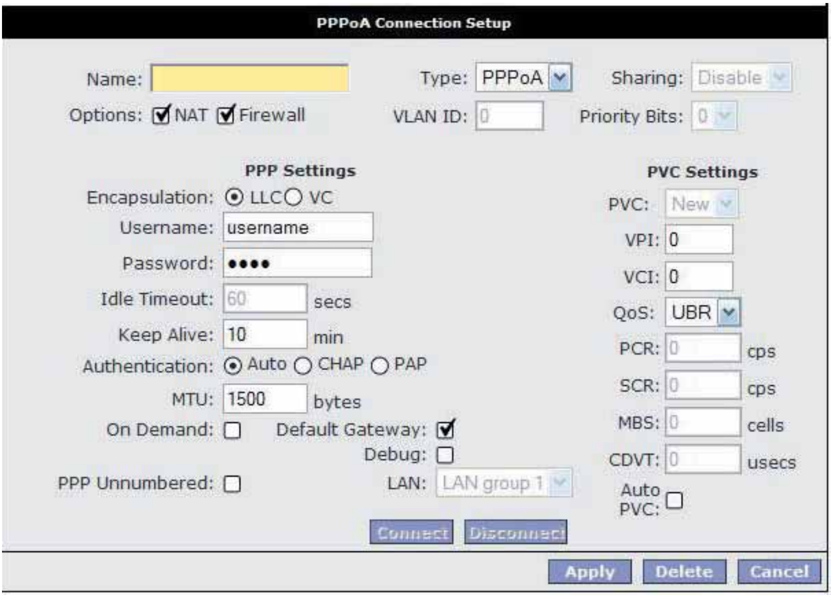
Option	Description
On Demand:	If enabled the Idle Timeout field can be modified. On Demand specifies that the modem will connect to the Internet on demand.
Default Gateway:	Specifies that this connection will be the default gateway for other LAN groups to access the Internet.
Enforce MTU:	Specifies that 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: PPPoA
Sharing: Disable
Options: ☑ NAT ☑ Firewall
VLAN ID: 0
Priority Bits: 0

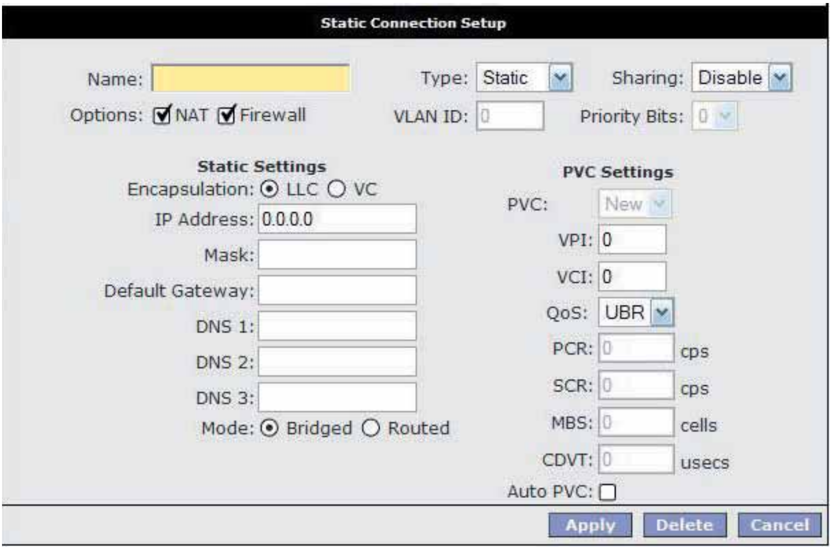
PPP Settings

Encapsulation: ● LLC ○ VC
Username: username
Password: ●●●●
Idle Timeout: 60 secs
Keep Alive: 10 min
Authentication: ● Auto ○ CHAP ○ PAP
MTU: 1500 bytes
On Demand: □
Default Gateway: ☑
Debug: □
PPP Unnumbered: □
LAN: LAN group 1

PVC Settings

PVC: New
VPI: 0
VCI: 0
QoS: UBR
PCR: 0 cps
SCR: 0 cps
MBS: 0 cells
CDVT: 0 usecs
Auto PVC: □

Static Connection Setup



Static Connection Setup

Name:

Type: Static

Sharing: Disable

Options: ☑ NAT ☑ Firewall

VLAN ID: 0

Priority Bits: 0

Static Settings

Encapsulation: ● LLC ○ VC

IP Address: 0.0.0.0

Mask:

Default Gateway:

DNS 1:

DNS 2:

DNS 3:

Mode: ● Bridged ○ Routed

PVC Settings

PVC: New

VPI: 0

VCI: 0

QoS: UBR

PCR: 0 cps

SCR: 0 cps

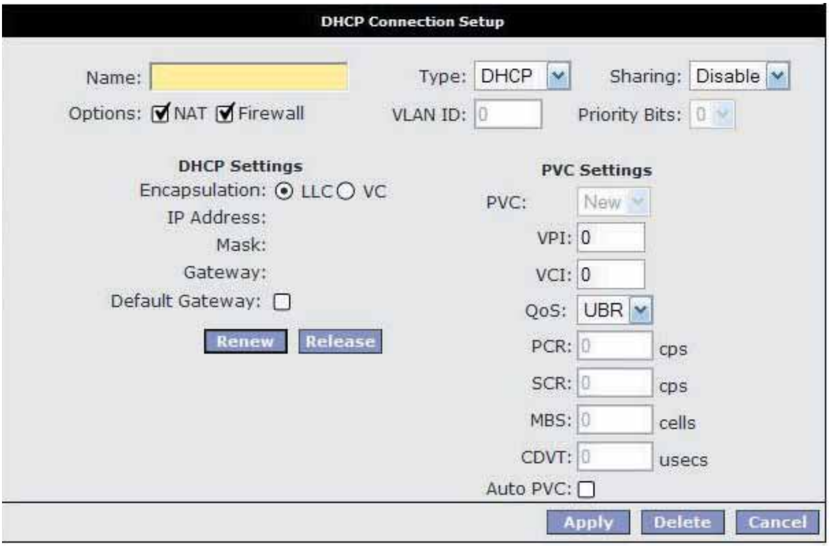
MBS: 0 cells

CDVT: 0 usecs

Auto PVC: □

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



DHCP Connection Setup

Name:

Type: DHCP

Sharing: Disable

Options: ☑ NAT ☑ Firewall

VLAN ID: 0

Priority Bits: 0

DHCP Settings

Encapsulation: ● LLC ○ VC

IP Address:

Mask:

Gateway:

Default Gateway: □

PVC Settings

PVC: New

VPI: 0

VCI: 0

QoS: UBR

PCR: 0 cps

SCR: 0 cps

MBS: 0 cells

CDVT: 0 usecs

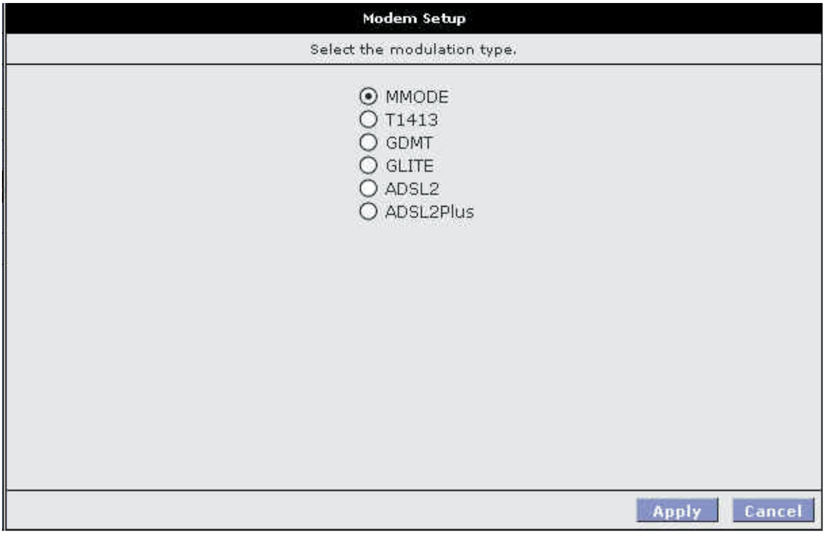
Auto PVC: □

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.

WAN Setup→Modem



Modem Setup

Select the modulation type.

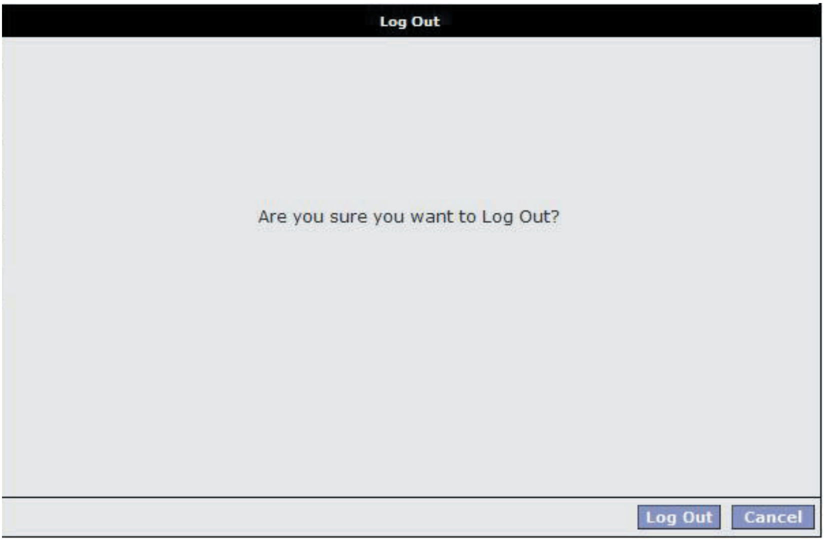
● MMODE
○ T1413
○ GDMT
○ GLITE
○ ADSL2
○ ADSL2Plus

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)).
ADSL2, 2Plus	Higher rate ADSL services gradually being made available at various exchanges. Follow ISP advice on whether this connection is suitable.

Click Apply to save the changes.

Logout

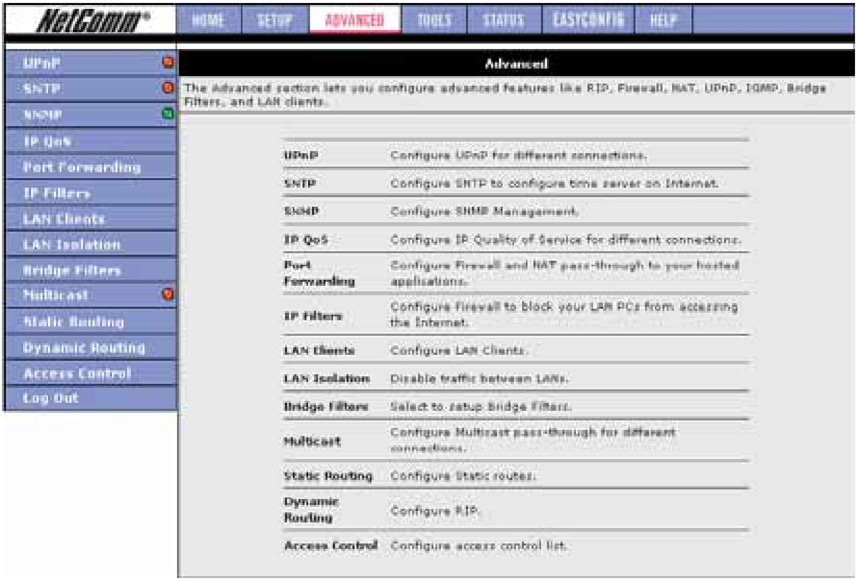


Are you sure you want to Log Out?

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.



Advanced

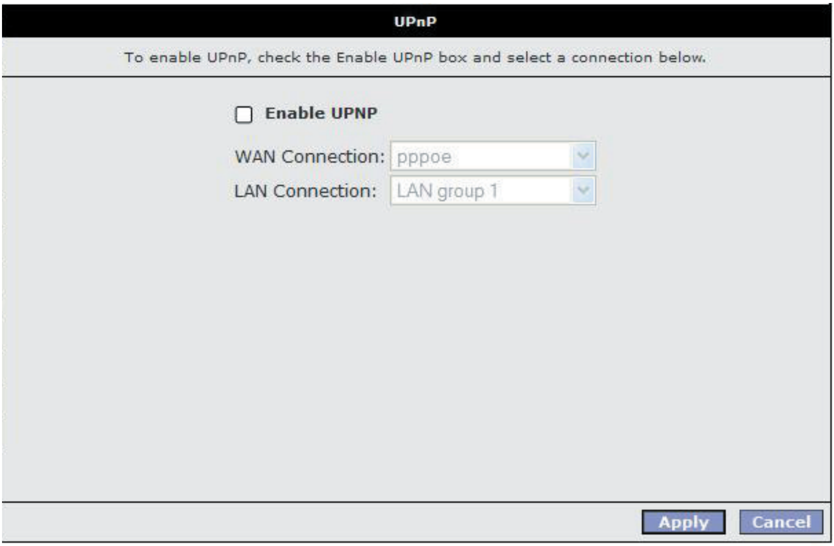
The Advanced section lets you configure advanced features like RIP, Firewall, NAT, UPnP, IGMP, Bridge Filters, and LAN clients.

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.
Multicast	Configure Multicast pass-through for different connections.
Static Routing	Configure Static routes.
Dynamic Routing	Configure RIP.
Access Control	Configure access control list.

Advanced ⋯→ UPnP

Your modem is Universal Plug ‘n Play Capable, for security this feature is disabled by default. The UPnP architecture is a distributed, open networking architecture that leverages TCP/IP and the Web to enable seamless proximity networking in addition to control and data transfer among networked devices in the home, office, and everywhere in between.

Supported by a large number of hardware and software vendors, UPnP provides a simple method for enabling certain network games and messaging applications to communicate, without requiring configuration of your router’s NAT function.


UPnP

To enable UPnP, check the Enable UPnP box and select a connection below.

□ Enable UPNP

WAN Connection: pppoe

LAN Connection: LAN group 1

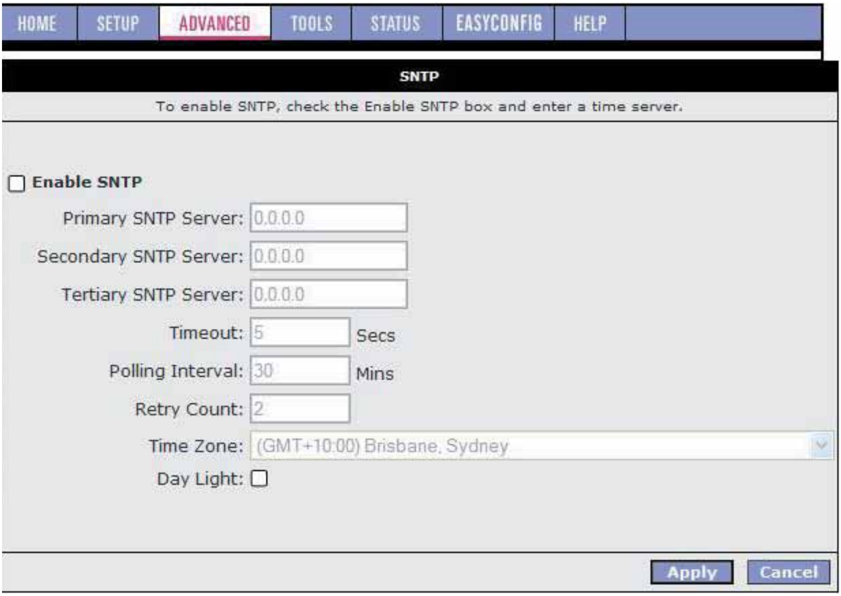
To Enable UPnP click the Enable UPnP box and choose the WAN connection (usually ‘PPPoE’). Select the LAN Connection (e.g. LAN Group 1) to which UPnP is to be applied to.

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



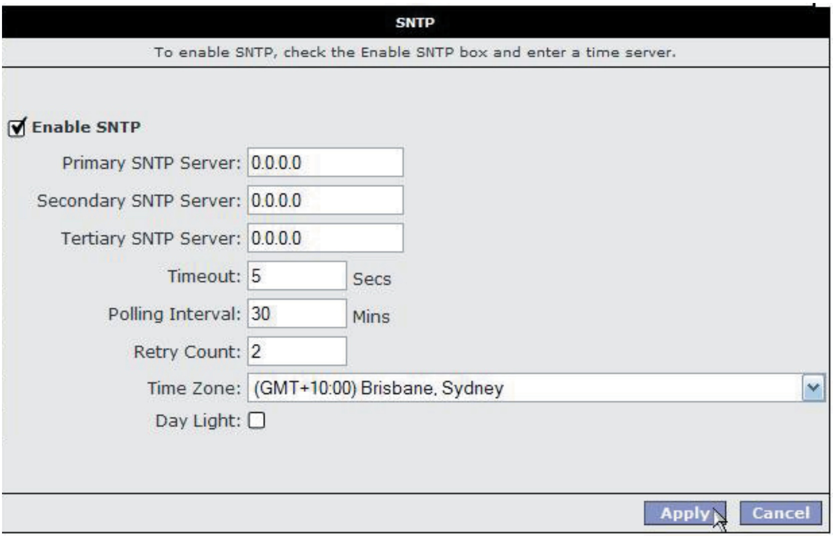
SNTP

To enable SNTP, check the Enable SNTP box and enter a time server.

□ **Enable SNTP**

Primary SNTP Server:	0.0.0.0	
Secondary SNTP Server:	0.0.0.0	
Tertiary SNTP Server:	0.0.0.0	
Timeout:	5	Secs
Polling Interval:	30	Mins
Retry Count:	2	
Time Zone:	(GMT+10:00) Brisbane, Sydney	
Day Light:	□	

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.

☑ **Enable SNTP**

Primary SNTP Server:	0.0.0.0	
Secondary SNTP Server:	0.0.0.0	
Tertiary SNTP Server:	0.0.0.0	
Timeout:	5	Secs
Polling Interval:	30	Mins
Retry Count:	2	
Time Zone:	(GMT+10:00) Brisbane, Sydney	
Day Light:	□	

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 NB1 modem is talking to an NTP server, follow these instructions for Windows Operating Systems:

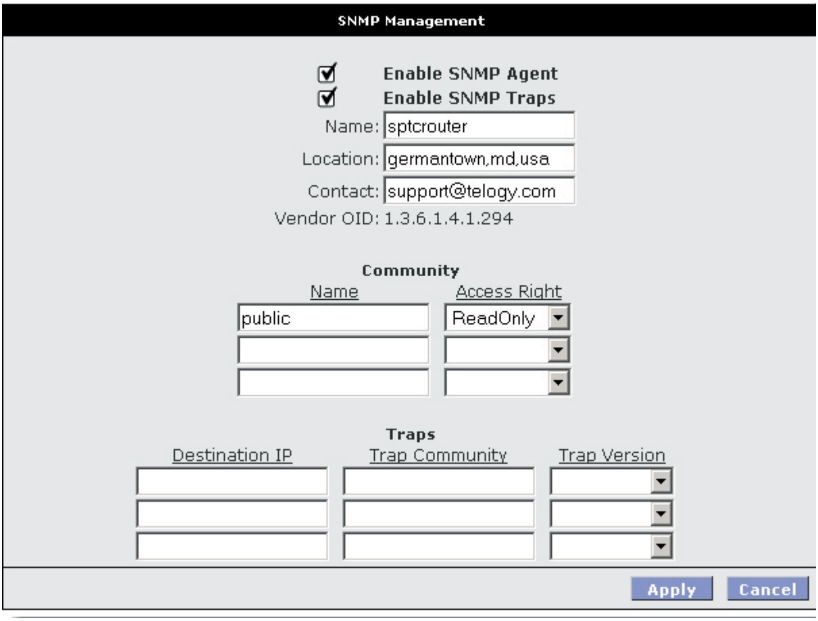
1. Open a Command Prompt (Start > Run > cmd).
2. Type telnet 192.168.1.1 (or the IP address of your modem) and enter.
3. Type your login and password.

   Login: admin

   Password: admin
4. date [ENTER key]
5. Note that the date is set correctly.

Advanced→SNMP

The Simple Network Management Protocol (SNMP) allows a network administrator to monitor a network by retrieving settings on remote network devices. The network administrator typically runs an SNMP management station program such as MIB browser on a local host to obtain information from an SNMP agent such as the router you use now.



SNMP Management

☑ Enable SNMP Agent

☑ Enable SNMP Traps

Name: sptcrouter

Location: germantown,md,usa

Contact: support@telogy.com

Vendor OID: 1.3.6.1.4.1.294

Community

Name	Access Right
public	ReadOnly

Traps

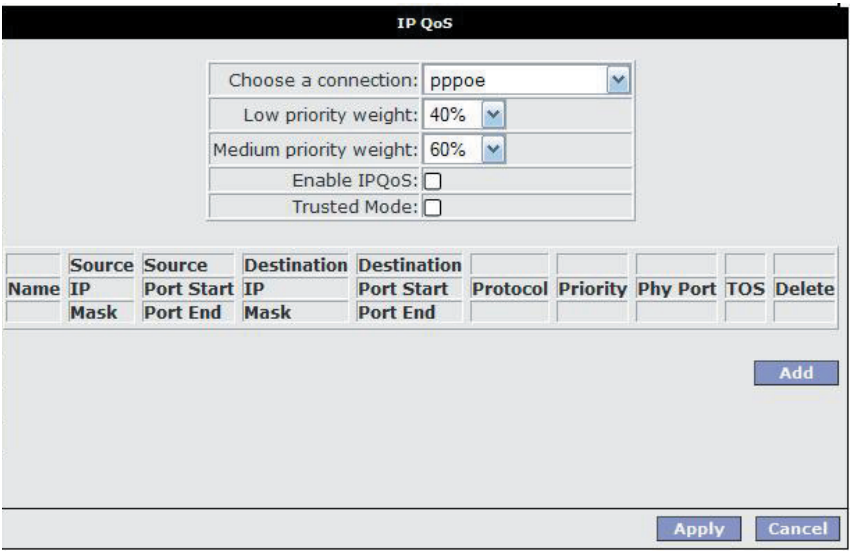
Destination IP	Trap Community	Trap Version

Option	Description
Vendor OID:	The enterprise OID to which the system belongs to.
Enable SNMP Agent:	Enabled by default. Allows SNMP management software to connect to your modem and gather information.
Enable SNMP Traps:	Enabled by default. Enables an agent to notify the management station of any significant events by using an unsolicited SNMP message.
Name:	Enter a name for your modem.
Location:	Enter the location (e.g. Sydney).
Contact:	Enter an email address for a contact.
Community	
Name:	Community name.
Access Right:	Select ReadOnly or ReadWrite.

Option	Description
Traps	
Destination IP:	The IP address of the SNMP management device.
Trap Community:	Used when sending SNMP traps to another device.
Trap Version:	Version 1 or 2c.
Apply:	Click Apply to save the changes.

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.



IP QoS

Choose a connection: pppoe

Low priority weight: 40%

Medium priority weight: 60%

Enable IPQoS: □

Trusted Mode: □

Name	Source IP Mask	Source Port Start Port End	Destination IP Mask	Destination Port Start Port End	Protocol	Priority	Phy Port	TOS	Delete

The NB1 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.

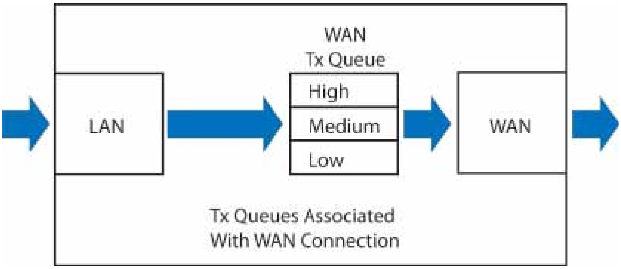
QoS Setup Page

The QoS setup page will have 2 primary fields:

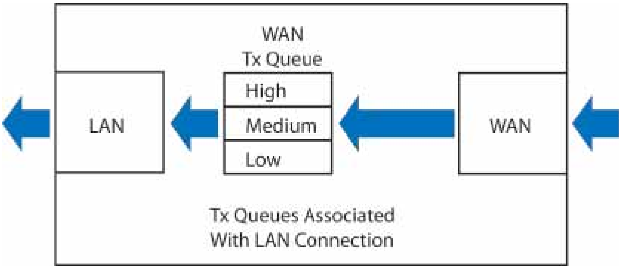
1. Connection name selection,
2. A table to select queue weights for the system transmit queues.

IP QoS traffic shaping is associated with any transmitted traffic from the perspective of the NB1. 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 NB1 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 NB1 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-preemtible 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:

	Total delay	PSTN delay		Maximum Data Fragment size		
	end-to-end	budget		based on upstream bandwidth (bytes)		
VIF	(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:

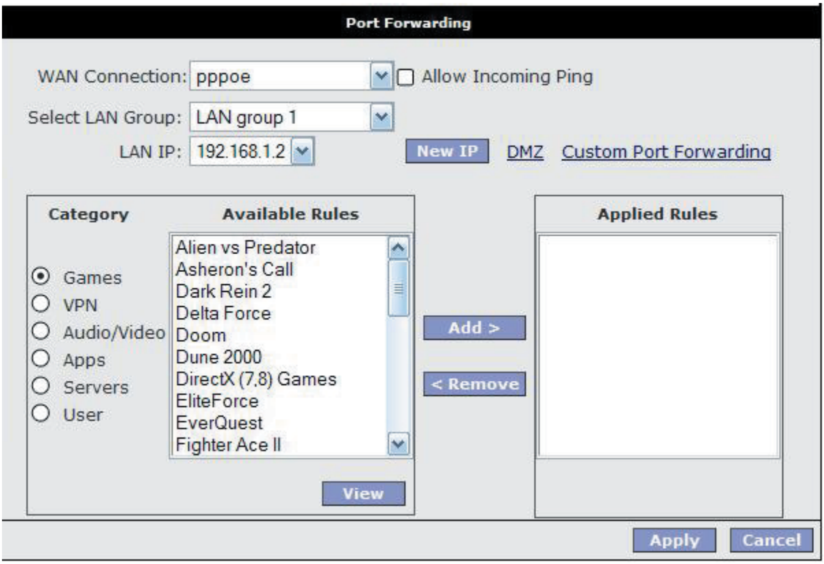
Binary	Meaning
1000	Minimize delay (md)
0100	Maximize throughput (mt)
0010	Maximize reliability (mr)
0001	Minimize monetary cost (mmc)
0000	Normal Service

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→Port Forwarding

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.



Port Forwarding

WAN Connection: pppoe ☐ Allow Incoming Ping

Select LAN Group: LAN group 1

LAN IP: 192.168.1.2

Category: ● Games ○ VPN ○ Audio/Video ○ Apps ○ Servers ○ User

Available Rules: Alien vs Predator, Asheron's Call, Dark Rein 2, Delta Force, Doom, Dune 2000, DirectX (7,8) Games, EliteForce, EverQuest, Fighter Ace II

Applied Rules:

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

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

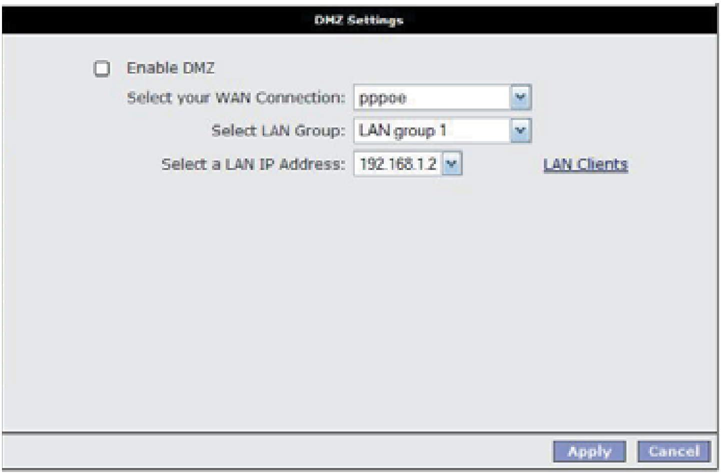
Well-know and registered Ports

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)
161	TCP	SNMP
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' .

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

☐ Enable DMZ

Select your WAN Connection: pppoe

Select LAN Group: LAN group 1

Select a LAN IP Address: 192.168.1.2

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.

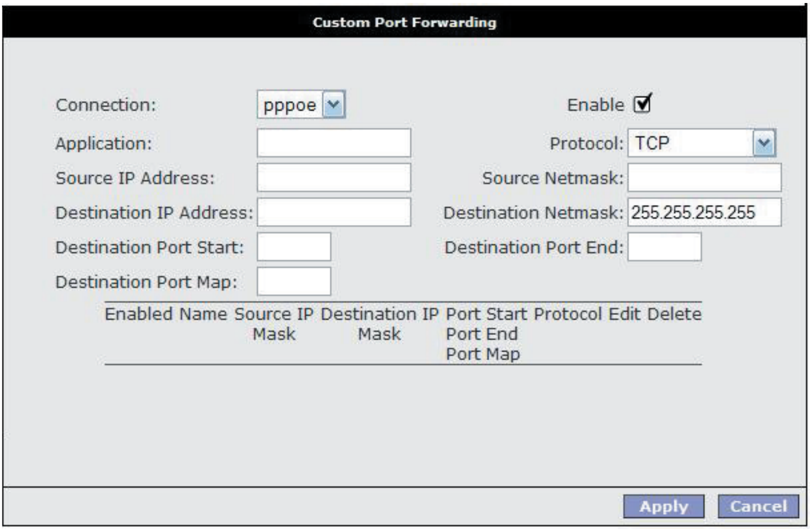
Option	Description
Select your WAN	
Connection:	Select the connection to which your DMZ client is connected to.
Select LAN group:	Select the LAN group in which you want to place the DMZ client.
Select a LAN IP	
Address:	Select the LAN IP address of the DMZ client.
LAN Clients:	Click the LAN clients hyperlink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



Custom Port Forwarding

Connection: pppoe

Enable ☑

Application:

Protocol: TCP

Source IP Address:

Source Netmask:

Destination IP Address:

Destination Netmask: 255.255.255.255

Destination Port Start:

Destination Port End:

Destination Port Map:

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

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 numbers. 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.

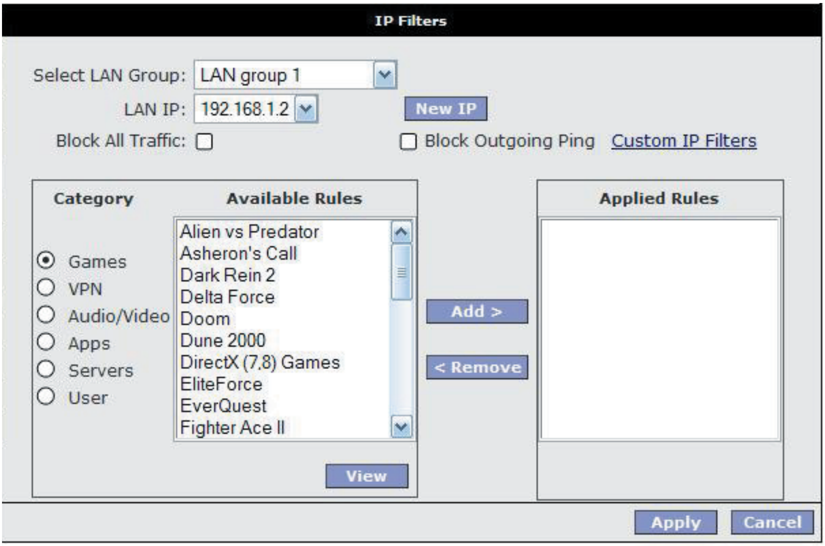
Adding Custom Rules to Applied Rules List

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 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.



Select LAN Group: LAN group 1

LAN IP: 192.168.1.2

Block All Traffic: □

□ Block Outgoing Ping

● Games
○ VPN
○ Audio/Video
○ Apps
○ Servers
○ User

Alien vs Predator
Asheron's Call
Dark Rein 2
Delta Force
Doom
Dune 2000
DirectX (7,8) Games
EliteForce
EverQuest
Fighter Ace II

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

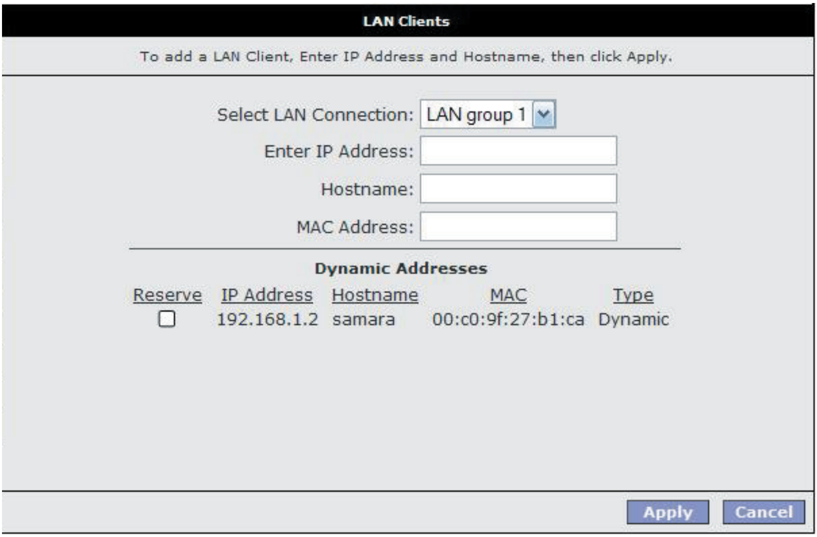
Custom IP filters are different from Port forwards, or Block All traffic because they allow greater scopes of IP addresses to be included in the block.

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⋯>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.



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

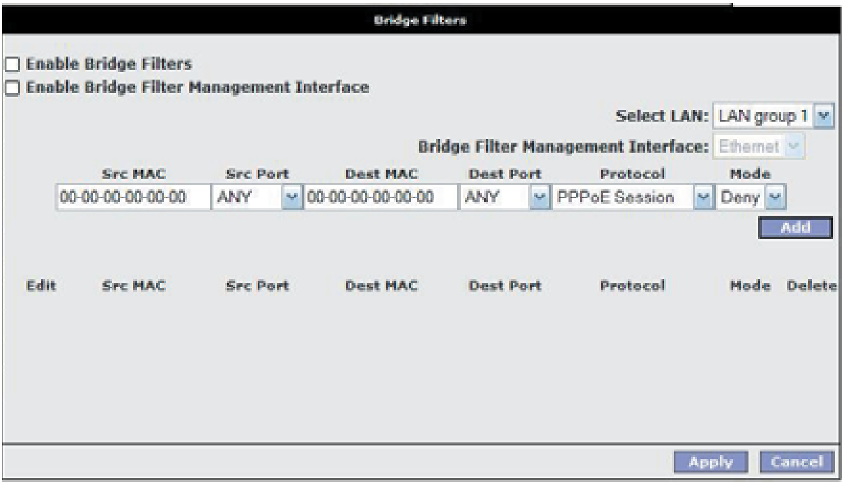
Reserve	IP Address	Hostname	MAC	Type
□	192.168.1.2	samara	00:c0:9f:27:b1:ca	Dynamic

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.
Apply:	Click Apply to save the changes.

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.



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

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

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

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.

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.

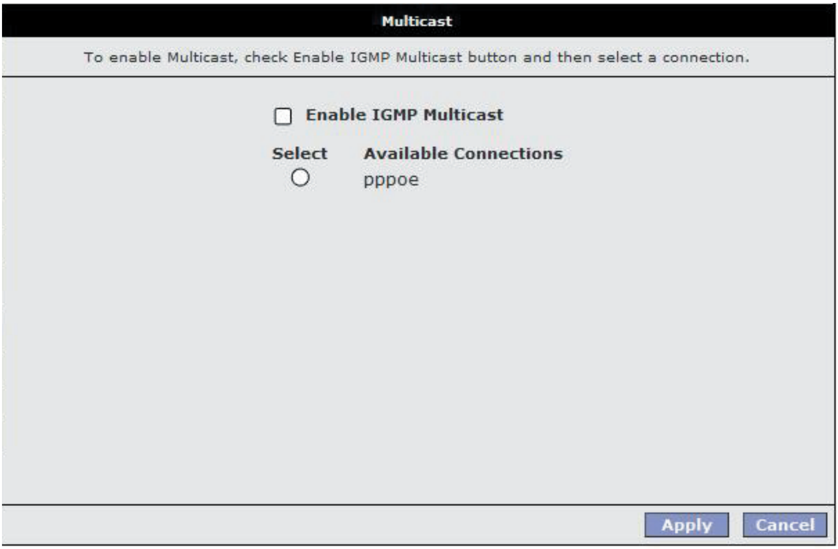
The third rule allows all IPv4 frames with the source MAC address of the bridge to go through.

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 updating 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.



Multicast

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

□ Enable IGMP Multicast

Select	Available Connections
○	pppoe

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

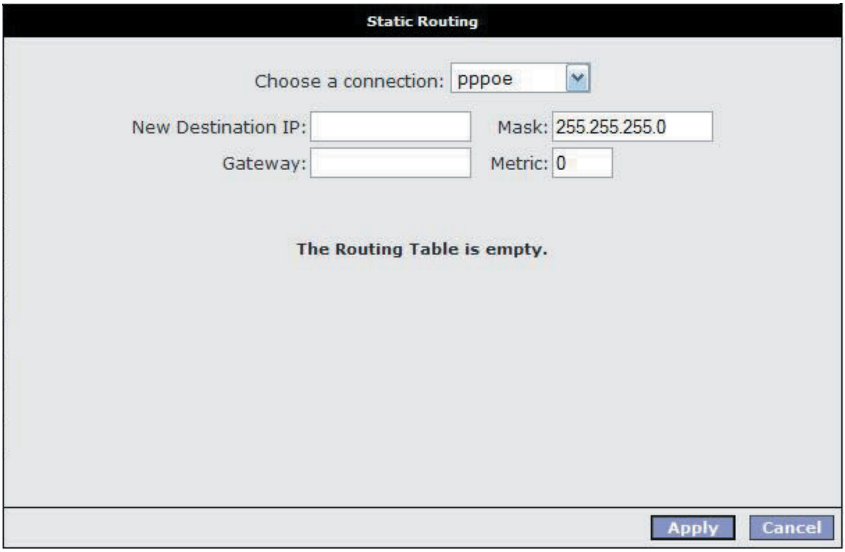
If you have multiple connections setup on your modem you will be able to choose which connection to enable IGMP Multicast for.

Click the Apply button to save the settings.

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.



Choose a connection: pppoe

New Destination IP:

Mask: 255.255.255.0

Gateway:

Metric: 0

The Routing Table is empty.

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.

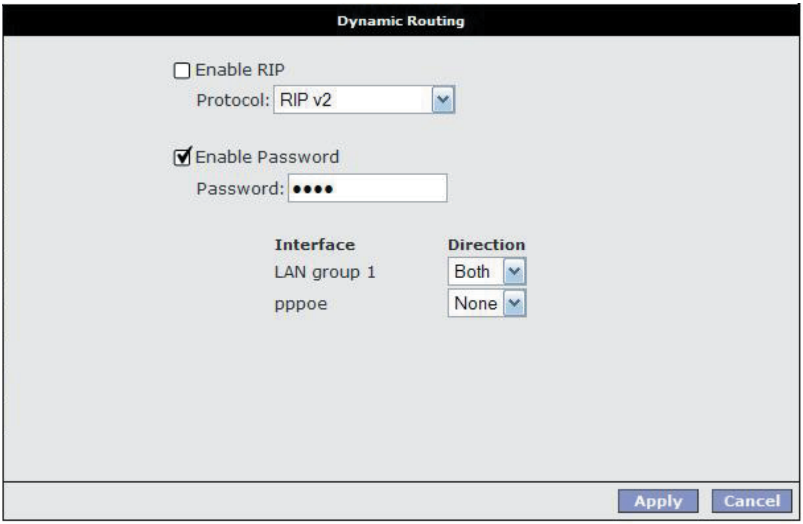
Gateway: IP address refers to the IP address of the near device that is to connect with the remote network or host. If the Modem is fulfilling this function then its IP address will be entered in this field.

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 NB1, 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.



Dynamic Routing

□ Enable RIP

Protocol: RIP v2

☑ Enable Password

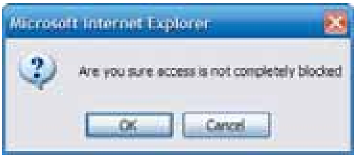
Password: ●●●●

Interface	Direction
LAN group 1	Both
pppoe	None

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 NB1 will only incorporate received RIP information.
Select 'Out':	The NB1 will only send out RIP information.
Select 'Both':	The NB1 will both incorporate received RIP information and send out updated RIP information.

Advanced⋯>Access Control

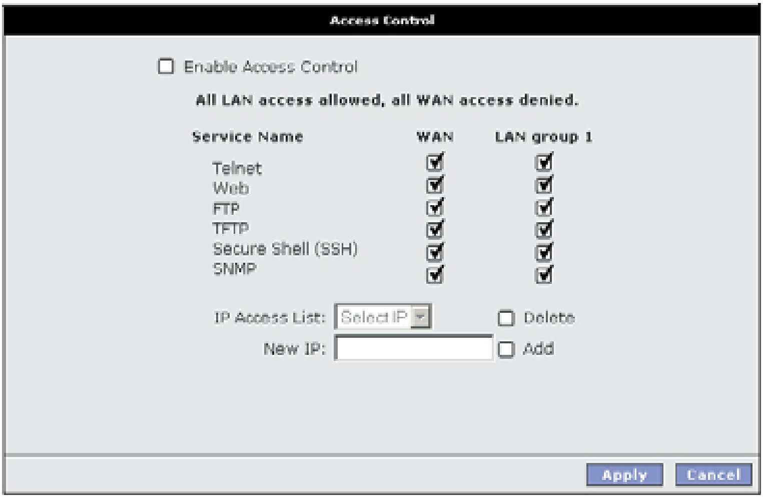
Use Access Control to configure advanced security functions by customising the Modem Firewall. The default 'Firewall On' setting blocks all anonymous Internet traffic. Access control enables the user to selectively direct such traffic, for example to a Web Host in the DMZ or to specific ports opened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



Microsoft Internet Explorer

Are you sure access is not completely blocked

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.



Access Control

□ Enable Access Control

All LAN access allowed, all WAN access denied.

Service Name	WAN	LAN group 1
Telnet	☑	☑
Web	☑	☑
FTP	☑	☑
TFTP	☑	☑
Secure Shell (SSH)	☑	☑
SNMP	☑	☑

IP Access List: Select IP □ Delete

New IP: □ Add

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.

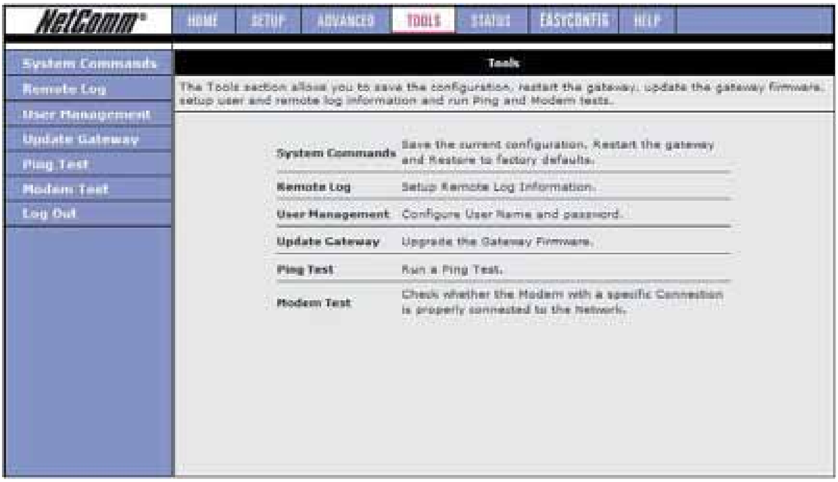
If Access Control is enabled, and an Enable WAN checkbox is selected, then WAN access to the matching service is enabled. In other words, for example, if your were to enable Telnet access on the WAN you could then manage and configure your modem from anywhere on the Internet via Telnet.

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.



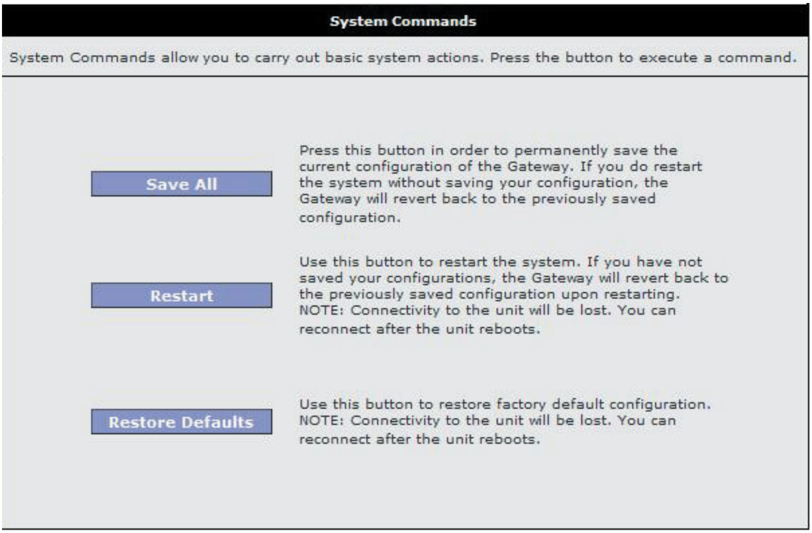
Tools

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.

System Commands	Save the current configuration, Restart the gateway and Restore to factory defaults.
Remote Log	Setup Remote Log Information.
User Management	Configure User Name and password.
Update Gateway	Upgrade the Gateway Firmware.
Ping Test	Run a Ping Test.
Modem Test	Check whether the Modem with a specific Connection is properly connected to the Network.

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:



System Commands

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

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.

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.

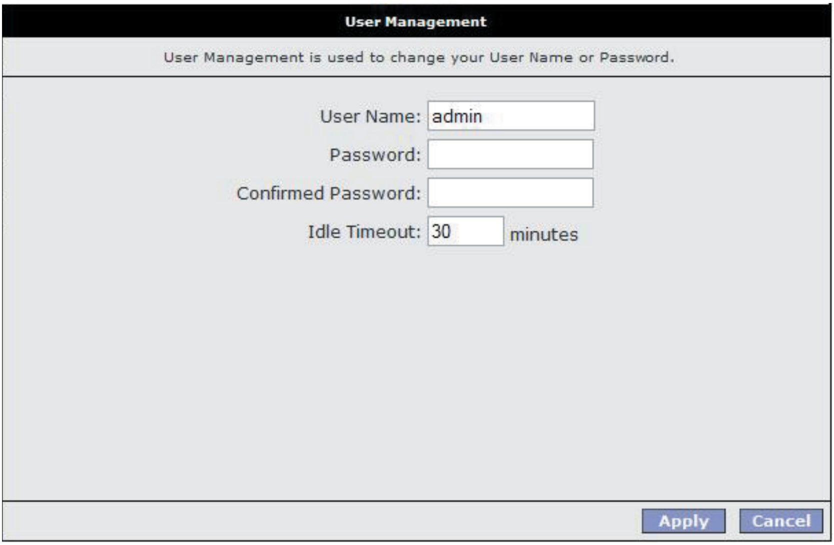
Use this button to restore factory default configuration. NOTE: Connectivity to the unit will be lost. You can reconnect after the unit reboots.

- 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 NB1’s User Name or Password.



User Management

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

User Name:	admin
Password:	
Confirmed Password:	
Idle Timeout:	30 minutes

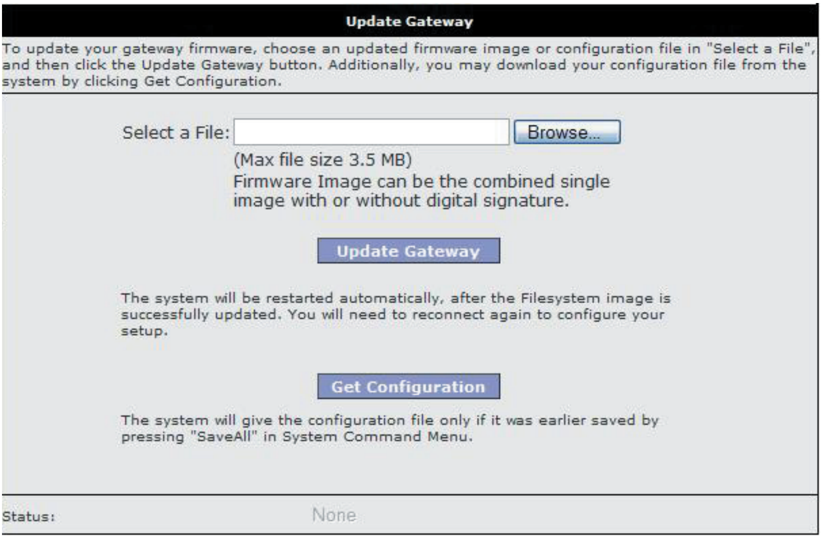
Option	Description
User Name:	Default is ‘admin’.
Password:	Default is ‘admin’.
Idle Timeout:	If there is no activity by the admin user logged into the modem for the number of minutes specified in this field, the user will be required to login again.
Apply:	Click Apply to save the changes.

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

Tools·····➔Update Firmware

To update your NB1'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.



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: [ ] Browse...

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

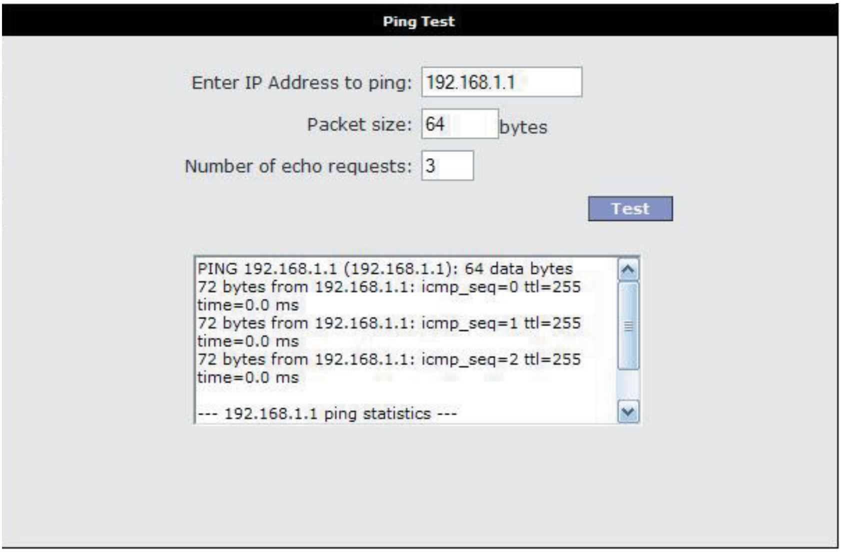
The system will be restarted automatically, after the Filesystem image is successfully updated. You will need to reconnect again to configure your setup.

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

Status: None

Tools⋯›Ping Test

The Ping test allows you to ping local and remote IP addresses to check for connectivity directly from the NB1 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.



Enter IP Address to ping: 192.168.1.1

Packet size: 64 bytes

Number of echo requests: 3

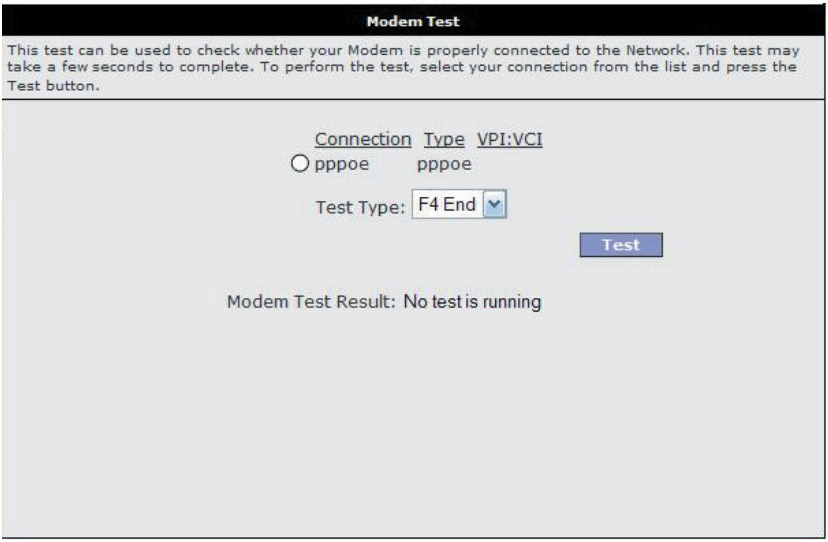
```
PING 192.168.1.1 (192.168.1.1): 64 data bytes
72 bytes from 192.168.1.1: icmp_seq=0 ttl=255
time=0.0 ms
72 bytes from 192.168.1.1: icmp_seq=1 ttl=255
time=0.0 ms
72 bytes from 192.168.1.1: icmp_seq=2 ttl=255
time=0.0 ms

--- 192.168.1.1 ping statistics ---
```

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.



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
○	pppoe	pppoe	

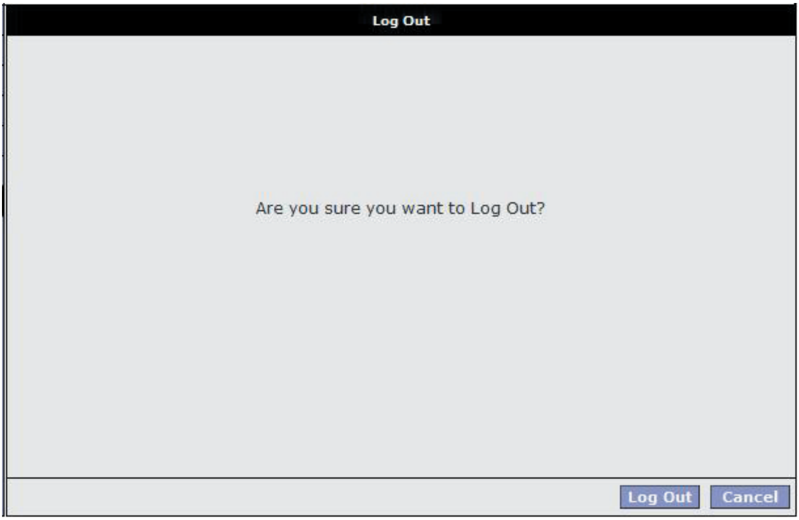
Test Type: F4 End

Modem Test Result: No test is running

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.

Tools⋯⋯›Log out

By clicking on Log Out, you will log out of the N1. Click the Log Out button will take you back to the login screen.



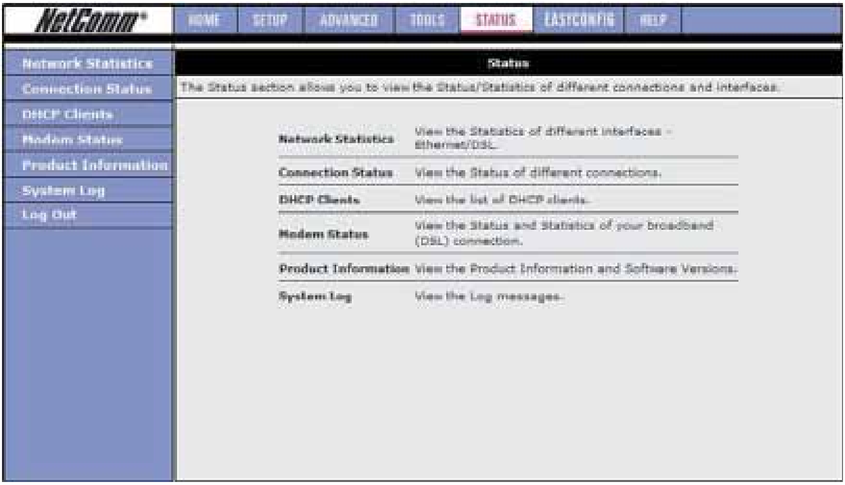
Are you sure you want to Log Out?

Use the following procedures to log out.

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).

Status

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



Status

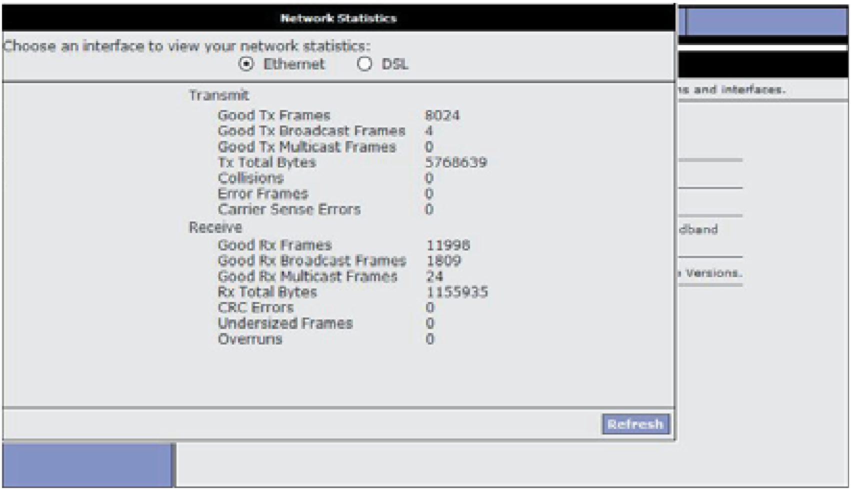
The Status section allows you to view the Status/Statistics of different connections and interfaces.

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.

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.



Network Statistics

Choose an interface to view your network statistics:
● Ethernet ○ DSL

Transmit

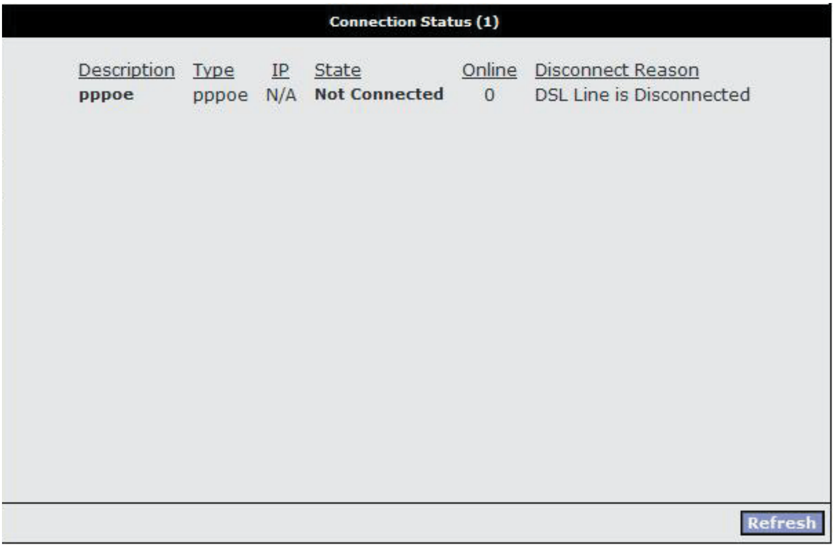
Good Tx Frames	8024
Good Tx Broadcast Frames	4
Good Tx Multicast Frames	0
Tx Total Bytes	5768639
Collisions	0
Error Frames	0
Carrier Sense Errors	0

Receive

Good Rx Frames	11998
Good Rx Broadcast Frames	1809
Good Rx Multicast Frames	24
Rx Total Bytes	1155935
CRC Errors	0
Undersized Frames	0
Overruns	0

Status→Connection Status

Here you can view the connection status of your Internet connection (usually ‘PPPoE’). You can also see the Public IP address that has been assigned to your modem as well as other information about the connection.

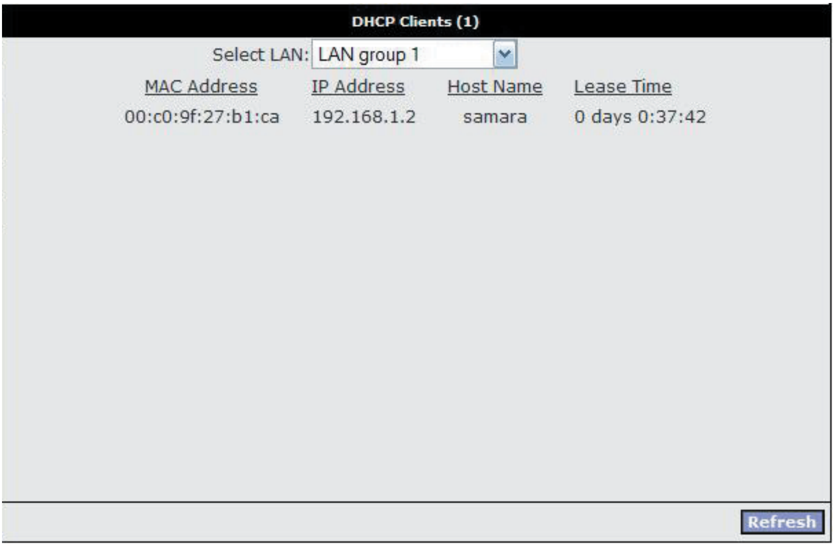


Connection Status (1)

Description	Type	IP	State	Online	Disconnect Reason
pppoe	pppoe	N/A	**Not Connected**	0	DSL Line is Disconnected

Status⇢DHCP Clients

The DHCP Clients page shows the MAC address, IP Address, Host Name and Lease Time assigned to other computers in your network by the modem.



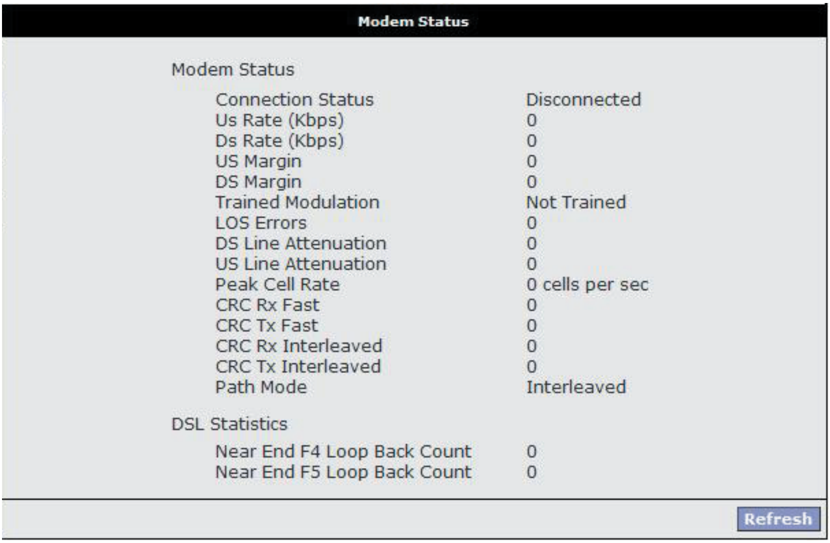
DHCP Clients (1)

Select LAN: LAN group 1

MAC Address	IP Address	Host Name	Lease Time
00:c0:9f:27:b1:ca	192.168.1.2	samara	0 days 0:37:42

Status⋯›Modem Status

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



Modem Status

Modem Status

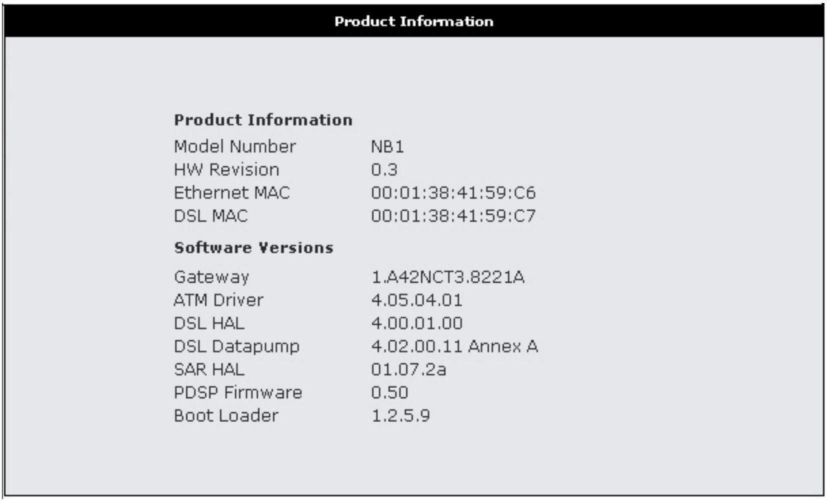
Connection Status	Disconnected
Us Rate (Kbps)	0
Ds Rate (Kbps)	0
US Margin	0
DS Margin	0
Trained Modulation	Not Trained
LOS Errors	0
DS Line Attenuation	0
US Line Attenuation	0
Peak Cell Rate	0 cells per sec
CRC Rx Fast	0
CRC Tx Fast	0
CRC Rx Interleaved	0
CRC Tx Interleaved	0
Path Mode	Interleaved

DSL Statistics

Near End F4 Loop Back Count	0
Near End F5 Loop Back Count	0

Status→Product Information

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



Product Information

Product Information

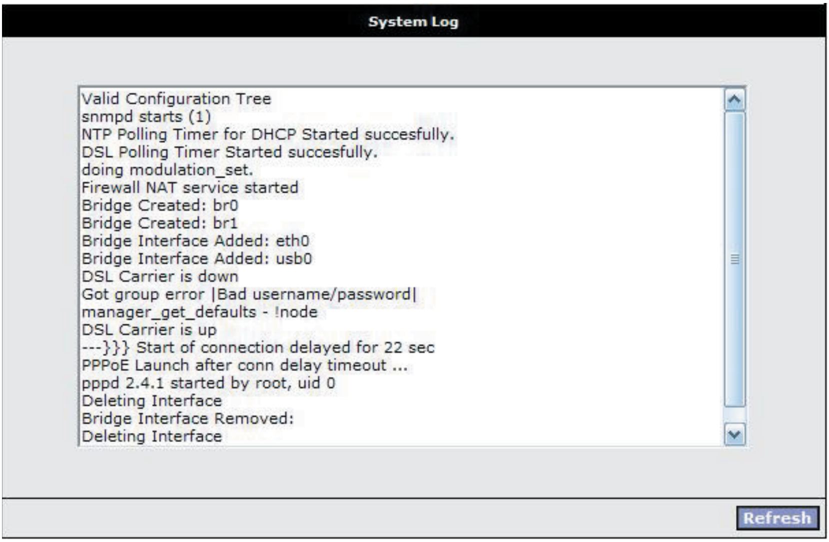
Model Number	NB1
HW Revision	0.3
Ethernet MAC	00:01:38:41:59:C6
DSL MAC	00:01:38:41:59:C7

Software Versions

Gateway	1.A42NCT3.8221A
ATM Driver	4.05.04.01
DSL HAL	4.00.01.00
DSL Datapump	4.02.00.11 Annex A
SAR HAL	01.07.2a
PDSP Firmware	0.50
Boot Loader	1.2.5.9

Status→System Log

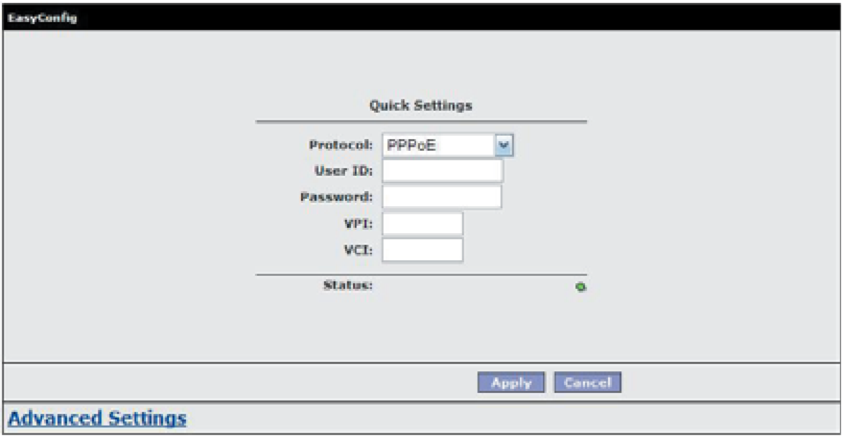
The System Log page shows the events triggered by the system.



```
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 - !node
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
```

EasyConfig

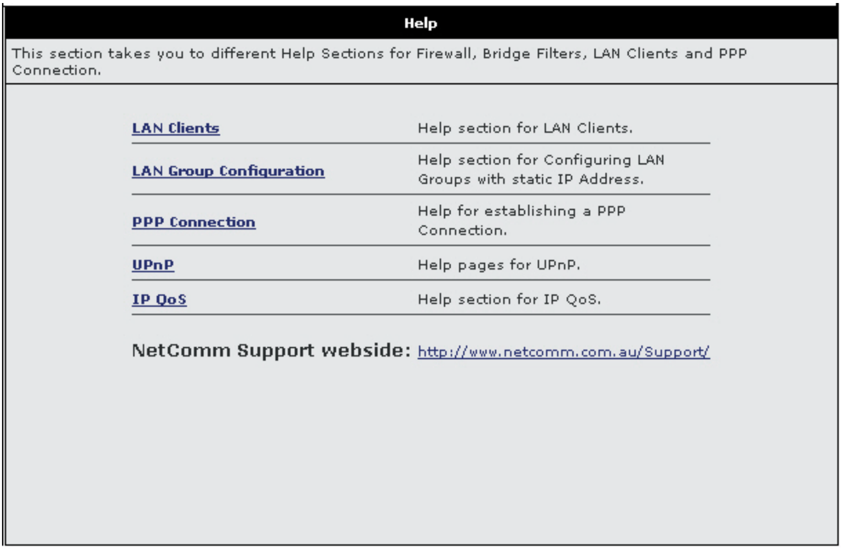
The EasyConfig menu takes you to the EasyConfig page. This is the page you originally configured your modem with.



Protocol: PPPoE

Help

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



Help

This section takes you to different Help Sections for Firewall, Bridge Filters, LAN Clients and PPP Connection.

LAN Clients	Help section for LAN Clients.
LAN Group Configuration	Help section for Configuring LAN Groups with static IP Address.
PPP Connection	Help for establishing a PPP Connection.
UPnP	Help pages for UPnP.
IP QoS	Help section for IP QoS.

NetComm Support webside: http://www.netcomm.com.au/Support/

Appendix A: 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

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

LED INDICATORS

- 1 x PPP LED
- 1 x Power LED
- 1 x ADSL Link Status LED
- 1 x Ethernet Link/Activity Status LED

Appendix B: 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 Net-Comm for further advice.

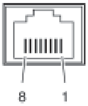
RJ-45 Network Ports

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.

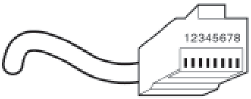
Note: To prevent loss of signal, make sure that the length of any twisted-pair connection does not exceed 100 metres.



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

Figure 1

Figures 3 and 4 illustrate the use of straight-through and crossover twisted pair cables along with the connector.



RJ-45 plug attached
to cable

Figure 2

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

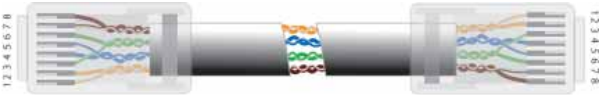


Figure 3

Wire	Becomes
1	1
2	2
3	3
6	6

Cross-Over Cabling

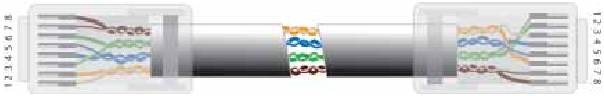


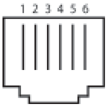
Figure 4

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.

RJ11 connector and cable

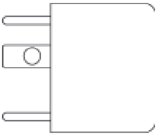
An RJ-11 connector is the small, modular plug used for most analog telephones. It has six pin slots in the head, but usually only two or four of them are used.



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

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 C: 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 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.

digital

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

SNMP

Simple Network Management Protocol The TCP/IP protocol used for network management.

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 standalone 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 D: 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 E: 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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