

VDSL/ADSL WiFi Gigabit Modem Router



NF4V
USER GUIDE

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Save Our Environment

When this equipment has reached the end of its useful life, it must be taken to a recycling centre and processed separately from domestic waste.

The cardboard box, the plastic contained in the packaging, and the parts that make up this device can be recycled in accordance with regionally established regulations. Never dispose of this electronic equipment along with your household waste. You may be subject to penalties or sanctions under the law. Instead, ask for disposal instructions from your municipal government.

Please be responsible and protect our environment.

This manual covers the following products:

NetComm Wireless NF4V VDSL/ADSL WiFi Gigabit Modem Router

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Overview

Introduction






This manual provides information related to the installation, operation, and use of the NF4V.

Target Users

The individual reading this manual is presumed to have a basic understanding of telecommunications terminology and concepts.

Prerequisites

Before continuing with the installation of your NF4V, please confirm that you comply with the minimum system requirements below.

-  An activated ADSL or configured WAN connection.
-  Computer with Windows, Macintosh, or Linux-based operating systems with a working Ethernet adapter with TCP/IP Protocol installed.
-  A Web Browser such as Internet Explorer, Google Chrome, Mozilla Firefox, Opera, Safari etc.
-  Wireless Computer System Requirements:
 -  Computer with a working 802.11b, 802.11g or 802.11n wireless adapter.

Notation

The following symbols are used in this manual:



Indicates a note requiring attention.













Indicates a note providing a warning.



Indicates a note providing useful information.








Product Introduction

Product Overview

-  Fully featured VDSL2 / ADSL2+ Modem Router
-  1 x 10/100/1000 Gigabit Ethernet WAN port for connection to fibre services
-  4 x 10/100/1000 Gigabit Ethernet LAN ports for wired connections
-  Wireless N300 Access Point for multiple high speed WiFi connections
-  2 x FXS ports for connecting a telephone to make VoIP calls
-  2 x USB host ports – supports USB storage device for file sharing
-  Built-in media server. Just add a USB hard drive
-  NBN ready: carefully developed hardware and software features to ensure this device is optimised for use on the National Broadband Network:
 - Wireline Routing Speeds
 - IGMP Snooping
 - IPTV IGMP V1 V2 Pass through
 - QoS
-  IPv6 ready for the next generation IP addressing
-  WPS button for simple setup of your wireless network

Package Contents

The NF4V package consists of:

-  1 x NetComm Wireless NF4V VDSL/ADSL WiFi Gigabit Modem Router
-  1 x Quick start guide
-  1 x 1.5m RJ-45 Ethernet cable
-  1 x WiFi security card
-  1 x Warranty card
-  1 x Power supply (12V/2A)
-  1 x RJ-11 Telephone cable

If any of these items are missing or damaged, please contact NetComm Wireless Support immediately by visiting the NetComm Wireless Support website at: <http://www.netcommwireless.com/contact-forms/support>

Product Features

Featuring a VDSL2/ADSL2+ modem and a Gigabit WAN port, you can choose whether you connect to the Internet via DSL or a fibre service. If you don't have a fibre connection, the Gigabit WAN port will have you protected should you choose to update in the future. With uncertainty around the future of the NBN, NetComm Wireless will have you covered should the network connection switch to VDSL.

This router also includes 2 x USB host ports that can be used to connect USB devices so that their capabilities can be shared with all connected users. Connect a USB hard drive so that all files stored can be accessed and shared.

The included FXS ports can be used to connect standard telephones that will allow users to make calls over the Internet. By using a VoIP service, phone bills can be dramatically reduced and if connecting with Fibre, the phone line can be made redundant.

All of these features can be shared with multiple users via the built-in wireless access point or the four LAN Ethernet ports. The high speed Wireless N provides a signal strong enough to penetrate the far corners of a house and can connect all WiFi enabled devices, such as laptops, smart phones, gaming consoles, tablets and PCs. The four Gigabit LAN Ethernet ports provide a wired connection that can be used to connect desktop computers, media devices or any Ethernet equipped product.









Note: Maximum wireless signal rate and coverage values are derived from IEEE Standard 802.11g and 802.11n specifications. Actual wireless speed and coverage are dependent on network and environmental conditions included but not limited to volume of network traffic, building materials and construction/layout.

Physical Dimensions and Indicators

LED Indicators

The NF4V has been designed to be placed on a desktop. All of the cables exit from the rear for easy organization. The display is visible on the front of the NF4V to provide you with information about network activity and the device status. See below for an explanation of each of the indicator lights.

LED INDICATOR	ICON	COLOUR	DEFINITION
Power		Green	The NF4V is powered on and operating normally.
		Red	The NF4V is starting up.
		Red Blinking	The firmware is being upgraded.
		Off	The power is off.
DSL		Off	No DSL signal detected.
		Green Blinking (Slow)	Data is being transferred over the DSL line.
		Green Blinking (Fast)	The NF4V is attempting to connect to the xDSL service.
		Green	The DSL connection is established.
Internet		Green	The NF4V is connected to an internet service.
		Red	Authentication on the broadband account has failed.
		Green Blinking	Data is being transmitted to or from the internet.
		Off	The NF4V is not connected to the internet.
WAN		Green	A device is connected to the Ethernet WAN port.
		Green Blinking	Data is being transmitted to or from the WAN.
		Off	No device is connected to the Ethernet WAN port.
Ethernet 1-4		Green	A device is connected to the Ethernet LAN port.
		Green Blinking	Data is being transmitted to or from the Ethernet LAN port.
		Off	No device is connected to the Ethernet LAN port.
WiFi		Green	WiFi is enabled.
		Green Blinking	Data is being transmitted to or from the Wireless interface.
		Off	WiFi is disabled.
WPS		Green	The client has successfully connected to the router.
		Green Blinking	The client is accessing the router via WPS.
		Off	WPS is disabled.
USB 1 - 2		Green	A USB hard drive is connected.
		Green Blinking	Data is being transmitted through the USB interface.
		Off	No USB hard drive is connected to the USB interface.
Telephone		Off	No handset is connected.
		Green	VoIP registration was successful.
		Green Blinking (Slow)	The telephone is ready to make or receive a call.
		Green Blinking (Fast)	The telephone is ringing.

Physical Dimensions

The following page lists the physical dimensions of the NF4V.



216 mm (L) x 61 mm (W) x 173 mm

NF4V DIMENSIONS	
Width	216 mm
Height	173 mm
Depth	61 mm
Weight	443 grams

NF4V Default Settings

The following tables list the default settings for the NF4V.

LAN (MANAGEMENT)	
Static IP Address	192.168.20.1
Subnet Mask	255.255.255.0
Default Gateway	192.168.20.1

WIRELESS (WIFI)	
SSID	(Refer to the included Wireless Security Card)
Security	WPA2-PSK (AES)
Security Key	(Refer to the included Wireless Security Card)

NF4V WEB INTERFACE ACCESS	
Username	admin
Password	admin

Interfaces

Rear

The following interfaces are available on the NF4V:



NUMBER	INTERFACE	DESCRIPTION
1	DSL	Use the provided RJ-11 cable to connect the router to the telephone line operating your xDSL service.
2	Telephone	Connect regular analogue telephone handsets here to use them with a VoIP service.
3	Ethernet 1 - 4	Gigabit Ethernet LAN ports. Connect your Ethernet based devices to one of these ports for high-speed internet access.
4	WAN	Gigabit WAN port for connection to a WAN network.
5	Reset button	Activate the Reset function by holding the Reset button down for 3 seconds.
6	USB 2	Connect an external USB hard drive here to use the NAS feature of the NF4V.
7	Power	Connection point for the included power adapter. Connect the power supply here.




Left



NUMBER	INTERFACE	DESCRIPTION
1	WPS	Activate the WPS function by holding the WPS button down for 3 seconds.
2	WiFi	Enable or disable the WiFi radio by holding the WiFi button down for 3 seconds.
3	USB 1	Connect an external USB hard drive here to use the NAS feature of the NF4V.
4	Power	Turns the NF4V on or off.

Safety and Product Care

With reference to unpacking, installation, use and maintenance of your electronic device, the following basic guidelines are recommended:

-  Do not use or install this product near water to avoid fire or shock hazard. For example, near a bathtub, kitchen sink, laundry tub, or near a swimming pool. Also, do not expose the equipment to rain or damp areas (e.g. a wet basement).
-  Do not connect the power supply cord on elevated surfaces. Allow it to lie freely. There should be no obstructions in its path and no heavy items should be placed on the cord. In addition, do not walk on, step on or mistreat the cord.
-  To safeguard the equipment against overheating, make sure that all openings in the unit that offer exposure to air are unobstructed.



WARNING

Disconnect the power line from the device before servicing.

Transport and Handling

When transporting the NF4V, it is recommended to return the product in the original packaging. This ensures the product will not be damaged.



In the event the product needs to be returned, ensure it is securely packaged with appropriate padding to prevent damage during courier transport.

Installation and Configuration of the NF4V

Placement of your NF4V



The wireless connection between your NF4V and your WiFi devices will be stronger the closer your connected devices are to your NF4V. Your wireless connection and performance will degrade as the distance between your NF4V and connected devices increases. This may or may not be directly noticeable, and is greatly affected by the individual installation environment.

If you have concerns about your network's performance that might be related to range or obstruction factors, try moving the computer to a position between three to five meters from the NF4V in order to see if distance is the problem.









Note: While some of the items listed below can affect network performance, they will not prohibit your wireless network from functioning; if you are concerned that your network is not operating at its maximum effectiveness, this checklist may help.

If you experience difficulties connecting wirelessly between your WiFi Devices and your NF4V, please try the following steps:

-  In multi-storey homes, place the NF4V on a floor that is as close to the centre of the home as possible. This may mean placing the NF4V on an upper floor.
-  Try not to place the NF4V near a cordless telephone that operates at the same radio frequency as the NF4V (2.4GHz).





Avoid obstacles and interference

Avoid placing your NF4V near devices that may emit radio "noise," such as microwave ovens. Dense objects that can inhibit wireless communication include:

-  Refrigerators
-  Washers and/or dryers
-  Metal cabinets
-  Large aquariums
-  Metallic-based, UV-tinted windows
-  If your wireless signal seems weak in some spots, make sure that objects such as those listed above are not blocking the signal's path (between your devices and the NF4V).

Cordless Phones

If the performance of your wireless network is impaired after considering the above issues, and you have a cordless phone:

-  Try moving cordless phones away from your NF4V and your wireless-enabled computers.
-  Unplug and remove the battery from any cordless phone that operates on the 2.4GHz band (check manufacturer's information). If this fixes the problem, your phone may be interfering with the NF4V.
-  If your phone supports channel selection, change the channel on the phone to the farthest channel from your wireless network. For example, change the phone to channel 1 and move your NF4V to channel 11. See your phone's user manual for detailed instructions.
-  If necessary, consider switching to a 900MHz or 5GHz cordless phone.

Choose the "Quietest" Channel for your Wireless Network

In locations where homes or offices are close together, such as apartment buildings or office complexes, there may be wireless networks nearby that can conflict with your wireless network. Use the Site Survey capabilities found in the Wireless Utility of your wireless adapter to locate any other wireless networks that are available (see your wireless adapter's user manual), and switch your Router and computers to a channel as far away from other networks as possible.

Experiment with more than one of the available channels, in order to find the clearest connection and avoid interference from neighbouring cordless phones or other wireless devices.

Hardware installation

1. Connect the power adapter to the Power socket on the back of the NF4V.
2. Plug the power adapter into the wall socket and switch on the power.
3. Wait approximately 60 seconds for the NF4V to power up.

Connecting via a cable

1. Connect the yellow Ethernet cable provided to one of the ports marked 'LAN' at the back of the NF4V.
2. Connect the other end of the yellow Ethernet cable to your computer.
3. Wait approximately 30 seconds for the connection to establish.
4. Open your Web browser, and enter <http://192.168.20.1> into the address bar and press enter.
5. Follow the steps to set up your NF4V.

Connecting wirelessly

1. Ensure Wi-Fi is enabled on your device (e.g. computer/laptop/smartphone).
2. Scan for wireless networks in your area and connect to the network name that matches the Wireless network name configured on the NF4V.



Note: Refer to the included Wireless Security Card for the default SSID and wireless security key of your NF4V

3. When prompted for your wireless security settings, enter the Wireless security key configured on the NF4V.
4. Wait approximately 30 seconds for the connection to establish.
5. Open your Web browser, and enter <http://192.168.20.1> into the address bar and press Enter.
6. Follow the steps to set up your NF4V.

Web Based Configuration Interface

First-time Setup Wizard

Please follow the steps below to configure your NF4V Wireless router via the web based configuration wizard.

Open your web browser (e.g. Internet Explorer/Firefox/Safari) and type <http://192.168.20.1/> into the address bar at the top of the window.

At the login screen, type **admin** in the username and password field, then click the **Login** button.



Note: **admin** is the default username and password for the unit.

1. Click on **Basic Setup** on the left side of the screen. The wizard assists you in configuring the router and entering the information required to setup your Internet connection.
2. Select either **VDSL** or **ADSL** depending on your connection type and click **Next**.

Basic > Quick Setup > Internet Setup (Select one DSL mode)

This Wizard is designed to walk you through the basic information needed to set up your device
To continue, please select your WAN connection type.

- ADSL
 VDSL

Next

ADSL:

3. Select either **PPP over Ethernet (PPPoE)** or **PPP over ATM (PPPoA)** depending on your Internet Service Provider's requirements. Click **Next**.

Basic > Quick Setup > Wan Setup (Select one WAN mode)

Select the WAN mode for your internet connection as specified by your Internet Service Provider(ISP).

- PPP Over Ethernet(PPPoE)
 PPP Over ATM(PPPoA)

Back Next

4. In the Username and Password fields, enter the username and password supplied to you by your Internet Service Provider (ISP). If required by your ISP, you may also adjust the VPI and VCI figures here. Click the **Finish** button when you have entered the required information.

Basic > Quick Setup > ADSL only > PPPoE Information

You can configure your PPP over Ethernet(PPPoE) settings include:User ID,Password,VPI and VCI as supplied by your Internet Service Provider(ISP).

Protocol:	PPPoE
User ID:	<input type="text"/>
Password:	<input type="text"/>
VPI:	<input type="text" value="8"/>
VCI:	<input type="text" value="35"/>

VDSL:

5. In the **User ID** and **Password** fields, enter the username and password assigned to you by your Internet Service Provider (ISP).

Basic > Quick Setup > VDSL only > PPPoE Information

You can configure your PPP over Ethernet(PPPoE) settings include:User ID,Password,VPI and VCI as supplied by your Internet Service Provider(ISP).

User ID:	<input type="text"/>
Password:	<input type="text"/>

6. Click the **Finish** button when you have entered the required details.

Device Info

Summary

When you log in to the router, the Device Info Summary page is displayed, giving a general overview of the status of the router and the WAN connection.

Device Info

Manufacturer:	NetComm Wireless
Product Class:	NF4V
Serial Number:	001fa492b79a
Build Timestamp:	201309122011
Software Version:	GURNV5.OT132A-8-NC.AU-R5B014.EN
Bootloader (CFE) Version:	1.0.38-114.170
DSL PHY and Driver Version:	A2pv6F039d.d24l
Wireless Driver Version:	6.30.163.23.cpe4.12L
Voice Service Version:	V2.4
Uptime:	0D 0H 12M 11S

This information reflects the current status of your WAN connection.

Line Rate - Upstream (Kbps):	0
Line Rate - Downstream (Kbps):	0
LAN IPv4 Address:	192.168.20.1
Default Gateway:	
Primary DNS Server:	0.0.0.0
Secondary DNS Server:	0.0.0.0
LAN IPv6 Address:	
Default IPv6 Gateway:	
Date/Time:	Sat Nov 19 00:12:02 2011

ITEM	DEFINITION
Manufacturer	Indicates that NetComm Wireless is the manufacturer of this product.
Product Class	The model of the product.
Serial Number	The unique set of numbers assigned to the routers for identification purposes.
Build Timestamp	The date and time that the software running on the router was published.
Software Version	The current firmware version installed on the router.
Boot Loader (CFE) Version	The current boot loader installed on the router.
DSL PHY and Driver Version	The current line driver installed on the router.
Wireless Driver Version	The current wireless driver installed on the router.
Voice Service Version	The version of the software running the voice module.
Uptime	The number of days, hours and minutes that the router has been running.
Line Rate – Upstream (Kbps)	The current upstream speed of the DSL connection in Kbps.
Line Rate – Downstream (Kbps)	The current upstream speed of the DSL connection in Kbps.
LAN IPv4 Address	The current version 4 IP address assigned to the router.
Default Gateway	The current default gateway of the WAN interface.
Primary DNS Server	The current primary DNS server in use
Secondary DNS Server	The current secondary DNS server is use.
LAN IPv6 Address	The current IPv6 IP address in use if assigned.
Default IPv6 Gateway	The current IPv6 default gateway if assigned.
Date/Time	The current date and time set on the router.

WAN

The WAN page shows more detailed information related to the WAN interface configuration, including the firewall status, IPv4 and IPv6 addresses of the router.

WAN Info

Interface	Description	Type	VLAN Mux ID	IGMP	NAT	Firewall	IPv4 Status	IPv6 Status	IPv4 Address	IPv6 Address
eth4.1	ipoe_eth4.10	IPoE	10	Disabled	Enabled	Enabled	Unconfigured	Unconfigured	0.0.0.0	

ITEM	DEFINITION
Interface	The Interface of the WAN connection.
Description	The description of the WAN connection.
Type	The type of WAN connection.
VLAN Mux ID	Details the status of VLAN Mux ID if used.
IGMP	Details the status of IGMP on each WAN connection. IGMP is only used with IP v4 connections.
NAT	The NAT status of the WAN connection.
Firewall	The status of the router firewall across the WAN connection.
IPv4 Status	The status of the IPv4 WAN connection.
IPv6 Status	The status of the IPv6 WAN connection.
IPv4 Address	The current IP v4 address of the WAN connection.
IPv6 Address	The current IP v6 address of the WAN connection.

Statistics

LAN

The Statistics – LAN page shows detailed information about the number of bytes, packets, errors and dropped packets on each LAN interface in both directions of communication.

Statistics -- LAN

Interface	Received				Transmitted			
	Bytes	Packets	Errors	Drops	Bytes	Packets	Errors	Drops
eth0	0	11249	0	0	0	6497	0	0
eth1	0	0	0	0	0	0	0	0
eth2	0	0	0	0	0	0	0	0
eth3	0	0	0	0	0	0	0	0
wl0	0	0	0	0	0	0	0	0

[Reset Statistics](#)

INTERFACE	DESCRIPTION	
Received/Transmitted	Bytes	Rx/Tx (receive/transmit) packets in bytes.
	Packets	Rx/Tx (receive/transmit) packets.
	Errors	Rx/Tx (receive/transmit) packets with errors.
	Drops	Rx/Tx (receive/transmit) packets with drops.

Statistics – WAN Service

The Statistics – WAN Service page shows detailed information about the number of bytes, packets, errors and dropped packets on the WAN interface in both directions of communication.

Statistics -- WAN

Interface	Description	Received				Transmitted			
		Bytes	Packets	Errors	Drops	Bytes	Packets	Errors	Drops
eth4.1	ipoe_eth4.10	0	0	0	0	0	0	0	0

[Reset Statistics](#)

INTERFACE	DESCRIPTION	
Received/Transmitted	Bytes	Rx/Tx (receive/transmit) packets in bytes.
	Packets	Rx/Tx (receive/transmit) packets.
	Errors	Rx/Tx (receive/transmit) packets with errors.
	Drops	Rx/Tx (receive/transmit) packets with drops.

Statistics – xTM

The Statistics – xTM page shows details related to the xTM interface of the router.

Interface Statistics

Port Number	In Octets	Out Octets	In Packets	Out Packets	In OAM Cells	Out OAM Cells	In ASM Cells	Out ASM Cells	In Packet Errors	In Cell Errors
-------------	-----------	------------	------------	-------------	--------------	---------------	--------------	---------------	------------------	----------------

Reset

INTERFACE	DESCRIPTION
Port Number	The port number used by the xTM interface.
In Octets	The number of data packets in octets received over the ATM interface.
Out Octets	The number of data packets in octets transmitted over the ATM interface.
In Packets	The number of data packets received over the ATM interface.
Out Packets	The number of data packets transmitted over the ATM interface.
In OAM Cells	Operation, Administration, and Maintenance (OAM) Cell is the ATM Forum specification for cells used to monitor virtual circuits.
Out OAM Cells	Operation, Administration, and Maintenance (OAM) Cell is the ATM Forum specification for cells used to monitor virtual circuits.
In ASM Cells	The number of Any Source Multicast (ASM) cells received over the interface.
Out ASM Cells	The number of Any Source Multicast (ASM) cells transmitted over the interface.
In Packets Errors	The number of packets with errors detected over the xTM interface.
In Cell Errors	The number of cells with errors detected over the xTM interface.

Statistics – xDSL

The Statistics – xDSL page shows details related to the DSL interface of the router.

Statistics – xDSL

Synchronized Time:		
Number of Synchronizations:	0	
Mode:		
Traffic Type:		
Status:	Disabled	
Link Power State:	L3	
	Downstream	Upstream
Line Coding (Trellis):		
SNR Margin (0.1 dB):		
Attenuation (0.1 dB):		
Output Power (0.1 dBm):		
Attainable Rate (Kbps):		
Rate (Kbps):		
Super Frames:		
Super Frame Errors:		
RS Words:		
RS Correctable Errors:		
RS Uncorrectable Errors:		
HEC Errors:		
OCD Errors:		
LCD Errors:		
Total Cells:		
Data Cells:		
Bit Errors:		
Total ES:		
Total SES:		
Total UAS:		

xDSL BER Test

Reset Statistics

Route

The Route page displays any routes that the router has detected.

Device Info -- Route

Flags: U - up, ! - reject, G - gateway, H - host, R - reinstate

D - dynamic (redirect), M - modified (redirect).

Destination	Gateway	Subnet Mask	Flag	Metric	Service	Interface
192.168.20.0	0.0.0.0	255.255.255.0	U	0		br0

ARP

Click ARP to display the ARP information.

This option can be used to determine which IP address / MAC address is assigned to a particular host. This can be useful when setting up URL filtering, Time of Day filtering or Static DHCP addressing.

Device Info -- ARP

IP address	Flags	HW Address	Device
192.168.20.2	Complete	00:21:9b:1a:89:ee	br0

DHCP

Click DHCP to display the DHCP information.

Device Info -- DHCP Leases

Hostname	MAC Address	IP Address	Expires In
pdg26	00:21:9b:1a:89:ee	192.168.20.2	23 hours, 50 minutes, 44 seconds

You can use this to determine when a specific DHCP lease will expire, or to assist you with setting up Static DHCP addressing.

Advanced Setup

Layer2 Interface

ATM Interface

The ATM (Asynchronous Transfer Mode) interface page shows the settings of all available DSL ATM interfaces.

DSL ATM Interface Configuration

Choose Add, or Remove to configure DSL ATM interfaces.

Interface	VPI	VCI	DSL Latency	Category	Peak Cell Rate(cells/s)	Sustainable Cell Rate(cells/s)	Max Burst Size(bytes)	Min Cell Rate(cells/s)	Link Type	Connection Mode	IP QoS	MPAAL Prec/Alg/Wght	Remove
-----------	-----	-----	-------------	----------	-------------------------	--------------------------------	-----------------------	------------------------	-----------	-----------------	--------	---------------------	--------

FIELD	DESCRIPTION
Interface	This field shows the interface name.
VPI	This field shows the Virtual Path Identifier (VPI) value. For most Australia connections the VPI is 8, for most new Zealand connections the VPI is 0.
VCI	This field shows the Virtual Channel Identifier (VCI) value. For most Australia connections the VCI is 35, for most new Zealand connections the VCI is 100.
DSL Latency	The value of the DSL Latency.
Category	This field shows the ATM service classes.
Peak Cell Rate (cell/s)	The maximum number of cells that may be transferred per second over the ATM interface.
Sustainable Cell Rate (cell/s)	An average, long-term cell transfer rate on the ATM interface.
Max Burst Size (bytes)	The maximum allowable burst size of cells that can be transmitted contiguously on the ATM interface.
Min Cell Rate (cell/s)	The minimum allowable rate at which cells may be transferred on the ATM interface.
Link Type	This field shows the type of link in use.
Connection Mode	This field shows the selected mode of connection.
IP QoS	This field shows the status of the Quality of Service (QoS) function.
MPAAL Prec/Alg/Wght	This displays data related to load balancing.
Remove	Select this field to remove the ATM configuration.

To add an ATM interface, click the **Add** button. Enter the details as required by your Internet Service Provider and click the **Apply/Save** button.

ATM PVC Configuration

This screen allows you to configure a ATM PVC.

VPI: [0-255]

VCI: [32-65535]

Select DSL Latency

Path0 (Fast)

Path1 (Interleaved)

Select DSL Link Type (EoA is for PPPoE, IPoE, and Bridge.)

EoA

PPPoA

IPoA

Encapsulation Mode:

Service Category:

Minimum Cell Rate: [cells/s] (-1 indicates no shaping)

Select Scheduler for Queues of Equal Precedence as the Default Queue

Weighted Round Robin

Weighted Fair Queuing

Default Queue Weight: [1-63]

Default Queue Precedences: [1-8] (lower value, higher priority)

VC WRR Weight: [1-63]

VC Precedence: [1-8] (lower value, higher priority)

Note: VC scheduling will be SP among unequal precedence VC's and WRR among equal precedence VC's.

For single queue VC, the default queue precedence and weight will be used for arbitration.

For multi-queue VC, its VC precedence and weight will be used for arbitration.

PTM Interface

The router can also establish DSL connections using PTM (Packet Transfer Mode). This page shows you an overview of the PTM interfaces and allows you to add or remove them.

DSL PTM Interface Configuration
Choose Add, or Remove to configure DSL PTM interfaces.

Interface	DSL Latency	PTM Priority	Connection Mode	IP QoS	Remove
<div style="display: flex; justify-content: center; gap: 20px;"> Add Remove </div>					

Click the **Add** button to create a new PTM interface. Enter the details as required by your Internet Service Provider and click the **Apply/Save** button.

PTM Configuration

This screen allows you to configure a PTM flow.

Select DSL Latency

- Path0 (Fast)
 Path1 (Interleaved)

Select Scheduler for Queues of Equal Precedence as the Default Queue

- Weighted Round Robin
 Weighted Fair Queuing

Default Queue Weight: [1-63]

Default Queue Precedence: [1-8] (lower value, higher priority)

Default Queue Shaping Rate: [Kbits/s] (blank indicates no shaping)

Default Queue Shaping Burst Size: [bytes] (shall be >=1600)

ETH Interface

The ETH interface page allows you to add or remove ETH WAN interfaces.

ETH WAN Interface Configuration
Choose Add, or Remove to configure ETH WAN interfaces.
Allow one ETH as layer 2 wan interface.

Name	Connection Mode	Remove
eth4/eth4	VlanMuxMode	<input type="checkbox"/>

WAN Service

The WAN Service page displays the current Wide Area Network service setup and allows you to configure the router to connect to a larger network for Internet access.

Wide Area Network (WAN) Service Setup

Choose Add, Remove or Edit to configure a WAN service over a selected interface.

Interface	Description	Type	VLAN 802.1p	VLAN Mux ID	IGMP	NAT	Firewall	IPv4	IPv6	MLD	Remove	Edit	Action
eth4.1	ipoe_eth4.10	IPoE	0	10	Disabled	Enabled	Enabled	Enabled	Disabled	Disabled	<input type="checkbox"/>	<input type="button" value="edit"/>	

To add a WAN service, click the **Add** button. Use the drop down list to select the layer 2 interface to use for the WAN service and click the **Next** button.

WAN Service Interface Configuration

Select a layer 2 interface for this service

Note: For ATM interface, the descriptor string is (portId_vpi_vci)
 For PTM interface, the descriptor string is (portId_high_low)
 Where portId=0 --> DSL Latency PATH0
 portId=1 --> DSL Latency PATH1
 portId=4 --> DSL Latency PATH08.1
 low =0 --> Low PTM Priority not set
 low =1 --> Low PTM Priority set
 high =0 --> High PTM Priority not set
 high =1 --> High PTM Priority set

eth4/eth4

Select a WAN service type, enter a **Service Description**, enter the **802.1P Priority** and **802.1 VLAN ID** then click the **Next** button.

WAN Service Configuration

Select WAN service type:

- PPP over Ethernet (PPPoE)
- IP over Ethernet
- Bridging

Enter Service Description:

For tagged service, enter valid 802.1P Priority and 802.1Q VLAN ID.
 For untagged service, set -1 to both 802.1P Priority and 802.1Q VLAN ID.

Enter 802.1P Priority [0-7]:

Enter 802.1Q VLAN ID [0-4094]:

PPP over Ethernet

Enter the details as required by your Internet Service Provider and click the **Next** button.

PPP Username and Password

PPP usually requires that you have a user name and password to establish your connection. In the boxes below, enter the user name and password that your ISP has provided to you.

PPP Username:

PPP Password:

PPPoE Service Name:

Authentication Method:

MTU[576-1492]:

- Config KeepAlive
- Enable Fullcone NAT
- Dial on demand (with idle timeout timer)
- Enable IPv4 for this service
- PPP IP extension
- Use Static IPv4 Address
- Enable IPv6 for this service
- Enable PPP Debug Mode
- Bridge PPPoE Frames Between WAN and Local Ports

Multicast Proxy

- Enable IGMP Multicast Proxy

IP over Ethernet

Enter the details as required by your Internet Service Provider and click the **Next** button.

WAN IP Settings

Enter information provided to you by your ISP to configure the WAN IP settings.
 Notice: If "Obtain an IP address automatically" is chosen, DHCP will be enabled for PVC in IPoE mode.
 If "Use the following Static IPv4/IPv6 address" is chosen, enter the WAN IPv4/IPv6 address, subnet mask/prefix Length and interface gateway.

Enable IPv4 for this service

Obtain an IP address automatically
 Use the following Static IP address

Option 55 Request List : (e.g:1,3,6,12)

Option 58 Renewal Time: (hour)

Option 59 Rebinding Time: (hour)

Option 60 Vendor ID:

Option 61 IAID: (8 hexadecimal digits)

Option 61 DUID: (hexadecimal digit)

Option 125:

Disable Enable

Enable IPv6 for this service

Select the NAT Translation settings as desired and click the **Next** button.

Network Address Translation Settings

Network Address Translation (NAT) allows you to share one Wide Area Network (WAN) IP address for multiple computers on your Local Area Network (LAN).

- Enable NAT
- Enable Fullcone NAT
- Enable Firewall

Multicast Proxy

- Enable IGMP Multicast

Bridging

When you select bridging mode, a summary of the settings is displayed. Click **Apply/Save** to commit the settings.

WAN Setup - Summary

Make sure that the settings below match the settings provided by your ISP.

Connection Type:	Bridge
NAT:	Enabled
Full Cone NAT:	Disabled
Firewall:	Enabled
IGMP Multicast:	Disabled
Quality Of Service:	Disabled

Click "Apply/Save" to have this interface to be effective. Click "Back" to make any modifications.

Use the arrow buttons to move the interfaces required to the list on the left. Click **Next**.

Routing -- Default Gateway

Default gateway interface list can have multiple WAN interfaces served as system default gateways but only one will be used according to the priority with the first being the highest and the last one the lowest priority if the WAN interface is connected. Priority order can be changed by removing all and adding them back in again.

Selected Default Gateway Interfaces

eth4.1

->

<-

Available Routed WAN Interfaces

ppp0.2

Back

Next

Use the arrow buttons to move the interfaces required as DNS Server interfaces to the left. The interface highest on the list has the highest priority as a DNS server. Click **Next** to continue.

DNS Server Configuration

Select DNS Server Interface from available WAN interfaces OR enter static DNS server IP addresses for the system. In ATM mode, if only a single PVC with IPoA or static IPoE protocol is configured, Static DNS server IP addresses must be entered.

DNS Server Interfaces can have multiple WAN interfaces served as system dns servers but only one will be used according to the priority with the first being the highest and the last one the lowest priority if the WAN interface is connected. Priority order can be changed by removing all and adding them back in again.

Select DNS Server Interface from available WAN interfaces:

Selected DNS Server Interfaces

eth4.1

->

<-

Available WAN Interfaces

ppp0.2

Back

Next

A summary of your settings is displayed. Click **Apply/Save** to commit your settings to the router.

WAN Setup - Summary

Make sure that the settings below match the settings provided by your ISP.

Connection Type:	PPPoE
NAT:	Enabled
Full Cone NAT:	Disabled
Firewall:	Enabled
IGMP Multicast:	Disabled
Quality Of Service:	Disabled

Click "Apply/Save" to have this interface to be effective. Click "Back" to make any modifications.

Back

Apply/Save

LAN

IPv6 Autoconfig

The IPv6 LAN Auto Configuration page allows you to configure settings pertaining to the IPv6 DHCP server.

IPv6 LAN Auto Configuration

Note:

1: Stateful DHCPv6 is supported based on the assumption of prefix length less than 64. Interface ID does NOT support ZERO COMPRESSION ":", Please enter the complete information. For example: Please enter "0:0:0:2" instead of "1:2".

2: Unique local address must start with "fd". The prefix and the address must be in same network and the prefix length must be 64.

Enable Unique Local Addresses And Prefix Advertisement

Randomly Generate

Statically Configure

Address: (e.g: fd80::1/64)

Prefix: (e.g: fd80::/64)

Preferred Life Time (hour):

Valid Life Time (hour):

IPv6 LAN Applications

Enable DHCPv6 Server and RADVD

Stateless

Stateful

Start interface ID: 0:0:0:2

End interface ID: 0:0:0:254

Leased Time (hour): 24

Enable MLD Snooping

Standard Mode

Blocking Mode

OPTION	DEFINITION
Enable Unique Local Addresses and Prefix Advertisement	Enable the use of unique local addresses. The router will advertise the IPv6 prefix to new devices on the network.
Randomly Generate	Randomly generates the unique local addresses and the prefix.
Statically Configure	Enter a static IPv6 address for the router if one has been assigned to you by your Internet Service Provider.
IPv6 LAN Applications	Enable IPv6 DHCP server
Enable DHCPv6 Server and RADVD	The Router Advertisement Daemon (radvd) is an open-source software product that implements link-local advertisements of IPv6 router addresses and IPv6 routing prefixes using the Neighbor Discovery Protocol (NDP) as specified in RFC 2461. The Router Advertisement Daemon is used by system administrators in stateless auto-configuration methods of network hosts on Internet Protocol version 6 networks. When IPv6 hosts configure their network interfaces, they broadcast router solicitation (RS) requests onto the network to discover available routers. The radvd software answers requests with router advertisement (RA) messages. In addition, radvd periodically broadcasts RA packets to the attached link to update network hosts. The router advertisement messages contain the routing prefix used on the link, the link maximum transmission unit (MTU), and the address of the responsible default router.
Stateless	IPv6 hosts can configure themselves automatically when connected to a routed IPv6 network using Internet Control Message Protocol version 6 (ICMPv6) router discovery messages. This type of configuration is suitable for small organizations and individuals. It allows each host to determine its address from the contents of received user advertisements. It makes use of the IEEE EUI-64 standard to define the network ID portion of the address.
Stateful	This configuration requires some human intervention as it makes use of the Dynamic Host Configuration Protocol for IPv6 (DHCPv6) for installation and administration of nodes over a network. The DHCPv6 server maintains a list of nodes and the information about their state to know the availability of each IP address from the range specified by the network administrator.
Enable MLD Snooping	Select whether to enable or disable MLD Snooping on the router. The Multicast Listener Discovery (MLD) snooping function constrains the flooding of IPv6 multicast traffic on VLANs on the router.

NAT

Virtual Servers

A virtual server allows you to direct incoming traffic from the WAN side to the Internal server with a private IP address on the LAN side.

NAT -- Virtual Servers Setup

Virtual Server allows you to direct incoming traffic from WAN side (identified by Protocol and External port) to the Internal server with private IP address on the LAN side. The Internal port is required only if the external port needs to be converted to a different port number used by the server on the LAN side. A maximum 32 entries can be configured.

Server Name	External Port Start	External Port End	Protocol	Internal Port Start	Internal Port End	Server IP Address or Hostname	WAN Interface	LAN Loopback	Enable/Disable	Remove
-------------	---------------------	-------------------	----------	---------------------	-------------------	-------------------------------	---------------	--------------	----------------	--------

Click the **Add** button to add a virtual server.

NAT -- Virtual Servers

Select the service name, and enter the server IP address or hostname, and click "Apply/Save" to forward IP packets for this service to the specified server.

NOTE: The "Internal Port End" cannot be modified directly. Normally, it is set to the same value as "External Port End". However, if you modify "Internal Port Start", then "Internal Port End" will be set to the same value as "Internal Port Start".

Remaining number of entries that can be configured: 32

Use Interface:

Service Name:

Select a Service:

Custom Service:

Enable LAN Loopback

Server IP Address or Hostname:

Status:

External Port Start	External Port End	Protocol	Internal Port Start	Internal Port End
		TCP		
		TCP		
		TCP		
		TCP		
		TCP		
		TCP		
		TCP		
		TCP		
		TCP		
		TCP		
		TCP		
		TCP		
		TCP		
		TCP		
		TCP		

FIELD	DESCRIPTION
Select a Service or custom Server	Select a pre-configured port forwarding rule or choose custom server to create your own port forwarding rule.
Server IP Address	Enter the IP address of the local server.
External Port Start	Enter the starting external port number (when custom server is selected). When a service is connected this field will be completed automatically.
External Port End	Enter the ending external port number (when custom server is selected). When a service is connected this field will be completed automatically.
Protocol	Options include TCP, UDP or TCP/UDP.
Internal Port Start	Enter the starting internal port number (when custom server is selected). When a service is connected this field will be completed automatically.
Internal Port End	Enter the ending internal port number (when custom server is selected). When a service is connected this field will be completed automatically.

Click **Save/Apply** to save your settings when you have finished creating virtual servers.

Port Triggering

Some applications require specific ports in the Router's firewall to be open for access by remote parties. Port Triggering opens up the 'Open Ports' in the firewall when an application on the LAN initiates a TCP/UDP connection to a remote party using the 'Triggering Ports'.

The Router allows the remote party from the WAN side to establish new connections back to the application on the LAN side using the 'Open Ports'. A maximum 32 entries can be configured.

NAT -- Port Triggering Setup

Some applications require that specific ports in the Router's firewall be opened for access by the remote parties. Port Trigger dynamically opens up the 'Open Ports' in the firewall when an application on the LAN initiates a TCP/UDP connection to a remote party using the 'Triggering Ports'. The Router allows the remote party from the WAN side to establish new connections back to the application on the LAN side using the 'Open Ports'. A maximum 32 entries can be configured.

Application Name	Trigger				Open			WAN Interface	Remove
	Protocol	Port Range		Protocol	Port Range				
		Start	End		Start	End			

To add a Trigger Port, press the **Add** button.

NAT -- Port Triggering

Some applications such as games, video conferencing, remote access applications and others require that specific ports in the Router's firewall be opened for access by the applications. You can configure the port settings from this screen by selecting an existing application or creating your own (Custom application) and click "Save/Apply" to add it.

Remaining number of entries that can be configured: 32

Use Interface:

Application Name:

Select an application:

Custom application:

Trigger Port Start	Trigger Port End	Trigger Protocol	Open Port Start	Open Port End	Open Protocol
		TCP			TCP
		TCP			TCP
		TCP			TCP
		TCP			TCP
		TCP			TCP
		TCP			TCP
		TCP			TCP
		TCP			TCP
		TCP			TCP

FIELD	DESCRIPTION
Select an Application or Custom Application	A user can select a pre-configured application from the list or select the Custom Application option to create custom application settings.
Trigger Port Start	Enter the starting trigger port number (when you select Custom Application). When an application is selected the port range values are automatically entered.
Trigger Port End	Enter the ending trigger port number (when you select Custom Application). When an application is selected the port range values are automatically entered.
Trigger Protocol	Options include TCP, UDP or TCP/UDP.
Open Port Start	Enter the starting open port number (when you select Custom Application). When an application is selected the port range values are automatically entered.
Open Port End	Enter the ending open port number (when you select Custom Application). When an application is selected the port range values are automatically entered.
Open Protocol	Options include TCP, UDP or TCP/UDP.

DMZ Host

The NF4V will forward IP packets from the Wide Area Network (WAN) that do not belong to any of the applications configured in the Virtual Servers table to the DMZ host computer.

Enter the computer's IP address and click **Apply** to activate the DMZ host. To deactivate the DMZ Host function clear the IP address field and press the Save/Apply button.

NAT -- DMZ Host

The Broadband Router will forward IP packets from the WAN that do not belong to any of the applications configured in the Virtual Servers table to the DMZ host computer.

Enter the computer's IP address and click 'Apply' to activate the DMZ host.

Clear the IP address field and click 'Apply' to deactivate the DMZ host.

DMZ Host IP Address:

Enable LAN Loopback

ALG

The Application Layer Gateway (ALG) is a feature which enables the router to parse application layer packets and support address and port translation for certain protocols. We recommend that you leave these protocols enabled unless you have a specific reason for disabling them.

ALG

Select the ALG below.

- Enable FTP
- Enable SIP
- Enable TFTP
- Enable H323
- Enable IRC
- Enable PT
- Enable PPTP
- Enable IPSEC
- Enable RTSP

Multi Nat

The Multi NAT page allows you to configure your own custom NAT rules.

MultiNat table--Support customer'defined NAT rule, contain One2One, One2Many, Many2One, Many2Many mode.

mode	Internal Address Start	Internal Address End	External Address Start	External Address End	remove

To add a new rule, click the **Add** button and enter the details of the rule as required.

NAT -- Multi NAT

Rule Type:

Use interfaces:

Internal Address Start	Internal Address End	External Address Start	External Address End

1. Select the type of NAT to use from the Rule Type drop down menu.
2. Select the interface to which the NAT rule should apply.
3. Enter the appropriate Internal Address Start and Internal Address End
4. Enter the appropriate External Address Start and External Address End

Click **Save/Apply** to save the new Multi NAT configuration settings.

Security

Firewall

The NF4V has a firewall function which helps to keep you secure while allowing you to configure rules allowing certain types of data through.

Firewall Table																
Name	Interface	Type	Action	Bytes	Packets											
Firewall's Rule Table																
Enabled	IP Version	Packet Length	DSCP/TC	Protocol	Action	Reject Type	ICMP Type	TCP Flags	Source IP Address	Source Mask/Prefix Length	Source Port Range	Destination IP Address	Destination Mask/Prefix Length	Destination Port Range	Bytes	Packets
<input type="button" value="Add Firewall"/> <input type="button" value="Add Rule"/> <input type="button" value="Modify Firewall"/> <input type="button" value="Modify Rule"/> <input type="button" value="Cancel"/> <input type="button" value="Remove Firewall"/> <input type="button" value="Remove Rule"/>																

To use the firewall feature, begin by clicking the **Add Firewall** button to create a firewall. Then click the **Add Rule** button to create a rule for the firewall. Enter the rules that you require for the firewall and then click the **Save&Apply** button to commit the settings.

Enabled	<input type="checkbox"/>	PacketLength(FROM:TO)	<input type="text"/>	TC(0~255)	<input type="text"/>	DSCP	<input type="text"/>
IP Version	4	Action	Permit	RejectType	<input type="text"/>	IcmpType	<input type="text"/>
Protocol	<input type="text"/>	TCP Flags	<input type="checkbox"/> SYN <input type="checkbox"/> ACK <input type="checkbox"/> FIN <input type="checkbox"/> RST <input type="checkbox"/> URG <input type="checkbox"/> PSH	origStartPort	<input type="text"/>	origEndPort	<input type="text"/>
origIPAddress:	<input type="text"/>	origMask/prefixLength	<input type="text"/>	destStartPort	<input type="text"/>	destEndPort	<input type="text"/>
destIPAddress:	<input type="text"/>	destMask/prefixLength	<input type="text"/>				

MAC Filtering

The NF4V offers the ability to use MAC Address filtering on ATM PVCs. You can elect to block or allow connections based on MAC Address criteria. The default policy is to allow connections which match the criteria.

MAC Filtering Setup

MAC Filtering is only effective on ATM PVCs configured in Bridge mode. **FORWARDED** means that all MAC layer frames will be **FORWARDED** except those matching with any of the specified rules in the following table. **BLOCKED** means that all MAC layer frames will be **BLOCKED** except those matching with any of the specified rules in the following table.

MAC Filtering Policy For Each Interface (maximum 32 entries):
WARNING: Changing from one policy to another of an interface will cause all defined rules for that interface to be REMOVED AUTOMATICALLY! You will need to create new rules for the new policy.

Interface	Policy	Change
-----------	--------	--------

Choose Add or Remove to configure MAC filtering rules.

Interface	Protocol	Destination MAC	Source MAC	Frame Direction	802.1p Priority	VLAN ID	Remove

Click **Add** to enter a new MAC Address filter.

Add MAC Filter

Create a filter to identify the MAC layer frames by specifying at least one condition below. If multiple conditions are specified, all of them take effect. Click 'Apply' to save and activate the filter.

Protocol Type:	<input type="text"/>
Destination MAC Address:	<input type="text"/>
Source MAC Address:	<input type="text"/>
Frame Direction:	LAN<=>WAN
802.1p Priority:	<input type="text"/>
Tag VLAN ID [0-4094]:	<input type="text"/>

WAN Interfaces (Configured in Bridge mode only)

1. Enter the Protocol type to apply the filter to
2. Enter the Source and Destination MAC Address
3. Enter the direction of the traffic to filter
4. Select the WAN interface to apply to the filter to.

Click **Apply/Save** to save the new MAC filtering configuration.

Parental Control

The Parental Control feature allows you to take advanced measures to ensure the computers connected to the LAN are used only when and how you decide.

Time Restriction

This Parental Control function allows you to restrict access from a Local Area Network (LAN) connected device to an outside network through the router on selected days and at certain times. Make sure to activate the Internet Time server synchronization as described in the SNTP section, so that the scheduled times match your local time.

Access Time Restriction -- A maximum 16 entries can be configured.

Rule Name	MAC	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Start	Stop	Remove
<div style="display: flex; justify-content: center; gap: 10px;"> Add Remove </div>											

Figure 1: Advanced - Parental Control – Time Restriction

To add a time restriction rule, press the **Add** button. The following screen appears.

Access Time Restriction

This page adds time of day restriction to a special LAN device connected to the Router. The 'Browser's MAC Address' automatically displays the MAC address of the LAN device where the browser is running. To restrict other LAN device, click the 'Other MAC Address' button and enter the MAC address of the other LAN device. To find out the MAC address of a Windows based PC, go to command window and type 'ipconfig /all'.

Rule Name

Browser's MAC Address

Other MAC Address

(xx:xx:xx:xx:xx:xx)

Days of the week

Click to select	Mon	Tue	Wed	Thu	Fri	Sat	Sun
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Start Blocking Time (hh:mm)

End Blocking Time (hh:mm)

Apply/Save

Figure 2: Advanced - Parental Control - Add Time Restriction

See the instructions below. Press the **Apply/Save** button to save a time restriction rule.

FIELD	DESCRIPTION
Rule Name	A user defined name for the time restriction rule.
Browser's MAC Address	The MAC address of the network card of the computer running the browser.
Other MAC Address	The MAC address of a second LAN device or network card.
Days of the Week	The days of the week for which the rules apply.
Start Blocking Time	The time of day when the restriction starts.
End blocking time	The time of day when the restriction ends.

Table 2: Advanced - Parental Control - Add Time Restriction Settings

URL Filter

With the URL filter, you are able to add certain websites or URLs to a safe or blocked list. This will provide you added security to ensure any website you deem unsuitable will not be able to be seen by anyone who is accessing the Internet via the NF4V.

Select the 'To block' or 'To allow' option and then click Add to enter the URL you wish to add to the URL Filter list.

URL Filter -- Please select the list type first then configure the list entries.
Maximum 100 entries can be configured.

URL List Type: Black List White List

Address	Port	Remove

Figure 3: Advanced - Parental Control - URL Filter

Once you have chosen to add a URL to the list you will be prompted to enter the address. Simply type it in and select the **Apply/Save** button.

Parental Control -- URL Filter Add

Enter the URL address and port number then click 'Apply/Save' to add the entry to the URL filter.

URL Address:

Port Number: (Default 80 will be applied if leave blank.)

Figure 4: Advanced - Parental Control - Add URL Filter

Quality of Service

Quality of Service offers a defined level of performance in a data communications system - for example the ability to guarantee that video traffic is given priority over other network traffic to ensure that video streaming is not disrupted by other network traffic. This means that if you are streaming video and someone else in the house starts downloading a large file, the download won't disrupt the flow of video traffic.

QoS -- Queue Management Configuration

If Enable QoS checkbox is selected, choose a default DSCP mark to automatically mark incoming traffic without reference to a particular classifier. Click 'Apply/Save' button to save it.

Note: If Enable QoS checkbox is not selected, all QoS will be disabled for all interfaces.

Note: The default DSCP mark is used to mark all egress packets that do not match any classification rules.

Enable QoS

Figure 5: Advanced - Enable QoS

To enable QoS select the **Enable QoS** checkbox, and set the **Default DSCP (Differentiated Services Code Point) Mark**. Then press the **Apply/Save** button.

QoS Queue

QoS Queue Setup

In ATM mode, maximum 16 queues can be configured.
 In PTM mode, maximum 8 queues can be configured.
 For each Ethernet interface, maximum 3 queues can be configured.
 To add a queue, click the **Add** button.
 To remove queues, check their remove-checkboxes, then click the **Remove** button.
 The **Enable** button will scan through every queues in the table. Queues with enable-checkbox checked will be enabled. Queues with enable-checkbox un-checked will be disabled.
 The enable-checkbox also shows status of the queue after page reload.
 If you disable WMM function in Wireless Page, queues related to wireless will not take effects

The QoS function has been disabled. Queues would not take effects.

Name	Key	Interface	Qid	Prec/Alg/Wght	DSL Latency	PTM Priority	Min Bit Rate(bps)	Shaping Rate(bps)	Burst Size(bytes)	Enable	Remove
WMM Voice Priority	1	w/0	0	1/SP						Enabled	
WMM Voice Priority	2	w/0	0	2/SP						Enabled	
WMM Video Priority	3	w/0	0	3/SP						Enabled	
WMM Video Priority	4	w/0	0	4/SP						Enabled	
WMM Best Effort	5	w/0	0	5/SP						Enabled	
WMM Background	6	w/0	0	6/SP						Enabled	
WMM Background	7	w/0	0	7/SP						Enabled	
WMM Best Effort	8	w/0	0	8/SP						Enabled	

Figure 6: Advanced - QoS Queue Setup

Click the **Add** button to add a QoS Queue. The following screen is displayed.

QoS Queue Configuration

This screen allows you to configure a QoS queue and add it to a selected layer2 interface.

Name:

Enable:

Interface:

Figure 7: Advanced - QoS - Add QoS Queue

The above screen allows you to configure a QoS queue entry and assign it to a specific network interface. Each of the queues can be configured for a specific precedence. The queue entry configured here will be used by the classifier to place ingress packets appropriately.

NOTE: Precedence level 1 relates to higher priority while precedence level 3 relates to lower priority.

QoS Classification

QoS Classification Setup -- maximum 32 rules can be configured.

To add a rule, click the **Add** button.
 To remove rules, check their remove-checkboxes, then click the **Remove** button.
 The **Enable** button will scan through every rules in the table. Rules with enable-checkbox checked will be enabled. Rules with enable-checkbox un-checked will be disabled.
 The enable-checkbox also shows status of the rule after page reload.
 If you disable WMM function in Wireless Page, classification related to wireless will not take effects

Class Name	Order	Class Interface	CLASSIFICATION CRITERIA										CLASSIFICATION RESULTS					Enable	Remove			
			Ethernet Type	Source MAC/Mask	Destination MAC/Mask	Source IP/Prefix Length	Destination IP/Prefix Length	Protocol	Source Port	Destination Port	DSCP Check	TC Check	802.1P Check	Queue Key	DSCP Mark	TC Mark	802.1P Mark			Rate Limit(kbps)		
																				<input type="button" value="Add"/>	<input type="button" value="Enable"/>	<input type="button" value="Remove"/>

Figure 8: Advanced - QoS Classification Setup

Click the **Add** button to configure network traffic classes.

Add Network Traffic Class Rule

This screen creates a traffic class rule to classify the ingress traffic into a priority queue and optionally mark the DSCP or Ethernet priority of the packet. Click 'Apply/Save' to save and activate the rule.

Traffic Class Name:

Rule Order: ▾

Rule Status: ▾

Specify Classification Criteria (A blank criterion indicates it is not used for classification.)

Class Interface: ▾

Ether Type: ▾

Source MAC Address:

Source MAC Mask:

Destination MAC Address:

Destination MAC Mask:

Specify Classification Results (A blank value indicates no operation.)

Specify Class Queue (Required): ▾

- Packets classified into a queue that exit through an interface for which the queue is not specified to exist, will instead egress to the default queue on the interface.

Mark 802.1p priority: ▾

- Class non-vlan packets egress to a non-vlan interface will be tagged with VID 0 and the class rule p-bits.
 - Class vlan packets egress to a non-vlan interface will have the packet p-bits re-marked by the class rule p-bits. No additional vlan tag is added.
 - Class non-vlan packets egress to a vlan interface will be tagged with the interface VID and the class rule p-bits.
 - Class vlan packets egress to a vlan interface will be additionally tagged with the packet VID, and the class rule p-bits.

Set Rate Limit: [Kbits/s]

Figure 9: Advanced - Add QoS Network Traffic Classification

The above screen creates a traffic class rule to classify the upstream traffic, assign queuing priority and optionally overwrite the IP header TOS (type of service) byte. A rule consists of a class name and at least one condition. All of the specified conditions in this classification rule must be satisfied for the rule to take effect.

Click the **Apply/Save** button to save and activate the rule.

Routing

The Default Gateway, Static Route, Policy Routing and Dynamic Route settings can be found in the Routing option of the Advanced menu.

Default Gateway

Select your preferred WAN interface from the available options.

Routing -- Default Gateway

Default gateway interface list can have multiple WAN interfaces served as system default gateways but only one will be used according to the priority with the first being the highest and the last one the lowest priority if the WAN interface is connected. Priority order can be changed by removing all and adding them back in again.

Selected Default Gateway Interfaces: ▾

Available Routed WAN Interfaces: ▾

TODO: IPV6 ***** Select a preferred wan interface as the system default IPv6 gateway.

Selected WAN Interface: ▾

Figure 10: Advanced - Routing - Default Gateway

Static Route

The Static Route screen displays the configured static routes. Click the **Add** or **Remove** buttons to change settings.

Routing -- Static Route (A maximum 32 entries can be configured)

IP Version	DstIP/Mask	Gateway	Interface	Metric	Remove
<input type="button" value="Add"/> <input type="button" value="Remove"/>					

Figure 11: Advanced - Routing - Static Route

To add a static route rule click the **Add** button. The following screen is displayed.

Routing -- Static Route Add

Enter the destination network address, subnet mask, gateway AND/OR available WAN interface then click 'Apply/Save' to add the entry to the routing table.

IP Version:

Destination IP address/prefix length:

Interface:

Gateway IP Address:

(optional: metric number should be greater than or equal to zero)
Metric:

Figure 12: Advanced - Routing - Add Static Route

Enter the Destination Network Address, Subnet Mask, Gateway IP Address and/or WAN Interface. Then click Apply/Save to add the entry to the routing table.

Policy Routing

This function allows you to add policy rules to certain situations.

Policy Routing Setting -- A maximum 7 entries can be configured.

Policy Name	Source IP	LAN Port	WAN	Default GW	Remove
<input type="button" value="Add"/> <input type="button" value="Remove"/>					

Figure 13: Advanced - Routing - Policy Routing

Click the **Add** button to add a policy rule. The following screen is displayed.

Policy Routing Setup

Enter the policy name, policies, and WAN interface then click "Apply/Save" to add the entry to the policy routing table.
Note: If selected "IPoE" as WAN interface, default gateway must be configured.

Policy Name:

Physical LAN Port:

Source IP:

Use Interface:

Default Gateway:

Figure 14: Advanced - Routing - Add Policy Route

Enter the details into the provided fields. The table below describes each field.

FIELD	DESCRIPTION
Policy Name	A user defined name for the policy route.
Physical LAN Port	The LAN port to be used for the policy.
Source IP	The IP address of the LAN device involved with the policy.
Use Interface	Select the interface that the policy will employ.
Default Gateway	Enter the gateway address.

RIP (Routing Information Protocol)

To activate this option, select the Enabled checkbox.

To configure an individual interface, select the desired RIP version and operation, and select the Enabled checkbox for that interface. Click **Apply/Save** to save the configuration.

Routing -- RIP Configuration

NOTE: RIP CANNOT BE CONFIGURED on the WAN interface which has NAT enabled (such as PPPoE).

To activate RIP for the WAN Interface, select the desired RIP version and operation and place a check in the 'Enabled' checkbox. To stop RIP on the WAN Interface, uncheck the 'Enabled' checkbox. Click the 'Apply/Save' button to star/stop RIP and save the configuration.

Interface	Version	Operation	Enabled
atm0.1	2	Passive	<input type="checkbox"/>

Apply/Save

Figure 15: Advanced - Routing - RIP

DNS

DNS Server

This page allows you to enable automatic DNS settings detected from the Internet Service Provider or specify your own DNS server address manually.

DNS Server Configuration

Select DNS Server Interface from available WAN interfaces OR enter static DNS server IP addresses for the system. In ATM mode, if only a single PVC with IPoA or static IPoE protocol is configured, Static DNS server IP addresses must be entered.

DNS Server Interfaces can have multiple WAN interfaces served as system dns servers but only one will be used according to the priority with the first being the highest and the last one the lowest priority if the WAN interface is connected. Priority order can be changed by removing all and adding them back in again.

Select DNS Server Interface from available WAN interfaces:

Selected DNS Server Interfaces

->

<-

Available WAN Interfaces

Use the following Static DNS IP address:

Primary DNS server:

Secondary DNS server:

Apply/Save

Figure 16: Advanced - DNS Server

Dynamic DNS

The Dynamic DNS service allows a dynamic IP address to be aliased to a static hostname in any of a selection of domains, allowing the router to be more easily accessed from various locations on the internet.

Dynamic DNS

The Dynamic DNS service allows you to alias a dynamic IP address to a static hostname in any of the many domains, allowing your Broadband Router to be more easily accessed from various locations on the Internet.

Choose Add or Remove to configure Dynamic DNS.

Hostname	Username	Service	Interface	Remove
<div style="display: flex; justify-content: center; gap: 20px;"> Add Remove </div>				

Figure 17: Advanced - DNS - Dynamic DNS



Note: The Add/Remove buttons will be displayed only if the router has been assigned an IP address from the remote server.

To add a dynamic DNS service, click the Add button and the following screen will display.

Add Dynamic DNS

This page allows you to add a Dynamic DNS address from DynDNS.org or TZO.

D-DNS provider

Hostname

Interface

DynDNS Settings

Username

Password

Figure 18: Advanced - DNS - Add Dynamic DNS Account

FIELD	DESCRIPTION
D-DNS Provider	Select the dynamic DNS provider from the list.
Host Name	The name of the dynamic DNS provider.
Interface	Select the interface from the list.
Username	Enter the Dynamic DNS account username.
Password	Enter the Dynamic DNS account password.

Table 3: Advanced - DNS - Add Dynamic DNS Account Settings

DSL

This page allows the user to modify the DSL modulation settings on the unit. By changing the settings, you can specify which DSL modulation that the modem will use.

DSL Settings

Select the modulation below.

G.Dmt Enabled
 G.lite Enabled
 T1.413 Enabled
 ADSL2 Enabled
 AnnexL Enabled
 ADSL2+ Enabled
 AnnexM Enabled
 VDSL2 Enabled

Select the profile below.

8a Enabled
 8b Enabled
 8c Enabled
 8d Enabled
 12a Enabled
 12b Enabled
 17a Enabled
 30a Enabled

US0
 Enabled

Select the phone line pair below.

Inner pair
 Outer pair

Capability

Bitswap Enable
 SRA Enable

Figure 19: Advanced – DSL

For advanced DSL options press the **Advanced Settings** button.

DSL Advanced Settings

Select the test mode below.

Normal
 Reverb
 Medley
 No retrain
 L3

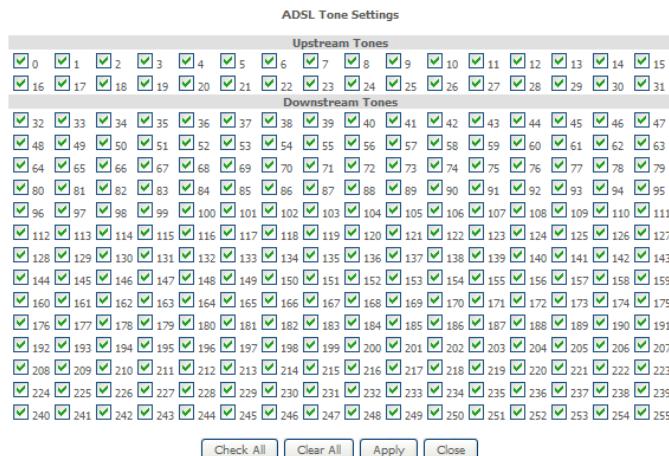
Figure 20: Advanced - DSL - Advanced DSL Settings

The DSL advanced settings relate to test mode settings. The default selection is 'Normal'.

ADSL Tone Settings

For ADSL Tone Settings select the 'Tone Selection' button on the DSL Advanced Settings page.

The frequency band of ADSL is split up into 256 separate tones, each spaced 4.3125kHz apart. With each tone carrying separate data, the technique operates as if 256 separate routers were running in parallel. The tone range is from 0 to 31 for upstream traffic and from 32 to 255 for downstream traffic. Do not change these settings unless you are directed by your Internet Service Provider.



ADSL Tone Settings

Upstream Tones

0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31

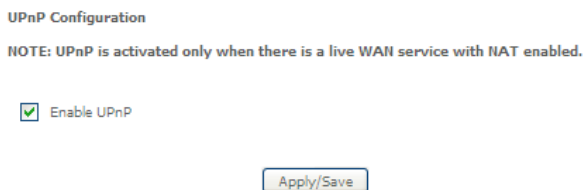
Downstream Tones

32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47
 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63
 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79
 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95
 96 97 98 99 100 101 102 103 104 105 106 107 108 109 110 111
 112 113 114 115 116 117 118 119 120 121 122 123 124 125 126 127
 128 129 130 131 132 133 134 135 136 137 138 139 140 141 142 143
 144 145 146 147 148 149 150 151 152 153 154 155 156 157 158 159
 160 161 162 163 164 165 166 167 168 169 170 171 172 173 174 175
 176 177 178 179 180 181 182 183 184 185 186 187 188 189 190 191
 192 193 194 195 196 197 198 199 200 201 202 203 204 205 206 207
 208 209 210 211 212 213 214 215 216 217 218 219 220 221 222 223
 224 225 226 227 228 229 230 231 232 233 234 235 236 237 238 239
 240 241 242 243 244 245 246 247 248 249 250 251 252 253 254 255

Figure 21: Advanced - DSL - ADSL Tone Settings

UPnP

Universal Plug and Play (UPnP) is a set of networking protocols that can allow networked devices, such as computers, printers, WiFi access points and mobile phones to automatically detect each other's presence on the network and establish functional network services for data sharing, communications, and entertainment.



UPnP Configuration

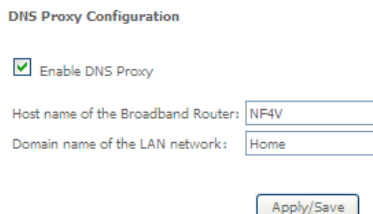
NOTE: UPnP is activated only when there is a live WAN service with NAT enabled.

Enable UPnP

Figure 22: Advanced - UPnP

DNS Proxy

To enable DNS Proxy settings, select the corresponding checkbox and then enter the Host and Domain name, as in the example shown below. Click **Apply/Save** to continue.



DNS Proxy Configuration

Enable DNS Proxy

Host name of the Broadband Router:

Domain name of the LAN network:

Figure 23: Advanced - DNS Proxy

The Host Name and Domain name are combined to form a unique label that is mapped to the router IP address. This can be used to access the user interface of the router with a local name rather than by using the router IP address.

DLNA

The DLNA page allows you to enable or disable and configure the digital media server. This means you can have digital media stored on an external USB hard drive connected to the NF4V and the router will make it accessible to other devices on your network.

Digital Media Server settings

This page allows you to enable / disable digital media server support.

Enable on-board digital media server.

Interface:

Media Library Path:

Media Library Update Period:

Figure 24: Advanced - DLNA

Select **Enable on-board digital media server** and then use the drop down list to select the Interface. In the **Media Library Path** field, enter the path to the media and then enter a period between media library updates in seconds. Click the **Apply/Save** button when you have finished.

Packet Acceleration

Packet acceleration uses a number of methods to try and reduce the latency experienced on some DSL services. These can range from utilising locally terminated TCP connections to Fast Connection Setup.

Packet Acceleration

Enable Packet Flow Accelerator

Figure 25: Advanced - Packet Acceleration

Select to enable or disable Packet Acceleration and click **Apply/Save** to save the new packet acceleration configuration settings.

Storage Service

The Storage Service options enable you to manage attached USB Storage devices and create accounts to access the data stored on the attached USB device.

Storage Device Info

The storage device info page displays information about the attached USB Storage device.

Storage Service

The Storage service allows you to use Storage devices with modem to be more easily accessed

Volume name	Physical Medium	File System	Total Space	Used Space
-------------	-----------------	-------------	-------------	------------

Figure 26: Advanced – Storage Service

User Accounts

User accounts are used to restrict access to the attached USB Storage device.

To delete a User account entry, click the **Remove** checkbox next to the selected account entry and click **Remove**.

Click **Add** to create a user account.

Storage User Account Configuration

Choose Add, or Remove to configure User Accounts.

Username	Remove
<input type="button" value="Add"/>	<input type="button" value="Remove"/>

Figure 27: Advanced – Storage Service – Storage User Account Configuration

Adding an account allows the creation of specific user accounts with a password to further control access permissions. To add an account, click the **Add** button and then enter the desired username and password for the account.

Storage User Account Setup

Please enter the username and password to be used for Network Attached Storage.
Username and Password must consists of [A-Z] or [a-z] or [0-9].

Username:

Password:

Confirm Password:

Figure 28: Advanced – Storage Service – Storage User Account Setup

Interface Grouping

Port Mapping allows you to create groups composed of the various interfaces available in your router. These groups then act as separate networks.

To delete an Interface group entry, click the Remove checkbox next to the selected group entry and click Remove.

Interface Grouping -- A maximum 16 entries can be configured

Interface Grouping supports multiple ports to PVC and bridging groups. Each group will perform as an independent network. To support this feature, you must create mapping groups with appropriate LAN and WAN interfaces using the Add button. The Remove button will remove the grouping and add the ungrouped interfaces to the Default group. Only the default group has IP interface.

Group Name	Remove	WAN Interface	LAN Interfaces	Edit
Default	<input type="checkbox"/>	atm0.1	eth0	<input type="button" value="Edit"/>
			eth1	
			eth2	
			eth3	
			wl0	
			wl0.1	
			wl0.2	
			wl0.3	

Figure 29: Advanced - Interface Grouping

Click **Add** to create an Interface group.

Interface grouping Configuration

To create a new interface group:

1. Enter the Group name and the group name must be unique.
2. Select interfaces from the available interface list and add it to the grouped interface list using the arrow buttons to create the required mapping of the ports.
3. Click Save/Apply button to make the changes effective immediately.

Group Name:

Grouped WAN Interfaces

Available WAN Interfaces

br_0_0_35/atm0.1

Grouped LAN Interfaces

Available LAN Interfaces

eth0
eth1
eth2
eth3
wl0
wl0.1
wl0.2
wl0.3

Enter a group name and then use the arrow buttons to select which interfaces you wish to group. Click **Apply/Save** to save the Interface grouping configuration settings.

IP Tunnel

The IP Tunnelling feature allows you to configure tunnelling of traffic between IPv6 and IPv4 networks.

IPv6inIPv4

IP Tunneling -- 6in4 Tunnel Configuration

Name	WAN	LAN	Dynamic	IPv4 Mask Length	6rd Prefix	Border Relay Address	Remove
<div style="display: flex; justify-content: center; gap: 10px;"> <input type="button" value="Add"/> <input type="button" value="Remove"/> </div>							

Figure 30: Advanced - IP Tunnel - IPv6inIPv4

Click the **Add** button to add a new tunnel.

IP Tunneling -- 6in4 Tunnel Configuration

Currently, only 6rd configuration is supported.

Tunnel Name:

Mechanism:

Associated WAN Interface:

Associated LAN Interface:

Manual
 Automatic

IPv4 Mask Length:

6rd Prefix with Prefix Length:

Border Relay IPv4 Address:

Figure 31: Advanced - IP Tunnel - IPv6inIPv4 - 6in4 Tunnel Configuration

IP Tunneling -- 4in6 Tunnel Configuration

Name	WAN	LAN	Dynamic	Remote Address	Remove
<input type="button" value="Add"/> <input type="button" value="Remove"/>					

Figure 32: Advanced - IP Tunnel – IPv4inIPv6

Click the **Add** button to add a new tunnel.

IP Tunneling -- 4in6 Tunnel Configuration

Currently, only DS-Lite configuration is supported.

Tunnel Name:

Mechanism:

Associated WAN Interface:

Associated LAN Interface:

Manual
 Automatic

Remote Address:

Figure 33: Advanced - IP Tunnel – IPv4inIPv6 - 4in6 Tunnel Configuration

IPSec

The NF4V offers IPSec VPN tunnel functionality. To delete an IPSec entry, click the Remove checkbox next to the selected IPSec tunnel entry and click **Remove**.

Click **Add** to create a new IPSec tunnel connection.

IPSec Settings

IPSec Connection Name:

Tunnel Mode:

Remote IPSec Gateway Address (IPv4 address in dotted decimal):

Tunnel access from local IP addresses:

IP Address for VPN:

IP Subnetmask:

Tunnel access from remote IP addresses:

IP Address for VPN:

IP Subnetmask:

Key Exchange Method:

Authentication Method:

Pre-Shared Key:

Perfect Forward Secrecy:

Advanced IKE Settings:

Figure 34: Advanced - IPSec

Enter the following parameters:

PARAMETER	DEFINITION
IPSec Connection Name	Enter a name to identify the IPSec tunnel
Tunnel Mode	Select the applicable IPSec tunnel mode
Remote IPSec Gateway	Enter the IP Address of the IPSec server to connect to
Tunnel access from Local	Select which remote addresses local IPSec connections are able to access
IP Address from VPN	Enter the IP Address to be used locally for the IPSec tunnel
Subnet mask for VPN	Enter the subnet mask to be used locally for the IPSec tunnel
Tunnel Access from Remote	Select which local addresses remote IPSec connections are able to access
IP Address for VPN	Enter the IP Address to be used on the remote end for the IPSec tunnel
Subnet mask for VPN	Enter the subnet mask to be used on the remote end for the IPSec tunnel
Key Exchange Method	Select the type of IPSec exchange is to be used on the IPSec tunnel
Authentication Method	Select the applicable authentication for the IPSec tunnel
Pre-Shared Key	Enter the pre-shared key (if applicable) to grant access to the IPSec tunnel
Perfect Forward Secrecy	Select to use Perfect Forward Secrecy during key exchange for the IPSec tunnel
Advanced IKE Settings	Configure advanced IKE settings for the IPSec tunnel such as the encryption method or key life time

After entering the required IPSec tunnel service settings, click **Apply/Save** to save the new IPSec Tunnel configuration settings.

Certificate

Local

Local Certificates

Add, View or Remove certificates from this page. Local certificates are used by peers to verify your identity.

Maximum 4 certificates can be stored.

Notice: Import and Remove Certificate need reboot the gateway

Name	In Use	Subject	Type	Action
<input type="button" value="Create Certificate Request"/> <input type="button" value="Import Certificate"/>				

Figure 35: Advanced – Certificate - Local

Trusted CA

Trusted CA (Certificate Authority) Certificates

Add, View or Remove certificates from this page. CA certificates are used by you to verify peers' certificates.

Maximum 4 certificates can be stored.

Notice: Import and Remove Certificate need reboot the gateway

Name	Subject	Type	Action
<input type="button" value="Import Certificate"/>			

Figure 36: Advanced – Certificate – Trusted CA

Power Management

The power management page enables you to control the green aspects of the NF4V.

You can enable or disable the power management features by selecting or unselecting the different power management functions as necessary and then click **Apply** to save these settings.

Power Management

This page allows control of Hardware modules to evaluate power consumption. Use the control buttons to select the desired option, click Apply and check the status response.

MIPS CPU Clock divider when Idle

Enable Status: **Disabled**

Wait instruction when Idle

Enable Status: **Enabled**

DRAM Self Refresh

Enable Status: **Enabled**

Energy Efficient Ethernet

Enable Status: **Enabled**

Ethernet Auto Power Down and Sleep

Enable Status: **Enabled**

Number of ethernet interfaces:

Powered up: 0

Powered down: 5

Figure 37: Advanced – Power Management

Multicast (IGMP Configuration)

The Internet Group Management Protocol (IGMP) is a communications protocol used by hosts and adjacent routers on IP networks to establish multicast group memberships. IGMP is a protocol only used on the network between a host and the router. It allows a host to inform the router whenever that host needs to join or leave a particular multicast group. IGMP provides for more efficient allocation of resources when used with online gaming and video streaming.

IGMP Configuration

Enter IGMP protocol configuration fields if you want modify default values shown below.
NOTE: Query Interval is advised to no larger than 125s.

Default Version:

Query Interval (s):

Query Response Interval (1/10s):

Last Member Query Interval (1/10s):

Robustness Value:

Maximum Multicast Data Sources (for IGMPv3):

Fast Leave Enable:

Membership Join Immediate (IPTV):

MLD Configuration

Enter MLD protocol (IPv6 Multicast) configuration fields if you want modify default values shown below.

Default Version:

Query Interval (s):

Query Response Interval (1/10s):

Last Member Query Interval (1/10s):

Robustness Value:

Maximum Multicast Data Sources (for mldv2):

Fast Leave Enable:

Figure 38: Advanced - IGMP Configuration

FIELD	DEFINITION
Default Version	The version IGMP in use by the router.
Query Interval	The hosts on the segment report their group membership in response to the router's queries. The query interval timer is also used to define the amount of time a router will store particular IGMP state if it does not hear any reports on the group. The query interval is the time in seconds between queries sent from the router to IGMP hosts.
Query Response Interval	When a host receives the query packet, it starts counting to a random value, less the maximum response time. When this timer expires, the host replies with a report, provided that no other host has responded yet. This accomplishes two purposes: a) Allows controlling the amount of IGMP reports sent during a time window. b) Engages the report suppression feature, which permits a host to suppress its own report and conserve bandwidth.
Last Member Query Interval	IGMP uses this value when router hears IGMP Leave report. This means that at least one host wants to leave the group. After router receives the Leave report, it checks that the interface is not configured for IGMP Immediate Leave (single-host on the segment) and if not, it sends out an out-of-sequence query.
Robustness Value	The robustness variable is a way of indicating how susceptible the subnet is to lost packets. IGMP can recover from robustness variable minus 1 lost IGMP packets. You can also click the scroll arrows to select a new setting. The robustness variable should be set to a value of 2 or greater. The default robustness variable value is 2.
Maximum Multicast Groups	The maximum number of multicast groups that the router can control at any one time.
Maximum Multicast Data Sources	The maximum number of data sources a multicast group can have.
Maximum Multicast Group Members	The maximum number of hosts a multicast group can have.
Fast Leave Enable	With IGMP fast-leave processing, which means that the router immediately removes the interface attached to a receiver upon receiving a Leave Group message from a IGMP host.

Wireless

Basic

The Wireless Basic page allows you to enable the wireless network and configure its basic settings.

Wireless -- Basic

This page allows you to configure basic features of the wireless LAN interface. You can enable or disable the wireless LAN interface, hide the network from active scans, set the wireless network name (also known as SSID) and restrict the channel set based on country requirements. Click 'Apply/Save' to configure the basic wireless options.


Enable Wireless
 Enable Wireless Hotspot2.0 [WPA2 is required]
 Hide Access Point
 Clients Isolation
 Disable WMM Advertise
 Enable Wireless Multicast Forwarding (WMM)

SSID:

BSSID:

Country:

Max Clients:



Wireless - Guest/Virtual Access Points:

Enabled	SSID	Hidden	Isolate Clients	Enable WMM Advertise	Enable WMMF	Enable HSPOT	Max Clients	BSSID
<input type="checkbox"/>	<input type="text" value="WLAN_Guest1"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="text" value="16"/>	N/A
<input type="checkbox"/>	<input type="text" value="WLAN_Guest2"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="text" value="16"/>	N/A
<input type="checkbox"/>	<input type="text" value="WLAN_Guest3"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="text" value="16"/>	N/A

Figure 39: Wireless - Basic

The following parameters are available:

PARAMETER	DEFINITION
Enable Wireless	Select to enable or disable the wireless network function
Hide Access Point	Select to hide or display the wireless network when an SSID scan is performed
Clients Isolation	Select to prevent clients on the wireless network being able to access each other
Disable WMM Advertise	Select to prevent the NF4V advertising its WMM function
Enable Multicast Forwarding (WMMF)	Select to enable Wireless Multicast Forwarding. This can reduce latency and improve throughput for wireless clients
Max Clients	Enter the maximum number of wireless clients able to connect to the wireless network
Wireless Guest Network	Select to enable a separate Wireless Guest network, the same options are available for a Guest network as with the main system wireless network.

Click **Apply/Save** to save the new wireless configuration settings.

Security

The NF4V supports all encryptions within the 802.11 standard. The factory default is WPA2-PSK. The NF4V also supports WPA, WPA-PSK, WPA2, WPA2-PSK. You can also select to enable WPS mode.

Wireless -- Security

This page allows you to configure security features of the wireless LAN interface.
You may setup configuration manually
OR
through WiFi Protected Setup(WPS)
Note: When both STA PIN and Authorized MAC are empty, PBC is used. If Hide Access Point enabled or Mac filter list is empty with "allow" chosen, WPS2 will be disabled

WPS Setup

Enable WPS:

Manual Setup AP

You can set the network authentication method, selecting data encryption, specify whether a network key is required to authenticate to this wireless network and specify the encryption strength. Click 'Apply/Save' when done.

Select SSID:

Network Authentication:

WPA/WAPI passphrase: [Click here to display](#)

WPA Group Rekey Interval:

WPA/WAPI Encryption:

WEP Encryption:

Figure 40: Wireless - Security

The following parameters are available:

PARAMETER	DEFINITION
Enable WPS	Select to enable or disable the WPS function of the NF4V.
Select SSID	Select the SSID to apply the security settings to.
Network Authentication	Select the Wireless security type to use with the wireless network.
WPA/WAPI passphrase	Enter the security key to use with the wireless network.
WPA Group Rekey Interval	Enter the group rekey interval. This should not need to change.
WPA/WAPI Encryption	Select the type of encryption to use on the wireless network.
WEP Encryption	Select to utilise WEP encryption on the wireless network connection.

Click **Apply/Save** to save the new wireless security configuration settings.

MAC Filter

MAC Filter allows you to add or remove the MAC Address of devices which will be allowed or denied access to the wireless network. First use the **Select SSID** drop down list to select the wireless network you wish to configure, then select to either allow or deny access to the MAC addresses listed.

Wireless -- MAC Filter

Select SSID:

MAC Restrict Mode: Disabled Allow Deny

Click **Add** to add a MAC Address Filter.

Wireless -- MAC Filter

Enter the MAC address and click 'Apply/Save' to add the MAC address to the wireless MAC address filters.

MAC Address:

Enter the MAC Address to be filtered and click **Apply/Save** to save the new MAC Address filter settings. To delete a MAC filter entry, click the Remove checkbox next to the selected filter entry and click Remove.

Wireless Bridge

Wireless Bridge allows you to configure the router's access point as a bridge.

Wireless -- Bridge

This page allows you to configure wireless bridge features of the wireless LAN interface. You can select Wireless Bridge (also known as Wireless Distribution System) to disable access point functionality. Selecting Access Point enables access point functionality. Wireless bridge functionality will still be available and wireless stations will be able to associate to the AP. Select Disabled in Bridge Restrict which disables wireless bridge restriction. Any wireless bridge will be granted access. Selecting Enabled enables wireless bridge restriction. Only those bridges selected in Remote Bridges will be granted access. Click "Refresh" to update the remote bridges. Wait for few seconds to update. Click "Apply/Save" to configure the wireless bridge options.

AP Mode:

Bridge Restrict:

Remote Bridges MAC Address:

Select the mode for the Wireless Access Point built into the NF4V. You can specify which wireless networks will be allowed to connect to the NF4V by using the 'Bridge Restrict' option and then entering the applicable MAC Addresses of the other wireless access points.

Click **Apply/Save** to save the new wireless bridge configuration settings.

Advanced

Advanced Wireless allows you to configure detailed wireless network settings such as the band, channel, bandwidth, transmit power and preamble settings.

Wireless -- Advanced

This page allows you to configure advanced features of the wireless LAN interface. You can select a particular channel on which to operate, force the transmission rate to a particular speed, set the fragmentation threshold, set the RTS threshold, set the wakeup interval for clients in power-save mode, set the beacon interval for the access point, set XPress mode and set whether short or long preambles are used. Click 'Apply/Save' to configure the advanced wireless options.

Band:

Channel: Current: 1 (interference: acceptable)

Auto Channel Timer(min):

802.11n/EWV:

Bandwidth: Current: 40MHz

Control Sideband: Current: Lower

802.11n Rate:

802.11n Protection:

Support 802.11n Client Only:

RIFS Advertisement:

OBSS Co-Existence:

RX Chain Power Save: Power Save status: **Low Power**

RX Chain Power Save Quiet Time:

RX Chain Power Save PPS:

54g Rate:

Multicast Rate:

Basic Rate:

Fragmentation Threshold:

RTS Threshold:

DTIM Interval:

Beacon Interval:

Global Max Clients:

XPress Technology:

Transmit Power:

WMM(Wi-Fi Multimedia):

WMM No Acknowledgement:

WMM APSD:

Click **Apply/Save** to save any changes to the wireless network settings configuration.

PARAMETER	DEFINITION
Band	You can select 2.4GHz or 5GHz.
Channel	Fill in the appropriate channel to correspond with your network settings. All devices in your wireless network must use the same channel in order to work correctly. This router supports auto channeling functionality.
Auto Channel Timer(min)	Specifies the timer of auto channelling.
802.11n/EWC	Select disable 802.11n or Auto.
Bandwidth	Select the bandwidth for the network. You can select 20MHz in Both Bands, 20MHz in 2.4G Band and 40MHz in 5G Band, or 40MHz in Both Bands.
Control Sideband	If you select 20MHz in Both Bands or 20MHz in 2.4G Band and 40MHz in 5G Band, the service of control sideband does not work. When you select 40MHz in Both Bands as the bandwidth, the following page appears. Then you can select Lower or Upper as the value of sideband. As the control sideband, when you select Lower, the channel is 1~7. When you select Upper, the channel is 5~11.
802.11n Rate	Select the transmission rate for the network. The rate of data transmission should be set depending on the speed of your wireless network. You can select from a range of transmission speeds, or you can select Auto to have the Router automatically use the fastest possible data rate and enable the Auto-Fallback feature. Auto-Fallback will negotiate the best possible connection speed between the Router and a wireless client. The default value is Auto.
802.11n Protection	The 802.11n standards provide a protection method so 802.11b/g and 802.11n devices can co-exist in the same network without "speaking" at the same time.
Support 802.11n Client Only	Only stations that are configured in 802.11n mode can associate.
Multicast Rate	Select the multicast transmission rate for the network. The rate of data transmission should be set depending on the speed of your wireless network. You can select from a range of transmission speeds, or you can select Auto to have the Router automatically use the fastest possible data rate and enable the Auto-Fallback feature. Auto-Fallback will negotiate the best possible connection speed between the Router and a wireless client. The default value is Auto.
Basic Rate	Select the basic transmission rate ability for the AP.
Fragmentation Threshold	Packets that are larger than this threshold are fragmented into multiple packets. Try to increase the fragmentation threshold if you encounter high packet error rates. Do not set the threshold too low, since this can result in reduced networking performance.
RTS Threshold	This value should remain at its default setting of 2347. Should you encounter inconsistent data flow, only minor reductions are recommended. Should you encounter inconsistent data flow, only minor reduction of the default value, 2347, is recommended. If a network packet is smaller than the preset RTS threshold size, the RTS/CTS mechanism will not be enabled. The Router sends Request to Send (RTS) frames to a particular receiving station and negotiates the sending of a data frame. After receiving an RTS, the wireless station responds with a Clear to Send (CTS) frame to acknowledge the right to begin transmission. The RTS Threshold value should remain at its default value of 2347.
DTIM Interval	(Delivery Traffic Indication Message) Enter a value between 1 and 255 for the Delivery Traffic Indication Message (DTIM.) A DTIM is a countdown informing clients of the next window for listening to broadcast and multicast messages.
Beacon Interval	A beacon is a packet of information that is sent from a connected device to all other devices where it announces its availability and readiness. A beacon interval is a period of time (sent with the beacon) before sending the beacon again. The beacon interval may be adjusted in milliseconds (ms). Default (100) is recommended.
XPress Technology	Select Enable or Disable. This is a special accelerating technology for IEEE802.11g. The default is Disabled.
Transmit Power	Adjust the transmission range here. This tool can be helpful for security purposes if you wish to limit the transmission range.
WMM (Wi-Fi Multimedia)	Select whether WMM is enable or disabled. Before you disable WMM, you should understand that all QoS queues or traffic classes relate to wireless do not take effects.
WMM No Acknowledgement	Select whether ACK in WMM packet. By default, the 'Ack Policy' for each access category is set to Disable, meaning that an acknowledge packet is returned for every packet received. This provides a more reliable transmission but increases traffic load, which decreases performance. To disable the acknowledgement can be useful for Voice, for example, where speed of transmission is important and packet loss is tolerable to a certain degree.
WMM APSD	APSD is short for automatic power save delivery, Selecting enable will make it has very low power consumption. WMM Power Save is an improvement to the 802.11e amendment adding advanced power management functionality to WMM.

Station Info

This page shows the MAC address of authenticated wireless stations that are connected to the NF4V and their status

Wireless -- Authenticated Stations

This page shows authenticated wireless stations and their status.

MAC Associated Authorized SSID Interface

Refresh

Voice

This section explains how to configure the VoIP settings of the NF4V.

VoIP Status

The Voice Status page displays the registration status of your SIP accounts and the total call time of each account.

Voice -- Voice Status

Account denial will display "Disabled", registered successfully will display "Up", and unregistered will display "Down".

SIP Account	call time	User Accounts	Registration Status
1	0:00:00		Down
2	0:00:00		Down

SIP Basic Setting

The SIP Settings page is where you enter your VOIP service settings as supplied by your VOIP service provider (VSP). If you are unsure about a specific setting or have not been supplied information for a particular field, please contact your VOIP service provider to verify if this setting is needed or not.

Voice -- SIP Basic Setting

Bound Interface Name: LAN

Country: AUS - AUSTRALIA

sip local port(1-65535):

SIP domain name*: (Note: Please leave this field blank unless required by your service provider)

Use SIP Proxy for SIP Account 1

Use SIP Outbound Proxy for SIP Account 1

Use SIP Registrar for SIP Account 1

Use SIP Proxy for SIP Account 2

Use SIP Outbound Proxy for SIP Account 2

Use SIP Registrar for SIP Account 2

SIP Account	1	2
Account Enabled	✓	✓
Polarity Reverse Enable	<input type="checkbox"/>	<input type="checkbox"/>
Authentication name	<input type="text"/>	<input type="text"/>
Password	<input type="text"/>	<input type="text"/>
Cid Name	<input type="text"/>	<input type="text"/>
Cid Number	<input type="text"/>	<input type="text"/>

codec--line 1	ptime[ms]	priority	enable	codec--line 2	ptime[ms]	priority	enable
G711U	20	1 (1-100)	✓	G711U	20	1 (1-100)	✓
G711A	20	2 (1-100)	✓	G711A	20	2 (1-100)	✓
G729	20	3 (1-100)	✓	G729	20	3 (1-100)	✓
G723_63	30	4 (1-100)	✓	G723_63	30	4 (1-100)	✓
G726_24	20	5 (1-100)	✓	G726_24	20	5 (1-100)	✓
G726_32	20	6 (1-100)	✓	G726_32	20	6 (1-100)	✓
G726_16	20	7 (1-100)	✓	G726_16	20	7 (1-100)	✓
G726_40	20	8 (1-100)	✓	G726_40	20	8 (1-100)	✓
G722	20	9 (1-100)	✓	G722	20	9 (1-100)	✓

The individual fields shown above on the SIP Basic Settings page are explained in the following table.

OPTION	DEFINITION
Bound Interface Name	Select the Interface that the VoIP account will use to make a connection to the VoIP Service Provider.
SIP Local Port	Set the SIP local port of the gateway, the default value is 5060. SIP local port is the SIP UA (user agent) port.
SIP domain name	Enter the SIP domain name or IP address of your VoIP Service Provider here.
Use SIP Proxy	Select the checkbox of Use SIP Proxy, if your DSL router uses a SIP proxy. SIP proxy allows other parties to call DSL router through it. When it is selected, the following fields appear.
SIP Proxy	The IP address of the proxy.
SIP Proxy port	The port that this proxy is listening on. By default, the port value is 5060.
Use SIP Outbound Proxy	Some network service providers require the use of an outbound proxy. This is an additional proxy, through which all outgoing calls are directed. In some cases, the outbound proxy is placed alongside the firewall and it is the only way to let SIP traffic pass from the internal network to the Internet. When it is selected, the following fields appear.
SIP Outbound Proxy	The IP address of the outbound proxy.
SIP Outbound Proxy port	The port that the outbound proxy is listening on. By default, the port value is 5060.
Use SIP Registrar	Select this option if required by your VoIP Service Provider. Enter the SIP Proxy Domain Name and SIP Proxy Port which is typically 5060.
SIP Registrar	The IP address of the SIP registrar.
SIP Registrar port	The port that SIP registrar is listening on. By default, the port value is 5060.
Account Enabled	If it is unselected, the corresponding account is disabled. You can not use it to initiate or accept any call.
Polarity Reverse Enable	Enable or disable this function.
Authentication name	Set the user name of authentication.
Password	Set the password of authentication.
Cid Name	User name. It is the Display Name.
Cid Number	Set the caller number. It must be a number of 0-9.
ptime	You can use it to set the packetization time (PT). The PT is the length of the digital voice segment that each packet holds. The default is 20 millisecond packets. If selecting 10 millisecond, packets improve the voice quality. Because of the packet loss, less information is lost, but more loads on the network traffic.
Priority	The priority of codec is declined from up to down. Codecs define the method of relaying voice data. Different codecs have different characteristics, such as data compression and voice quality. For Example, G723 is a codec that uses compression, therefore, it is good for use where the bandwidth is limited but its voice quality is not good as other codecs, such as the G711. If you specify none of the codecs, using the default value showed in the above figure, the DSL router chooses the codec automatically.

After entering your VoIP settings press the **Apply** button. Select **Management > Save/Reboot** and press the **Reboot** button. Once the router restarts if there is a valid internet connection and the VoIP account settings are valid the VoIP service will start.

SIP Advanced

The SIP Advanced page allows you to configure settings that your VoIP service provider has enabled on your SIP account and if you have the appropriate call features and other functionality on your cordless or corded phone handsets.

Voice -- SIP Advanced Setting

Line	1	2
Call waiting	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Unconditionally Call forwarding number	<input type="text"/>	<input type="text"/>
Busy Call forwarding number	<input type="text"/>	<input type="text"/>
No Answer Call forwarding number	<input type="text"/>	<input type="text"/>
Options Time	<input type="text" value="0"/>	<input type="text" value="0"/>
Forward unconditionally	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Forward on "busy"	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Forward on "no answer"	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
MWI	<input type="checkbox"/>	<input type="checkbox"/>
Anonymous call blocking	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Anonymous calling	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Anonymous calling mode	Display anonymous	Display anonymous
DND	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Enable Call Return	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Call Transfer	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Call conference	<input type="checkbox"/>	<input type="checkbox"/>

Fax Negotiate Mode: Bypass Codec:

Enable T38 redundancy support

Enable vbd redundancy support

Enable VAD support VAD mode in signal:

Enable RTCP Flow Ctrl

Enable Echo Cancellation

Enable # To ASCII

Enable Reinjection Function

RFC2198 Payload Value(range 97~127):

Registration Expire Timeout*:

Session Expire Time:

Min Session Expire Time(need >= 90s):

Figure 41: VoIP - Advanced - Service Provider

OPTION	DEFINITION
Line	Displays the line number you want to configure
Call Waiting	Select this option for your phone if your VoIP Service Provider has enabled Call Waiting on your SIP account.
Unconditionally Call forwarding number	Select this option if your VoIP Service Provider has enabled Call Forwarding on your SIP account and you wish to use this feature.
Busy Call Forwarding Number	Enter the phone number to forward a call to if it arrives while the line is busy.
No Answer Call forwarding number	Enter the phone number to forward a call to if the call is not answered.
Forward On "busy"	Select this option if your VoIP Service Provider has enabled Call Forwarding on your SIP account and you wish to use this feature.
Forward On "No Answer"	Select this option if your VoIP Service Provider has enabled Call Forwarding on your SIP account and you wish to use this feature.
MWI (Message Waiting Indicator)	Select this option if your VoIP Service Provider has enabled MWI (Message Waiting Indicator) on your SIP account and you wish to use this feature.
Anonymous Call Blocking	Select this option if your VoIP Service Provider has enabled Anonymous Call Blocking on your SIP account and you wish to use this feature.
Anonymous Calling	Select this option if your VoIP Service Provider has enabled Anonymous Calling on your SIP account and you wish to use this feature.
Anonymous calling mode	When set to Display anonymous, the modem hides your caller ID. When set to All anonymous, the modem hides both caller ID and the SIP URL of the originating call.
DND (Do Not Disturb)	Select this option if your VoIP Service Provider has enabled DND (Do Not Disturb) on your SIP account and you wish to use this feature.
Enable T38 Redundancy Support	Select this function if you wish to send or receive faxes via VoIP and have a fax machine capable of using the T38 fax over VoIP protocol.
Enable VBD redundancy support	Select this checkbox to use the feature.
Enable VAD support	Enables the Voice Activated Detection function of the modem.

Enable RTCP Flow Control	Select this checkbox to use the feature.
Enable Echo Cancellation	Select this checkbox to use the feature.
Enable # To ASCII	Select this checkbox to use the feature.
Enable Reinjection Function	Select this checkbox to use the feature.
RFC2198 Payload Value (range 97-127)	Enter the RFC2198 payload value that the valid range is 96 ~ 127.
Registration Expire Timeout	Enter the registration expire timeout.
Session Expire Time	The interval of dialog refreshing time.
Min Session Expire Time	The minimum interval of dialog refreshing time.
VoIP DialPlan Setting	Set the VoIP dial plan. If user-dialed number matches it, the number is processed by the DSL router immediately.
DSCP for SIP	Set the DSCP for SIP. You can select it from the drop-down list.
DSCP for RTP	Set the DSCP for RTP. You can select it from the drop-down list.
Dtmf Relay Setting	Set DTMF transmit method, which can be following values: – SIP Info: Use SIP INFO message to transmit DTMF digits. – RFC2833: Use RTP packet to encapsulate DTMF events, as specified in RFC 2833. – InBand: DTMF events are mixed with user voice in RTP packet.
SIP Transport Protocol	Select the transport protocol to use for SIP signaling. Note that the SIP proxy and registrar need to support the protocol you select.
Enable Local Supplementary Service	Select the checkbox to enable the supplementary service settings by the telephone set. If you deselect the checkbox, the supplementary service can not be set by the telephone set.

Table 4: VoIP - Advanced - Service Provider

SIP Extra Setting

This page displays additional settings related to the SIP service.

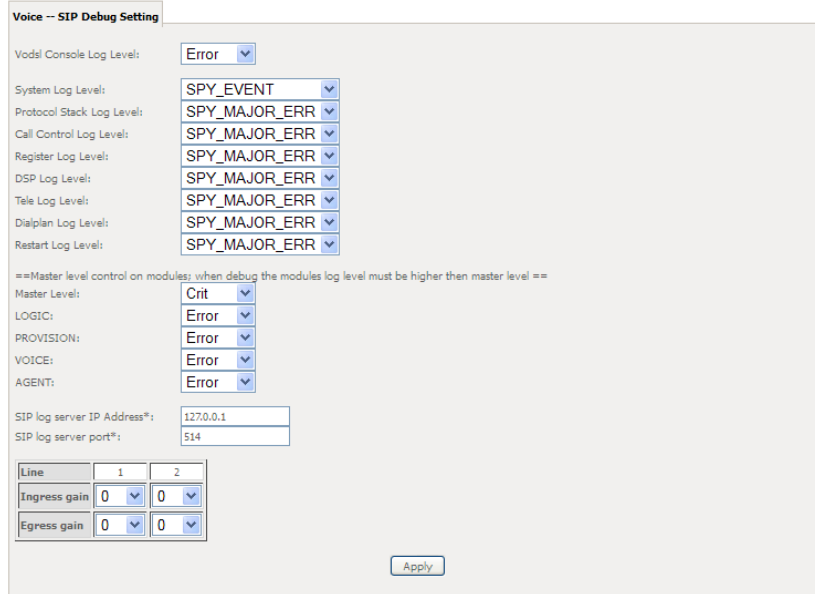
Voice -- SIP Extra Settings

Line	1	2	
Dial tone time	15	15	10 ~ 20
Busy tone time	40	40	30 ~ 180
Inter digit time	5	5	1 ~ 5
Offhook warning tone time	60	60	30 ~ 180
Ringback tone time	80	80	30 ~ 180
T digit timer	4		
Short digit timer	4		

PARAMETER	DEFINITION
Dial tone time	Dial tone duration.
Busy tone time	Busy tone duration.
Inter digit time	The valid range is 1 ~ 5.
Offhook warning tone time	Offhook warning tone duration.
Ringback tone time	Ringback tone duration.

SIP Debug Setting

This page allows you to configure various settings regarding the logging levels of the SIP service.



OPTION	DEFINITION
SIP Log Server IP Address	Enter the IP address where the SIP Log data for the router's currently saved VoIP account settings will be sent to.
SIP Log Server port	Enter the port to be used for transmitting the SIP Log data for the router's currently saved VoIP account settings.
Ingress Gain	The incoming signal amplitude can be controlled with this field. Combined with the Egress gain a ratio can be expressed of input to output. The Ingress Gain setting can help improve the quality of the VoIP line, and can influence call volumes and help eliminate echoes.
Egress Gain	The outgoing signal amplitude can be controlled with this field. Combined with the Ingress gain a ratio can be expressed of input to output. The Egress Gain setting can help improve the quality of the VoIP line, and can influence call volumes and help eliminate echoes.

VoIP Functionality

This section describes how to use the VoIP function of the DSL router in more detail. Some features involve 2 or 3 parties. In that case, note that all 3 parties have to be successfully registered.

Registering

Before using any VoIP functions, the DSL router has to register itself to a registrar. The DSL router also has to be configured with a proxy, which relays VoIP signaling to the next hop. In fact, many implementations integrate these two into one server, so in many case registrar and proxy refer to the same IP.

1. Select the right interface to use for registering, depending on where proxy/registrar resides. If use WAN link, ensure that it is already up.
2. Select the checkbox of **Use SIP Registrar**, and fill in the IP address and port with the right value.
3. Fill the extension information: **Authentication name**, **Password**, **Cid Name** and **Cid Number**.
4. Click **Apply** to take the settings into effect.
5. **TEL** indicator of VoIP service should be on, indicating that SIP client is successfully registered.

Placing a Call

This section describes how to place a basic VoIP call.

1. Pick up the receiver on the phone.
2. Hear the dial-tone. Dial the extension of remote party.
3. To end the dialing, wait for digit timeout, or just press **#** immediately.
4. After the remote party answers the call, you are in voice connection.

Anonymous call

Anonymous call does not send the caller ID to the remote party. This is useful if you do not want others know whom you are.

1. Enable Anonymous calling in the Voice--SIP Advanced Setting web page.
2. Pick up the receiver on the phone.
3. Dial *68 to enable anonymous call.
4. Hook on the receiver, and dial another extension as you like. Now your caller ID information is blocked.

Do Not Disturb (DND)

If DND is enabled, all incoming calls are rejected. DND is useful if you do not want others to disturb you.

1. Enable DND in the Voice--SIP Advanced Setting web page.
2. Pick up the receiver on the phone.
3. Dial *78 to enable DND.
4. Hook on the phone. Now your phone rejects all incoming calls.
5. Hook off again to disable the DND.

Call Return

For incoming calls, the DSL router remembers the number of calling party.

1. Enable Call Return in the Voice--SIP Advanced Setting web page.
2. Press *69 to return a call.
3. Now you can make the call as if you have dialed the whole number.

Call Hold

Call hold enable you to put a call to a pending state, and pick it up in future.

1. Assuming you are in a voice connection, you can press **FLASH** to hold current call.
2. Now you can call another party, or press **FLASH** again to return to first call.

Call Waiting

Call waiting allows third party to call in when you are in a voice connection.

1. Enable Call waiting in the Voice--SIP Advanced Setting web page.
2. Pick up the phone attached to the DSL router.
3. Assuming you are in a voice connection. When another call comes in, the DSL router streams a call waiting tone to your phone, indicating another call is available.
4. Press FLASH to switch to this call and the initial call put to hold automatically.
5. Press FLASH multi-times to switch between these two calls back and forth.

Blind Transfer

Blind transfer transfers the current call to a third party blindly, regardless of whether the transfer is successfully or not.

1. Assume you have already been in a voice connection.
2. Press **FLASH** to hold the first party.
3. Dial **#90** + third party number.
4. Before the third party answering the call, hook on your phone.
5. Now the first party takes over the call and he is in connection with the third party.

Consultative Transfer

Consultative transfer lets the third party answer the transferred call, and then hook on the transferring party. It' more gentle than blind transfer.

1. Assume you have already been in a voice connection with a first party.
2. Press **FLASH** to hold the first party.

3. Dial **#91** + third party number.
4. After the third party answering the call, hook on your phone.
5. Now the first party takes over the call and he is in connection with the third party.

Call Forwarding No Answer

If this feature enabled, incoming calls are forwarded to third party when you does answer them. It involves in two steps: setting the forwarding number and enable the feature.

1. Enable Forward on "no answer" in the Voice--SIP Advanced Setting web page.
2. When our phone does not answer the incoming call, the call is forwarded.

Call Forwarding Busy

If this feature enabled, incoming calls will be forwarded to third party when you busy. It involves two steps: setting the forwarding number and enable the feature.

1. Set Busy Call forwarding number and enable Forward on "busy" in the Voice--SIP Advanced Setting web page.
2. When our phone is busy, this call can be forwarded.

Call Forwarding All

If this feature enabled, incoming calls are forwarded to third party without any reason. It involves in two steps: setting the forwarding number and enable the feature.

1. Set Unconditionally Call forwarding number and Forward unconditionally in the Voice--SIP Advanced Setting web page.
2. All incoming calls are forwarded to the third party.

Three-Way Conference

Three-way conference enables you to invite a third party to a call, and every person in the conference is able to hear others' voice.

1. Assume you are in connection with a first party.
2. Press **FLASH** to put the first party on-hold.
3. Dial a third party.
4. After the third party answers the call, press **FLASH** again to invite the first party.
5. Now all three parties are in a three-way conference.

T38 Faxing

To make T38 faxing, enable T38 support on the Web. After that, connect a fax machine to a FXS port of the DSL router. Now you can use it as a normal phone, and it is able to send or receive fax to or from other fax machines on the VoIP network. In the initial setup, faxing behaves like a normal call. After the DSL router detects the fax tone, it switch to T38 mode, and use it as the transmit approach.

Pass-Through Faxing

If T38 support is disabled, faxing uses normal voice codec as its coding approach. Therefore, this mode more like normal phone calls.

Diagnostics

This page is used to test the connection to your local network, the connection to your DSL service provider, and the connection to your Internet service provider. You may diagnose the connection by clicking the **Test** button or click the **Test With OAM F4** button. If the test continues to fail, click **Help** and follow the troubleshooting procedures.

Diagnostics

The Diagnostics menu provides feedback on the connection status of the device. The individual tests are listed below. If a test displays a fail status:

1. Click on the **Help** link and follow the troubleshooting procedures in the Help screen that appears.
2. Now click **Rerun Diagnostic Tests** at the bottom of the screen to re-test and confirm the error.
3. If the test continues to fail, contact Technical Support.

br_0_0_35 Diagnostics

Your modem is capable of testing your DSL connection. The individual tests are listed below. If a test displays a fail status, click "Rerun Diagnostic Tests" at the bottom of this page to make sure the fail status is consistent. If the test continues to fail, click "Help" and follow the troubleshooting procedures.

Test the connection to your local network

Test your eth0 Connection:	PASS	Help
Test your eth1 Connection:	FAIL	Help
Test your eth2 Connection:	FAIL	Help
Test your eth3 Connection:	FAIL	Help
Test your Wireless Connection:	PASS	Help

Test the connection to your DSL service provider

Test xDSL Synchronization:	FAIL	Help
Test ATM OAM F5 segment ping:	DISABLED	Help
Test ATM OAM F5 end-to-end ping:	DISABLED	Help

FIELD	DESCRIPTION
eth Connection	Pass: Indicates the Ethernet connection to your computer is connected to the LAN port of the router. Fail: Indicates that the router does not detect the Ethernet interface of your computer.
Test your Wireless Connection	Pass: Indicates that the wireless card is switched ON. Fail: Indicates that the wireless card is switched OFF.

Fault Management

The Fault Management page allows you to perform diagnostics for VDSL PTM mode.

802.1ag Connectivity Fault Management

This diagnostic is only used for VDSL PTM mode.

Maintenance Domain (MD) Level:

Destination MAC Address:

802.1Q VLAN ID: [0-4095]

VDSL Traffic Type:

Test the connection to another Maintenance End Point (MEP)

Loopback Message (LBM):

Find Maintenance End Points (MEPs)

Linktrace Message (LTM):	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

Management

Settings

The Settings screens allow you to back up, retrieve and restore the default settings of your Router. It also provides a function for you to update your router's firmware.

Backup

The following screen appears when Backup is selected. Click the Backup Settings button to save the current configuration settings.

You will be prompted for the location to save the backup file to on your PC.

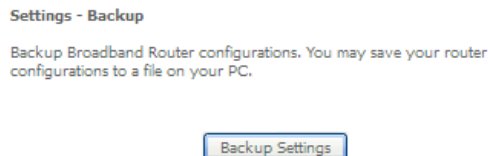
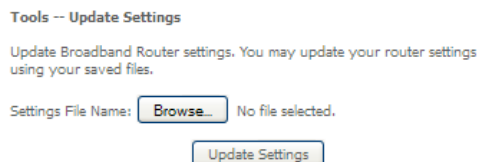


Figure 42: Management - Device Settings – Backup

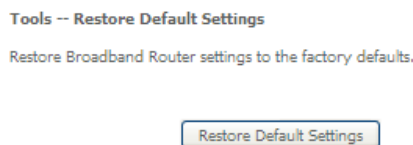
Update Settings

The following screen appears when selecting Update from the Settings submenu. By clicking on the Browse button, you can locate a previously saved filename as the configuration backup file. Click on the Update settings button to upload the selected file.



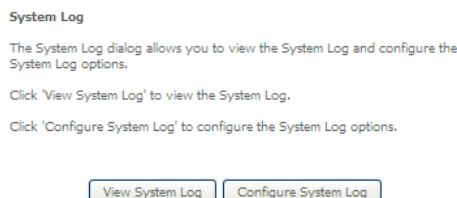
Restore Default

The following screen appears when selecting Restore Default from the Settings submenu. By clicking on the Restore Default Settings button, you can restore your Routers default firmware settings. To restore system settings, reboot your Router.



System Log

The System log page allows you to view the log of the modem and configure the logging level also. To view the system log, click the **View System Log** button.



To configure the system log, click the **Configure System Log** button.

System Log -- Configuration

If the log mode is enabled, the system will begin to log all the selected events. For the Log Level, all events above or equal to the selected level will be logged. For the Display Level, all logged events above or equal to the selected level will be displayed. If the selected mode is 'Remote' or 'Both,' events will be sent to the specified IP address and UDP port of the remote syslog server. If the selected mode is 'Local' or 'Both,' events will be recorded in the local memory.

Select the desired values and click 'Apply/Save' to configure the system log options.

Log: Disable Enable

Log Level:

Display Level:

Mode:

SNMP Agent

The Simple Network Management Protocol (SNMP) allows a network administrator to monitor a network by retrieving settings on remote network devices. To do this, the administrator typically runs an SNMP management station program such as MIB browser on a local host to obtain information from the SNMP agent, in this case the NF1ADV (if SNMP is enabled). An SNMP 'community' performs the function of authenticating SNMP traffic. A 'community name' acts as a password that is typically shared among SNMP agents and managers.

SNMP - Configuration

Simple Network Management Protocol (SNMP) allows a management application to retrieve statistics and status from the SNMP agent in this device.

Select the desired values and click 'Apply' to configure the SNMP options.

SNMP Agent Disable Enable

Read Community:

Set Community:

System Name:

System Location:

System Contact:

Trap Manager IP:

TR-069 Client

TR-069 enables provisioning, auto-configuration or diagnostics to be automatically performed on your router if supported by your Internet Service Provider (ISP).

TR-069 client - Configuration

WAN Management Protocol (TR-069) allows a Auto-Configuration Server (ACS) to perform auto-configuration, provision, collection, and diagnostics to this device.

Select the desired values and click 'Apply/Save' to configure the TR-069 client options.

Enable WAN Management Protocol (TR-069).

Inform Disable Enable

Inform Interval:

ACS URL:

ACS Username:

ACS Password:

WAN Interface used by TR-069 client:

Display SOAP messages on serial console Disable Enable

Connection Request Authentication



Connection Request Port:

Connection Request URL:

FIELD	DESCRIPTION
Inform	Set to enable to activate TR-069 client settings.
Inform interval	Time in seconds that data is sent to the Auto-Configuration Server (ACS).
ACS URL	The address where the ACS server is located.
ACS User Name	The user name to access the ACS server.
ACS Password	The password to access the ACS server.
WAN Interface used by TR-069 Client	The connection used to send and receive data to the ACS server.

Access Control




The Access Control option found in the Management drop down menu configures access related parameters in the following three areas:

-  Passwords
-  Services Control

Access Control is used to control local and remote management settings for your router.

Passwords

The Passwords option configures your account access password for your modem. Access to the device is limited to the following three user accounts:

-  admin is to be used for local unrestricted access control
-  support is to be used for remote maintenance of the device
-  user is to be used to view information and update device firmware

Use the fields illustrated in the screen below to change or create your password. Passwords must be 16 characters or less with no spaces. Click the Apply/Save button after making any changes to continue.

Access Control -- Passwords

Access to your DSL router is controlled through three user accounts: admin, support and user .

The username "admin" has unrestricted access to change and view configuration of your DSL Router.

The username "support" is used to allow an ISP technician to access your DSL Router for maintenance and to run diagnostics.

The username "user" can access the DSL Router, view configuration settings and statistics, as well as, update the router's software.

Use the fields below to enter up to 15 characters and click 'Apply/Save' to change or create passwords. Note: Password cannot contain a space.

Username:

New Username:

Old Password:

New Password:

Confirm Password:

Services

The Service Control List (SCL) allows you to enable or disable your Local Area Network (LAN) or Wide Area Network (WAN) services by ticking the checkbox as illustrated below. The following access services are available: FTP, HTTP, ICMP, SAMBA, SNMP, SSH, TELNET, and TFTP. Click the **Apply/Save** button after making any changes to continue.

Access Control -- Services
Services access control list (SCL) enable or disable the running services.

Services	LAN	WAN	Port
HTTP	<input checked="" type="checkbox"/> enable	<input type="checkbox"/> enable	80
TELNET	<input checked="" type="checkbox"/> enable	<input type="checkbox"/> enable	23
SSH	<input checked="" type="checkbox"/> enable	<input type="checkbox"/> enable	22
FTP	<input checked="" type="checkbox"/> enable	<input type="checkbox"/> enable	21
TFTP	<input checked="" type="checkbox"/> enable	<input type="checkbox"/> enable	69
ICMP	<input checked="" type="checkbox"/> enable	<input type="checkbox"/> enable	0
SNMP	<input checked="" type="checkbox"/> enable	<input type="checkbox"/> enable	161
SAMBA	<input checked="" type="checkbox"/> enable	<input type="checkbox"/> enable	445

Update Software

The following screen appears when selecting the Update Software option from the **Management** menu. By following this screen's steps, you can update your modem's firmware. Manual device upgrades from a locally stored file can also be performed using the following screen.

1. Obtain an updated software image file.
2. Enter the path and filename of the firmware image file in the Software File Name field or click the **Browse** button to locate the image file.
3. Click the **Update Software** button once to upload and install the file.

Tools -- Update Software

Step 1: Obtain an updated software image file from your ISP.

Step 2: Enter the path to the image file location in the box below or click the 'Browse' button to locate the image file.

Step 3: Click the 'Update Software' button once to upload the new image file.

NOTE: The update process takes about 2 minutes to complete, and your Broadband Router will reboot.

Software File Name: No file selected.

Save/Reboot

This option reboots the NF4V.

Click the button below to reboot the router.

Figure 43: Management - Reboot

NOTE 1: It may be necessary to reconfigure your TCP/IP settings to adjust for the new configuration. For example, if you disable the Dynamic Host Configuration Protocol (DHCP) server you will need to apply Static IP settings.

NOTE 2: If you lose all access to your web user interface, simply press the reset button on the rear panel for 3 seconds to restore default settings.

Additional Product Information

Establishing a wireless connection

Windows XP (Service Pack 3)

1. Open the Network Connections control panel (Start -> Control Panel -> Network Connections):
2. Right-click on your Wireless Network Connection and select View Available Wireless Networks:
3. Select the wireless network listed on your included wireless security card and click Connect.
4. Enter the network key (refer to the included wireless security card for *the default wireless network key*).
5. The connection will show Connected.

Windows Vista

1. Open the Network and Sharing Center (Start > Control Panel > Network and Sharing center).
2. Click on "Connect to a network".
3. Choose "Connect to the Internet" and click on "Next".
4. Select the wireless network listed on your included wireless security card and click Connect.
5. Enter the network key (refer to the included wireless security card for *the default wireless network key*).
6. Select the appropriate location. This will affect the firewall settings on the computer.
7. Click on both "Save this network" and "Start this connection automatically" and click "Next".

Windows 7

1. Open the Network and Sharing Center (Start > Control Panel > Network and Sharing center).
2. Click on "Change Adapter settings" on the left-hand side.
3. Right-click on "Wireless Network Connection" and select "Connect / Disconnect".
4. Select the wireless network listed on your included wireless security card and click Connect.
5. Enter the network key (refer to the included wireless security card for *the default wireless network key*).
6. You may then see a window that asks you to "Select a location for the 'wireless' network". Please select the "Home" location.
7. You may then see a window prompting you to setup a "HomeGroup". Click "Cancel" on this.
8. You can verify your wireless connection by clicking the "Wireless Signal" indicator in your system tray.
9. After clicking on this, you should see an entry matching the SSID of your NF4V with "Connected" next to it.

Mac OSX 10.6

1. Click on the Airport icon on the top right menu.
2. Select the wireless network listed on your included wireless security card and click Connect.
3. On the new window, select "Show Password", type in the network key (refer to the included wireless security card for *the default wireless network key*) in the Password field and then click on OK.
4. To check the connection, click on the Airport icon and there should be a tick on the wireless network name.



Note: For other operating systems, or if you use a wireless adaptor utility to configure your wireless connection, please consult the wireless adaptor documentation for instructions on establishing a wireless connection.

Troubleshooting

Using the indicator lights (LEDs) to Diagnose Problems

The LEDs are useful aides for finding possible problem causes.

Power LED

The Power LED does not light up.

STEP	CORRECTIVE ACTION
1	Make sure that the NF4V power adaptor is connected to the device and plugged in to an appropriate power source. Use only the supplied power adaptor.
2	Check that the NF4V and the power source are both turned on and device is receiving sufficient power.
3	Turn the NF4V off and on.
4	If the error persists, you may have a hardware problem. In this case, you should contact technical support.

Web Configuration

I cannot access the web configuration pages.

STEP	CORRECTIVE ACTION
1	Make sure you are using the correct IP address of the NF4V. You can check the IP address of the device from the Network Setup configuration page.
2	Check that you have enabled remote administration access. If you have configured an inbound packet filter, ensure your computer's IP address matches it.
3	Your computer's and the NF4V's IP addresses must be on the same subnet for LAN access. You can check the subnet in use by the router on the Network Setup page.
4	If you have changed the devices IP address, then enter the new one as the URL you enter into the address bar of your web browser.
5	If you are still not able to access the web configuration pages, reset the router to the factory default settings by pressing the reset button for 3 seconds and then releasing it. When the Power LED begins to blink, the defaults have been restored and the NF4V restarts. Navigate to 192.168.20.1 in your web browser and enter "admin" (without the quotes) as the username and password.

The web configuration does not display properly.

STEP	CORRECTIVE ACTION
1	Delete the temporary web files and log in again. In Internet Explorer, click Tools, Internet Options and then click the Delete Files ... button. When a Delete Files window displays, select Delete all offline content and click OK. (Steps may vary depending on the version of your Internet browser.)

Login Username and Password

I forgot my login username and/or password.

STEP	CORRECTIVE ACTION
1	Press the Reset button for 3 seconds, and then release it. When the Power LED begins to blink, the defaults have been restored and the NF4V restarts. You can now login with the factory default username and password "admin" (without the quotes)
2	It is highly recommended to change the default username and password. Make sure you store the username and password in a safe place.

WLAN Interface

I cannot access the NF4V from the WLAN or ping any computer on the WLAN.

STEP	CORRECTIVE ACTION
1	Check the Wi-Fi LED on the front of the unit and verify the WLAN is enabled as per the LED Indicator section.
2	If you are using a static IP address for the WLAN connection, make sure that the IP address and the subnet mask of the NF4V and your computer(s) are on the same subnet. You can check the routers configuration from the Network Setup page.

Technical Data

The following table lists the hardware specifications of the NF4V.

MODEL	NF4V
ADSL2+	ITU 992.1 (G.dmt) Annex A ITU 992.2 (G.lite) ITU 992.3 ADSL2 (G.dmt.bis) ITU 992.5 ADSL2+
Ethernet WAN	1 x Gigabit WAN port (10/100/1000 Mbps)
Connectivity	4 x 10/100/1000 Mbps, 1 x RJ-11 ADSL, 1 x WLAN
LED Indicators	Power, ADSL, WWW, LAN 1-4, WAN, WiFi.
Operating Temperature	Operating temperature: 0°C - 40°C, Humidity: 10%-90% non-condensing Storage temperature: -10°C - 70°C, Humidity: 0%-95% non-condensing
Power Input	12V DC - 2A
Dimensions & Weight	216 mm (L) x 61 mm (W) x 173 mm (H) 443 grams
Regulatory Compliance	A-Tick

Electrical Specifications

It is recommended that the NF4V be powered by the supplied 12V DC, 2A power supply. A replacement power supply is available from the NetComm Wireless Online shop.

Environmental Specifications / Tolerances

The NF4V housing enables it to operate over a wide variety of temperatures from 0°C - 40°C (operating temperature).

Legal & Regulatory Information

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Customer Information

The Australian Communications & Media Authority (ACMA) requires you to be aware of the following information and warnings:

1. This unit may be connected to the Telecommunication Network through a line cord which meets the requirements of the AS/CA S008-2011 Standard.
2. This equipment incorporates a radio transmitting device, in normal use a separation distance of 20cm will ensure radio frequency exposure levels complies with Australian and New Zealand standards.
3. This equipment has been tested and found to comply with the Standards for C-Tick and or A-Tick as set by the ACMA. 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:
 - i. Change the direction or relocate the receiving antenna.
 - ii. Increase the separation between this equipment and the receiver.
 - iii. Connect the equipment to an alternate power outlet on a different power circuit from that to which the receiver/TV is connected.
 - iv. Consult an experienced radio/TV technician for help.
4. 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 Wireless. Failure to do so may cause damage to this product, fire or result in personal injury.

Consumer Protection Laws

Australian and New Zealand consumer law in certain circumstances implies mandatory guarantees, conditions and warranties which cannot be excluded by NetComm and legislation of another country's Government may have a similar effect (together these are the Consumer Protection Laws). Any warranty or representation provided by NetComm is in addition to, and not in replacement of, your rights under such Consumer Protection Laws.

If you purchased our goods in Australia and you are a consumer, you are entitled to a replacement or refund for a major failure and for compensation for any other reasonably foreseeable loss or damage. You are also entitled to have the goods repaired or replaced if the goods fail to be of acceptable quality and the failure does not amount to a major failure. If you purchased our goods in New Zealand and are a consumer you will also be entitled to similar statutory guarantees.

Product Warranty

All NetComm Wireless products have a standard one (1) year warranty from date of purchase, however, some products have an extended warranty option (refer to packaging and the warranty card) (each a Product Warranty). To be eligible for the extended warranty option you must supply the requested warranty information to NetComm Wireless Limited within 30 days of the original purchase date by registering online via the NetComm Wireless web site at www.netcommwireless.com. For all Product Warranty claims you will require proof of purchase. All Product Warranties are in addition to your rights and remedies under applicable Consumer Protection Laws which cannot be excluded (see Consumer Protection Laws Section above).

Subject to your rights and remedies under applicable Consumer Protection Laws which cannot be excluded (see the [Consumer Protection Laws](#) Section above), the Product Warranty is granted on the following conditions:

1. the Product Warranty extends to the original purchaser (you / the customer) and is not transferable;
2. the Product 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;
5. NetComm Wireless Limited does not have any liability or responsibility under the Product 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; and
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 Wireless Limited recommends that you enable these features to enhance your security.

Subject to your rights and remedies under applicable Consumer Protection Laws which cannot be excluded (see Section 3 above), the Product Warranty is automatically voided if:

1. you, or someone else, use the product, or attempt to use it, other than as specified by NetComm Wireless Limited;
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 Wireless Limited; or
6. the serial number has been defaced or altered in any way or if the serial number plate has been removed.

Limitation of Liability

This clause does not apply to New Zealand consumers. Subject to your rights and remedies under applicable Consumer Protection Laws which cannot be excluded (see the [Consumer Protection Laws](#) Section above), NetComm Wireless Limited accepts no liability or responsibility, for consequences arising from the use of this product. NetComm Wireless Limited reserves the right to change the specifications and operating details of this product without notice.

If any law implies a guarantee, condition or warranty in respect of goods or services supplied, and NetComm Wireless's liability for breach of that condition or warranty may not be excluded but may be limited, then subject to your rights and remedies under any applicable Consumer Protection Laws which cannot be excluded, NetComm Wireless's liability for any breach of that guarantee, condition or warranty is limited to: (i) in the case of a supply of goods, NetComm Wireless Limited doing any one or more of the following: replacing the goods or supplying equivalent goods; repairing the goods; paying the cost of replacing the goods or of acquiring equivalent goods; or paying the cost of having the goods repaired; or (ii) in the case of a supply of services, NetComm Wireless Limited doing either or both of the following: supplying the services again; or paying the cost of having the services supplied again.

To the extent NetComm Wireless Limited is unable to limit its liability as set out above, NetComm Wireless Limited limits its liability to the extent such liability is lawfully able to be limited.

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