ADSL Wireless Router

HN294dp/di

User Guide

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.

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Abstract

This User Guide provides general information about the installation of the Ericsson ADSL Wireless Router HN294d, as well as information about configuration possibilities.

Trademark List

Windows	Windows is a registered trademark of Microsoft Corporation

Enclosure List

Contents

1 Introduction

1.1 About this User Guide

This User Guide provides general information about the installation of the Ericsson ADSL Wireless Router HN294d, as well as information about configuration possibilities.

The following chapters are included in this guide:

- **Chapter 1** – “Introduction” - provides information about the ADSL Wireless Router HN294d.

- **Chapter 2** – “Hardware Description and Installation” – provides a hardware description of the product and detailed instructions about how to install the HN294d in a PC/Windows environment

- **Chapter 3** – “Initial Configuration” – describes how to access the built-in Configuration tool and run the Configuration Wizard in order to perform the initial configuration.

- **Chapter 4, 5, 6, 7 and 8** – “ADSL-mode – xxx” – give a description of each of the five pre-defined ADSL-modes included in the Configuration Wizard.

- **Chapter 9** – “Advanced Configuration” - provides detailed information about the built-in Web Manager and how to perform advanced configuration.

- **Chapter 10** – “Troubleshooting” - provides tips and solution for resolving some of the problems that might occur when installing and using the HN294d.

- **Chapter 11** – “Important Information” – provides information about License Agreement and Regulatory Information.

- The **Glossary** includes abbreviations and explanations to technical terms used in this guide.

1.2 About the ADSL Wireless Router HN294d

Thank you for choosing the Ericsson ADSL (Asymmetric Digital Subscriber Line) Wireless Router HN294d. Already by the name you can see that the

HN294d is a powerful addition to your home; HN294d stands for Ericsson quality, Wireless (WLAN) stands for freedom from cables, ADSL stands for high-speed access to the Internet, Router stands for security/convenience and they altogether stands for the future.

The HN294d is available in two versions: HN294dp and HN294di. Both products offer the same features, but they rely on different types of telephone line in order to provide the ADSL service. **HN294dp** offers ADSL service over POTS (Plain Old Telephone System) lines, while **HN294di** uses ISDN (Integrated Services Digital Network) lines to provide the ADSL service.

Based on the IEEE 802.1d wireless standard the HN294d will let you experience the freedom from cables, this means "no more annoying cables"! With up to 11 Mbit/s in wireless speed you will have access to your broadband network from wherever you are in your home.

With the fast and powerful HN294d you can spend less time waiting and more time doing the things you want to do and you can do it anytime anywhere. You can even talk on the telephone simultaneously as you surf the Internet using your existing phone line. Using this wireless router will give you lots of advantages over only using a simple ADSL modem (simple ADSL modems are often referred to as "bridged" modems). With a router you can connect multiple PCs together to use a single Internet connection using wireless, Ethernet- or USB devices (the HN294d can handle all three simultaneously) and you will be protected by state-of-the-art firewall technology. But, perhaps the best thing about the HN294d is that you don’t have to be a computer expert to use it, simple plug it in and you are done. No complex configuration with a lot of questions you don’t know how to answer, Ericsson has already answered them for you.

1.2.1 Ease of Use

For standard Internet access (surfing websites, playing network games, downloading files, using peer-to-peer programs etc) all you have to do is select an appropriate ADSL-mode in the web-based Configuration Wizard and the technical details is set-up and managed automatically. The HN294d comes pre-programmed with different ADSL-modes to suit different end-users.

1.2.2 Wireless Features

It is very easy to have a wireless network up and running when using the HN294d. As the HN294d is preconfigured, all you have to do is to install and configure a wireless card to your computer (wireless PCMCIA-card, wireless PCI-card or wireless USB adapter) and when your computer is correctly setup just turn on your HN294d. Your computer will automatically find the HN294d and assign your computer an IP address. Now, you are ready to surf and use the Internet anywhere in your home.

Since a wireless network is more vulnerable to attacks than a traditional wired network it is recommended to make some configuration that will make it impossible for another user than you to access the wireless network. The HN294d has several configuration possibilities to help you improve the security in your wireless LAN.

In a wireless configuration the HN294d is designed to reach 50-100 meters indoors (up to 300 meters outdoors), but when choosing a location for your router keep in mind that this length is affected by a number of rules, such as:

- The more walls the signal has to pass, the shorter will the signal reach.
- The thicker the wall is, the shorter will the signal reach.
- Keep the HN294d away from equipment that might disturb the signal (such as Bluetooth devices, microwave ovens and 2.4 GHz cordless phones).

1.2.3 Security

You can connect more than 250 PCs to the HN294d, all sharing the same public IP address. This is made possible by NAT (Network Address Translation) technology. NAT also hides your PCs from the Internet, which serves as security protection, making it impossible to directly target your PCs from the outside. All traffic is addressed to the HN294d, which, with its powerful firewall, inspects all incoming and outgoing traffic and removes malicious or dangerous packets. The firewall is a full stateful packet inspection firewall, which means that it will not only inspect packets (like simple firewalls) but also will remember and investigate traffic flows and patterns to detect and prevent advanced attacks. To keep it simple, all that you need to do is select the desired level of security.

Even though your PCs are invisible and protected from the Internet you can still access the Internet as before, and all your Internet programs (games, applications, peer-to-peer programs, communications applications etc) will still work. This is handled by built-in mechanisms that recognize your programs and allow them to access the Internet directly. Everything is handled automatically and requires no user configuration.

The HN294 also supports pass-through of common VPN (Virtual Private Network) implementations making it possible for the user to create secure connections. A VPN is used to create secure connections where confidential information needs to be sent. The VPN can be compared to a tunnel where the information inside the tunnel is encrypted so that only the intended target at the end of the tunnel can read the information.

1.2.4 Advanced Possibilities

The HN294d also offers sophisticated router functionality making it possible for advanced users to create customized network scenarios as desired. This includes the ability to set up static routes, multiple subnets, a DMZ, etc. The Virtual server function enables you to create your own servers behind the HN294d firewall, giving both the servers and the PCs, on which they run, full protection. Several servers are already pre-defined, making it easy to enable secure access to the server.

With its dual benefits of advanced functionality and ease of use, the HN294d provides an ideal Internet access solution for a corporate environment, a small office, and even for home users.

2 Hardware Description and Installation

This chapter provides a hardware description of the product and detailed instructions about how to install the HN294d in a PC/Windows environment.

2.1 Before You Start

2.1.1 Package Contents

Check the contents of the package against the shipping contents checklist (and figure) below. If any of the items is missing, please contact the dealer from whom the equipment was purchased.

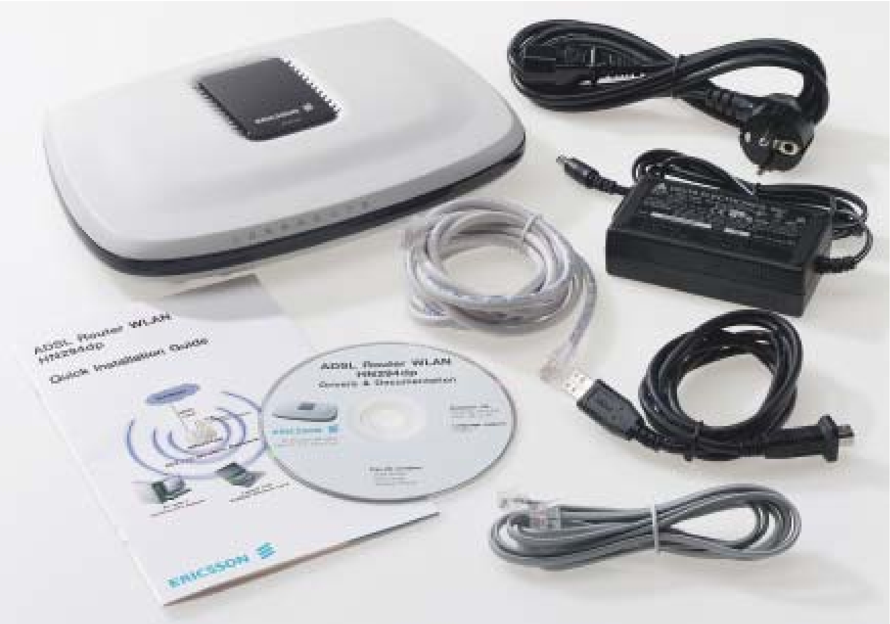


Figure 1 - HN294d Package Contents

Shipping contents checklist:

- ❑ The ADSL Wireless Router HN294d
- ❑ A Power Supply Adapter with connecting cable
- ❑ Drivers & Documentation CD (including drivers for USB installation, Acrobat Reader, and this User Guide)

- ADSL Line Cable
- Ethernet Cable
- USB Cable
- Quick Installation Guide

Your HN294d package may also include other materials provided by your ADSL operator.

2.1.2 Subscription for ADSL Service

To use the ADSL Wireless Router HN294d, you will require an ADSL service subscription from your broadband service provider.

2.2 Physical Appearance

2.2.1 Front Panel and LED Indicators

The HN294d is equipped with nine LEDs on the front panel. Although the LED functions depend upon the operational state of the router, each LEDs general purpose is described in the table below (from left to right):

Symbol	Status/Description
⏻ PWR	**Unlit**: Power Off. **Solid**: Power On
🗠 DIAG	**Unlit**: Power Off or initial self test of the unit is OK. **Blinking**: Software is downloading or updating of operation parameters is in progress. **Solid**: Failure during initial self-test or programming FLASH memory.
🖧 LAN 1-4	**Unlit**: Power Off or no Ethernet link detected to the corresponding (1-4) Ethernet port. **Blinking**: User data is going through the corresponding (1-4) Ethernet port. **Solid**: Ethernet connection is OK.
USB	**Unlit**: Power Off or waiting for USB connection going up. **Blinking**: User data is going through the USB port. **Solid**: USB connection is OK.

Symbol	Status/Description
📶 WLAN	**Unlit**: Power Off or no radio signal (WLAN card is not present or fails to function). **Blinking**: Traffic is going through the WLAN interface. **Solid**: The Wireless LAN interface is ready.
🌐 DSL	**Unlit**: Power Off. **Blinking**: ADSL line connection is handshaking or training is in progress. **Solid**: ADSL line connection is OK.

Table 1 - Description of LEDs

2.2.2 Back Panel and Connectors

The following figure illustrates the back panel of your HN294d:

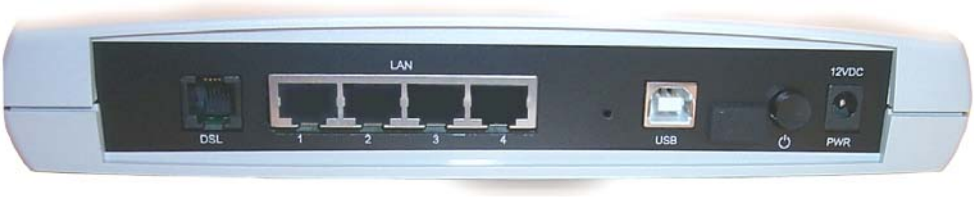


Figure 2 - Back Panel of the HN294d

Description of connectors and buttons:

- **DSL** – The DSL port is used for connecting the HN294d to the ADSL service port (splitter/filter or phone outlet) using the supplied ADSL line cable (RJ11 – RJ11).
- **LAN 1, 2, 3, 4** – The LAN ports (Ethernet 10/100 BaseT) are used for connecting the HN294d to client PCs NIC (Network Interface Card). One Ethernet cable (RJ45 – RJ45) is supplied.
- **USB** – The USB port is used for connecting the HN294d to a PC USB port using the supplied USB cable.
- **RESET button** (tiny hole) – Used to restore your HN294d to its original factory default settings.
- (**CONSOLE** – The CONSOLE port should only be used by field technicians).

- **POWER button –** To power ON/OFF your HN294d.
- **PWR** – The PWR socket is used for connecting the supplied power supply adapter.

2.3 Choose a Place for the Router

The HN294d can be mounted on the wall or simply placed on a flat surface.

NOTE! Proper ventilation is necessary to prevent the product from over-heating. Do not block or cover the slots and openings on the device, which are intended for ventilation and proper operation.

In a wireless configuration the HN294d is designed to reach 50-100 meters indoors and up to 300 meters outdoors. When choosing a location for your router, keep in mind that the number, thickness and location of walls, ceilings or other objects that the wireless signal must pass through may limit the range. Also keep the HN294d away from equipment that might disturb the signal, such as Bluetooth devices, microwave ovens and 2.4 GHz cordless phones.

If you choose to wall mount the router, use two screws and two of the mounting slots on the bottom of the unit as shown in the illustrations below:

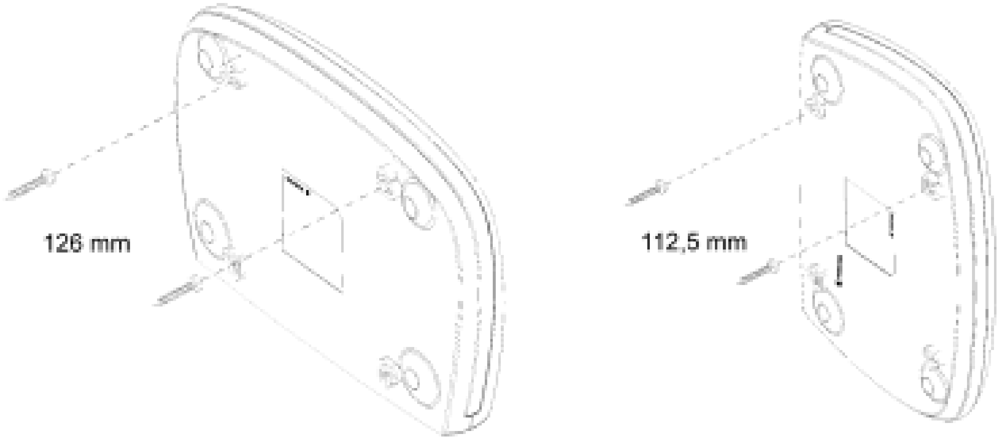


Figure 3 - Wall mounting of the HN294d

Note that the transparent top cover can be rotated to ensure that the logo is correctly positioned for various mounting positions.

2.4 Connect the HN294d

This chapter describes how to connect the HN294d to your Wireless LAN and/or to your LAN computer(s) using the Ethernet and/or USB interface(s).

2.4.1 Connect Wireless Computer(s)

To be able to communicate with the HN294d in a wireless LAN your computer(s) need some kind of wireless adapter installed. This could for example be a PCMCIA wireless card for your laptop, a wireless PCI card or a USB wireless adapter for your desktop PCs.

NOTE! Before installing a wireless adapter find and write down the MAC address of the product, as you might need it later when configuring your HN294d. You will normally find the MAC address on the product label of your WLAN adapter. MAC addresses are given in the form 00:90:96:1A:2B:3C and only numbers (0 through 9) and letters (a through f) are allowed.

Follow the instructions below to connect the HN294d in a Wireless LAN environment.

1. **Install wireless adapter(s)** according to instructions provided together with the equipment.

2. **Connect the ADSL Line**
   Use the provided **ADSL Line cable** to connect the **DSL** port of the HN294d to your ADSL outlet (splitter/filter of phone outlet).

3. **Connect the Power Supply**
   Connect the provided **Power cable** to the **PWR** socket of your HN294d and plug the power supply adapter into a power source.

4. **Power ON the HN294d**
   Press the **Power** button on the back of the HN294d to turn it on.

   Check that PWR ⏻ LED turns On.

   Check that the DSL 🌐 LED turns On indicating that the ADSL line is ready. The LED is blinking when handshaking/training for the ADSL line connection is in progress.

5. If your client PC is correctly configured it will automatically detect and connect to the HN294d.

   Check that the WLAN 📶 LED turns On indicating that the Wireless LAN is ready.
   The HN294d comes preconfigured with a unique SSID network name: **HN294-xxxxxx**, where xxxxxx is the last six digits of its

wireless MAC address (can be found on an information sticker on the bottom of the router).

6. Now, the HN294d must be configured for your specific ADSL mode and other settings. This is described in chapter 3 “Initial Configuration”.

2.4.2 Connect Computer(s) via Cables

NOTE! If you want to use both a LAN and the USB port, connect them to two different PCs. It is NOT recommended to connect one PC to both a LAN and the USB ports simultaneously.

Follow the instructions below to connect the HN294d to your LAN computer(s) using the Ethernet and/or USB interface:

1. **Connect the ADSL Line**
   Use the provided **ADSL Line cable** to connect the **DSL** port of the HN294d to your ADSL outlet (splitter/filter or phone outlet).

2. **Connect a client PC:**

   - to one of the four LAN ports
   Attach one end of the provided **Ethernet cable** to one of the four **LAN** ports of your HN294d. Connect the other end to the Ethernet adapter port on your client PC.

   -- OR --

   - to the USB port
   Insert the provided “Drivers & Documentation” CD and follow the instructions given in the next section – “Install USB Drivers”. DO NOT connect the USB cable until the installation program instructs you.

3. **Connect the Power Supply**
   Connect the provided **Power cable** to the **PWR** socket of your HN294d and plug the power supply adapter into a power source.

4. **Power ON the HN294d**
   Press the **Power button** on the back of the HN294d to turn it on.

   Check the LEDs on the HN294d according to the following:
   The PWR ⏻ LED turns On.
   The DSL 🌐 LED turns On indicating that the ADSL line is ready. The LED is blinking when handshaking/training for the ADSL line connection is in progress.

The LAN 🖧 and/or USB ⭠ LED(s) turn On indicating a proper connection to either a Ethernet NIC or a USB port.

5. Now, the HN294d must be configured for your specific ADSL mode and other settings. This is described in chapter 3 – “Initial Configuration”.

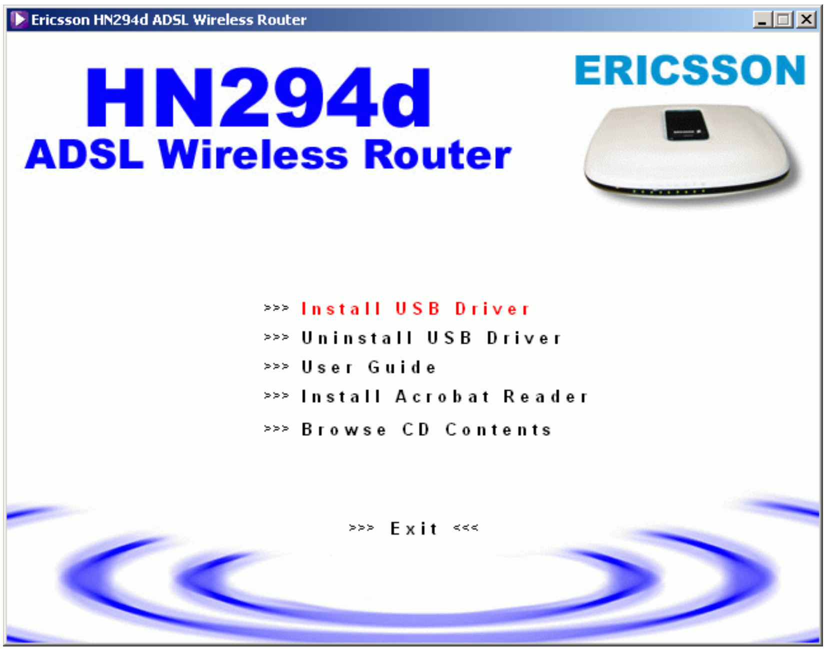
2.4.2.1 Install USB Drivers

NOTE! This should only be done if you have connected a computer via the USB interface.

For USB connection you need to install USB drivers to your PC. Follow the instructions below to install USB drivers and connect the HN294d to the USB interface.

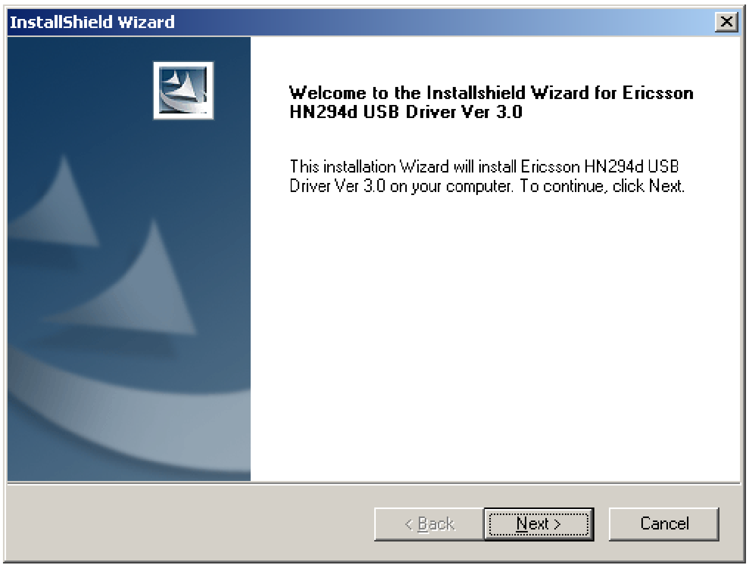
1. Close ALL Windows applications and insert the provided “Drivers & Documentation” CD into your CD-ROM drive.

2. The CD starts automatically and the following Welcome page is displayed:



NOTE! If Autorun does not start, select **Start > Run…**, type **D:\startup.exe** (where D: is the letter of your CD-ROM drive) and press Enter.

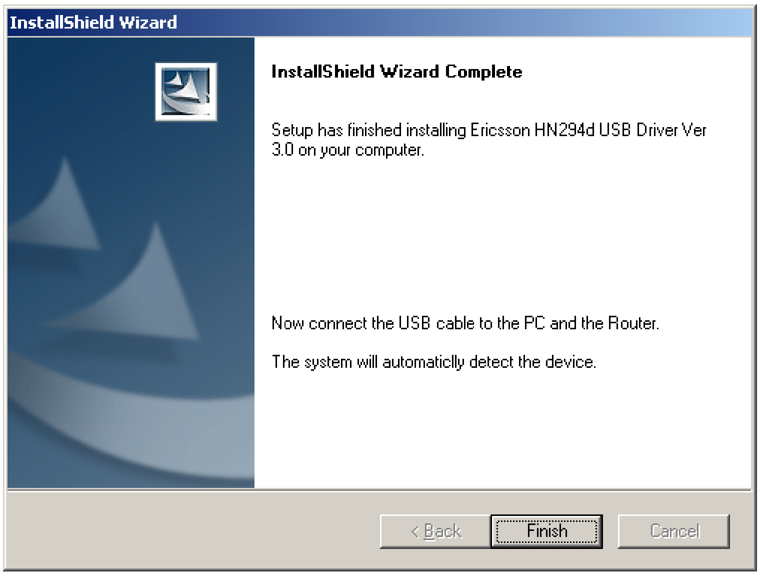
3. Select **Install USB Driver** and wait until the following window is displayed:



Welcome to the Installshield Wizard for Ericsson HN294d USB Driver Ver 3.0

This installation Wizard will install Ericsson HN294d USB Driver Ver 3.0 on your computer. To continue, click Next.

4. Click **Next>**. Files will now be copied to your hard disk and when completed the following window appears:



InstallShield Wizard Complete

Setup has finished installing Ericsson HN294d USB Driver Ver 3.0 on your computer.

Now connect the USB cable to the PC and the Router.

The system will automaticlly detect the device.

5. Connect the provided **USB cable** to the **USB** port of your HN294d. Connect the other end to the USB port on your client PC.

6. Windows will now detect the new USB device and finalize the installation.

NOTE! If the **Digital Signature Not Found** window (or similar) appears, you should click **Yes** (or **Continue Anyway**) to continue the installation. This is a warning from Microsoft that the installation software is not a digitally signed version, but since Ericsson has tested the software in different Windows versions this is not necessary.

7. Click **Finish** to close the InstallShield wizard.

8. Click **>>> Exit <<<** in the Welcome page of the CD to close that window.

2.5 Configure Client PCs

This chapter describes how you can check (and maybe change) the TCP/IP settings in your computer(s) if you have problems to access the Internet. Refer to information from your Internet Service Provider.

2.5.1 Use DHCP

If you have not been provided any IP settings from your ISP/service provider, you should use DHCP that is the most common used method.

In Windows 98/98SE and Me:

1. From the **Start** menu select **Settings > Control Panel** and double-click on the **Network** icon.

2. Click the **Configuration** tab and select **TCP/IP** for the network adapter (wireless, Ethernet or USB) that is connected to your HN294d. Click the **Properties** button.

3. Select the **IP Address** tab and make sure that “Obtain an IP address automatically” is selected. If not, select it and click **OK**.

4. Click **OK** in the “Network” dialog box and close the Control Panel.

5. Some configuration files may be copied to your hard disk and if a “Settings Changes” message asks you to restart your PC, you should answer **Yes**.

In Windows 2000:

1. From the **Start** menu select **Settings > Control Panel** and double-click on the **Network and Dial-up Connections** icon.

2. Double-click on the Local Area Connection icon for the HN294d. Be sure to choose the correct one if you have several dial-up icons.

3. Click the **Properties** button.

4. Select the **Internet Protocol (TCP/IP)** and click the **Properties** button.

5. Make sure that “Obtain an IP address automatically” is selected. If not, select it and click **OK**.

6. Click **OK** in the “Local Area Connection Properties” dialog box and click **Close** in the “Local Area Connection Status” dialog box.

7. Close the “Network and Internet Connections” window.

In Windows XP:

1. From the **Start** menu select **Control Panel** and double-click on **Network Connections** (Classic View) or double-click on the link **Network and Internet connections** followed by **Network Connections** (Category View).

2. Double-click on the Local Area Connection icon for the HN294d. Be sure to choose the correct one if you have several dial-up icons.

3. Click the **Properties** button.

4. Select the **Internet Protocol (TCP/IP)** and click the **Properties** button.

5. Make sure that “Obtain an IP address automatically” is selected. If not, select it and click **OK**.

6. Click **Close** in the “Local Area Connection Properties” and “Local Area Connection Status” dialog boxes.

7. Close the “Network and Internet Connections” window.

2.5.2 Use Static IP Addresses

If your ISP/service provider has provided you with IP settings (for instance IP address, subnet mask and default gateway) and/or explicitly stated that DHCP is not used, you should do the following:

In Windows 98/98SE and Me:

1. From the **Start** menu select **Settings > Control Panel** and double-click on the **Network** icon.

2. Click the **Configuration** tab and select **TCP/IP** for the network adapter (wireless, Ethernet or USB) that is connected to your HN294d. Click the **Properties** button.

3. Select the **IP Address** tab.

4. Select “Specify an IP address” and enter the IP settings provided by your ISP/service provider. Click **OK**.

5. Click **OK** in the “Network” dialog box and close the Control Panel.

6. Some configuration files may be copied to your hard disk and if a “Settings Changes” message asks you to restart your PC, you should answer **Yes**.

In Windows 2000:

1. From the **Start** menu select **Settings > Control Panel** and double-click on the **Network and Dial-up Connections** icon.
2. Double-click on the Local Area Connection icon for the HN294d. Be sure to choose the correct one if you have several dial-up icons.
3. Click the **Properties** button.
4. Select the **Internet Protocol (TCP/IP)** and click the **Properties** button.
5. Select “Specify an IP address” and enter the IP settings provided by your ISP/service provider. Click **OK**.
6. Click **OK** in the “Local Area Connection Properties” dialog box and click **Close** in the “Local Area Connection Status” dialog box.
7. Close the “Network and Internet Connections” window.

In Windows XP:

1. From the **Start** menu select **Control Panel** and double-click on **Network Connections** (Classic View) or double-click on the link **Network and Internet connections** followed by **Network Connections** (Category View).
2. Double-click on the Local Area Connection icon for the HN294d. Be sure to choose the correct one if you have several dial-up icons.
3. Click the **Properties** button.
4. Select the **Internet Protocol (TCP/IP)** and click the **Properties** button.
5. Select “Use the following IP address” and enter the IP settings provided by your ISP/service provider. Click **OK**.
6. Click **Close** in the “Local Area Connection Properties” and “Local Area Connection Status” dialog boxes.
7. Close the “Network and Internet Connections” window.

3 Initial Configuration

This chapter describes how to access the built-in Configuration tool and run the Configuration Wizard in order to perform the initial configuration.

3.1 Introduction

The HN294d is an advanced ADSL router with several features and supported modes that make it ideal for advanced home networking. Most routers with similar features require complex configuration routines, but the HN294d offers a Configuration Wizard that enables you to easily configure the HN294d through a user friendly GUI. No special software is required on your PC to manage and operate the HN294d. All you need is a web browser (e.g. Internet Explorer or Netscape Communicator).

In the Configuration Wizard the user can select an ADSL-mode that fits his/her needs. There are currently five pre-defined ADSL-modes as shown in the table below where they are briefly described. The following “ADSL-mode” chapters give a deeper description of each of them.

Connection Type	**Select ADSL-mode**
Connect using PPPoE (sometimes called dial-up). This type of connection requires a Username and a Password.	RFC1483 Bridge (described in chapter 4) or PPPoE Router (described in chapter 7).
Connect using PPPoA (sometimes called dial-up). This type of connection requires a Username and a Password.	PPPoA Router (described in chapter 8)
Connect using DHCP or fixed IP address (without a Username and Password. Some operators provide Username and Password also for this type of connection, but the login process is in this case done from a webpage or similar.	RFC1483 Bridge (described in chapter 4) or RFC1483 Router (described in chapter 5) or RFC1483 MER Router (described in chapter 6).

The HN294 still offers the possibility for advanced users to set up special network scenarios themselves or to modify the existing ones. Refer to the “Advanced Configuration” chapter for further information.

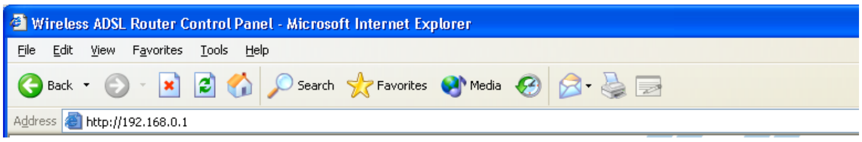
TIP: For advanced network scenarios, select the ADSL-mode that is closest to your requirements and then modify it to meet your needs. This is easier than creating a complete new profile.

3.2 Access the Configuration Wizard

Follow the steps below to access the built-in Configuration tool and start the Configuration Wizard.

NOTE! Before performing the following steps make sure that all the steps in chapter “Hardware Description and Installation” have been performed.

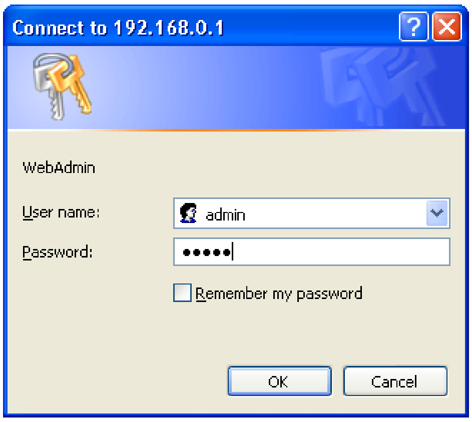
1. Start your web browser and type **192.168.0.1** (the private IP address for the HN294d) in the URL field and press Enter.



Wireless ADSL Router Control Panel - Microsoft Internet Explorer

Address http://192.168.0.1

2. To access the Configuration tool you have to login and the following window is displayed:



Connect to 192.168.0.1

WebAdmin

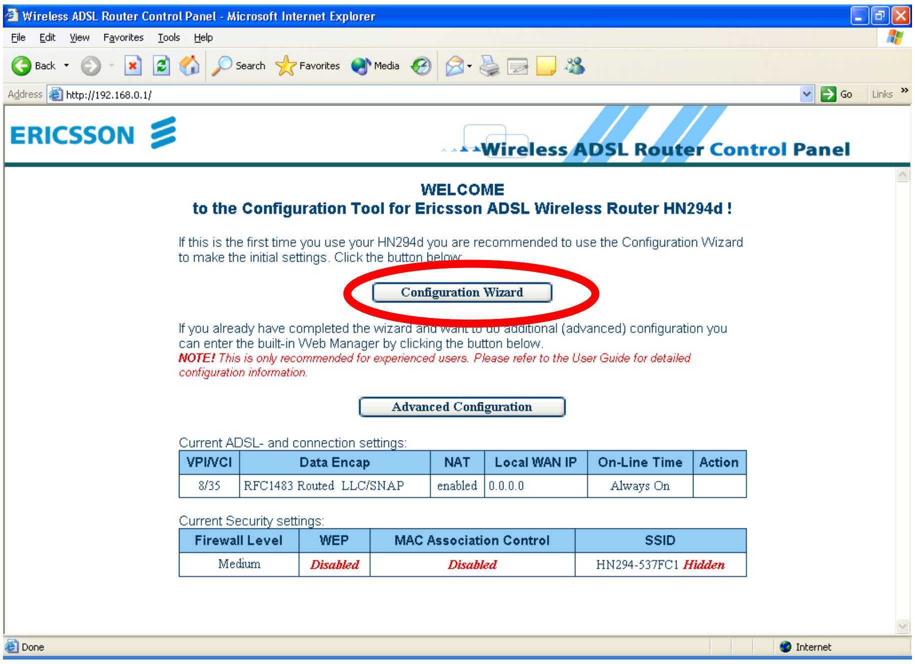
User name: admin

Password: •••••

□ Remember my password

3. Type **admin** in both the “User name” and “Password” fields that are the default settings for the HN294d, and click **OK**.

4. The welcome page of the Configuration tool is displayed:



Wireless ADSL Router Control Panel - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Search Favorites Media
Address http://192.168.0.1/
Go Links
ERICSSON
Wireless ADSL Router Control Panel
Done
Internet

WELCOME
to the Configuration Tool for Ericsson ADSL Wireless Router HN294d !

If this is the first time you use your HN294d you are recommended to use the Configuration Wizard to make the initial settings. Click the button below.

Configuration Wizard

If you already have completed the wizard and want to do additional (advanced) configuration you can enter the built-in Web Manager by clicking the button below.
NOTE! This is only recommended for experienced users. Please refer to the User Guide for detailed configuration information.

Advanced Configuration

Current ADSL- and connection settings:

VPI/VCI	Data Encap	NAT	Local WAN IP	On-Line Time	Action
8/35	RFC1483 Routed LLC/SNAP	enabled	0.0.0.0	Always On	

Current Security settings:

Firewall Level	WEP	MAC Association Control	SSID
Medium	*Disabled*	*Disabled*	HN294-537FC1 *Hidden*

5. Click on the **Configuration Wizard** button and follow the instructions given on-screen.

6. When you have completed the wizard and reached the last page (step 4) it is important that you click the **Save Configuration** button to save all configuration settings to non-volatile memory. The HN294d will reboot and is then ready for use.

3.3 Access the Internet

Your Internet Service Provider may have provided you additional instructions (in the package or separately) about account setup, additional software installation, and/or Internet usage. In that case, please follow those instructions to complete your Internet connection setup.

If your Internet connection is not working properly your computer(s) might need to be configured for TCP/IP. Refer to chapter 2.5 “Configure Client PCs” to find some general descriptions.

4 ADSL-mode – RFC1483 Bridge

4.1 Description

RFC1483 (2684) Bridged Mode (single PVC)

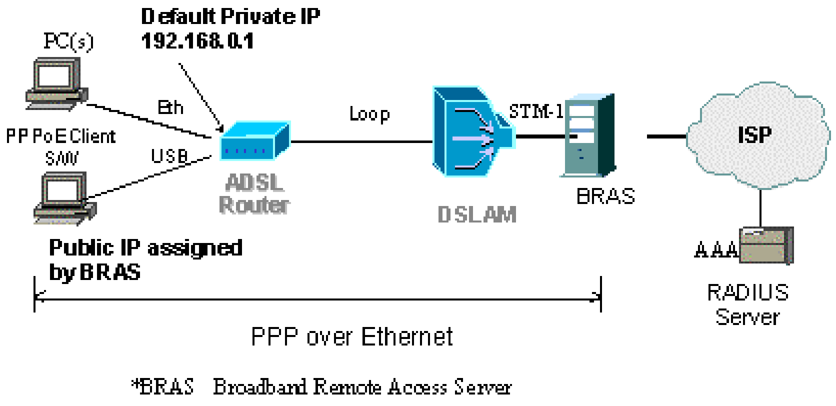
In this mode the HN294d will act only as a “bridge”, meaning that the routing functionality (firewall, NAT, UPnP, etc) will be disabled. This mode is suitable when you only want to connect a single computer to the Internet and want to perform all special functionality in the computer instead of the HN294d. This mode emulates the functionality of simple ADSL modems.

Your ISP is responsible for handling all IP addresses that the PCs on your LAN/WLAN need. The ISP can either use DHCP, PPPoE or static assignment of IP addresses. All the three examples are transparent for the HN294d and there is no configuration of the HN294d necessary for any of the three scenarios. All traffic from the LAN/WLAN uses the same PVC (the normal ISP scenario).

The following sections show three sample scenarios for which this ADSL-mode is suitable. Even various combinations of these scenarios can be implemented without any extra configuration.

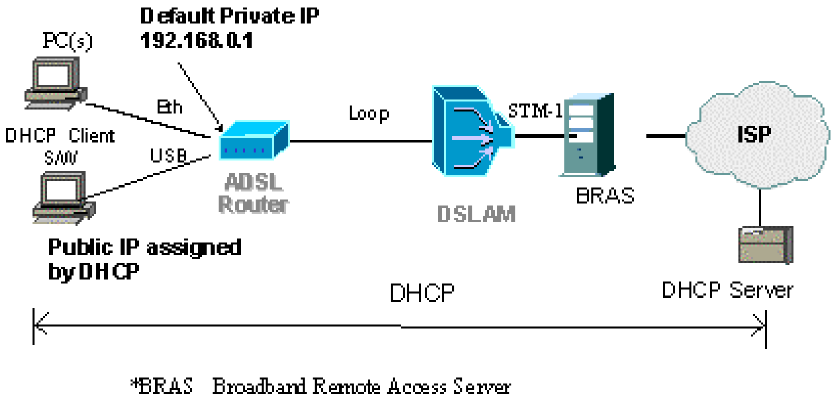
4.2 IP Addresses Assigned by PPPoE

The PCs on the LAN/WLAN need to have a PPPoE client installed. The PCs get their IP addresses from the PPPoE session assigned by the ISP.



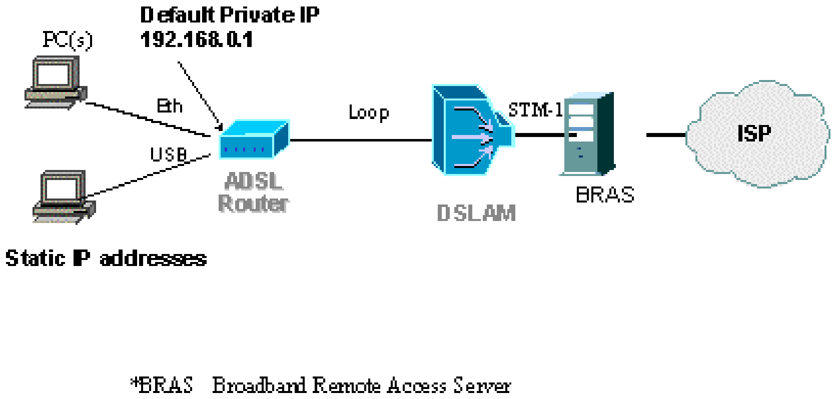
4.3 IP Addresses Assigned by DHCP

The PCs on the LAN/WLAN use the DHCP protocol. The IP addresses are dynamically assigned to the PCs from the DHCP server at the ISP. Verify that your TCP/IP settings are set to "Obtain an IP address automatically". Refer to section xxx "Use DHCP" for instructions.



4.4 Static IP Addresses

The PCs on the LAN/WLAN are manually configured with static IP addresses provided by your ISP/service provider. Refer to section xxx "Use Static IP Addresses" for instructions.



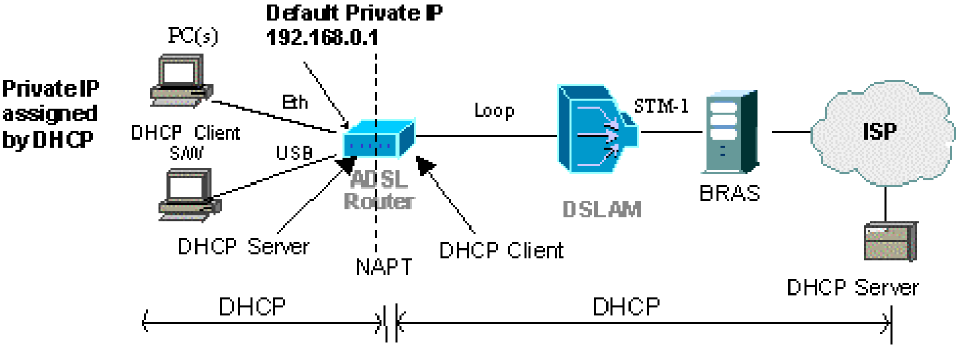
5 ADSL-mode – RFC1483 Router

5.1 Description

RFC1483 (2684) Routed Mode (single PVC)

The RFC1483 Router mode allows a simple routed connection to the Internet. This ADSL-mode can also be used together with NAT to let the end-user connect an almost unlimited number of PCs on the LAN/WLAN with only one IP address from the ISP.

NOTE! The HN294d supports RFC1483 Routed mode with static IP addresses or with DHCP IP addresses assignment to the WAN interface. No standard exists for DHCP over a RFC1483 Routed connection, meaning this is a proprietary solution.



*BRAS Broadband Remote Access Server

The built-in DHCP client will provide the built-in DHCP server with information so that no configuration is needed of the built-in DHCP server (DNS information etc is filled in automatically). PCs on the LAN/WLAN will be assigned private IP addresses from the built-in DHCP server and the NAT service will route the traffic to/from the WAN. All traffic from the LAN/WLAN uses the same PVC (as in the normal ISP scenario).

5.2 IP Addresses Assigned by DHCP

The PCs on the LAN/WLAN normally use the DHCP protocol. The IP addresses are dynamically assigned to the PCs from the DHCP server in the HN294d. If DHCP Relay is enabled, the IP addresses can be assigned from a DHCP server at the ISP. Verify that your TCP/IP settings are set to

“Obtain an IP address automatically”. Refer to section xxx “Use DHCP” for instructions.

5.3 Static IP Addresses

The PCs on the LAN/WLAN are manually configured with static IP addresses provided by your ISP/service provider. Refer to section xxx “Use Static IP Addresses” for instructions.

6 ADSL-mode – RFC1483 MER Router

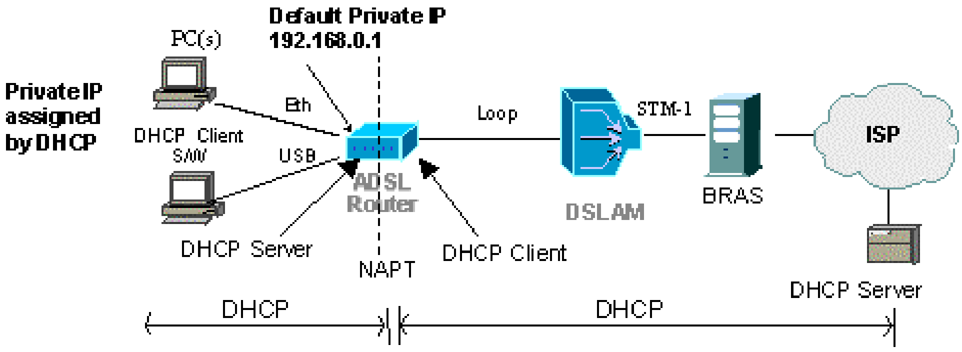
6.1 Description

RFC1483 (2684) Bridged Mode (single PVC) with router functionality enabled.

A new feature of the HN294d is bridge-router mode. In this mode the user can connect an almost unlimited number of PCs to the LAN/WLAN but still only require one IP address from the ISP (which is the standard offering of most ISPs today). This mode eliminates the need to place an external router behind the bridged modem on the LAN/WLAN in order to connect more than one computer and also takes advantage of the security aspects of using a firewall-enabled router. Everything is handled in the HN294d making an external router unnecessary.

NOTE! In this scenario the ISP uses a DHCP server. If the ISP uses PPP, the “PPPoE Router” or “PPPoA Router” ADSLmode should be used instead.

The bridge-router mode means that the device operates as a bridge to the WAN (like in the ADSL-mode “RFC1483 Bridge”) while simultaneously operating as a router to the LAN/WLAN.



*BRAS Broadband Remote Access Server

The HN294d has a built-in DHCP client that is assigned a public IP address from the DHCP server at the ISP at start-up. The HN294d automatically activates the NAT (Network Address Translation) and its internal DHCP server. The built-in DHCP client will provide the built-in DHCP server with information so that no configuration is needed (information such as DNS, gateway, and mask etc is filled in automatically). All traffic from the LAN/WLAN uses the same PVC (as in the standard ISP scenario).

PCs on the LAN/WLAN will be assigned private IP addresses from the built-in DHCP server and the NAT will route the traffic to/from the WAN. The HN294d offers several automatic features (such as ALG, Smart tracking, UPnP, Firewall etc) to make Internet surfing, downloading files, and playing network games a pleasant and trouble-free experience.

6.2 IP Addresses Assigned by DHCP

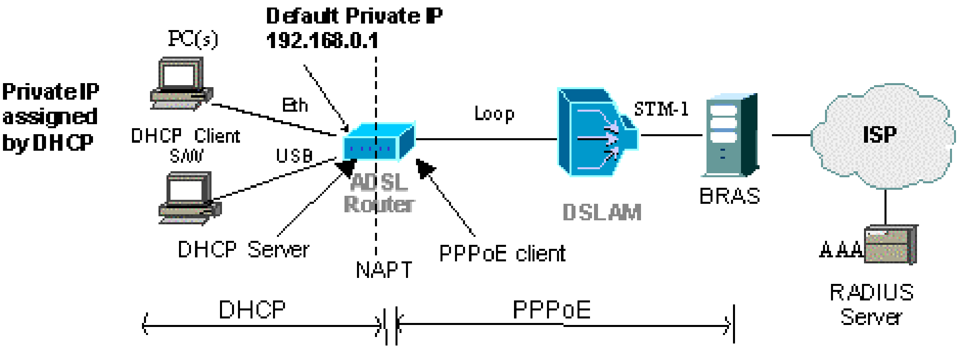
The PCs on the LAN/WLAN normally use the DHCP protocol. The IP addresses are dynamically assigned to the PCs from the DHCP server in the HN294d. If DHCP Relay is enabled, the IP addresses can be assigned from a DHCP server at the ISP. Verify that your TCP/IP settings are set to “Obtain an IP address automatically”. Refer to section xxx “Use DHCP” for instructions.

7 ADSL-mode – PPPoE Router

7.1 Description

This ADSL-mode, much like the “RFC1483 MER Router” mode, allows the user to connect an almost unlimited number of PCs on the LAN/WLAN with only one IP address from the ISP. All traffic from the LAN/WLAN uses the same PVC.

NOTE! This ADSL-mode is applicable if your ISP uses PPPoE as connection type.



*BRAS Broadband Remote Access Server

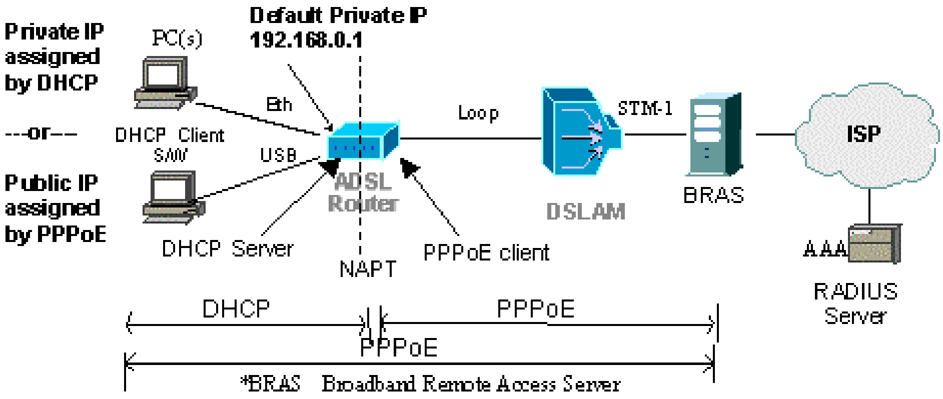
The HN294d has a built-in PPPoE client that will be assigned a public IP address from the BRAS at the ISP. The ISP uses PPPoE (or dial-up) connection to identify users and allow them Internet access. This type of connection requires a Username and a Password.

The HN294d automatically activates the NAT (Network Address Translation) service and its internal DHCP server. The built-in PPPoE client will provide the built-in DHCP server with information so that no configuration is needed of the built-in DHCP server (DNS information etc is filled in automatically). PCs on the LAN/WLAN will be assigned private IP addresses from the built-in DHCP server and the NAT service will route the traffic to/from the WAN.

7.2 PPPoE Termination and PPPoE Passthrough

The “PPPoE Router” mode also allows user to connect directly from the PC to the BRAS at the ISP. This means that the user can choose if he/she wants to use the built-in PPPoE client, a PPPoE client installed on the PC, or a combination of the two. This requires no extra configuration of the HN294d.

The HN294d will detect if the incoming traffic is PPPoE or if it is traffic that should be routed to the built-in PPPoE client, i.e. lacks PPPoE headers. If the incoming packets from the LAN/WLAN have PPPoE headers, the HN294d will bridge the traffic onto the WAN. If the incoming packets from the LAN/WLAN lack the PPPoE headers, they will be routed through the NAT and onto the built-in PPPoE client.



7.3 IP Addresses Assigned by DHCP

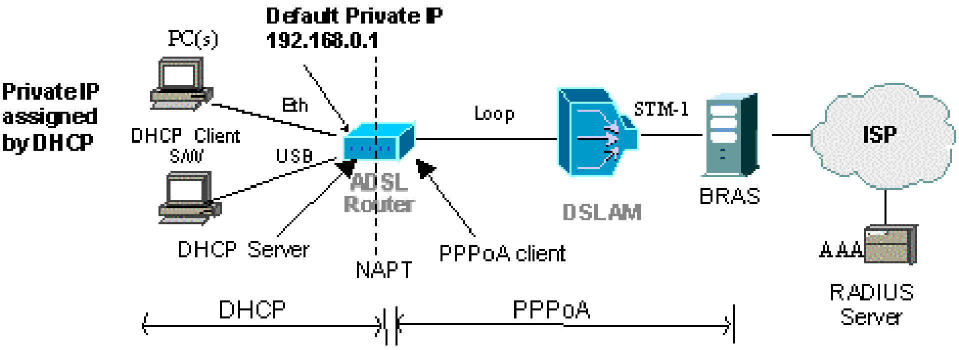
The PCs on the LAN/WLAN normally use the DHCP protocol. The IP addresses are dynamically assigned to the PCs from the DHCP server in the HN294d. If DHCP Relay is enabled, the IP addresses can be assigned from a DHCP server at the ISP. Verify that your TCP/IP settings are set to “Obtain an IP address automatically”. Refer to section xxx “Use DHCP” for instructions.

8 ADSL-mode – PPPoA Router

8.1 Description

This ADSL-mode, much like the “RFC1483 MER Router” mode, allows the user to connect an almost unlimited number of PCs on the LAN/WLAN with only one IP address from the ISP. All traffic from the LAN/WLAN uses the same PVC.

NOTE! This ADSL-mode is applicable if your ISP uses PPPoA as connection type.



*BRAS Broadband Remote Access Server

The HN294d has a built-in PPPoA client that will be assigned a public IP address from the BRAS at the ISP. The ISP uses PPPoA (or dial-up) connection to identify users and allow them Internet access. This type of connection requires a Username and a Password.

The HN294d automatically activates the NAT (Network Address Translation) service and its internal DHCP server. The built-in PPPoA client will provide the built-in DHCP server with information so that no configuration is needed of the built-in DHCP server (DNS information etc is filled in automatically). PCs on the LAN/WLAN will be assigned private IP addresses from the built-in DHCP server and the NAT service will route the traffic to/from the WAN.

8.2 IP Addresses Assigned by DHCP

The PCs on the LAN/WLAN normally use the DHCP protocol. The IP addresses are dynamically assigned to the PCs from the DHCP server in the HN294d. If DHCP Relay is enabled, the IP addresses can be assigned from a DHCP server at the ISP. Verify that your TCP/IP settings are set to “Obtain an IP address automatically”. Refer to section xxx “Use DHCP” for instructions.

9 Advanced Configuration

9.1 Introduction

The HN294 offers the possibility for advanced users to set up special network scenarios themselves or to modify the existing ones.

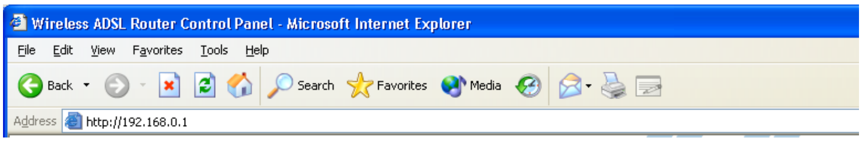
TIP: For advanced network scenarios, use the Configuration Wizard and select the ADSL-mode that is closest to your requirements and then modify it to meet your needs. This is easier than creating a complete new profile.

9.2 Access the Web Manager

Follow the steps below to access the built-in Configuration tool and the Web Manager including web pages for advanced configuration.

NOTE! By default, the built-in web pages are only accessible from your LAN/WLAN computer(s). Refer to the “Status” chapter for instructions on how to change settings to allow remote access.

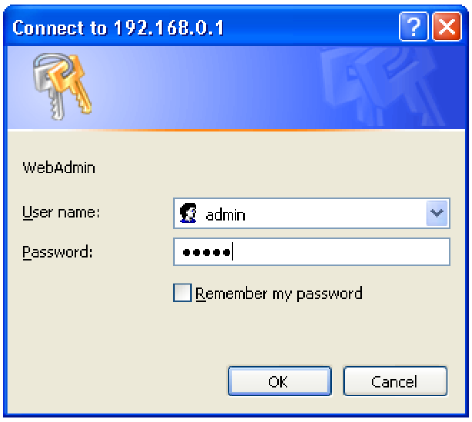
1. Start your web browser and type **192.168.0.1** (the private IP address for the HN294d) in the URL field and press Enter.



Wireless ADSL Router Control Panel - Microsoft Internet Explorer

Address http://192.168.0.1

2. To access the Configuration tool you have to login and the following window is displayed:



Connect to 192.168.0.1

WebAdmin

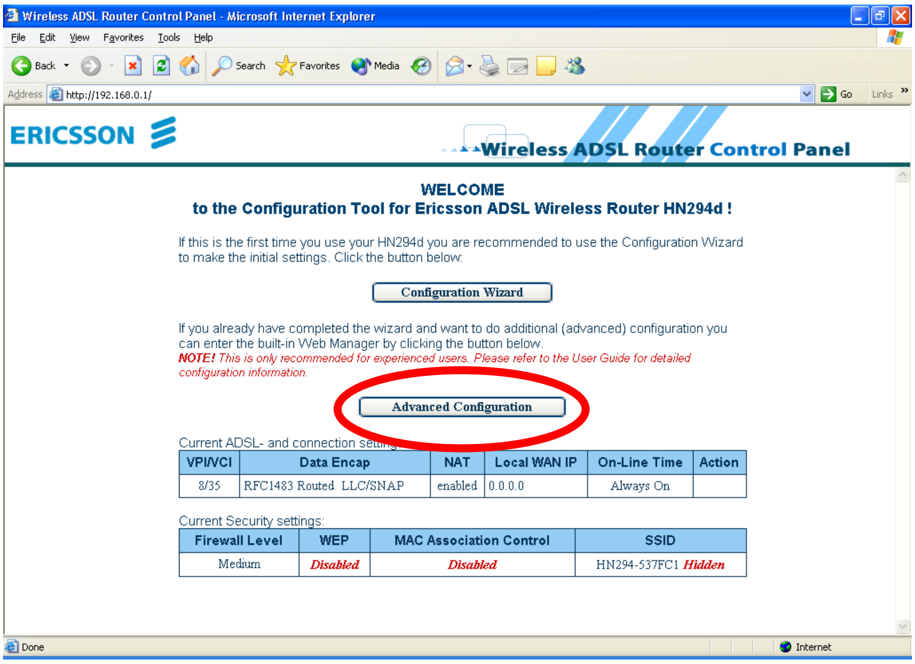
User name: admin

Password: •••••

□ Remember my password

3. Type **admin** in both the “User name” and “Password” fields that are the default settings for the HN294d, and click **OK**.

4. The welcome page of the Configuration tool is displayed:



Wireless ADSL Router Control Panel - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Search Favorites Media
Address http://192.168.0.1/
Go Links
ERICSSON
Wireless ADSL Router Control Panel
Configuration Wizard
Advanced Configuration
Done
Internet

WELCOME
to the Configuration Tool for Ericsson ADSL Wireless Router HN294d !

If this is the first time you use your HN294d you are recommended to use the Configuration Wizard to make the initial settings. Click the button below:

If you already have completed the wizard and want to do additional (advanced) configuration you can enter the built-in Web Manager by clicking the button below.
NOTE! This is only recommended for experienced users. Please refer to the User Guide for detailed configuration information.

Current ADSL- and connection setting

VPI/VCI	Data Encap	NAT	Local WAN IP	On-Line Time	Action
8/35	RFC1483 Routed LLC/SNAP	enabled	0.0.0.0	Always On	

Current Security settings:

Firewall Level	WEP	MAC Association Control	SSID
Medium	*Disabled*	*Disabled*	HN294-537FC1 *Hidden*

5. Click on the **Advanced Configuration** button to enter the Web Manager.

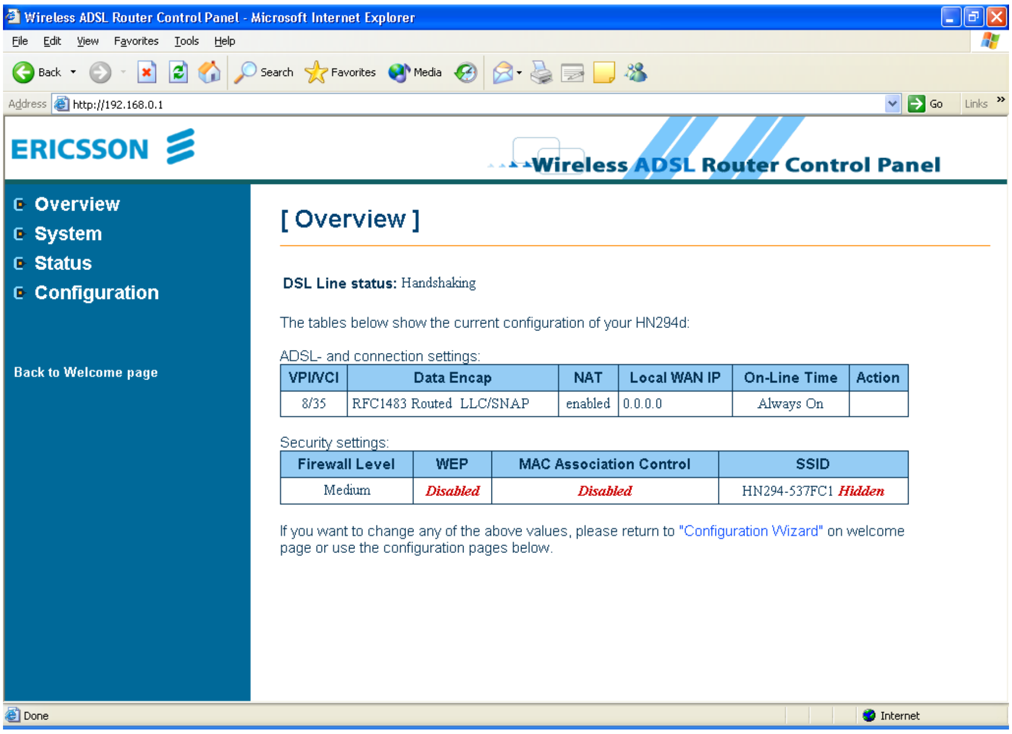
9.2.1 Outline of the Web Manager

The Web Manager is composed of three areas:

- **Title**; Indicates the title of this management interface.
- **Main Menu**; Includes the Overview, System, Status and Configuration menus. By clicking of the main menus they will expand and present the included sub-menus. Clicking on each item will display its content in the main window accordingly.
- **Main Window**; The main workspace containing configuration or status information.

9.3 Overview

This is the start page of the Web Manager:



Wireless ADSL Router Control Panel - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Search Favorites Media
Address http://192.168.0.1
Go Links
ERICSSON
Wireless ADSL Router Control Panel
Overview
System
Status
Configuration
Back to Welcome page
Done
Internet

[Overview]

DSL Line status: Handshaking

The tables below show the current configuration of your HN294d:

ADSL- and connection settings:

VPI/VCI	Data Encap	NAT	Local WAN IP	On-Line Time	Action
8/35	RFC1483 Routed LLC/SNAP	enabled	0.0.0.0	Always On	

Security settings:

Firewall Level	WEP	MAC Association Control	SSID
Medium	*Disabled*	*Disabled*	HN294-537FC1 *Hidden*

If you want to change any of the above values, please return to "Configuration Wizard" on welcome page or use the configuration pages below.

On this page you can see the current configuration of your HN294d.

For ADSL-modes that use PPP as connection type, you need to Connect/Disconnect when you want to access the Internet. This is shown in the “Action” column by either a **Connect** or **Disconnect** button.

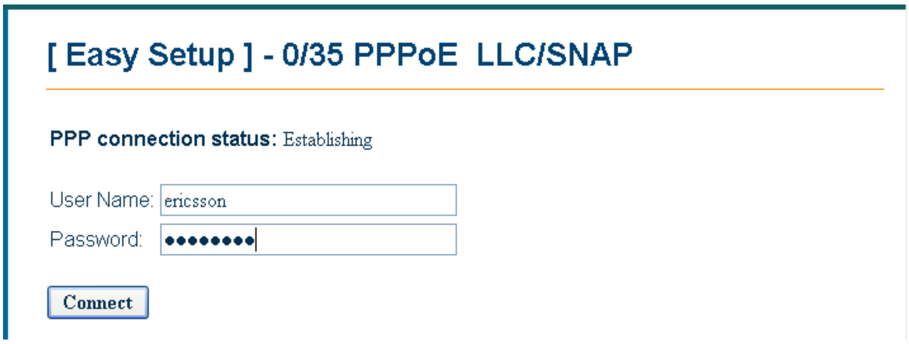
For other type of ADASL-modes you are “Always on” which is indicated in the “On-Line Time” column.

9.3.1 Connect/Disconnect to ISP

For ADSL-modes that use PPP as connection type you need to Connect/Disconnect when you want to access the Internet. The default setting in the HN294d is “Always On” meaning that when you have performed the steps below (entered your User Name and Password) once, the HN294d will automatically connect to your ISP whenever you use your Internet connection.

Follow the steps below to connect to your ISP:

1. Click the **Connect** button in the “Action” column. The following page appears:



[Easy Setup] - 0/35 PPPoE LLC/SNAP

PPP connection status: Establishing

User Name: ericsson

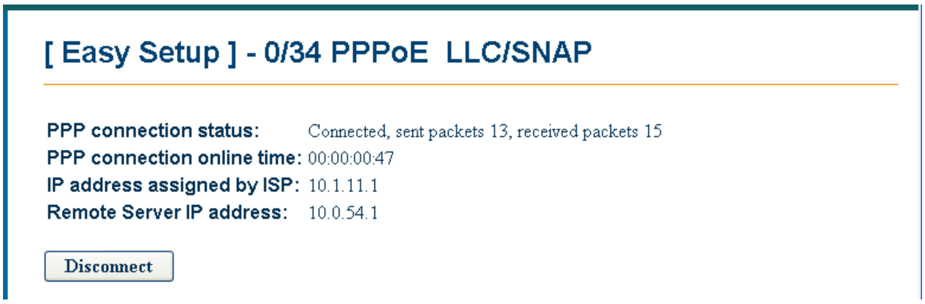
Password: ••••••••

2. Enter the **User Name** and **Password** provided by your ISP and click on the **Connect** button.

3. Once the connection is successfully established you will return to the Overview page where you can keep track on the “On-Line Time”.

Disconnect:

1. Click the **Disconnect** button in the “Action” column. The following page appears:



[Easy Setup] - 0/34 PPPoE LLC/SNAP

PPP connection status: Connected, sent packets 13, received packets 15

PPP connection online time: 00:00:00:47

IP address assigned by ISP: 10.1.11.1

Remote Server IP address: 10.0.54.1

2. Click the **Disconnect** button.

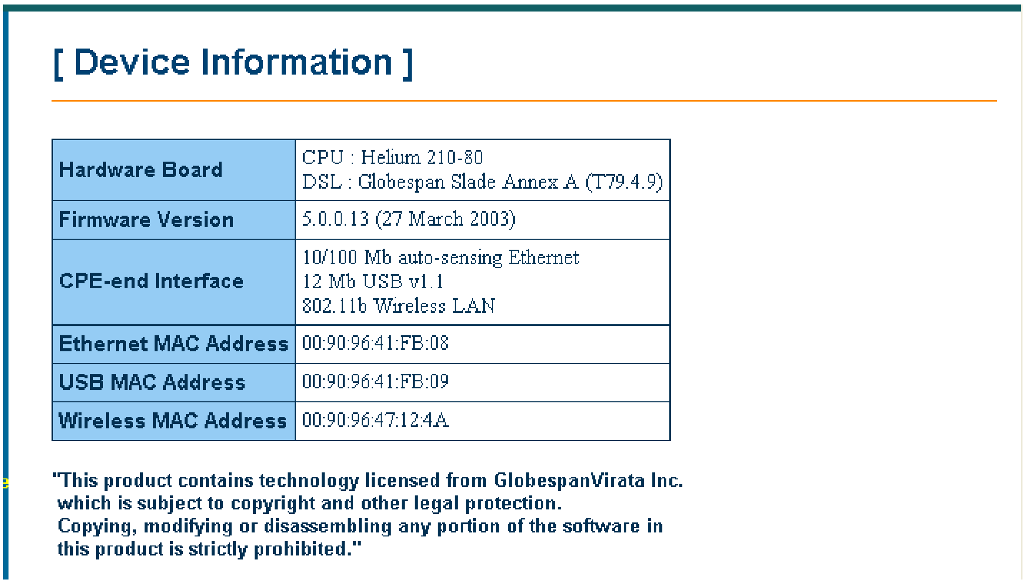
3. Once the connection is disconnected you will return to the Overview page where the counter for “On-Line Time” will stop and be reset.

NOTE! On the **Configuration > WAN** (modify) page you can select to automatically disconnect if no traffic is detected for a specific period (minutes). If outbound traffic is detected when the HN294d is disconnected, it will automatically connect again.

9.4 System

9.4.1 Device Information

The **System > Device Info** page provides a general overview of your HN294d including the hardware board, firmware version, and information about the Ethernet, USB and Wireless interfaces.



[Device Information]

Hardware Board	CPU : Helium 210-80 DSL : Globespan Slade Annex A (T79.4.9)
Firmware Version	5.0.0.13 (27 March 2003)
CPE-end Interface	10/100 Mb auto-sensing Ethernet 12 Mb USB v1.1 802.11b Wireless LAN
Ethernet MAC Address	00:90:96:41:FB:08
USB MAC Address	00:90:96:41:FB:09
Wireless MAC Address	00:90:96:47:12:4A

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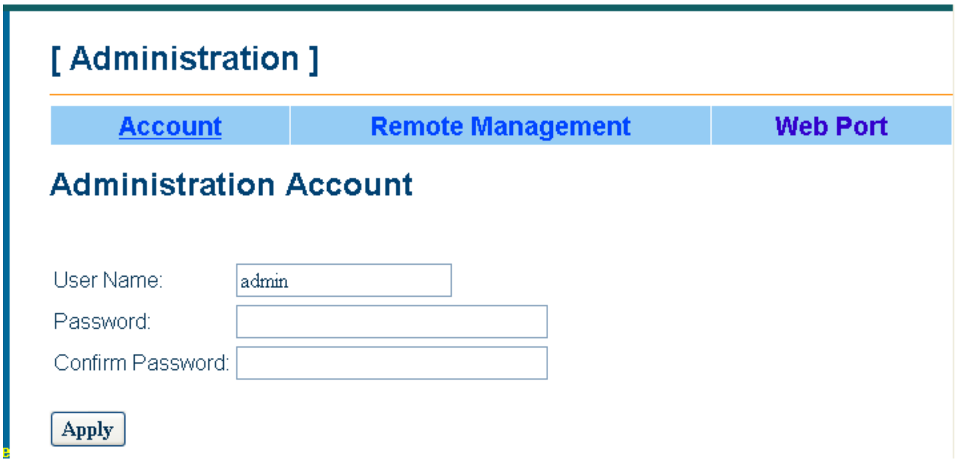
9.4.2 Administration

9.4.2.1 Account

On the **System > Administration > Account** page you can change the default User Name and/or Password which is recommended to avoid unauthorized access to the configuration pages. Users with a valid User Name and Password can only access the Web Manager. By default, both the User Name and Password are set to **admin**.


[Administration]

Administration Account

User Name: admin

Password:

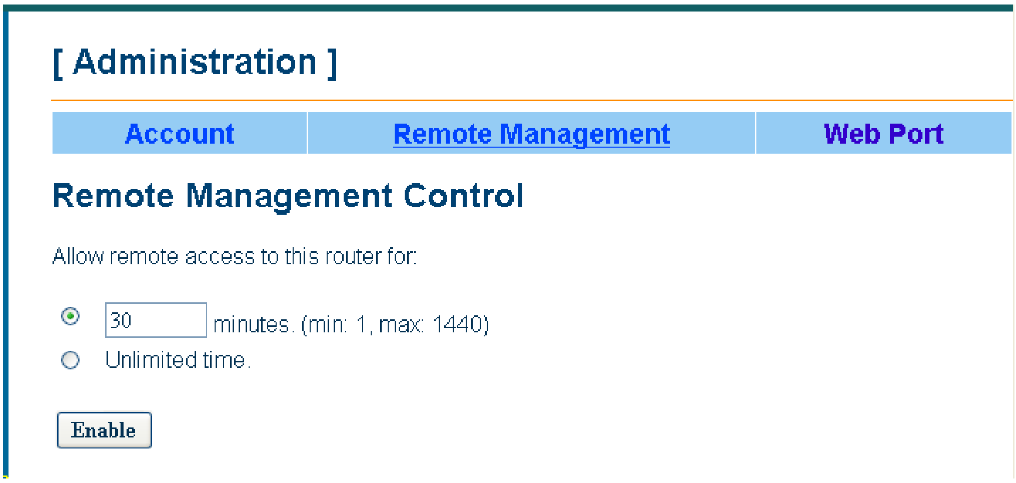
Confirm Password:

To change the default User Name and/or Password, just type your new information in the fields. If you only want to change the password, keep **admin** in the “User Name” field and type your new password (in both fields).

Confirm by clicking the **Apply** button. The login window then appears and you are prompted to make a new login with your new User Name and/or Password.

9.4.2.2 Remote Management

On the **System > Administration > Remote Management** page you can manage remote client access to the HN294d from the WAN.


[Administration]

Remote Management Control

Allow remote access to this router for:

● 30 minutes. (min: 1, max: 1440)

○ Unlimited time.

To enable/disable remote access proceed as follows:

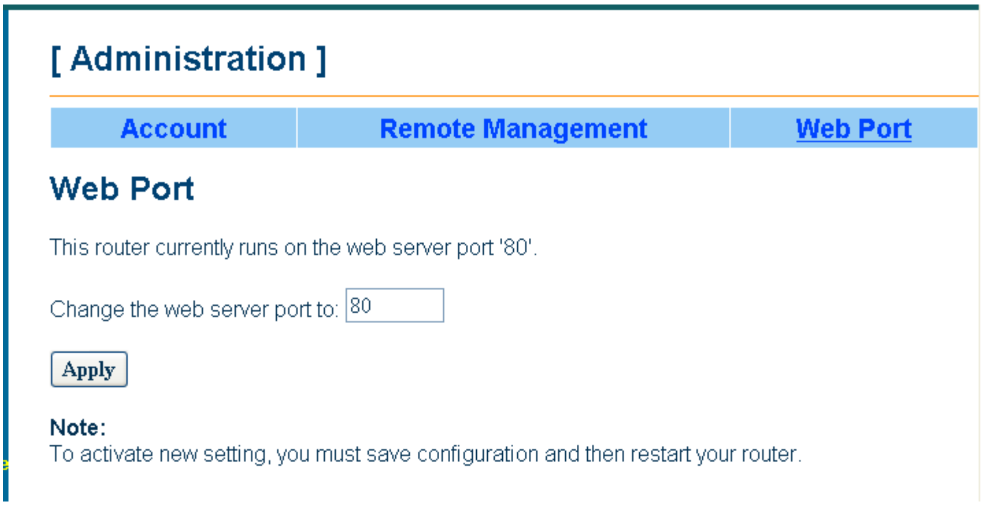
1. Enter an appropriate access time in the **Allow access for:** field. This is recommended if you want to temporarily enable remote access for another user.

Select **Unlimited time** if you always want to have access to your HN294 d from the Internet.

2. Click the **Enable** button. Information about “Seconds remaining for remote access” is now displayed.
3. In order to disable this function, simply click the **Disable** button.
4. Select **System > Save Configuration** and click the **Save** button to save your new settings.

9.4.2.3 Web Port

On the **System > Administration > Web Port** page you can change the default web server port (80).



[Administration]

Account | Remote Management | Web Port

Web Port

This router currently runs on the web server port '80'.

Change the web server port to: 80

Apply

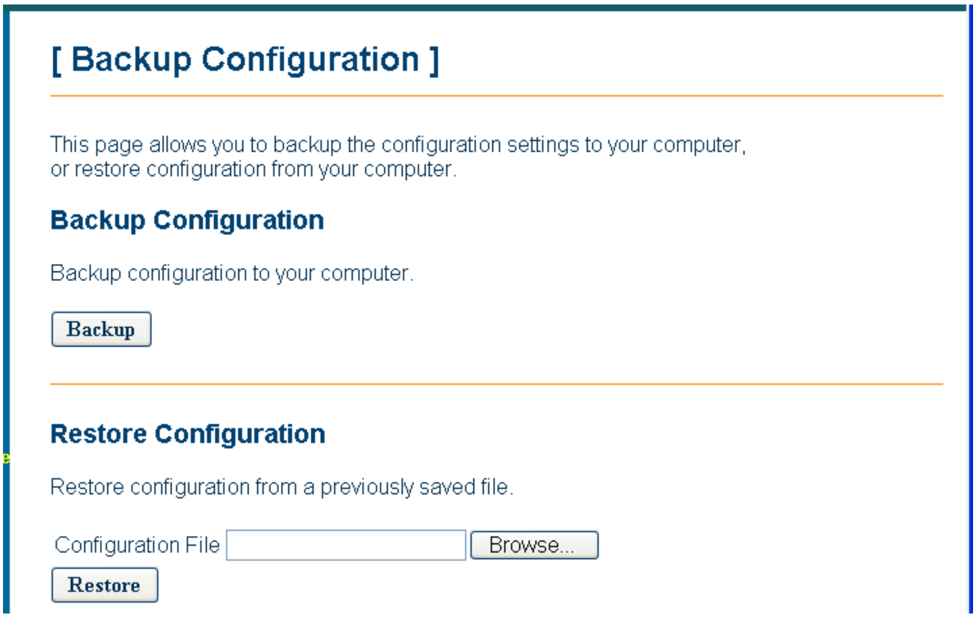
Note:
To activate new setting, you must save configuration and then restart your router.

Enter a new port number in the **Change the web server port to:** field and click the **Apply** button.

Select **System > Save Configuration** and click the **Save** button to save your new settings.

9.4.3 Backup Configuration

On the **System > Backup Configuration** page you can backup the current configuration settings to a file on your computer and also restore the configuration from a previously saved file.



[Backup Configuration]

This page allows you to backup the configuration settings to your computer, or restore configuration from your computer.

Backup Configuration

Backup configuration to your computer.

Restore Configuration

Restore configuration from a previously saved file.

Configuration File

9.4.3.1 Backup

To save a backup file of your current configuration proceed as follows:

1. Click the **Backup** button.
2. An information window is displayed. Click **OK** to continue..
3. Enter a filename (or keep the default MyConfiguration) and select a destination folder where you want to save the backup file.

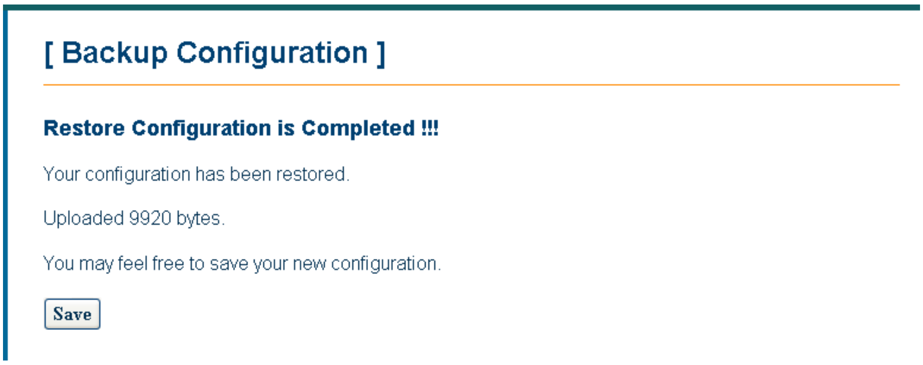
NOTE! Do not modify this file, since it then will be invalid and not accepted by the router if you want to make a restore.

9.4.3.2 Restore

To restore your configuration from a previously save file proceed as follows:

1. Click the **Browse** button to locate your backup file.
2. Click the **Restore** button.
3. An information window is displayed. Click **OK** to continue.

4. When the restoring is completed the following window appears:



[Backup Configuration]

Restore Configuration is Completed !!!

Your configuration has been restored.

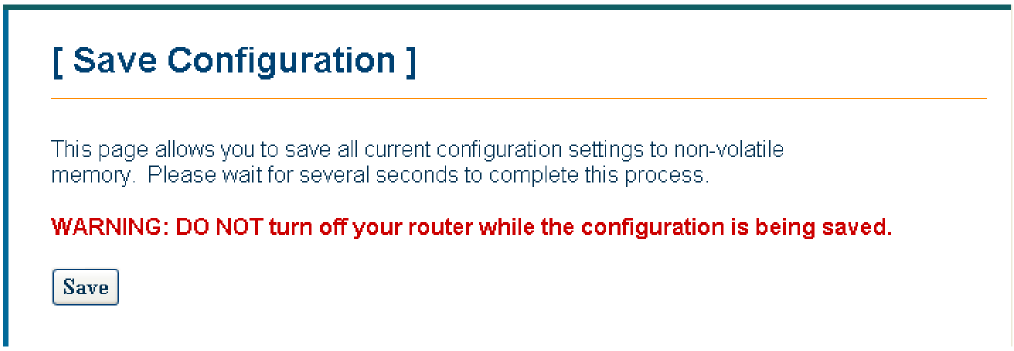
Uploaded 9920 bytes.

You may feel free to save your new configuration.

5. Click the **Save** button to save the configuration (otherwise the new settings are only valid until next reboot).

9.4.4 Save Configuration

From the **System > Save Configuration** page you can save all current configuration to non-volatile memory.



[Save Configuration]

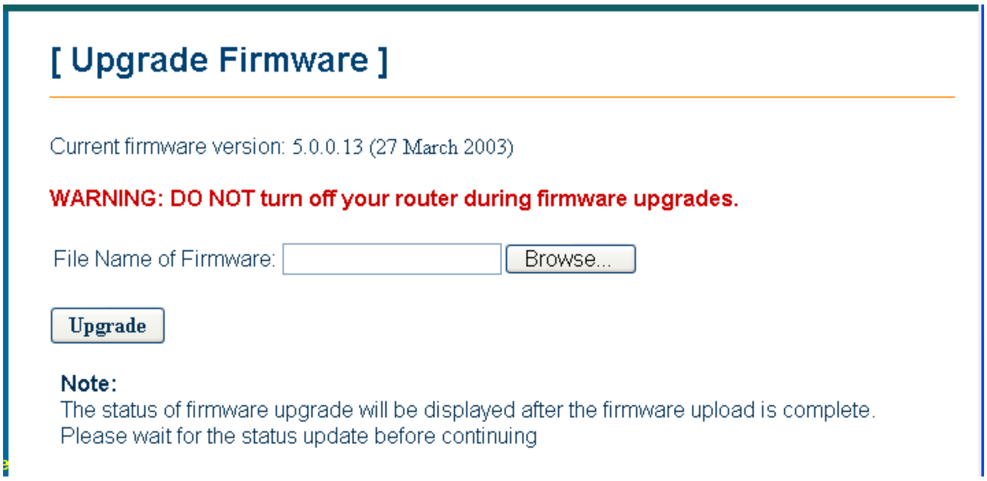
This page allows you to save all current configuration settings to non-volatile memory. Please wait for several seconds to complete this process.

WARNING: DO NOT turn off your router while the configuration is being saved.

All settings you apply on the pages in the Web Manager will take effect immediately, but once you restart or turn off your HN294d the changes will be discarded. If you want the settings to remain in effect even after the current session, you must click the **Save** button on this page.

9.4.5 Upgrade Firmware

From the **System > Upgrade Firmware** page you can upgrade the firmware in the HN294d.



[Upgrade Firmware]

Current firmware version: 5.0.0.13 (27 March 2003)

WARNING: DO NOT turn off your router during firmware upgrades.

File Name of Firmware:

Note:
The status of firmware upgrade will be displayed after the firmware upload is complete.
Please wait for the status update before continuing

The HN294d supports firmware upgrades via HTTP.

To transfer a new firmware file and upgrade the HN294d, follow the steps below:

1. Download and unzip the new firmware file to your local PC.

2. In the **File Name of Firmware** field, click the **Browse** button to locate the upgrade file.

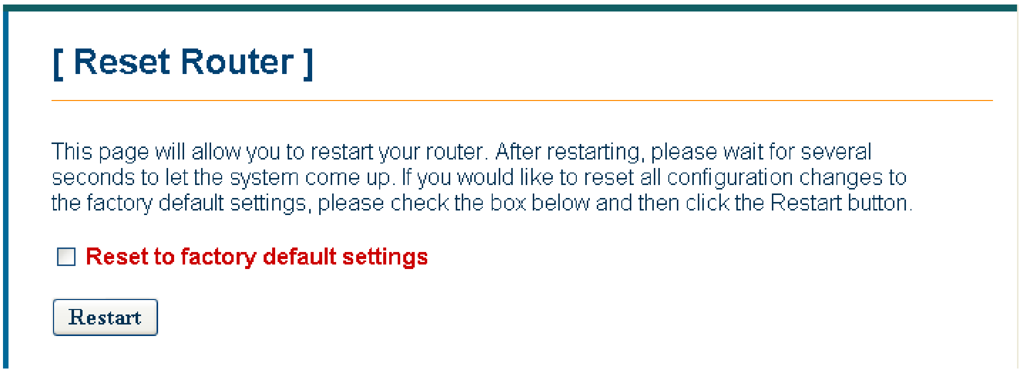
3. Click the **Upgrade** button.
   DO NOT turn off the HN294 during the firmware upgrade. The upgrade process may take a while due to extensive testing of the software. After upgrading, the original configuration settings will remain.

4. The status of the firmware upgrade will be displayed after the firmware upload is completed.

NOTE! In case that an upgrade fails, all LEDs will lit and the Web Manager will not be accessible. Please refer to the "Troubleshooting" chapter (section Safety Mode) for information about how to access the router and make a new upgrade.

9.4.6 Reset Router

The **System > Reset Router** page allows you to reset your HN294.



[Reset Router]

This page will allow you to restart your router. After restarting, please wait for several seconds to let the system come up. If you would like to reset all configuration changes to the factory default settings, please check the box below and then click the Restart button.

☐ Reset to factory default settings

Click the **Restart** button.

When restarting the system, your browser session will be disconnected. Please wait until the device has finished restarting before attempting to reconnect to the device.

9.4.6.1 Reset to Factory Default

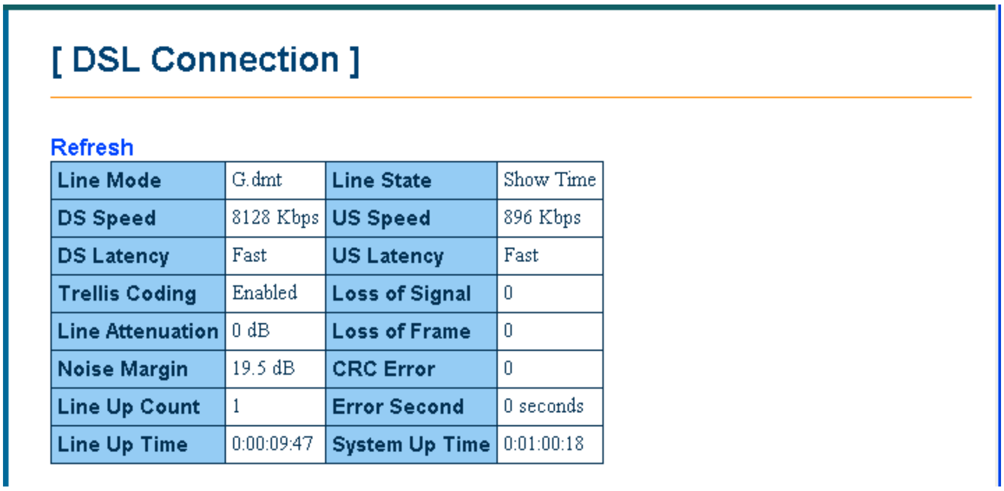
If **Reset to factory default settings** is checked before you click the **Restart** button, the settings will return to factory default settings, including the User Name and Password.

You can also reset the HN294d to factory default settings using the Reset button (tiny hole) on the back panel. This method is used when you cannot access the Web Manager. A detailed description is provided in the “Troubleshooting” chapter.

9.5 Status

9.5.1 DSL Connection

The **Status > DSL Connection** page shows the DSL line connection status:



[DSL Connection]

Refresh

Line Mode	G.dmt	Line State	Show Time
DS Speed	8128 Kbps	US Speed	896 Kbps
DS Latency	Fast	US Latency	Fast
Trellis Coding	Enabled	Loss of Signal	0
Line Attenuation	0 dB	Loss of Frame	0
Noise Margin	19.5 dB	CRC Error	0
Line Up Count	1	Error Second	0 seconds
Line Up Time	0:00:09:47	System Up Time	0:01:00:18

By clicking the **Refresh** link (above the table) all values will be updated.

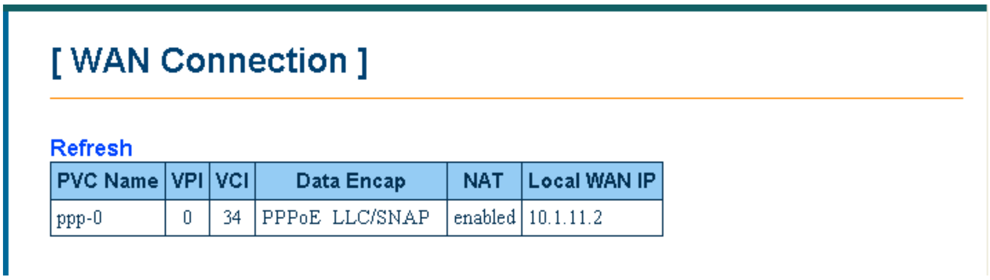
The table below describes the included parameters:

Parameter	**Description**
Line Mode	The HN294d supports multi-mode standard, ANSI T1.413, G.lite and G.dmt.
Line State	Shows the status of the startup of the ADSL connection. This could be: **Handshake** mode where information is exchanged for startup of the ADSL connection. **Training** mode where the transceiver is attempting a startup prior to entering the Show Time mode, and **Show Time** mode where the transceiver has started up, trained and is capable of passing user data.
DS / US Speed	Shows the Downstream / Upstream speed of the ADSL line connection.

Parameter	Description
DS / US Latency	Displays whether a fast or interleaved latency path is specified.
Trellis coding	Indicates if trellis coding is enabled or disabled. Trellis coding is a method of providing better performance in a noisy environment. It helps to transmit at faster line rates with lower error rates, thus providing a faster overall throughput in a moderately noisy environment.
Line Attenuation	Indicates the signal attenuation caused by line length. It increase with line length and frequency and decreases as wire diameter increases.
Noise Margin	Signal to noise ratio, the ratio of good data (signal) to bad (noise) on the line, expressed in decibels (dB).
Loss os Signal / Frame	Indicates the loss of signals or frames detected.
CRC Error	The number of Cyclic Redundancy Checksum generated.
Error Second	The sum of the seconds during which packet error have occurred.
Line / System Up Time	The elapsed time from line / system startup.

9.5.2 WAN Connection

The **Status > WAN Connection** page shows the ATM PVC interface(s) currently defined.



[WAN Connection]

Refresh

PVC Name	VPI	VCI	Data Encap	NAT	Local WAN IP
ppp-0	0	34	PPPoE LLC/SNAP	enabled	10.1.11.2

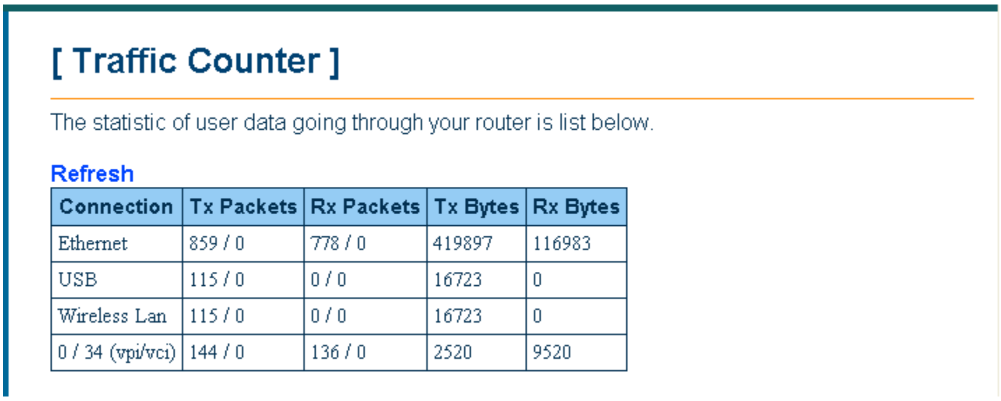
By clicking the **Refresh** link (above the table) all the values will be updated.

The table below describes the included parameters:

Parameter	Description
PVC Name	The name specified for the specific PVC.
VPI	Shows the VPI (Virtual Path Identifier). Valid range is from 0 to 255.
VCI	Shows the VCI (Virtual Channel Identifier). Valid range is from 32 to 4095 (1-31 is reserved for well-known protocols).
Data Encap	Shows the ADSL mode connection type (RFC1483 Bridged, RFC1483 Routed, RFC1483 MER, PPPoA or PPPoE) and the selected encapsulation type (VC-MUX or LLC/SNAP).
NAT	Shows if NAT (Network Address Translation) is enabled.
Local WAN IP	Shows the IP address your HN294d will use on the Internet.

9.5.3 Traffic Counter

The **Status > Traffic Counter** page shows the records of data going through the LAN, WLAN and WAN interfaces.



[Traffic Counter]

The statistic of user data going through your router is list below.

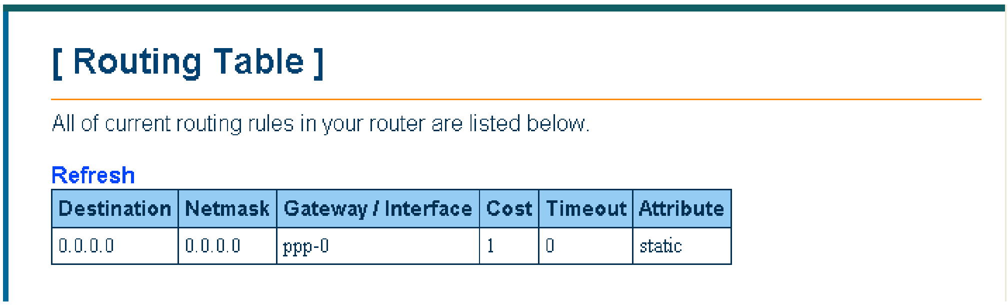
Connection	Tx Packets	Rx Packets	Tx Bytes	Rx Bytes
Ethernet	859 / 0	778 / 0	419897	116983
USB	115 / 0	0 / 0	16723	0
Wireless Lan	115 / 0	0 / 0	16723	0
0 / 34 (vpi/vci)	144 / 0	136 / 0	2520	9520

For each interface, cumulative totals are displayed for Transmitted (Tx) / Received (Rx) packets and Transmitted (Tx) / Received (Rx) bytes.

By clicking the **Refresh** link (above the table) all the values will be updated.

9.5.4 Routing Table

The **Status > Routing Table** page shows the routing rules of data packets going through the HN294d while in routing mode.



[Routing Table]

All of current routing rules in your router are listed below.

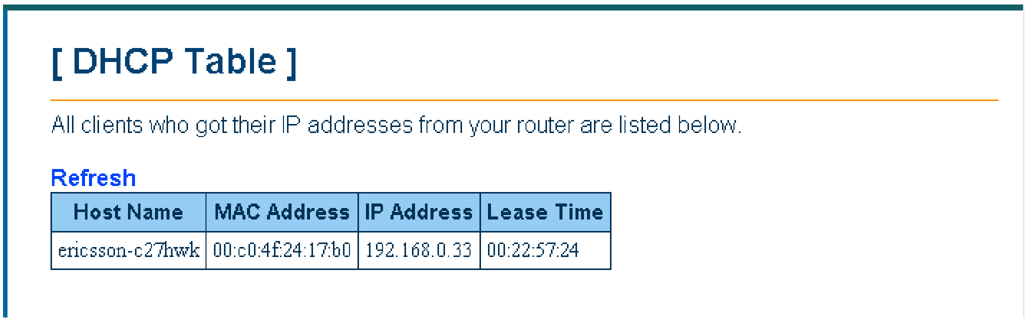
Refresh

Destination	Netmask	Gateway / Interface	Cost	Timeout	Attribute
0.0.0.0	0.0.0.0	ppp-0	1	0	static

By clicking the **Refresh** link (above the table) all the values will be updated.

9.5.5 DHCP Table

The **Status > DHCP Table** page shows the DHCP client(s) who get their IP addresses from the HN294d.



[DHCP Table]

All clients who got their IP addresses from your router are listed below.

Refresh

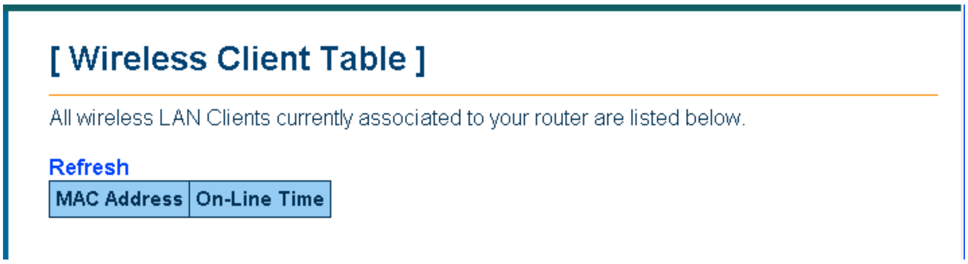
Host Name	MAC Address	IP Address	Lease Time
ericsson-c27hwk	00:c0:4f:24:17:b0	192.168.0.33	00:22:57:24

For each DHCP client, the Host Name, MAC Address, IP Address and the Lease Time are indicated.

By clicking the **Refresh** link (above the table) all the values will be updated.

9.5.6 Wireless Client

The **Status > Wireless Client** page shows the wireless client(s) that are associated to the HN294d.



[Wireless Client Table]

All wireless LAN Clients currently associated to your router are listed below.

Refresh

MAC Address	On-Line Time

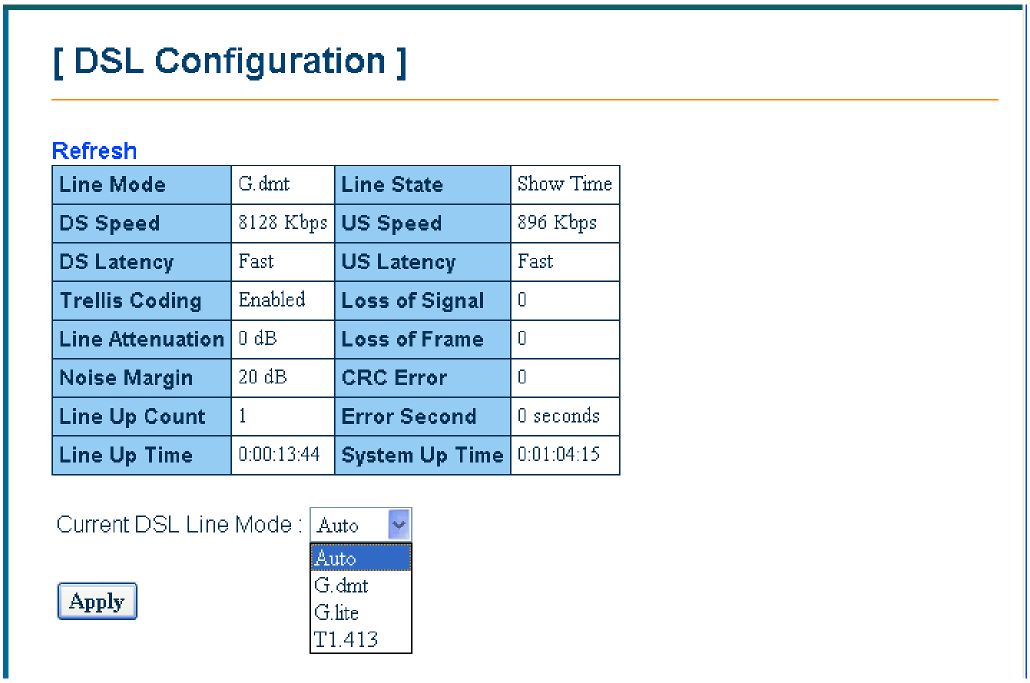
For each wireless client, the MAC Address and the On-Line Time are indicated.

By clicking the **Refresh** link (above the table) all the values will be updated.

9.6 Configuration

9.6.1 DSL Configuration

The **Configuration > DSL** page allows you to define the DSL Line Mode.



[DSL Configuration]

Refresh

Line Mode	G.dmt	Line State	Show Time
DS Speed	8128 Kbps	US Speed	896 Kbps
DS Latency	Fast	US Latency	Fast
Trellis Coding	Enabled	Loss of Signal	0
Line Attenuation	0 dB	Loss of Frame	0
Noise Margin	20 dB	CRC Error	0
Line Up Count	1	Error Second	0 seconds
Line Up Time	0:00:13:44	System Up Time	0:01:04:15

Current DSL Line Mode : Auto

The DSL Line Mode you specify will be applied to the entire HN294d meaning that all ATM PVC provides created will use the same line mode. Consult your ISP/service provider to find out which option applies to your DSL line.

From the drop-down list, select an appropriate DSL Line Mode and then click the **Apply** button.

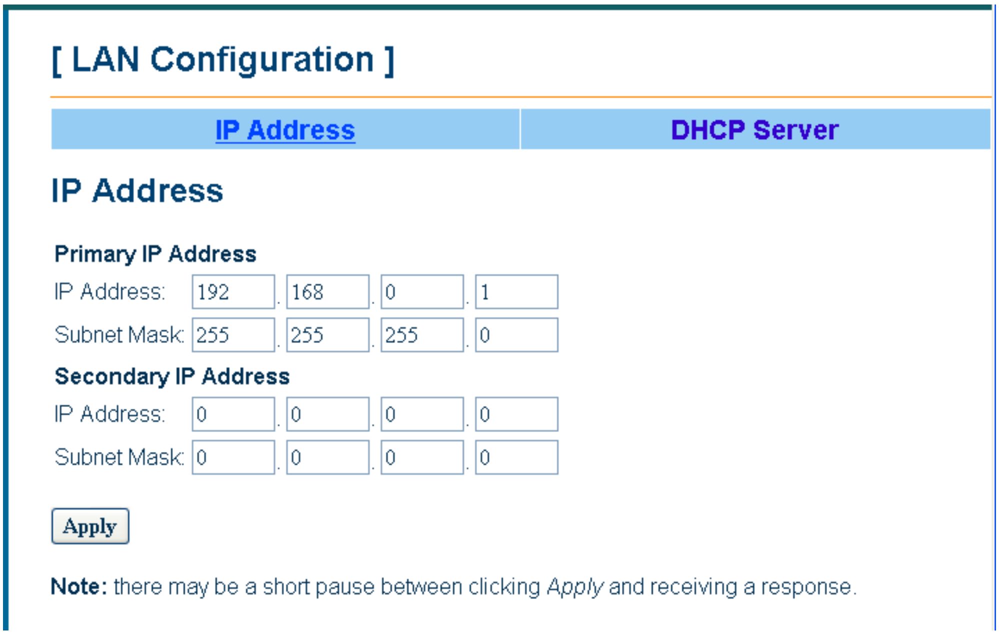
Select **System > Save Configuration** and click the **Save** button to save your new settings.

9.6.2 LAN Configuration

The **Configuration > LAN** pages allow you to define the IP addresses over the LAN interface and make settings for the built-in DHCP server.

9.6.2.1 IP Address

On the **Configuration > LAN > IP Address** page you can define the IP addresses over the LAN interface on which you can access the HN294d.



[LAN Configuration]

IP Address

Primary IP Address

IP Address: 192 . 168 . 0 . 1

Subnet Mask: 255 . 255 . 255 . 0

Secondary IP Address

IP Address: 0 . 0 . 0 . 0

Subnet Mask: 0 . 0 . 0 . 0

Note: there may be a short pause between clicking *Apply* and receiving a response.

The table below describes the parameters:

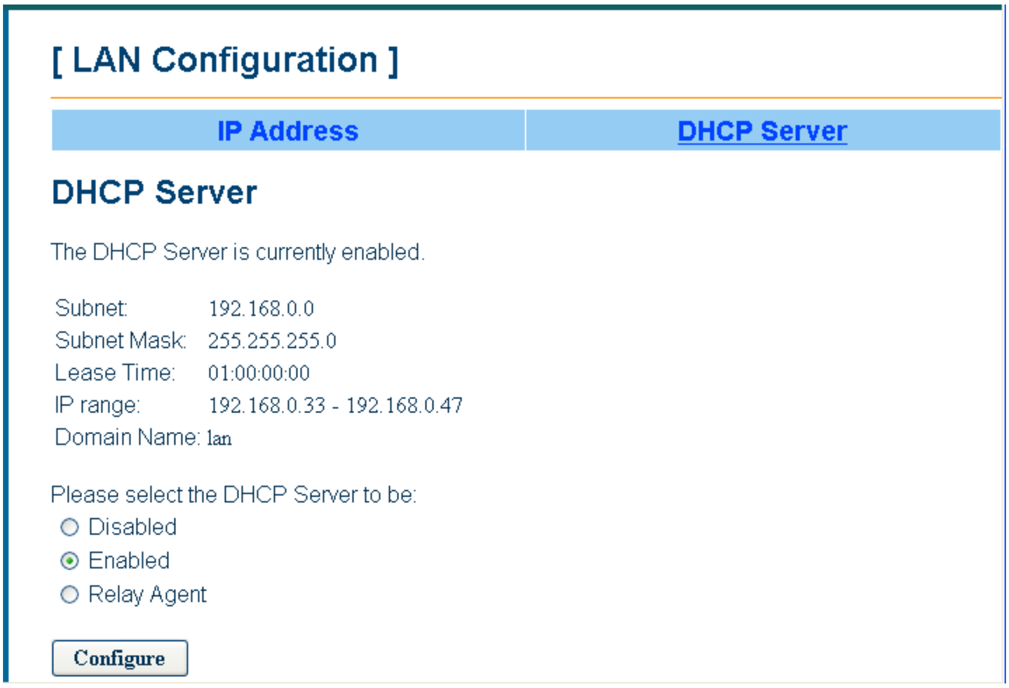
Parameter	Description
Primary IP Address	The Primary IP address is used for the purpose of system management. When it is assigned, a PC on the LAN is able to use the specified address to access the HN294d through Ethernet. By default, the IP address and subnet mask are **192.168.0.1** and **255.255.255.0** respectively. This gives that you have an available range of IP addresses from 192.168.0.2 to 192.168.0.254 that can be assigned to PCs on the LAN.
Secondary IP Address	If you have several IP address ranges you can apply a secondary IP address on which LAN computers also can access the HN294d. This is a convenient way to access the HN294d if you have two different subnets.

Enter your IP settings and click the **Apply** button.

Select **System > Save Configuration** and click the **Save** button to save you new settings.

9.6.2.2 DHCP Server

The **Configuration > LAN > DHCP Server** page allows you to configure the built-in DHCP Server.



DHCP Server

The DHCP Server is currently enabled.

Subnet:	192.168.0.0
Subnet Mask:	255.255.255.0
Lease Time:	01:00:00:00
IP range:	192.168.0.33 - 192.168.0.47
Domain Name:	lan

Please select the DHCP Server to be:

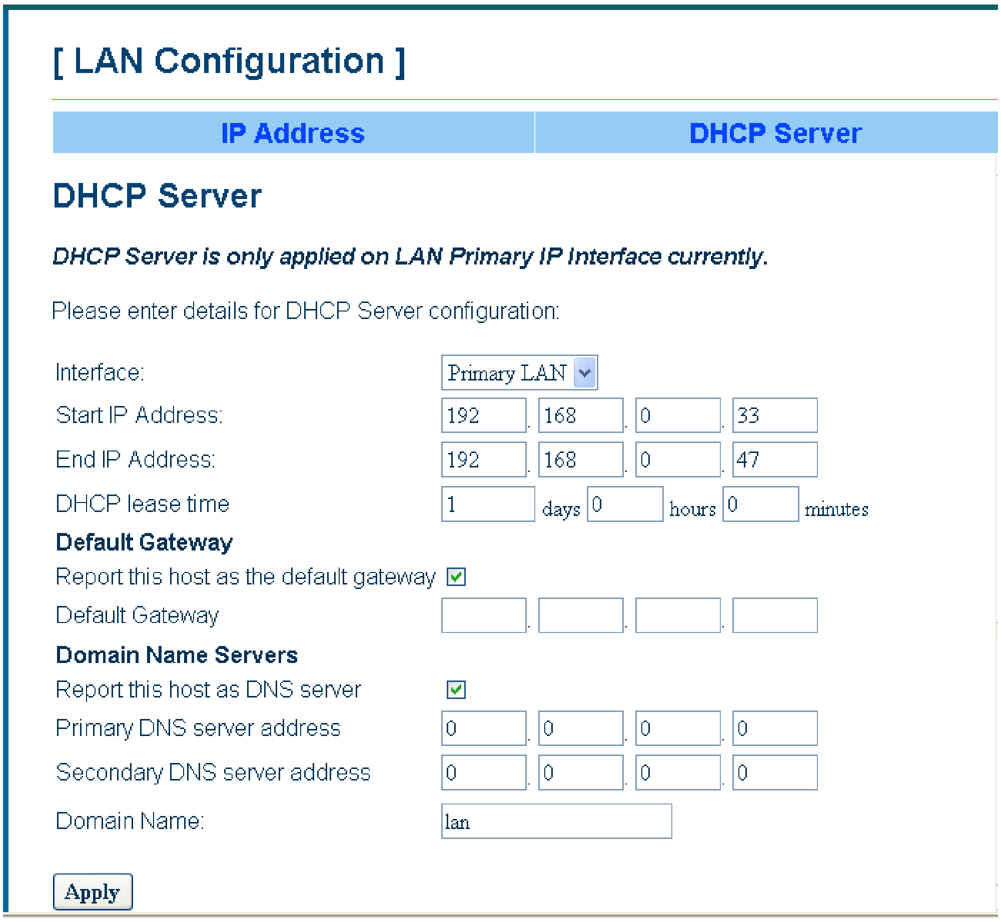
○ Disabled
● Enabled
○ Relay Agent

The HN294d incorporates a DHCP (Dynamic Host Configuration Protocol) server, which dynamically assigns IP addresses and serves as a DNS server to the PCs on the LAN/WLAN. DHCP functionality spares you the hassle of manually assigning a fixed IP address to each PC on the LAN/WLAN.

NOTE! By default the DHCP Server is enabled on the private LAN interface (192.168.0.1) but if you already have a DHCP server on your network, you should disable this function.

Enable and configure the DHCP server:

Select the **Enabled** radio button and click the **Configure** button. The following page appears:



[LAN Configuration]

DHCP Server

DHCP Server is only applied on LAN Primary IP Interface currently.

Please enter details for DHCP Server configuration:

Interface:	Primary LAN
Start IP Address:	192 . 168 . 0 . 33
End IP Address:	192 . 168 . 0 . 47
DHCP lease time	1 days 0 hours 0 minutes
Default Gateway	
Report this host as the default gateway	☑
Default Gateway	. . .
Domain Name Servers	
Report this host as DNS server	☑
Primary DNS server address	0 . 0 . 0 . 0
Secondary DNS server address	0 . 0 . 0 . 0
Domain Name:	lan

The table below describes the parameters:

Parameter	Description
Interface	Select the appropriate interface from the drop-down list. **NOTE!** "Primary LAN" is the only selection in this version.
Start IP Address End IP Address	Specify the range of IP addresses that can be assigned to PCs on your LAN.
DHCP lease time	Specify the time that a network device can lease an IP address before it is reassigned.
Default Gateway	Check the **Report this host as the default gateway** box to use this host as the default gateway or fill in an IP address as the default gateway.

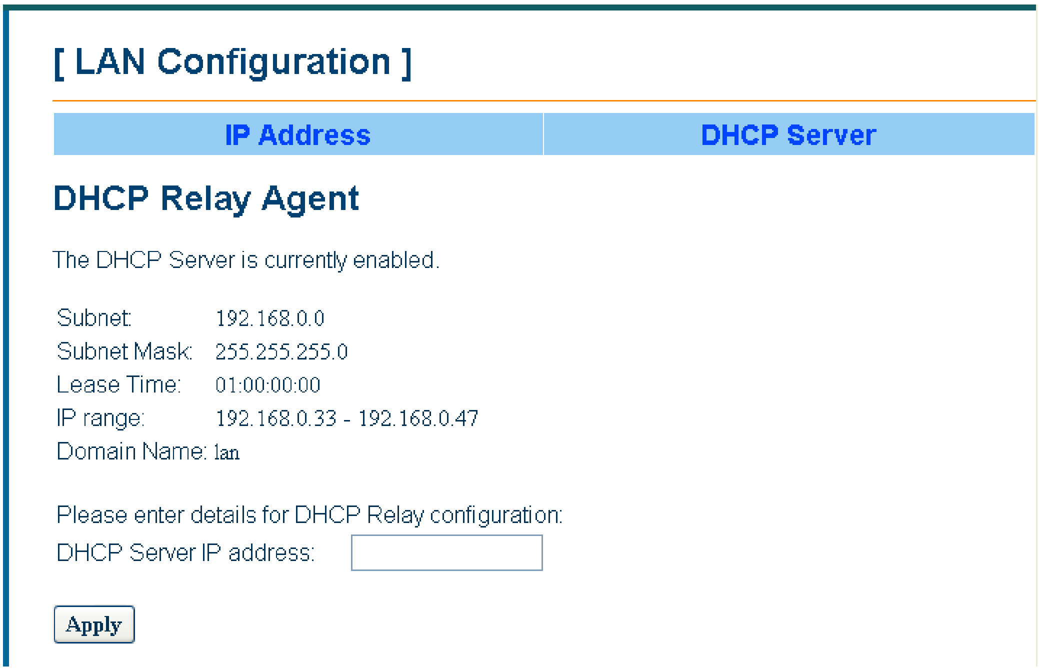
Parameter	Description
Domain Name Servers	You can check the **Report this host as the DNS server** box to use this host as the default DNS. Or you can uncheck the box and manually set up the DNS IP address in the **Primary/Secondary DNS IP address** fields. The DNS server addresses will be passed to the DHCP clients along with the IP addresses. The DHCP clients use the DNS to map a domain name to its corresponding IP address and vice versa.

Enter details for the DHCP Server configuration and click the **Apply** button.

Select **System > Save Configuration** and click the **Save** button to save your new settings.

Enable and configure the DHCP Relay Agent:

Select the **Relay Agent** radio button and click the **Configure** button. The following page appears:



[LAN Configuration]

DHCP Relay Agent

The DHCP Server is currently enabled.

Subnet: 192.168.0.0
Subnet Mask: 255.255.255.0
Lease Time: 01:00:00:00
IP range: 192.168.0.33 - 192.168.0.47
Domain Name: lan

Please enter details for DHCP Relay configuration:

DHCP Server IP address:

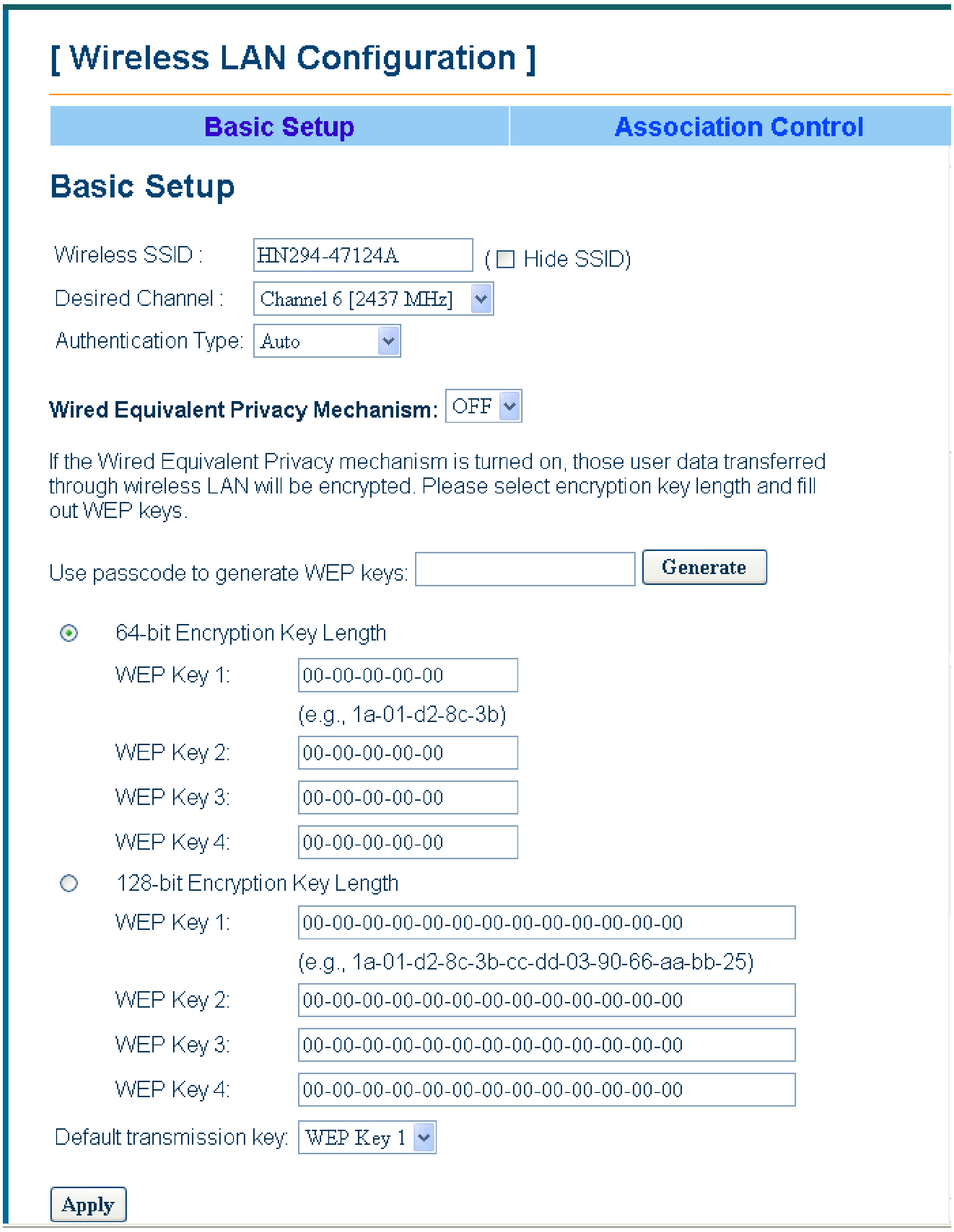
Enter the **DHCP Server IP address** and click the **Apply** button.

Select **System > Save Configuration** and click the **Save** button to save your new settings.

9.6.3 WLAN Configuration

9.6.3.1 Basic Setup

On the **Configuration > WLAN > Basic Setup** page you can make some basic security configuration for your Wireless LAN.



[Wireless LAN Configuration]

Basic Setup

Wireless SSID : HN294-47124A (□ Hide SSID)

Desired Channel : Channel 6 [2437 MHz]

Authentication Type: Auto

Wired Equivalent Privacy Mechanism: OFF

If the Wired Equivalent Privacy mechanism is turned on, those user data transferred through wireless LAN will be encrypted. Please select encryption key length and fill out WEP keys.

Use passcode to generate WEP keys:

● 64-bit Encryption Key Length

WEP Key 1: 00-00-00-00-00
(e.g., 1a-01-d2-8c-3b)
WEP Key 2: 00-00-00-00-00
WEP Key 3: 00-00-00-00-00
WEP Key 4: 00-00-00-00-00

○ 128-bit Encryption Key Length

WEP Key 1: 00-00-00-00-00-00-00-00-00-00-00-00-00
(e.g., 1a-01-d2-8c-3b-cc-dd-03-90-66-aa-bb-25)
WEP Key 2: 00-00-00-00-00-00-00-00-00-00-00-00-00
WEP Key 3: 00-00-00-00-00-00-00-00-00-00-00-00-00
WEP Key 4: 00-00-00-00-00-00-00-00-00-00-00-00-00

Default transmission key: WEP Key 1

The table below describes the parameters:

Parameter	Description
Wireless SSID	The **Wireless SSID** (Service Set IDentification) is the name of your wireless network. The HN294d comes preconfigured with a unique name, HN294-xxxxxx, where xxxxxx is the last six digits of its wireless MAC address. This MAC address can be found on an information sticker at the bottom of your HN294d. If you change the name, make sure you select something that is unlikely to be used by any other wireless networks close to you. The SSID is the way to find your wireless network if there are more than one. Your wireless clients (laptop, PC, etc) will scan the air and find the SSID of all available networks. If more than one, select your own.
Hide SSID	Check **Hide SSID** if you don't want the HN294d to send out the SSID to prevent network intrusion by using WLAN sniffer tools to read the SSID.
Desired Channel	In the **Desired Channel** drop-down list, choose the channel you wish to use. To optimize the connection, be sure not to use a channel close to one used nearby. E.g., if there is another wireless network running on channel 1 nearby, do not use channel 2 or 3, but rather channel 4 or preferably 5. In case you want to deploy many (more than three or four) different wireless networks at the same location, it is better to use the same channel twice than using to adjacent channels. The number of available channels depends on national regulation, and will therefore be different for each country. When you have selected a channel in the HN294d, the clients will automatically adapt to that channel upon joining the wireless network.
Authentication Type	There are three possible Authentication types: **Open system**, **Shared Key** or **Auto**. An access point that operates in "open system" mode will let any WLAN client associate to the access point, whereas an access point running in "shared key" mode will require a proof from each client trying to connect to the access point in order to associate. This is d one automatically and is based on the entered WEP key (which must be the same in the client and the HN294d). Selecting "shared key" mode in the HN294d, will in order to connect, force the clients to select shared

	key mode as well. If you select "Auto", the HN294d will adapt to each client's setting, and therefore accept clients using both "open system" and clients using "shared key" authentication. For maximum security, Shared key mode should be used.
Wired Equivalent Privacy Mechanism	The HN294d provides the security of 64- or 128-bit encryption following the WEP (Wired Equivalent Privacy) standard. If your wireless clients also support "passcode" you can use this method to automatically create the keys to be used, instead of writing them by hand one by one. Remember that if someone knows your "passcode" they can also generate the same keys, so keep the keys safe or don't use the "passcode" at all. **TIP!** Do not use an easy "passcode" like your name. Try to use something that cannot be related to you as a person or can be found in a dictionary.

Make your basic security configuration for you wireless LAN as described below:

1. Make your settings for **Wireless SSID, Desired Channel** and **Authentication Type**.

2. In order to benefit from the increased security (optional) you can enable WEP as the following:

   - ❑ Set the **Wired Equivalent Privacy Mechanism** to ON.

   - ❑ Select the **Key Length** (a 128-bit key provides greater security).

   - ❑ Enter a **key**. The key must consist of numbers 0 through 9 and letters a through f only and is given in the form 1a-01-d2-8c-3b for 64-bit WEP and 1a-01-d2-8c-3b-cc-dd-03-90-66-aa-bb-25 for 128-bit WEP.
     In order to communicate with each other, all devices in the wireless network must use the same key.

   - ❑ Choose which of the entered keys to use in the **Default transmission key**. It is recommended to regularly change keys.

Click the **Apply** button.

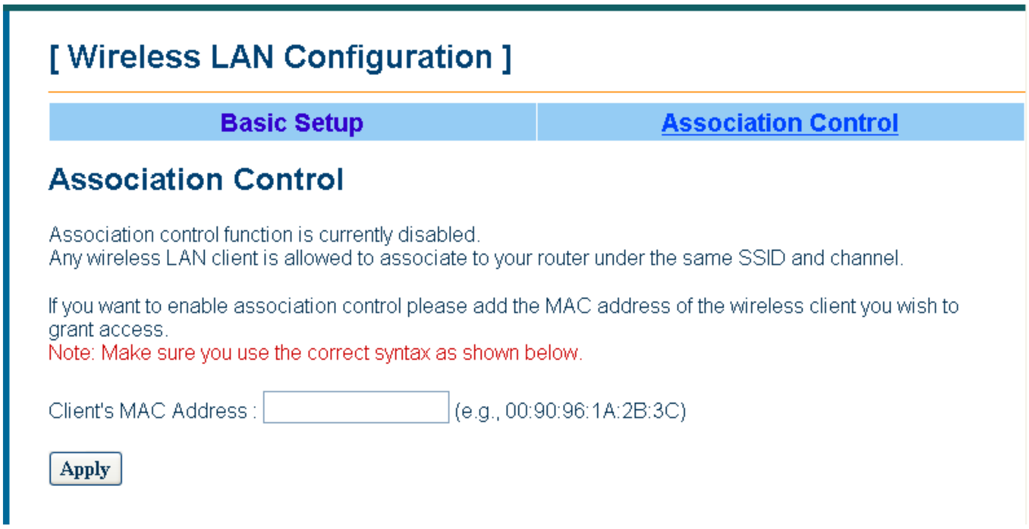
Select **System > Save Configuration** and click the **Save** button to save your new settings.

NOTE! If you are using a wireless client when configuring WEP, after pressing the **Apply** button you will not be able to have contact with the router until you have configured your wireless clients as well. This is fully normal and is a proof that your network is now protected. Remember to enter the same keys at every device on the wireless network. Refer to your wireless client manual how to configure WEP as this will vary depending on what operating system and wireless client you are using.

9.6.3.2 Association Control

The **Configuration > WLAN > Association Control** page allows you to enable the feature “ which is an effective and easy way to secure your wireless network from intruders. It doesn’t require any configuration of your computer(s) but on the other hand it doesn’t encrypt the traffic like WEP. This means that it is possible that someone could listen to your traffic, but they cannot access your computers, router or access the Internet.

Association Control will only stop people to use or communicate over your wireless network, i.e. they cannot access the HN294d, Internet or any or your WLAN computers, but they can with special programs listen to your wireless traffic. Your ordinary secure services like banking, tele-working or accessing your e-mail is usually already encrypted but if you want to protect people from listening to other kinds of traffic (like surfing the web to pages that are not secured or gaming) you should enable WEP or use some kind of VPN technology together with the Association Control.



Association Control

Association control function is currently disabled.
Any wireless LAN client is allowed to associate to your router under the same SSID and channel.

If you want to enable association control please add the MAC address of the wireless client you wish to grant access.
Note: Make sure you use the correct syntax as shown below.

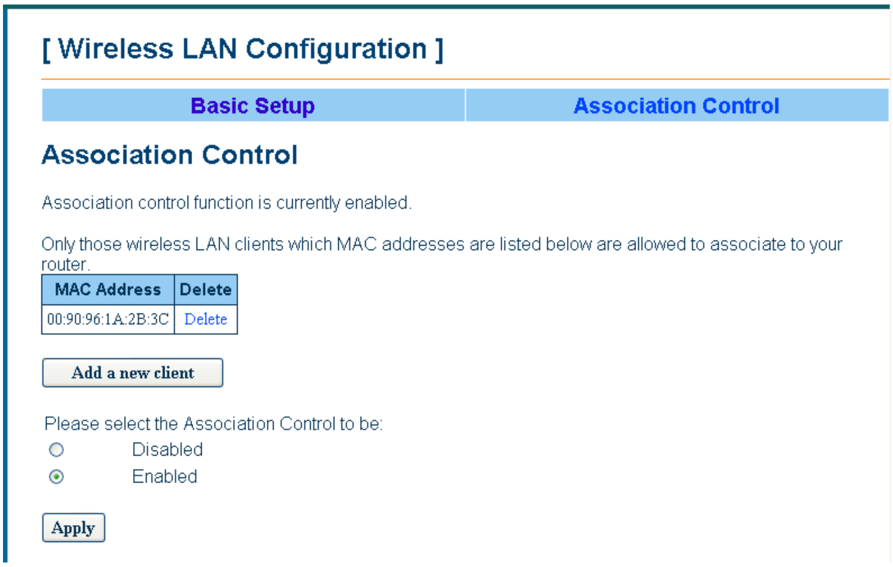
Client's MAC Address : (e.g., 00:90:96:1A:2B:3C)

Enable Association Control

1. Enter the **MAC address** of the wireless client you want to allow access to the HN294d.
   You will normally find the MAC address on the product label of your WLAN adapter. MAC addresses are given in the form

00:90:96:1A:2B:3C and only number 0 through 9 and letters a through f are allowed.

2. Click the **Apply** button and the following page appears:



[Wireless LAN Configuration]

Association Control

Association control function is currently enabled.

Only those wireless LAN clients which MAC addresses are listed below are allowed to associate to your router.

MAC Address	Delete
00:90:96:1A:2B:3C	Delete

Please select the Association Control to be:

○ Disabled

● Enabled

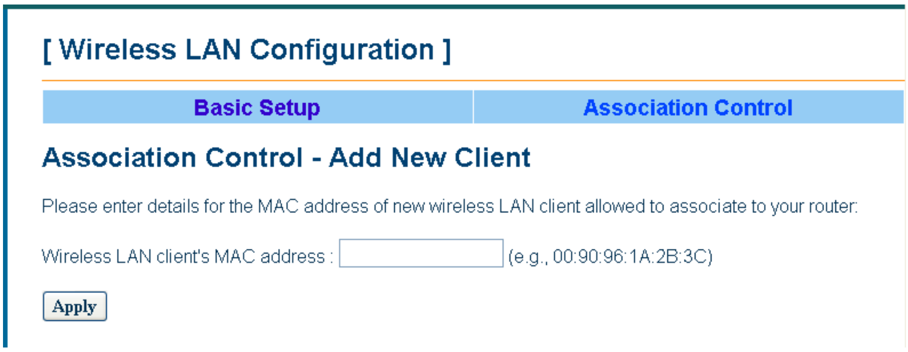
3. Verify that the correct MAC address is shown in the list of authorized clients.

4. Select **System > Save Configuration** and click the **Save** button to save your new settings.

Add / Remove client

If Association Control is enabled and you want to add a new wireless client (MAC address) to the list of approved clients, proceed as follows:

1. Click the **Add a new client** button. The following page appears:



[Wireless LAN Configuration]

Association Control - Add New Client

Please enter details for the MAC address of new wireless LAN client allowed to associate to your router:

Wireless LAN client's MAC address : (e.g., 00:90:96:1A:2B:3C)

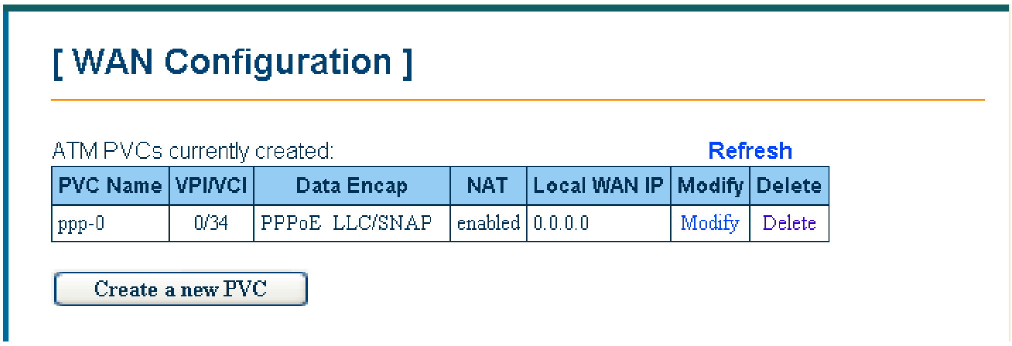
2. Enter the **MAC address** of the wireless client and click the **Apply** button.

3. Select **System > Save Configuration** and click the **Save** button to save your new settings.

To remove a client, simply click **Delete** in the list of approved clients.

9.6.4 WAN Configuration

On the **Configuration > WAN** page you can create, modify and delete ATM PVC interfaces.



[WAN Configuration]

ATM PVCs currently created:

PVC Name	VPI/VCI	Data Encap	NAT	Local WAN IP	Modify	Delete
ppp-0	0/34	PPPoE LLC/SNAP	enabled	0.0.0.0	Modify	Delete

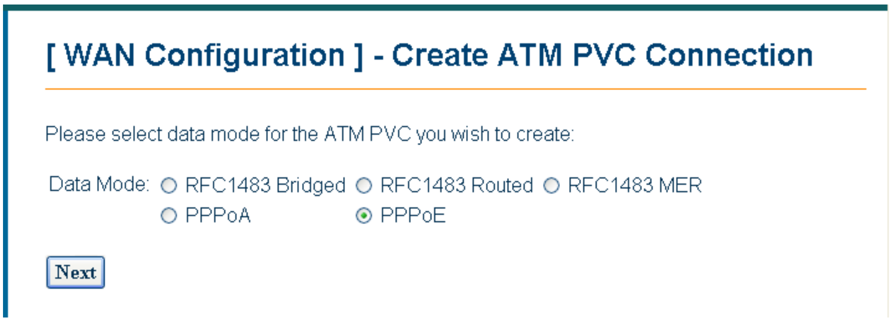
The HN294d supports ATM (Asynchronous Transfer Mode) over ADSL. To set up connections over the WAN you have to define an ATM PVC interface for each remote connection.

You can select an existing ATM PVC interface and click the **Modify** link to edit its parameters or click the **Delete** link to delete it.

Create a new ATM PVC Interface

If you want to add a new ATM PVC Interface, proceed as follows:

1. Click the **Create a new PVC** button and the following page appears:



[WAN Configuration] - Create ATM PVC Connection

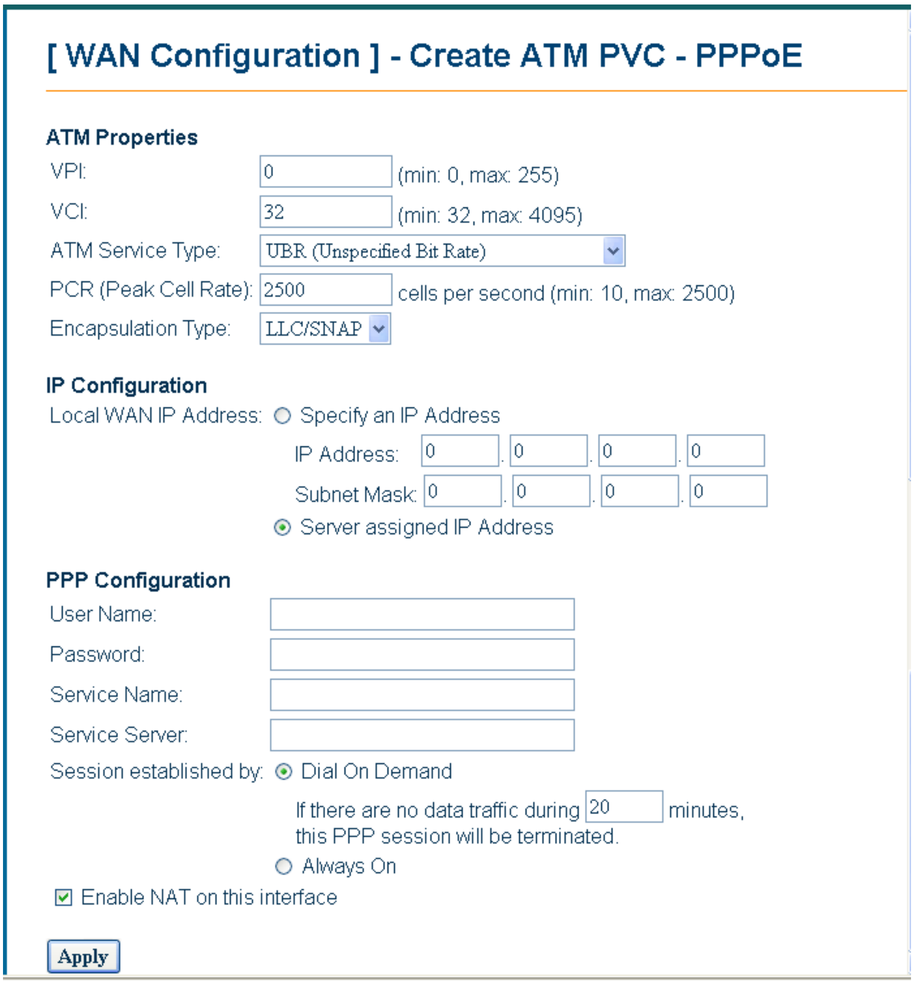
Please select data mode for the ATM PVC you wish to create:

Data Mode: ○ RFC1483 Bridged ○ RFC1483 Routed ○ RFC1483 MER
○ PPPoA ● PPPoE

2. Select a **Data Mode** and click the **Next** button.

3. Depending on which Data Mode were selected different pages is now appearing. In the example below, Data Mode “PPPoE” was

selected:



[WAN Configuration] - Create ATM PVC - PPPoE

ATM Properties

VPI: 0 (min: 0, max: 255)

VCI: 32 (min: 32, max: 4095)

ATM Service Type: UBR (Unspecified Bit Rate)

PCR (Peak Cell Rate): 2500 cells per second (min: 10, max: 2500)

Encapsulation Type: LLC/SNAP

IP Configuration

Local WAN IP Address: ○ Specify an IP Address

IP Address: 0 . 0 . 0 . 0

Subnet Mask: 0 . 0 . 0 . 0

● Server assigned IP Address

PPP Configuration

User Name:

Password:

Service Name:

Service Server:

Session established by: ● Dial On Demand

If there are no data traffic during 20 minutes, this PPP session will be terminated.

○ Always On

☑ Enable NAT on this interface

4. Fill in the parameters according to information from your ISP/service provider and click the **Apply** button.

5. Select **System > Save Configuration** and click the **Save** button to save your new settings.

The parameters for creating a new ATM PVC Interface are described below. Note that not all parameters are shown for all Data Modes.

Parameter	**Description**
ATM Properties	
VPI	Identifies the VPI (Virtual Path Identifier). The valid range is from 0 to 255.

Parameter	Description
VCI	Identifies the VCI (Virtual Channel Identifier). The valid range is from 32 to 4095 (1 to 31 are reserved for well-known protocols).
ATM Service Type	Supported ATM Service Types are UBR, CBR, VBR-nrt and VBR-rt.
PCR (Peak Cell Rate)	Identifies the PCR cells per second. Valid values are min. 10 and max 2500.
Encapsulation Type	Supported Encapsulation Types are VC-MUX or LLC/SNAP.
IP Configuration	
Local WAN IP Address	In Router mode, selecting **None** means that you have a public LAN IP address. If you select **Specify an IP Address**, you can specify a WAN IP address provided by your ISP/service provider for your HN294d. If **Server assigned IP Address** is selected, the HN294d will get a dynamic WAN IP address when connecting to the remote server or ISP. **NOTE!** If a fixed WAN IP is entered, this IP address and the subnet mask MUST NOT be the same as the public LAN interface.
PPP Configuration:	
User Name/Password	The User Name and Password used to access the remote server or ISP.
Service Name	The name of your PPP service.
Service Server	
Session established by	Check **Dial on Demand** if you want the HN294d to automatically dial the ISP when any client PC sends out a request for connection. In this case, you can disconnect the PPP session by clicking the D**isconnect** button on the “Overview” page. Enter a value for idle time out (when the PPP session will be automatically terminated if no activity is detected.

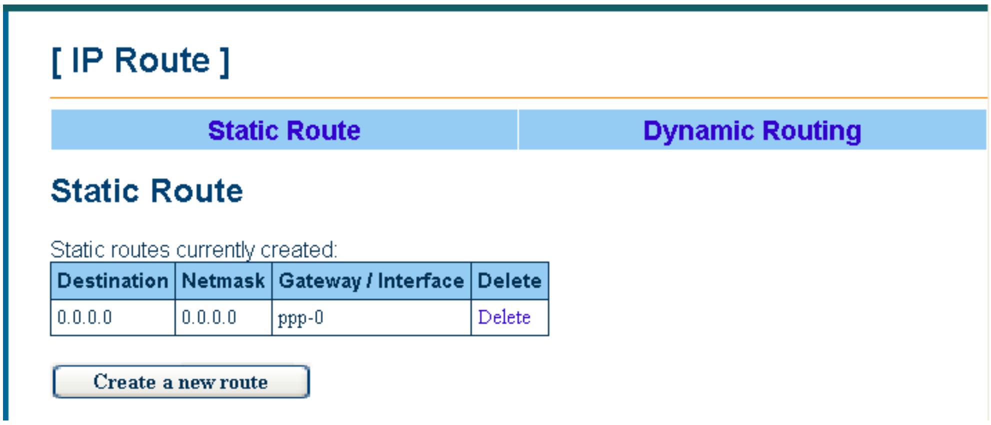
	By enabling **Always On** a periodic echo request will be sent to the ISP that prevents the connection from being closed by the ISP.
Enable NAT on this interface	Select this option if you want to enable NAT (Network Address Translation) on the interface.

NOTE! When you initially add a PVC for the PPP connection to your ISP, a default routing of **0.0.0.0** is added automatically to the IP Static Routing. If you set up more than one PVC profile and the first PVC is deleted, you will have to manually add the default routing.

9.6.5 IP Route

9.6.5.1 Static Route

The **Configuration > IP Route > Static Route** page shows the Static Routes currently created and allows you to add new or delete IP routes.



Static Route

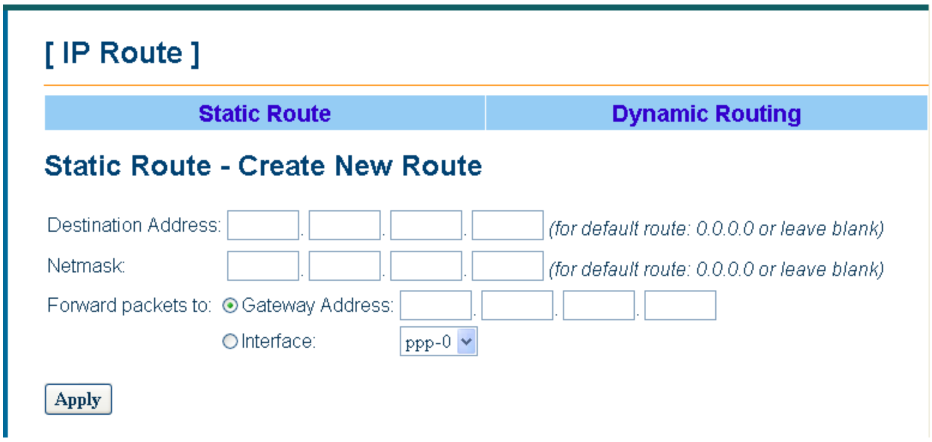
Static routes currently created:

Destination	Netmask	Gateway / Interface	Delete
0.0.0.0	0.0.0.0	ppp-0	Delete

A Static IP Route is a manually defined path that determines the data-transmitting route. If your local network is composed of multiple subnets, you may want to specify a routing path to the routing table.

Follow the steps below to create a new route:

1. Click the **Create a new route** button. The following page appears:



[IP Route]

Static Route | Dynamic Routing

Static Route - Create New Route

Destination Address: ___ . ___ . ___ . ___ (for default route: 0.0.0.0 or leave blank)

Netmask: ___ . ___ . ___ . ___ (for default route: 0.0.0.0 or leave blank)

Forward packets to: ● Gateway Address: ___ . ___ . ___ . ___

○ Interface: ppp-0

2. Enter parameters according to information in the table below and click the **Apply** button.

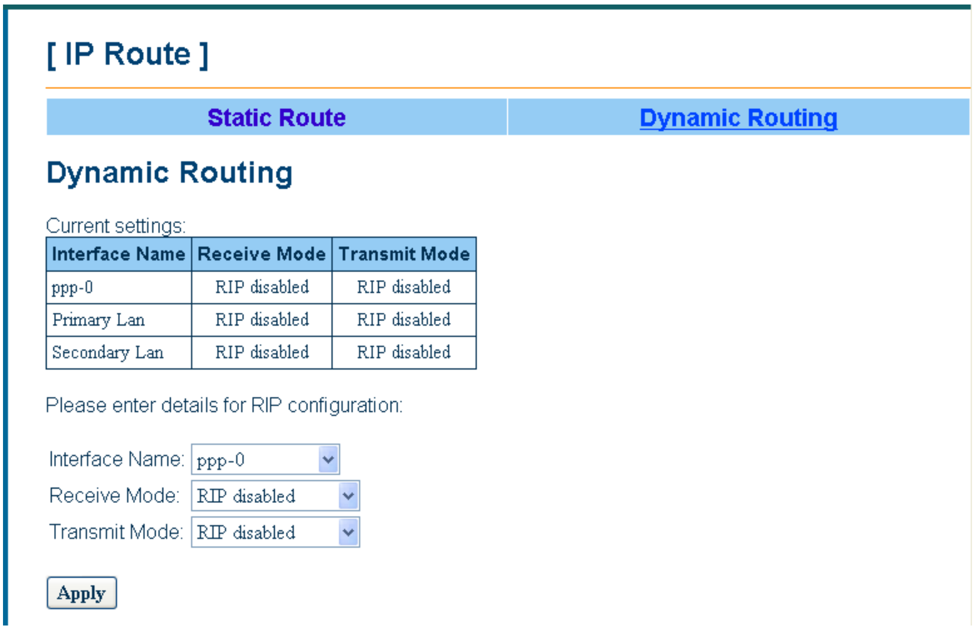
3. Select **System > Save Configuration** and click the **Save** button to save your new settings.

Description of parameters when creating a new Static Route:

Parameter	**Description**
Destination Address and Netmask	Identifies the destination IP address and netmask of the network where data packets are to be sent. For default route enter 0.0.0.0 or leave the fields blank.
Forward packets to	Select **Gateway Address** and enter the IP address of the gateway on the LAN where data packets are to be sent. This is to be configured only when the LAN interface is configured as a route. or Select **Interface** and from the drop-down list select the ATM PVC interface where data packets are to be sent.

9.6.5.2 Dynamic Routing

On the **Configuration > IP Route > Dynamic Routing** page you can enable/disable the Routing Information Protocol (RIP) that will help routers to determine optimal routes.



[IP Route]

Dynamic Routing

Current settings:

Interface Name	Receive Mode	Transmit Mode
ppp-0	RIP disabled	RIP disabled
Primary Lan	RIP disabled	RIP disabled
Secondary Lan	RIP disabled	RIP disabled

Please enter details for RIP configuration:

Interface Name: ppp-0

Receive Mode: RIP disabled

Transmit Mode: RIP disabled

By default RIP is disabled and you can enable RIP on both the WAN and Primary LAN interfaces. The RIP values can be customized for both Receive and Transmit mode. Receive Mode incorporates the RIP information when receiving RIP packets and Transmit Mode broadcasts the routing table.

To enable/disable RIP follow the steps below:

1. Select an **Interface Name** from the drop-down list.

2. To enable RIP, select the appropriate RIP version in the drop-down lists for both Receive and Transmit mode.
   To disable RIP, select RIP disabled from the drop-down lists.

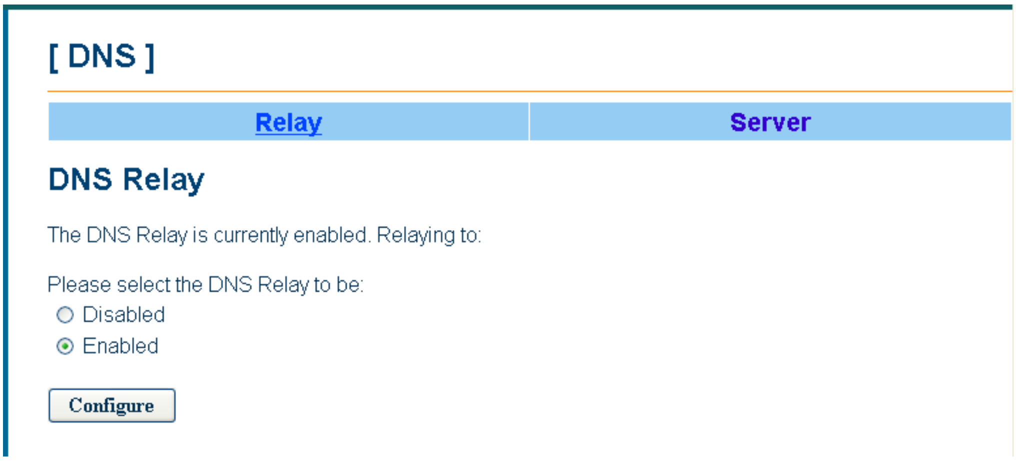
3. Click the **Apply** button.

4. Select **System > Save Configuration** and click the **Save** button to save your new settings.

9.6.6 DNS

9.6.6.1 DNS Relay

On the **Configuration > DNS > Relay** page you can disable/enable the DNS Relay function. If you have established settings before, the page will show the current DNS Relay status.



[DNS]

DNS Relay

The DNS Relay is currently enabled. Relaying to:

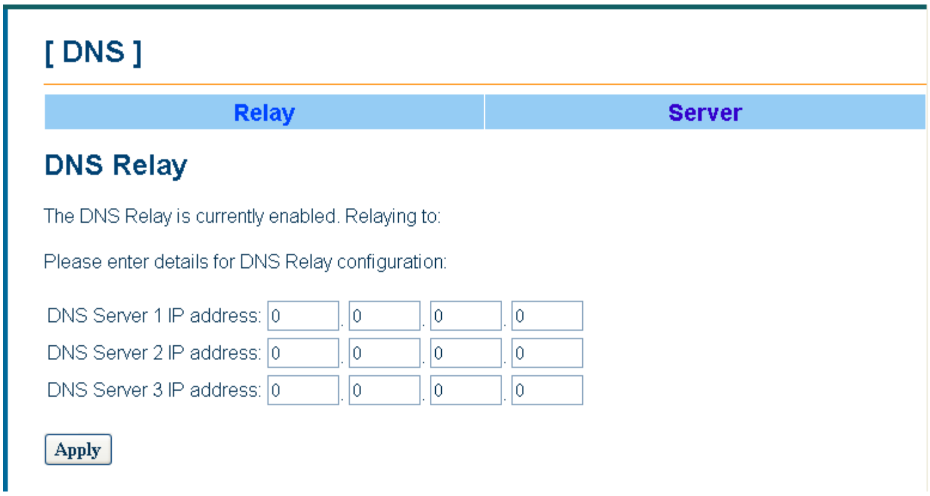
Please select the DNS Relay to be:

○ Disabled

● Enabled

To enable DNS Relay or modify the current settings proceed as follows:

1. Select the **Enabled** radio button and click the **Configure** button. The following page appears:



[DNS]

DNS Relay

The DNS Relay is currently enabled. Relaying to:

Please enter details for DNS Relay configuration:

DNS Server 1 IP address: 0 . 0 . 0 . 0

DNS Server 2 IP address: 0 . 0 . 0 . 0

DNS Server 3 IP address: 0 . 0 . 0 . 0

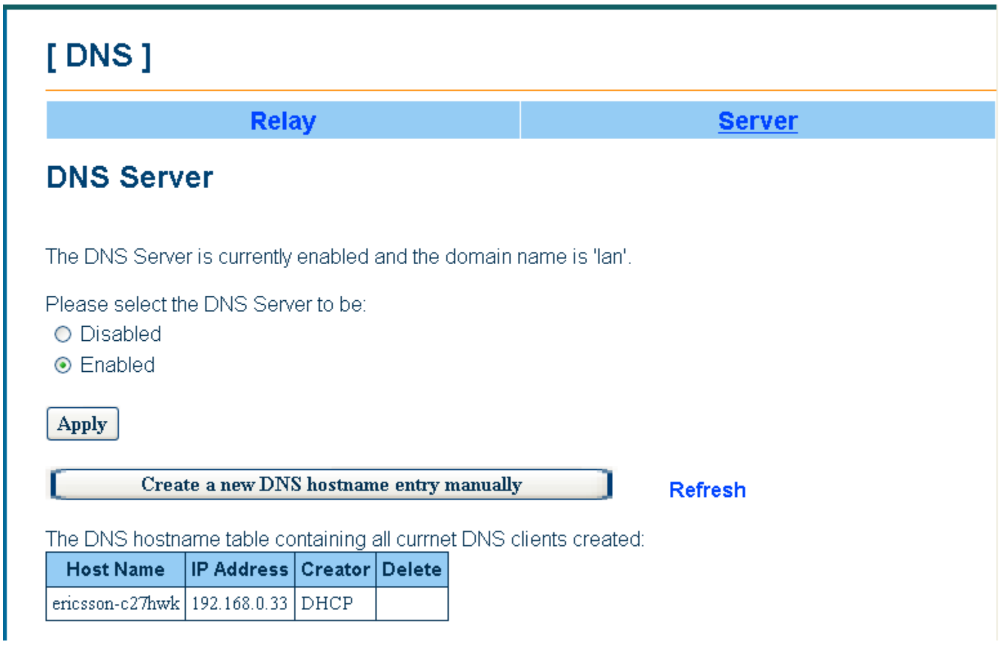
2. Specify up to three DNS Server IP addresses and click the **Apply** button.

3. Select **System > Save Configuration** and click the **Save** button to save your new settings.

To disable DNS Relay, just select the **Disabled** radio button and click the **Configure** button.

9.6.6.2 DNS Server

On the **Configuration > DNS > Server** page you can disable/enable the DNS Server function. If you have established settings before, the page will show a table containing all current DNS clients created.



[DNS]

DNS Server

The DNS Server is currently enabled and the domain name is 'lan'.

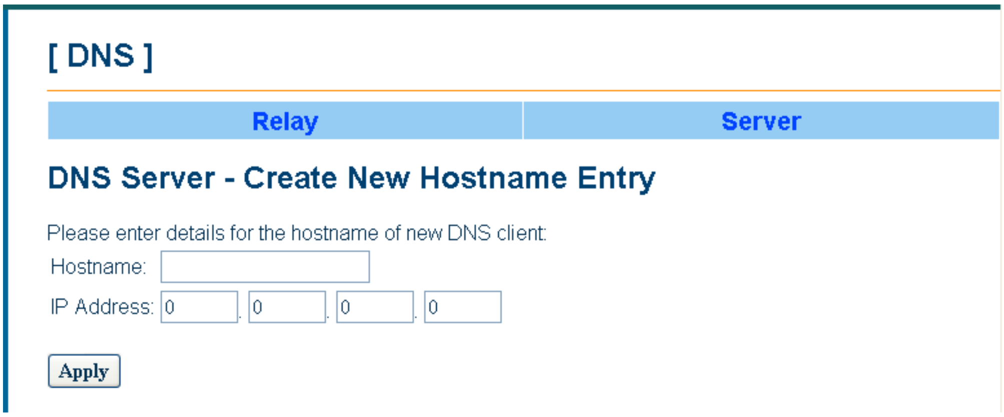
Please select the DNS Server to be:
○ Disabled
● Enabled

The DNS hostname table containing all currnet DNS clients created:

Host Name	IP Address	Creator	Delete
ericsson-c27hwk	192.168.0.33	DHCP	

To disable/enable the DNS Server, select the appropriate radio button and click the **Apply** button.

By adding a name to your LAN clients you can reach them by using names instead of IP addresses. To create a new hostname entry click the **Create a new DNS hostname entry manually** button and the following page appears:



[DNS]

DNS Server - Create New Hostname Entry

Please enter details for the hostname of new DNS client:

Hostname:

IP Address: 0 . 0 . 0 . 0

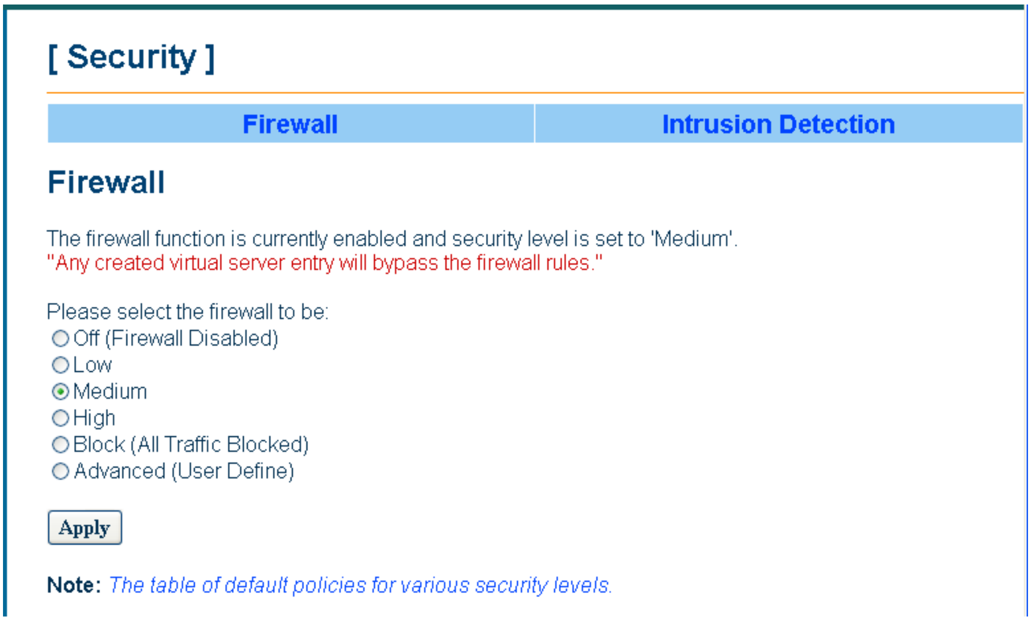
Enter the **Hostname** and **IP Address** of the DNS client and click the **Apply** button.

Select **System > Save Configuration** and click the **Save** button to save your new settings.

9.6.7 Security

9.6.7.1 Firewall

On the **Configuration > Security > Firewall** page you can select the desired security level for the built-in firewall.



Firewall

The firewall function is currently enabled and security level is set to 'Medium'.
"Any created virtual server entry will bypass the firewall rules."

Please select the firewall to be:

○ Off (Firewall Disabled)
○ Low
● Medium
○ High
○ Block (All Traffic Blocked)
○ Advanced (User Define)

Apply

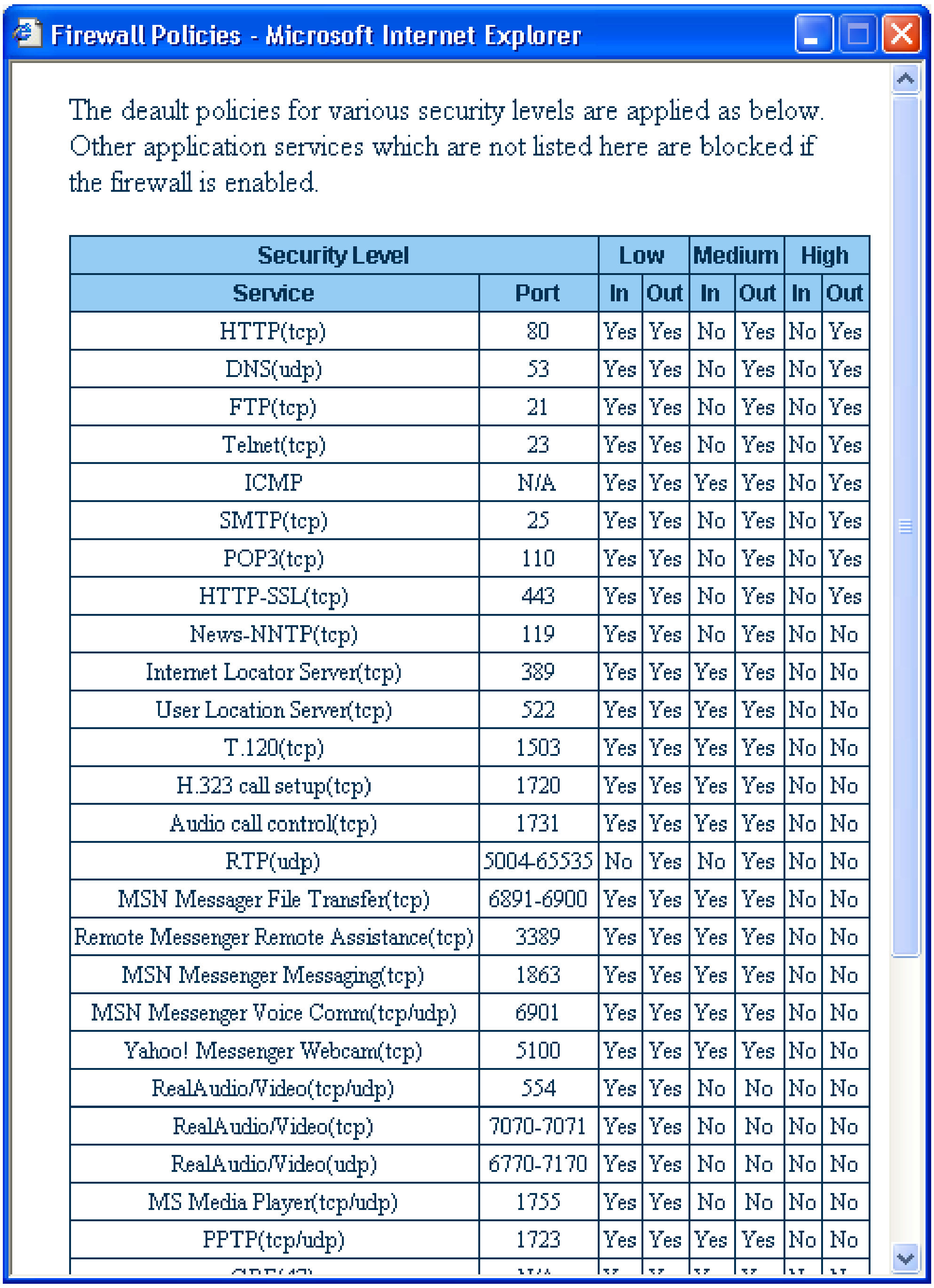
Note: *The table of default policies for various security levels.*

To simplify the configuration you can select a general security level (Low, Medium or High) for the firewall.

Low does not imply a low level of security, but differs from High in that High implement more restrictive rules, allowing fewer programs to be able to pass through the firewall. Even the Low setting offers a high level of security since the firewall inspects all traffic and blocks attacks before they can reach your PCs.

If you select **Off**, the firewall will be disabled and if you select **Block**, all traffic to/from the Internet will be blocked.

You can click the link **The table of default policies for various security levels** at he bottom of the page to see which applications are allowed for the different security levels:



The deault policies for various security levels are applied as below. Other application services which are not listed here are blocked if the firewall is enabled.

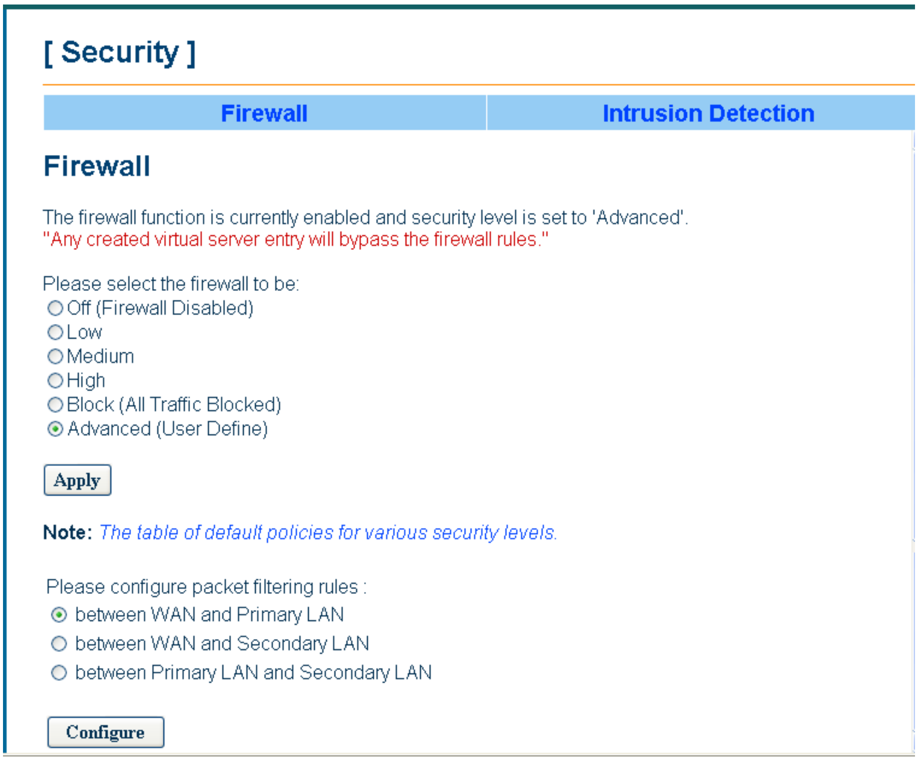
Security Level		Low		Medium		High	
Service	Port	In	Out	In	Out	In	Out
HTTP(tcp)	80	Yes	Yes	No	Yes	No	Yes
DNS(udp)	53	Yes	Yes	No	Yes	No	Yes
FTP(tcp)	21	Yes	Yes	No	Yes	No	Yes
Telnet(tcp)	23	Yes	Yes	No	Yes	No	Yes
ICMP	N/A	Yes	Yes	Yes	Yes	No	Yes
SMTP(tcp)	25	Yes	Yes	No	Yes	No	Yes
POP3(tcp)	110	Yes	Yes	No	Yes	No	Yes
HTTP-SSL(tcp)	443	Yes	Yes	No	Yes	No	Yes
News-NNTP(tcp)	119	Yes	Yes	No	Yes	No	No
Internet Locator Server(tcp)	389	Yes	Yes	Yes	Yes	No	No
User Location Server(tcp)	522	Yes	Yes	Yes	Yes	No	No
T.120(tcp)	1503	Yes	Yes	Yes	Yes	No	No
H.323 call setup(tcp)	1720	Yes	Yes	Yes	Yes	No	No
Audio call control(tcp)	1731	Yes	Yes	Yes	Yes	No	No
RTP(udp)	5004-65535	No	Yes	No	Yes	No	No
MSN Messager File Transfer(tcp)	6891-6900	Yes	Yes	Yes	Yes	No	No
Remote Messenger Remote Assistance(tcp)	3389	Yes	Yes	Yes	Yes	No	No
MSN Messenger Messaging(tcp)	1863	Yes	Yes	Yes	Yes	No	No
MSN Messenger Voice Comm(tcp/udp)	6901	Yes	Yes	Yes	Yes	No	No
Yahoo! Messenger Webcam(tcp)	5100	Yes	Yes	Yes	Yes	No	No
RealAudio/Video(tcp/udp)	554	Yes	Yes	No	No	No	No
RealAudio/Video(tcp)	7070-7071	Yes	Yes	No	No	No	No
RealAudio/Video(udp)	6770-7170	Yes	Yes	No	No	No	No
MS Media Player(tcp/udp)	1755	Yes	Yes	No	No	No	No
PPTP(tcp/udp)	1723	Yes	Yes	Yes	Yes	No	No

Set an appropriate security level for the firewall and click the **Apply** button.

Select **System > Save Configuration** and click the **Save** button to save your new settings.

Modify or delete existing rules

1. Select the **Advanced (User Define)** option and click the **Apply** button. The following page appears:



Firewall

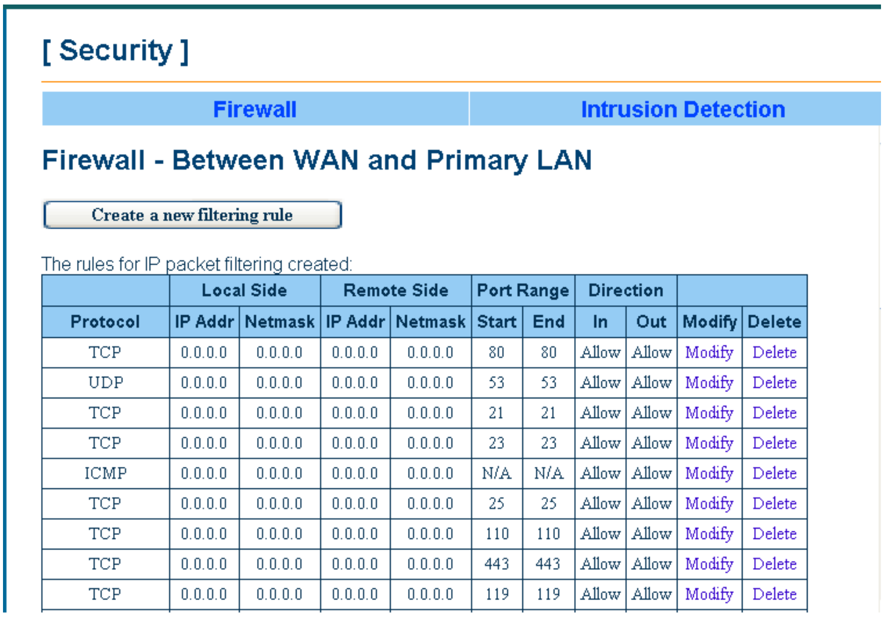
The firewall function is currently enabled and security level is set to 'Advanced'.
"Any created virtual server entry will bypass the firewall rules."

Please select the firewall to be:
○ Off (Firewall Disabled)
○ Low
○ Medium
○ High
○ Block (All Traffic Blocked)
● Advanced (User Define)

Note: *The table of default policies for various security levels.*

Please configure packet filtering rules :
● between WAN and Primary LAN
○ between WAN and Secondary LAN
○ between Primary LAN and Secondary LAN

2. At the bottom of the page, select between which interfaces you want to modify or delete the existing rules.
   If you have not created a secondary LAN (see Configuration > LAN) you can only create rules “between WAN and Primary LAN”.
   Click the **Configure** button and the following page appears:



[Security]

Firewall - Between WAN and Primary LAN

The rules for IP packet filtering created:

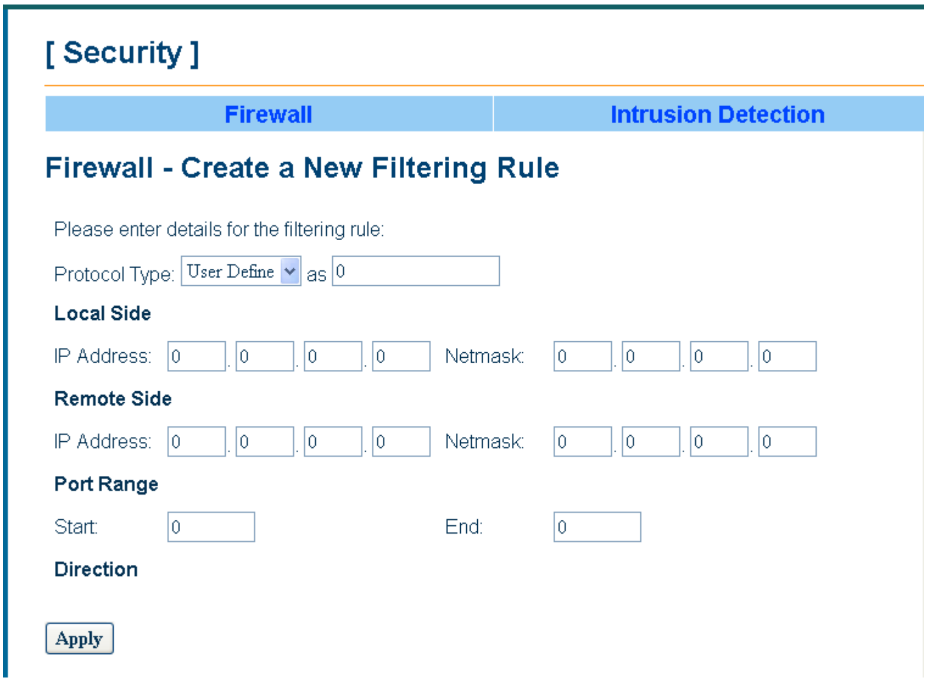
	Local Side		Remote Side		Port Range		Direction			
Protocol	IP Addr	Netmask	IP Addr	Netmask	Start	End	In	Out	Modify	Delete
TCP	0.0.0.0	0.0.0.0	0.0.0.0	0.0.0.0	80	80	Allow	Allow	Modify	Delete
UDP	0.0.0.0	0.0.0.0	0.0.0.0	0.0.0.0	53	53	Allow	Allow	Modify	Delete
TCP	0.0.0.0	0.0.0.0	0.0.0.0	0.0.0.0	21	21	Allow	Allow	Modify	Delete
TCP	0.0.0.0	0.0.0.0	0.0.0.0	0.0.0.0	23	23	Allow	Allow	Modify	Delete
ICMP	0.0.0.0	0.0.0.0	0.0.0.0	0.0.0.0	N/A	N/A	Allow	Allow	Modify	Delete
TCP	0.0.0.0	0.0.0.0	0.0.0.0	0.0.0.0	25	25	Allow	Allow	Modify	Delete
TCP	0.0.0.0	0.0.0.0	0.0.0.0	0.0.0.0	110	110	Allow	Allow	Modify	Delete
TCP	0.0.0.0	0.0.0.0	0.0.0.0	0.0.0.0	443	443	Allow	Allow	Modify	Delete
TCP	0.0.0.0	0.0.0.0	0.0.0.0	0.0.0.0	119	119	Allow	Allow	Modify	Delete

3. Click the **Modify** link next to the rule you want to modify.

4. To delete an existing rule, click the **Delete** link.

   NOTE! If you delete any of the predefined entries, the service type of the deleted entry will be blocked. This means that the LAN PCs will not be able to access its corresponding service. If you want to filter a specific computer from accessing certain Internet services or locations, you should create additional filter rules.

5. To create a new rule, click the **Create a new filtering rule** button. The following page appears:



Firewall - Create a New Filtering Rule

Please enter details for the filtering rule:

Protocol Type: User Define as 0

Local Side

IP Address: 0 . 0 . 0 . 0 Netmask: 0 . 0 . 0 . 0

Remote Side

IP Address: 0 . 0 . 0 . 0 Netmask: 0 . 0 . 0 . 0

Port Range

Start: 0 End: 0

Direction

6. Enter parameters according to the descriptions below and click the **Apply** button.
7. Select **System > Save Configuration** and click the **Save** button to save your new settings.

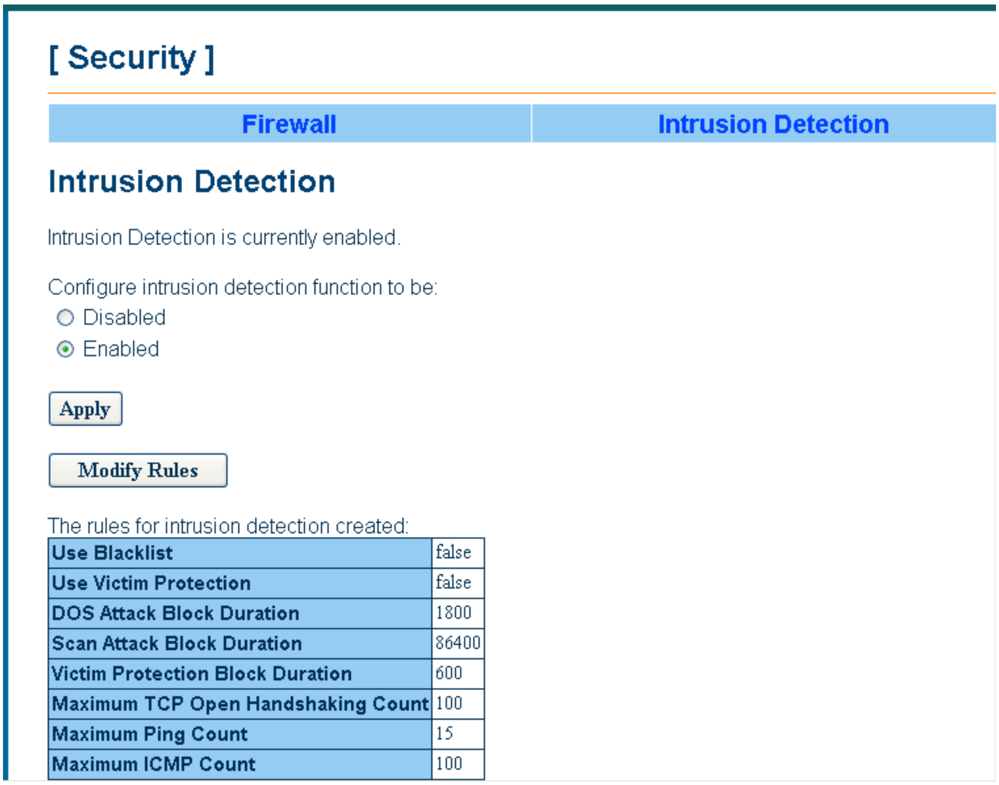
Description of parameters when creating a new filtering rule:

Parameter	**Description**
Protocol Type	It governs the information flow within a communications infrastructure. You may select the protocol from the drop-down list and then enter the port number that identifies the service, e.g. web service is on port 80 and FTP on port 21.
Local Side IP Address and Netmask	If you wish to filter packets originating from a certain node, enter the IP address and subnet mask that identifies this node on the network.
Remote Side IP Address and Netmask	If you wish to filter packets addressed to a certain node, enter the IP address and subnet mask that identifies that destination node on the Internet. The Netmask field is disregarded if you leave it as 0.0.0.0.

Parameter	Description
Port Range	Enter the starting and ending port numbers that identify the service that you want to filter, e.g. web service is on port 80 and FTP on port 21.
Direction	Choose whether to filter the packets that are incoming (In Bound) or outgoing (Out Bound) with respect to the interface. The action can be Allow or Block. Each data packet that enters will undergo data filtering. Data packets are either blocked or allowed to pass, depending on whether or not a match is found.

9.6.7.2 Intrusion Detection

On the **Configuration > Security > Intrusion Detection** you can enable/disable the intrusion detection function and also see and modify the existing rules.



Intrusion Detection

Intrusion Detection is currently enabled.

Configure intrusion detection function to be:

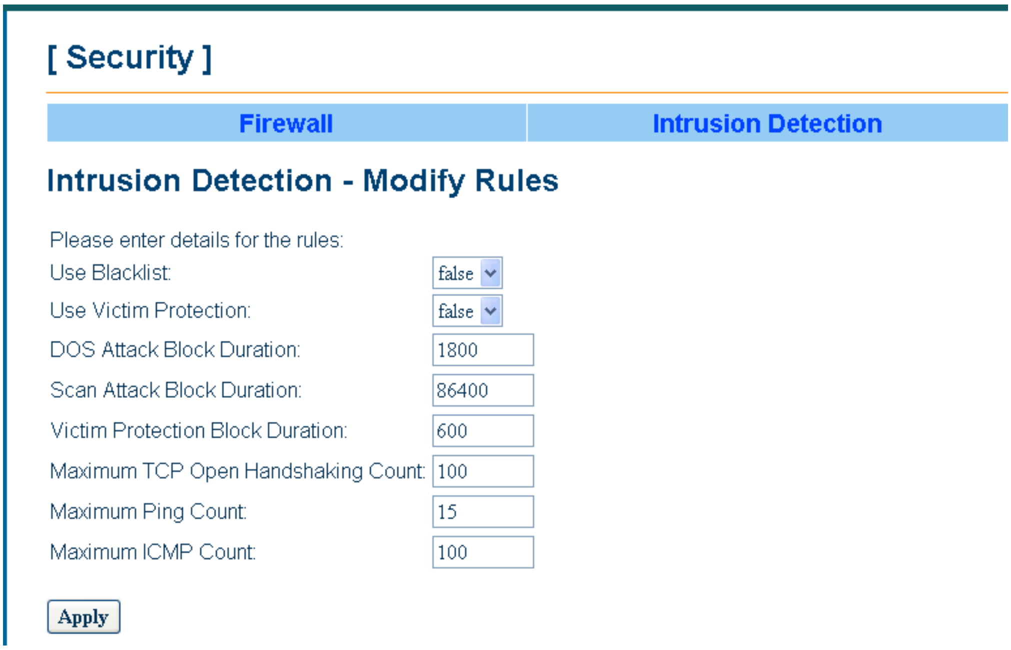
○ Disabled
● Enabled

The rules for intrusion detection created:

Use Blacklist	false
Use Victim Protection	false
DOS Attack Block Duration	1800
Scan Attack Block Duration	86400
Victim Protection Block Duration	600
Maximum TCP Open Handshaking Count	100
Maximum Ping Count	15
Maximum ICMP Count	100

To enable/disable the intrusion detection function select the appropriate radio button and click the **Apply** button.

To modify the existing rules, click the **Modify Rules** button and the following page appears:



Intrusion Detection - Modify Rules

Please enter details for the rules:

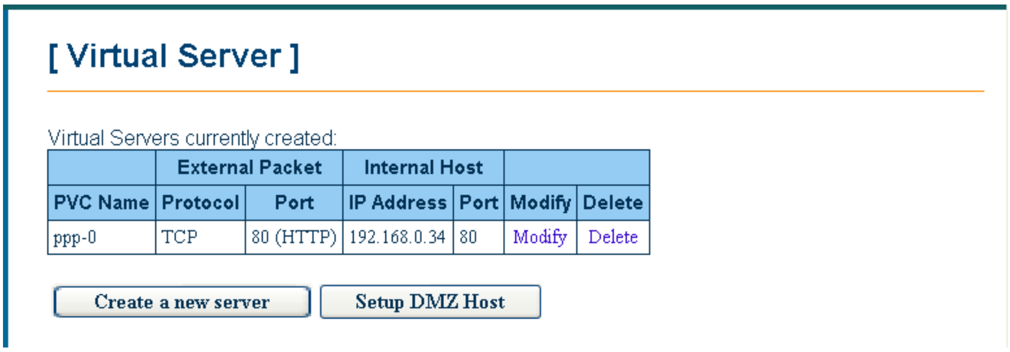
Use Blacklist:	false
Use Victim Protection:	false
DOS Attack Block Duration:	1800
Scan Attack Block Duration:	86400
Victim Protection Block Duration:	600
Maximum TCP Open Handshaking Count:	100
Maximum Ping Count:	15
Maximum ICMP Count:	100

Make your changes and click the **Apply** button.

Select **System > Save Configuration** and click the **Save** button to save your new settings.

9.6.8 Virtual Server

The **Configuration > Virtual Server** page shows the Virtual Server(s) currently created and allows you to create new server(s) and to setup a DMZ zone for one of your LAN computers.



Virtual Servers currently created:

	External Packet		Internal Host			
PVC Name	Protocol	Port	IP Address	Port	Modify	Delete
ppp-0	TCP	80 (HTTP)	192.168.0.34	80	Modify	Delete

The HN294d implements NAT (Network Address Translation) to allow your entire local network to appear as a single machine to the Internet. The typical situation is that you have local servers for various services and you want to make them publicly accessible. With NAT applied, the internal IP addresses of these servers will be translated to a single IP address that is unique on the Internet. The NAT function not only eliminates the need for multiple public IP addresses, but also provides a measure of security for your LAN/WLAN.

When the HN294d receives an incoming IP packet requesting access to your local server, the router will recognize the service type according to the port number in this packet (e.g. port 80 indicates HTTP service and port 21 indicates FTP service). By specifying the port number, you tell the router which services should be forwarded to which local IP addresses you specify.

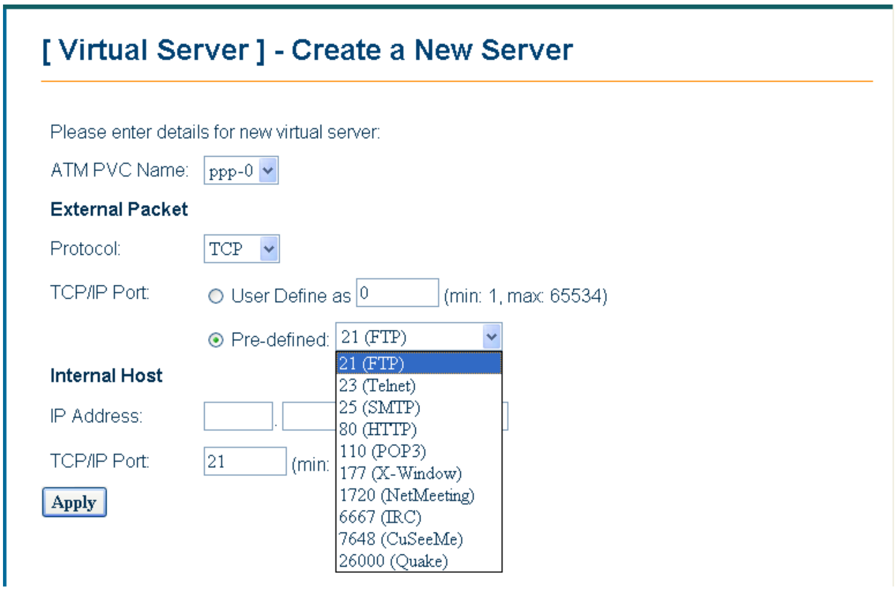
NOTE! After you have set up a virtual server you should modify the filter rules for those ports and services you set up on the virtual server. This is because the firewall uses these filter rules to protect the route.

In the virtual server list table, you may modify or delete an entry by simply clicking the **Modify** or **Delete** link for that entry.

Create a new virtual server

To add a new virtual server service entry proceed as follows:

1. Click the **Create a new server** button and the following page appears:



[Virtual Server] - Create a New Server

Please enter details for new virtual server:

ATM PVC Name: ppp-0

External Packet

Protocol: TCP

TCP/IP Port: ○ User Define as 0 (min: 1, max: 65534)

● Pre-defined: 21 (FTP)

Internal Host

IP Address: .

TCP/IP Port: 21 (min:

2. Enter parameters according to the description in the table below and click the **Apply** button.

3. Select **System > Save Configuration** and click the **Save** button to save your new settings.

Description of parameters when creating a new virtual server:

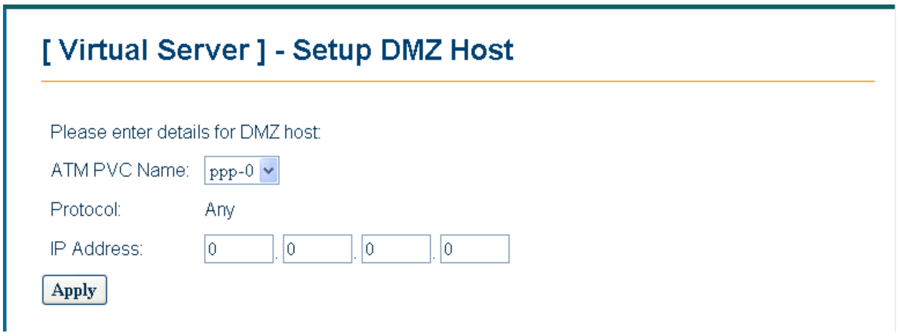
Parameter	**Description**
ATM PVC Name	Select the ATM PVC interface from the drop-down list.
External Packet	
Protocol	Select the protocol type to be used by the service that will be forwarded.
TCP/IP Port	Select **User Define as** and enter a port number or Select one of the **Pre-defined** ports from the drop-down list. The HN294d supports a port mapping function that translates a standard port number to a non-standard port number. Incoming data packets, sent to a specific IP port, could be mapped to the port you specify. The most often used port numbers are: 21 (FTP), 80 (HTTP), 23 (Telnet) and 25 (SMTP).
Internal Host	
IP Address	Enter the IP address of the internal server to which the packets are forwarded.
TCP/IP Port	Enter the port number you wish to use for your internal server. If "Pre-defined" was selected above, the port number will be filled in automatically.

Create a DMZ zone

With the help of the Virtual Server you can also create a DMZ zone for one of your LAN computers. When a DMZ zone is created, all ports will be redirected to this IP address. This may be useful if playing Internet games and having problems with NAT and Firewall

To create a DMZ zone follow the steps below:

1. Click the **Setup DMZ host** button and the following page appears:



[Virtual Server] - Setup DMZ Host

Please enter details for DMZ host:

ATM PVC Name: ppp-0

Protocol: Any

IP Address: 0 . 0 . 0 . 0

2. Enter parameters according to the description in the table below and click the **Apply** button.

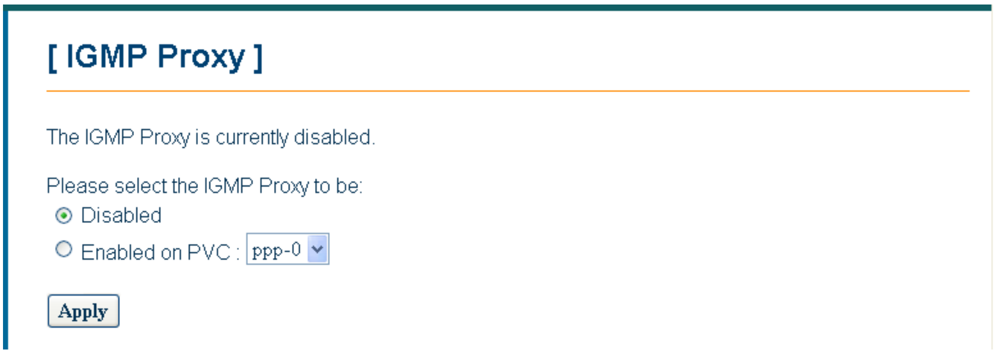
3. Select **System > Save Configuration** and click the **Save** button to save your new settings.

Description of parameters when setting up a DMZ Host:

Parameter	Description
ATM PVC Name	Select the ATM PVC interface from the drop-down list.
IP Address	Enter the IP address of the LAN computer you want to have in the DMZ zone.

9.6.9 IGMP Proxy

On the **Configuration > IGMP Proxy** page you can select to enable IGMP proxy. When enabled it will listen to IGMP subscriptions from your LAN computers.



[IGMP Proxy]

The IGMP Proxy is currently disabled.

Please select the IGMP Proxy to be:

● Disabled

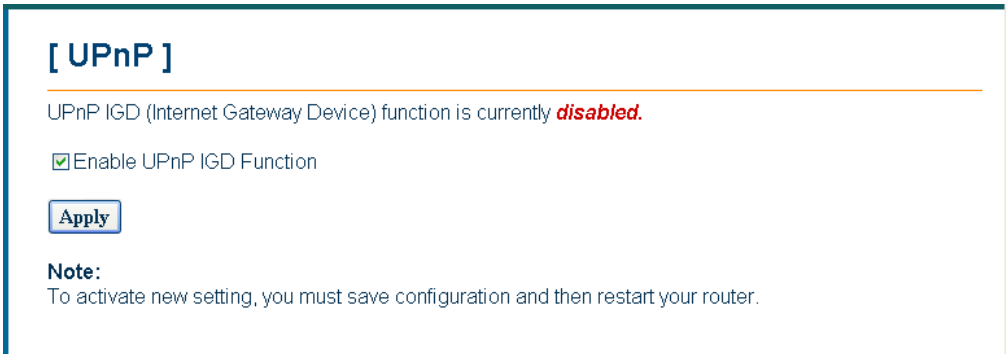
○ Enabled on PVC : ppp-0

Select **Enabled on PVC** and from the drop-down list select the appropriate ATM PVC interface. Click the **Apply** button.

Select **System > Save Configuration** and click the **Save** button to save your new settings.

9.6.10 UPnP

On the **Configuration > UPnP** page you can enable the UPnP function.



[UPnP]

UPnP IGD (Internet Gateway Device) function is currently ***disabled.***

☑ Enable UPnP IGD Function

Note:
To activate new setting, you must save configuration and then restart your router.

Universal plug and play (UPnP) is a networking architecture that provides compatibility among networking equipment, software and peripherals of the 400+ vendors that are part of the Universal Plug and Play Forum. UPnP works with wired or wireless networks and can be supported on any operating system.

When UPnP is enabled it will help your programs to pass the NAT and it will also appear as a UPnP device on your network. Future programs will use this device for different purposes. UPnP can be considered as a security hole, but there are great advantages too to use it. Programs like MSN Messenger uses UPnP.

To enable the UPnP function just check the **Enable UPnP IGD Function** box and click the **Apply** button.

Select **System > Save Configuration** and click the **Save** button to save your new settings.

10 Troubleshooting

This chapter provides tips and solutions for resolving some of the problems you might encounter when using your HN294d. If the suggested solutions do not resolve your issue, contact your system administrator or Internet Service Provider.

10.1 Basic Functions

Indication/Symptom	What to do
No LEDs light up on my HN294d and it will not turn on.	Check that the power adapter is connected to your HN294d and into a power outlet. Make sure that the power switch on the back of the HN294d is set to On. **NOTE!** Only use the power adapter provided with the HN294d. Using any other adapter may damage your router and violate your warranty.

10.2 LAN Connection

Indication/Symptom	What to do
The PCs on the LAN cannot access the HN294d	Check that the power adapter is connected to your HN294d and into a power outlet. Make sure that your HN294d is turned On. Check the network cable and make sure that there is a physical connection between your computer and the HN294d and that the LAN and/or USB LED lit (depending on which interface you used for connection). Use the WINIPCFG (Windows 95/98/Me) or IPCONFIG (Windows NT/2000/XP) utility described below to make sure that your computer has a compatible IP address. This utility is used mainly to view, release and renew your IP address configuration.

10.2.1 How to use WINIPCFG

Use WINIPCFG if your PC is running Windows 95, 98 or Me:

1. From the **Start** menu select **Run…** .

2. Type **winipcfg** and click **OK**. The “IP Configuration” dialog box appears.

3. From the scroll down menu at the top, select the network card that you are using. This is important if you have more than one network card.

4. Make sure that the Default gateway is the IP address of your HN294d. If it is not, you will not be able to connect to the Internet.

   If you are using DHCP, click the **Release** and then the **Renew** buttons to receive the correct IP settings.

   If you manually set your network settings, make sure that the IP address of your HN294d is set in the Gateway portion of the TCP/IP settings in your network settings.

5. Click **OK** to close the “IP Configuration” dialog box.

10.2.2 How to use IPCONFIG

Use UPCONFIG if your PC is running Windows NT, 2000 or XP:

1. From the **Start** menu select **Programs > Accessories > Command Prompt**. The “Command Prompt” window appears.

2. Type **ipconfig** to display your IP configuration.

3. Make sure that the Default gateway is the IP address of your HN294d. If it is not, you will not be able to connect to the Internet.

   If you are using DHCP, type **ipconfig /release** and when the C:\> prompt appears again type **ipconfig /renew** to receive the correct IP settings.

4. Close the “Command Prompt” window.

10.3 WAN Connection

Indication/Symptom	What to do
I can access the HN294d but cannot connect to my ISP.	Make sure that the HN294d is connected properly according to the installation instructions. If the DSL LED on the front panel is Off or keeps flashing, there may be a problem with the cable connection to the HN294d. Make sure that the right connection type (ADSL mode) is used in the **Configuration Wizard** (according to instructions from your ISP/service provider). If you connect using a User Name and Password, make sure you type it exactly as provided, i.e. distinguish between uppercase and lowercase letters. Verify that you are in accordance with your ISP service agreement before sharing Internet access. Some ISP's do not care if you share your broadband connection while others will explicitly restrict this type of activity.

10.4 WLAN Connection

Indication/Symptom	What to do
I cannot find the MAC address of my WLAN adapter.	You will normally find the MAC address on the product label of your WLAN adapter. If not, click **Start > Run…** type **command** and click **OK**. In the command window that appears, type **ipconfig /all** and hit Enter. You will then find the MAC address listed as physical address under your wireless adapters.
I have problems getting a wireless connection	If you have enabled WEP, try disabling that. When the wireless network runs smoothly, you may then enable WEP. Remember to enter the same keys at every device on the wireless network. Try setting up the connection with the client in the same room. Remember that walls and ceilings will reduce the operating range. Also, other devices emitting radiation at the same frequency, such as

	Bluetooth devices, microwave ovens and 2.4 GHz cordless phones might interfere with your wireless LAN. Furthermore, you may want to consider repositioning the HN294d (e.g. wall mount it).

10.5 Reset the HN294d

Failure to access your HN294d may occur if the router is configured incorrectly or if you simply forget your login Username and Password. You may end up in a situation where restoring the original default settings is the only option.

The following procedure will reset ALL configurable values back to their original default, including the login Username and Password.

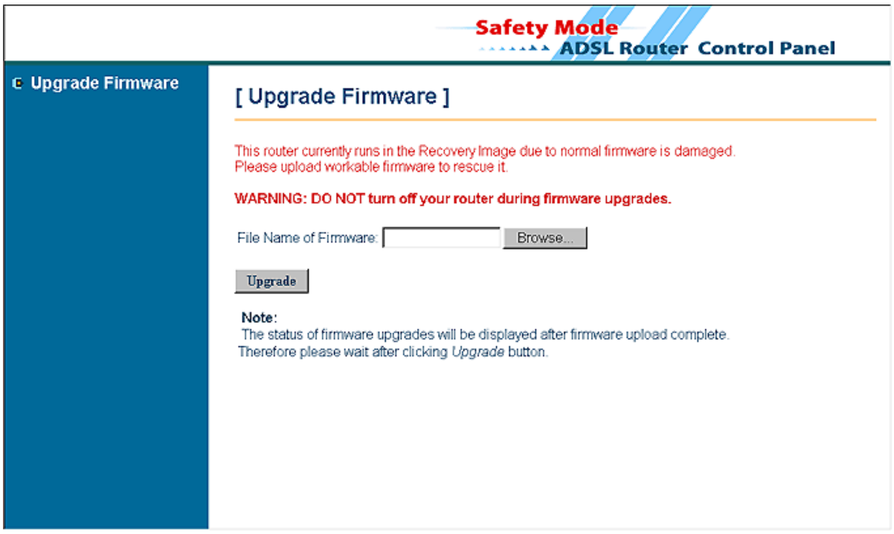
1. Make sure your HN294d is turned On.
2. By using the tip of a pen, press the Reset button (tiny hole) to the left of the power switch at the back of the HN294d.
3. Keep the button pressed for at least 10 seconds before releasing it.
4. The HN294d will reboot and comes then online with factory default settings.

10.6 Safety Mode

The HN294d is equipped with a special Safety Mode that is used only if a software upgrade fails. In case that an upgrade fails, all LEDs will lit and the Web Manager is not accessible.

Follow the steps below to access the router again and to make a new upgrade:

1. Your computer must be set to static IP address (within the range 192.168.0.2 to 192.168.0.253) and subnet mask 255.255.255.0.
2. Start your web browser and type **192.168.0.1** (the private IP address for the HN294d) in the URL field. The following page appears:



This router currently runs in the Recovery Image due to normal firmware is damaged.
Please upload workable firmware to rescue it.

WARNING: DO NOT turn off your router during firmware upgrades.

File Name of Firmware: Browse...

Upgrade

Note:
The status of firmware upgrades will be displayed after firmware upload complete.
Therefore please wait after clicking *Upgrade* button.

3. In the **File Name of Firmware** field, click the **Browse** button to locate the upgrade file.

4. Click the **Upgrade** button.

   DO NOT turn off your HN294d during the firmware upgrade. The process may take a while due to extensive testing of the software. After upgrading, the original configuration settings will remain.

5. The status of the firmware upgrade will be displayed after the firmware upload completed

6. After a successful upgrade the static IP address on your computer should be changed to the previous settings (normally “Obtain an IP address automatically”).

11 Important Information

11.1 Product Care and Maintenance

NOTE! These are important guidelines for safe and efficient use of your device. Read this information before using your Ericsson ADSL Wireless Router HN294d.

Your ADSL Wireless Router HN294d is a highly sophisticated electronic device. To get the most out of your product, be sure to read the following text about product care, safety and efficient use.

Do not expose the product to liquid or moisture.

Do not expose the product to extreme temperatures, neither hot nor cold.

Do not expose the product to lit candles, cigarettes, cigars, open flames, etc.

Do not drop, throw or try to bend the product. Rough treatment may damage the product.

Do not attempt to disassemble your product. The warranty is no longer valid if the warranty seal has been broken. The product does not contain consumer serviceable components. Service should only be performed by Certified Service Centers.

Do not allow children to play with the product as it contains small parts that could be detached and create a choking hazard.

Avoid using this telephone equipment during an electrical storm. There may be a remote risk of electric shock from lightning.

Use only original Ericsson components and replacement parts. Failure to do so may result in performance loss, damage to the product, fire, electric shock or injury; and will invalidate the warranty.

Use only the power supply adapter that comes with the unit. Replacement power supply adapters can be obtained from Ericsson upon request.

Treat the product with care, keep it in a clean and dust free place. Use only a soft, damp cloth to clean the product.

11.2 License Agreement

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Except for the above express limited warranties, Vendor and its suppliers make and you receive no warranties or conditions either express, implied, statutory or otherwise and Vendor and its suppliers specifically disclaim any implied warranties of merchantability and fitness for a particular purpose. Vendor does not warrant that the Software will be uninterrupted or error free. You assume the responsibility for the selection of the program and hardware to achieve your intended results; and for the installation, use and results obtained from the Software.

Some jurisdictions do now allow limitations on duration of an implied warranty, so the above limitation may not apply to you.

11.2.4 Intended Use

The Software shall be used in accordance with the instructions and for its intended use and purpose only. The software or part of it is not permitted to be used in form example life support systems, nuclear facility applications, missile technology, chemical or biologized industry or of flight navigation or communication of air, ground support equipment or other similar business, if failure to perform on behalf of the software in any way, could result in personal injury, death, damage or tangibles or environmental damage.

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If no event shall Vendor or its suppliers be liable for any indirect or consequential losses or damages whatsoever including loss of data, loss of business, loss of profits, business interruption or personal injury arising out of the use of or inability to use this Software. Vendor and its supplier’s entire liability under this Agreement shall be limited to the amount actually paid by Licensee for the Software.

11.2.6 Governing Law

The validity, construction and performance of this Agreement shall be governed by the laws of Sweden.

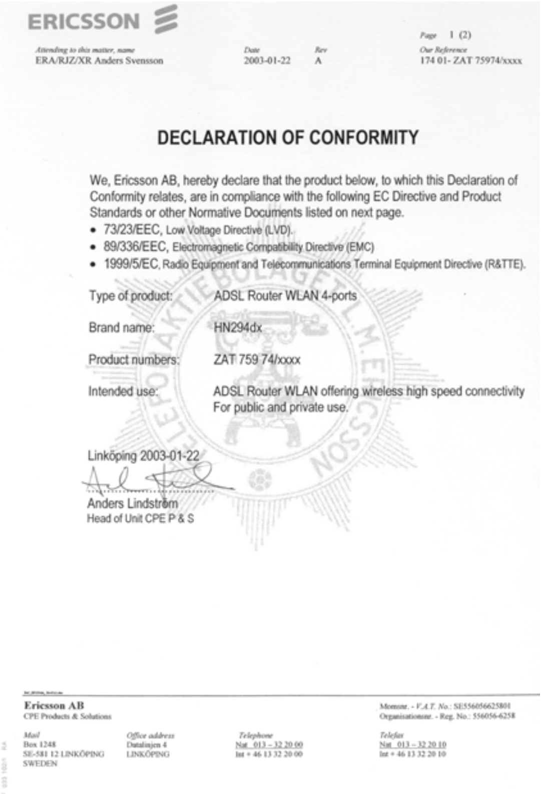
11.3 Regulatory Information

11.3.1 EU Directives

The HN294d meet the following EU directives for the CE-mark:

- 73/23/EEC, Low Voltage Directive (LVD)
- 89/336/EEC, Electromagnetic Compatibility Directive (EMC)
- 1999/5/EC, Radio Equipment and Telecommunication Terminal Directive (R&TTE).

11.3.1.1 Declaration of Conformity



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Attending to this matter, name	*Date*	*Rev*	*Our Reference*
ERA/RJZ/XR Anders Svensson	2003-01-22	A	174 01- ZAT 75974/xxxx

DECLARATION OF CONFORMITY

We, Ericsson AB, hereby declare that the product below, to which this Declaration of Conformity relates, are in compliance with the following EC Directive and Product Standards or other Normative Documents listed on next page.

- 73/23/EEC, Low Voltage Directive (LVD).
- 89/336/EEC, Electromagnetic Compatibility Directive (EMC)
- 1999/5/EC, Radio Equipment and Telecommunications Terminal Equipment Directive (R&TTE).

Type of product:	ADSL Router WLAN 4-ports
Brand name:	HN294dx
Product numbers:	ZAT 759 74/xxxx
Intended use:	ADSL Router WLAN offering wireless high speed connectivity For public and private use.

Linköping 2003-01-22

Anders Lindström
Head of Unit CPE P & S

Ericsson AB
CPE Products & Solutions

Momsnr. - *V.A.T. No.*: SE556056625801
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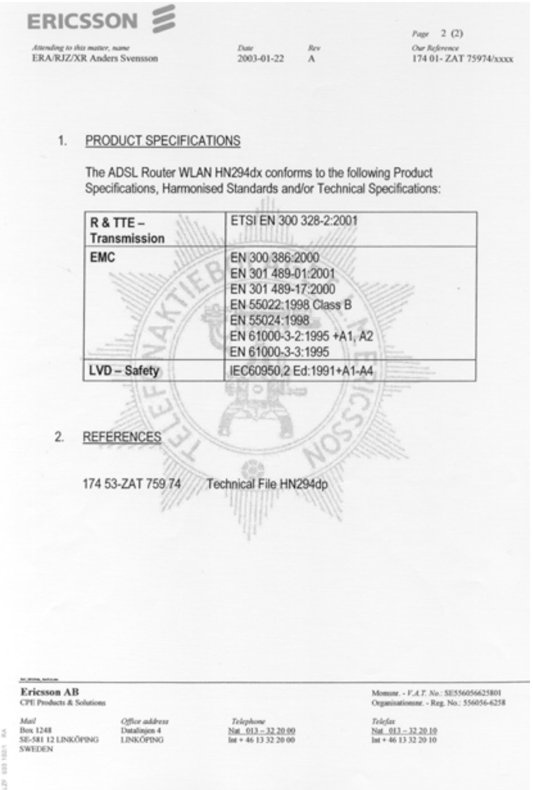
LZF 033 1021 RA



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Attending to this matter, name	*Date*	*Rev*	*Our Reference*
ERA/RJZ/XR Anders Svensson	2003-01-22	A	174 01- ZAT 75974/xxxx

1. PRODUCT SPECIFICATIONS

The ADSL Router WLAN HN294dx conforms to the following Product Specifications, Harmonised Standards and/or Technical Specifications:

R & TTE – Transmission	ETSI EN 300 328-2:2001
EMC	EN 300 386:2000 EN 301 489-01:2001 EN 301 489-17:2000 EN 55022:1998 Class B EN 55024:1998 EN 61000-3-2:1995 +A1, A2 EN 61000-3-3:1995
LVD – Safety	IEC60950,2 Ed:1991+A1-A4

2. REFERENCES

174 53-ZAT 759 74 Technical File HN294dp

Ericsson AB
CPE Products & Solutions

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LZF 033 1021 RA

11.3.2 Safety Approvals

The HN294d is approved according to the following safety standards:

- UL 1950, 3rd Ed.

- ❑ CAN/CSA C22.2 No. 950-95
- ❑ IEC 60950 2nd Ed, 1991 + A1-A4

11.3.2.1 UL 1950 Statement

When using your telephone equipment, basic safety precautions should always be followed to reduce the risk of fire, electric shock and injury to persons, including the following:

1. Do not use this product near water, for example, near a bathtub, washbowl, kitchen sink or laundry tub, in a wet basement or near a swimming pool.
2. Avoid using a telephone (other than a cordless type) during an electrical storm. There may be a remote risk of electric shock from lightning.
3. Do not use the telephone to report a gas leak in the vicinity of the leak.
4. Use only the power cord and batteries indicated in this manual. Do not dispose of batteries in a fire. They may explode. Check with local codes for possible special disposal instructions.

CAUTION! Always disconnect all telephone lines from the wall outlet before servicing or disassembling this equipment.

11.3.3 EMC Approvals

The HN294d is approved according to the following EMC standards:

- ❑ EN 300386:2000
- ❑ EN 301489-01:2001
- ❑ EN 301489-17:2000
- ❑ EN 55022:1998 Class B
- ❑ EN 55024:1998
- ❑ EN 61000-3-2:1995 + A1-A2
- ❑ EN 61000-3-3:1995
- ❑ FCC Part 15, Class B, ANSI C63.4-1992

- EN 300328-2 V1.2.1:2001

11.3.3.1 FCC Part 15 Statement

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules (Code of Federal Regulations Title 47, Telecommunications (CFR 47)). These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a residential installation.

This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with these instructions, may cause harmful interference to radio or television reception. However, there is no guarantee that interference will occur in particular installation. If this equipment does cause harmful interference to radio or television, which can be determined by turning the equipment off and on, the user is encouraged to eliminate the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna of the affected equipment.
- Increase the separation between the ADSL Router WLAN HN294d and the affected equipment.
- Connect the ADSL Router WLAN HN294d power supply to an outlet on a circuit different from that to which the affected equipment is connected.
- Consult your service provider or an experienced radio/TV technician for help.

11.3.3.2 FCC RF Radiation Exposure Statement

This equipment complies with FCC RF radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed an operated with a minimum distance of 2.5 cm between the radiator and your body. This device must not be co-located with any other antenna or transmitter.

11.3.4 Telecom Approval

The HN294d is approved according to the following telecom standard:

- FCC Part 68

11.3.4.1 FCC Part 68 Statement

The Federal Communications Commission (FCC) has established Rules which permit this device to be directly connected to the telephone network. Standardized jacks are used for these connections. This equipment should not be used on party lines or coin phones.

If this device is malfunctioning, it may also be causing harm to the telephone network; this device should be disconnected until the source of the problem can be determined and until repair has been made. If this is not done, the telephone company may temporarily disconnect service.

The telephone company may make changes in its technical operations and procedures; if such changes affect the compatibility or use of this device, the telephone company is required to give adequate notice of the changes. You will be advised of your right to file a complaint with the FCC.

If the telephone company requests information on what equipment is connected to their lines, inform them of:

- The telephone number to which this unit is connected
- The USOC jack required
- The FCC Registration Number (indicated on the label).

The Ringer Equivalence Number (REN). Note that if several devices are connected on the same line, the RENs must not add up to more than 5.0. This REN figure is important to your telco and can be found on the equipment's FCC compliance label.

In case of operational problems, disconnect your unit by removing the modular or multi-connector plug from the telco's jack. If your regular phone still works properly, your modem has a problem and must remain disconnected and (officially) serviced or returned for repairs. If upon the above disconnection your regular phone still has problems, notify your telco that they may have a problem. If problem is still found in premises wiring not telco-installed, you are subject to a service charge. If a fault is found in telco-installed wiring, you may still be subject to a service call charge.

Unless otherwise noted in the User's Manual (e.g. fuses, etc), user may not under any circumstances (in or out of warranty) attempt any service adjustment, or repairs on this unit. It must be returned to the factory or authorized U.S. service agency for all such work. Locations and phone number of factory or authorized U.S. service points are as following:

Company: ASKEY International Corp.
Address: 1751 Yeager Ave, La Verne, CA 91750, USA
Tel: 909-596-5180.

11.3.5 Access Point Frequency Band

2412 MHz to 2472 MHz (subject to local regulations).

11.3.6 Caution

Changes or modifications to this product not authorized by the manufacturer could void your authority to operate the equipment and invalidate approvals.

11.3.7 Power Supply

The ADSL Wireless Router HN294d is equipped with an external adapter rated at a 100-240 VAC / 50-60 Hz input transformed to a 12 VDC / 1A unregulated output.

NOTE! For use only with approved supplied power adapter. In the event of equipment malfunction, replace only with an AC/DC Adapter specified by Ericsson.

11.3.8 Environmental Information

Maximum environmental values during use:

- Temperature: 0°C to +40°C
- Humidity: 5% to 85% RH, non-condensing.

11.3.9 Intended Use

The HN294d is intended for indoor public and private use.

Glossary

- A -

Access Point

An Access Point (AP) is a hardware device or a computer's software that acts as a communication hub for users of a wireless device to connect to a wireless LAN (WLAN). The HN294dp has an integrated WLAN access point which complies to the 802.11b standard.

ADSL

Short for *Asymmetric Digital Subscriber Line*. A variation of the DSL technologies that is most familiar to home and small business users. ADSL is called "asymmetric" because most of its two-way or duplex bandwidth is devoted to the downstream direction, sending data to the user. Only a small portion of bandwidth is available for upstream or user-interaction messages.

ARP

Short for *Address Resolution Protocol*, a TCP/IP protocol used to convert an IP address into a physical address, such as an Ethernet address. A host wishing to obtain a physical address broadcasts an ARP request onto the TCP/IP network. The host on the network that has the IP address in the request then replies with its physical hardware address. There is also Reverse ARP (RARP) which can be used by a host to discover its IP address. In this case, the host broadcasts its physical address and a RARP server replies with the host's IP address.

Asynchronous

Occuring at different times. For example, electronic mail is asynchronous communication because it does not require the sender and receiver to be connected at the same time.

ATM

Short for *Asynchronous Transfer Mode*, a network technology based on transferring data in cells or packets of a fixed size. The cell used with ATM is relatively small compared to units used with older technologies. The small, constant cell size allows ATM equipment to transmit video, audio, and computer data over the same network, and assure that no single type of data hogs the line.

- B -

Bandwidth
A measure of capacity of communications media. Greater bandwidth allows communication of more information in a given period of time. Bandwidth is generally described either in terms of analog signals in units of Hertz (Hz), which describes the maximum number of cycles per second, or in terms of digital signals in units of bits per second.

Bridge
A device that connects two local-area networks (LANs), or two segments of the same LAN that use the same protocol, such as Ethernet.

Broadcast
To simultaneously send the same message to multiple recipients.

- C -

CBR
Short for *Constant Bit Rate*. A type of ATM service which specifies a fixed bit rate so that data is sent in a steady stream. This is analogous to a leased line.

CRC
Abbreviation of *Cyclic Redundancy Check*, a common technique for detecting data transmission errors.

- D -

Device
Any machine or component that attaches to a computer. Examples of devices include disk drives, printers, mice and modems.

DHCP
Short for *Dynamic Host Configuration Protocol*, which is a protocol for assigning dynamic IP addresses to devices in a network. With dynamic addressing, a device can have a different IP address every time it connects to the network. Many ISPs use dynamic IP addressing for dial-up users.

DMZ
A *Demilitarized Zone* is used by a company that wants to host its own Internet services without sacrificing unauthorized access to its private network. The DMZ sits between the Internet and an internal network's line of defense, usually some combination of firewalls and bastion hosts.

DNS

Short for *Domain Name System (or Service)*, an Internet service that translates domain names into IP addresses. Because domain names are alphabetic, they're easier to remember. The Internet however, is really based on IP addresses. Every time you use a domain name, therefore, a DNS service must translate the name into the corresponding IP address. The DNS system is, in fact, its own network. If one DNS server doesn't know how to translate a particular domain name, it asks another one, and so on, until the correct IP address is returned.

Domain name

A name that identifies one or more IP addresses. For example, the domain name microsoft.com represents about a dozen IP addresses. Domain names are used in URLs to identify particular Web pages. Because the Internet is based on IP addresses, not domain names, every Web server requires a Domain Name System (DNS) server to translate domain names into IP addresses.

DOS attack

DOS (Denial of service) attack is a method of flooding a site with "spoofed" (artificially generated) packets. A DOS tries to generate enough traffic deny service to legitimate users. One recent method has been called "smurfing".

Downstream

The direction of a downstream signal is from the ISP/service provider to the user's computer (downloading).

DSL

Short for *Digital Subscriber Line*, which is a data communications technology that transmits information over the existing copper telephone lines (POTS). DSL takes existing voice cables that connect customer premises (CPE) to the phone company's central office (CO) and turns them into a high-speed digital link. There are many types of DSL and ADSL is one of them.

DSLAM

Short for *Digital Subscriber Line Access Multiplexer*, a mechanism at a phone company's central location that links many customer DSL connections to a single high-speed ATM line. When the phone company receives a DSL signal, an ADSL modem with a POTS splitter detects voice calls and data. Voice calls are sent to the PSTN, and data are sent to the DSLAM, where it passes through the ATM to the Internet, then back through the DSLAM and ADSL modem before returning to the customer's PC.

- E -

Encapsulation
A technology that enables one network to send its data via another network's connections. Encapsulation works by encapsulating a network protocol within packets carried by the second network. Encapsulation is also called tunneling.

Ethernet
A local-area network (LAN) architecture that uses a bus topology and supports data transfer rates of 10 Mbps. It is one of the most widely implemented LAN standards.
A newer version of Ethernet, called 100Base-T (or Fast Ethernet), supports data transfer rates of 100 Mbps. And the newest version, Gigabit Ethernet, supports data rates of 1 gigabit (1,000 megabits) per second.

- F -

Firewall
A system designed to prevent unauthorized access to or from a private network. Firewalls can be implemented in both hardware and software, or a combination of both. Firewalls are frequently used to prevent unauthorized Internet users from accessing private networks connected to the Internet, especially intranets. All messages entering or leaving the intranet pass through the firewall, which examines each message and blocks those that do not meet the specified security criteria. *See also Stateful Inspection*.

Firmware
Firmware is a combination of software and hardware consisting of software (programs or data) that has been written onto read-only memory.

FTP
Abbreviation of *File Transfer Protocol*, the protocol used on the Internet for sending files.

- G -

Gateway
A node on a network that serves as an entrance to another network. In enterprises, the gateway is the computer that routes the traffic from a workstation to the outside network that is serving the Web pages. In homes, the gateway is the ISP that connects the user to the Internet.

G.dmt
A kind of asymmetric DSL technology, based on DMT modulation, that offers up to 8 megabits per second downstream bandwidth, 1.544 Megabits per second upstream bandwidth. "G.dmt" is actually a nickname for the standard officially known as ITU-T Recommendation G.992.1.

G.lite
A kind of asymmetric DSL technology, based on DMT modulation, that offers up to 1.5 megabits per second downstream bandwidth, 384 Kilobits per second upstream, does not usually require a splitter and is easier to install than other types of DSL. "G.lite" is a nickname for the standard officially known as G.992.2.

- H -

Host
A computer that is connected to a TCP/IP network, including the Internet. Each host has a unique IP address.

HTTP
Short for *HyperText Transfer Protocol*, the underlying protocol used by the World Wide Web. HTTP defines how messages are formatted and transmitted, and what actions Web servers and browsers should take in response to various commands.

- I -

IEEE
Abbreviation of *Institute of Electrical and Electronics Engineers*, pronounced I-triple-E. IEEE is an organization composed of engineers, scientists, and students. The IEEE is best known for developing standards for the computer and electronics industry. In particular, the IEEE 802 standards for local-area networks are widely followed.

IEEE 802.11
802.11 refers to a family of specifications developed by the IEEE for wireless LAN technology. 802.11 specifies an over-the-air interface between a wireless client and a base station or between two wireless clients. The HN294dp is fully compatible with the 802.11b standard (also referred to as 802.11 High Rate or Wi-Fi).

IETF
Short for *Internet Engineering Task Force*, the main standards orgnization for the Internet. The IETF is a large open international community of network designers, operators, vendors, and researchers concerned with the evolution of the Internet architecture and the smooth operation of the Internet. It is open to any interested individual.

IGMP
Short for *Internet Group Management Protocol* which is defined in RFC 1112 as the standard for IP multicasting in the Internet. It's used to establish host memberships in particular multicast groups on a single network. The mechanisms of the protocol allow a host to inform its local

router, using Host Membership Reports, that it wants to receive messages addressed to a specific multicast group.

Intranet
A network based on TCP/IP protocols (an internet) belonging to an organization, usually a corporation, accessible only by the organization's members, employees, or others with authorization. An intranet's Web sites look and act just like any other Web sites, but the firewall surrounding an intranet fends off unauthorized access.

IP address
An identifier for a computer or device on a TCP/IP network. Networks using the TCP/IP protocol route messages based on the IP address of the destination. The format of an IP address is a 32-bit numeric address written as four numbers separated by periods. Each number can be zero to 255, for example 192.168.0.1.

Public IP addresses are LAN IP addresses that can be considered "legal" for the Internet because they can be recognized and accessed by any device on the other side of a connection. In most cases your ISP allocates them.

Private IP addresses are also LAN IP addresses, but are considered "illegal" IP addresses to the Internet. They are private to an enterprise while still permitting full network layer connectivity between all hosts inside an enterprise as well as all public hosts of different enterprises.

ISP
Short for *Internet Service Provider*, a company that provides access to the Internet.

- L -

LAN
Short for *Local Area Network*, which is a computer network limited to the immediate area, usually the same building or floor of a building. A WAN, on the other hand, is an outside connection to another network or the Internet.

LED
Abbreviation of *Light Emitting Diode*, a type of control lamp on devices that indicates the status of a device.

- M -

MAC address
Short for *Media Access Control address*, a hardware address that uniquely identifies each node of a network.

- N -

NAT

Short for *Network Address Translation*, which is an Internet standard that translates a private IP address within one network to a public IP address, either a static or dynamic. NAT provides a type of firewall by hiding internal IP addresses and it also enables a company to use more internal IP addresses.

NIC

Short for *Network Interface Card*, which is an expansion board you insert into a computer so the computer can be connected to a network. Most NICs are designed for a particular type of network, protocol, and media, although some can serve multiple networks.

- P -

Peer-to-peer

Peer-to-peer architecture is a type of network in which each workstation has equivalent capabilities and responsibilities. This differs from client/server architectures, in which some computers are dedicated to serving the others. Peer-to-peer networks are generally simpler, but they usually do not offer the same performance under heavy loads.

Ping

A utility to determine whether a specific IP address is accessible. It works by sending a packet to the specified address and waiting for a reply. Ping is used primarily to troubleshoot Internet connections.

Port

In TCP/IP and UDP networks, an endpoint to a logical connection. The port number identifies what type of port it is. For example, port 80 is used for HTTP traffic.

POTS

Short for *Plain Old Telephone Service*, which refers to the standard telephone service that most homes use. The POTS network is also called the Public Switched Telephone Network (PSTN).

PPP

Short for *Point-to-Point Protocol*, a method of connecting a computer to the Internet. PPP sends the computer's TCP/IP packets to a server that puts them onto the Internet.

PPPoE

Acronym for *Point-to-Point Protocol over Ethernet*. PPPoE relies on two widely accepted standards: PPP and Ethernet. PPPoE is a specification for connecting the users on an Ethernet to the Internet through a common broadband medium, such as a single DSL line, wireless device or cable modem. All the users over the Ethernet share a common connection, so the Ethernet principles supporting multiple users in a LAN combine with the principles of PPP, which apply to serial connections.

PVC
Short for *Permanent Virtual Circuit*, which is a logical point-to-point circuit between customer sites. PVCs are low-delay circuits because routing decisions do not need to be made along the way. Permanent means that the circuit is preprogrammed by the carrier as a path through the network. It does not need to be set up or disconnected for each session.

- R -

RFC
Short for *Request For Comments*, a series of notes about the Internet, started in 1969 (when the Internet was the ARPANET). An Internet Document can be submitted to the IETF by anyone, but the IETF decides if the document becomes an RFC. Eventually, if it gains enough interest, it may evolve into an Internet standard. Each RFC is designated by an RFC number. Once published, an RFC never changes. Modifications to an original RFC are assigned a new RFC number.

RIP
Short for *Routing Information Protocol*, which is a protocol that specifies how routers exchange routing table information. With RIP, routers periodically exchange entire tables.

Router
A device that connects any number of LANs. Routers use headers and a forwarding table to determine where packets go, and they use ICMP to communicate with each other and configure the best route between any two hosts. Very little filtering of data is done through routers. Routers do not care about the type of data they handle.

- S -

SMTP
Short for *Simple Mail Transfer Protocol*, a protocol for sending e-mail messages between servers. Most e-mail systems that send mail over the Internet use SMTP to send messages from one server to another.

SSID
Short for *Service Set Identifier*, a 32-character unique identifier attached to the header of packets sent over a WLAN that acts as a password when a mobile device tries to connect to the BSS (Basic Service Set). The SSID differentiates one WLAN from another; so all access points and all devices attempting to connect to a specific WLAN must use the same SSID. A

device will not be permitted to join the BSS unless it can provide the unique SSID. Because an SSID can be sniffed in plain text from a packet it does not supply any security to the network.
An SSID is also referred to as a Network Name because essentially it is a name that identifies a wireless network

Stateful Inspection
Stateful inspection is a firewall architecture that works at the network layer. Unlike static packet filtering, which examines a packet based on the information in its header, stateful inspection tracks each connection traversing all interfaces of the firewall and makes sure they are valid. An example of a stateful firewall may examine not just the header information but also the contents of the packet up through the application layer in order to determine more about the packet than just information about its source and destination. A stateful inspection firewall also monitors the state of the connection and compiles the information in a state table. Because of this, filtering decisions are based not only on administrator-defined rules (as in static packet filtering) but also on context that has been established by prior packets that have passed through the firewall. As an added security measure against port scanning, stateful inspection firewalls close off ports until connection to the specific port is requested.

- T -

T1.413
The American National Standards Institute (ANSI) standard for asymmetric digital subscriber line using discrete multitone modulation, which the G.dmt standard is based on.

TCP
Abbreviation of *Transmission Control Protocol*, and pronounced as separate letters. TCP is one of the main protocols in TCP/IP networks. Whereas the IP protocol deals only with packets, TCP enables two hosts to establish a connection and exchange streams of data. TCP guarantees delivery of data and also guarantees that packets will be delivered in the same order in which they were sent.

TCP/IP
Short for *Transmission Control Protocol / Internet Protocol*, the suite of communication protocols used to connect hosts on the Internet.

Telnet
A terminal emulation program for TCP/IP networks such as the Internet. The Telnet program runs on your computer and connects your PC to a server on the network. You can then enter commands through the Telnet program and they will be executed as if you were entering them directly on the server console.

- U -

UBR
Sort for *Unspecified Bit Rate*. A type of ATM service that does not guarantee any throughput levels. This is used for applications, such as file transfers, that can tolerate delays.

UDP
Short for *User Datagram Protocol*, which is a connectionless transport service that dispenses with the reliability services provided by TCP. UDP gives applications a direct interface with IP and the ability to address a particular application process running on a host via a port number, without setting up a connection session.

UPnP
Short for *Universal Plug and Play*, a networking architecture that provides compatibility among networking equipment, software and peripherals of the 400+ vendors that are part of the Universal Plug and Play Forum. UPnP works with wired or wireless networks and can be supported on any operating system. UPnP boasts device-driver independence and zero-configuration networking.

Upstream
The direction of an upstream signal is from the user's computer to the ISP/service provider (uploading).

USB
Short for *Universal Serial Bus*, an external bus standard that supports data transfer rates of 12 Mbps. A USB port can be used to connect peripheral devices, such as mice, modems, and keyboards. USB also supports Plug-and-Play installation and hot plugging.

- V -

VBR
Short for *Variable Bit Rate*. A type of ATM service that provides a specified throughput capacity but is not sent evenly. This is a popular choice for voice and videoconferencing data.

Virtual Server
A server, usually a Web server, that shares computer resources with other virtual servers. In this context, the virtual part simply means that it is not a dedicated server -- that is, the entire computer is not dedicated to running the server software. Virtual Web servers are a very popular way of providing low-cost web hosting services. Instead of requiring a separate computer for each server, dozens of virtual servers can co-reside on the same computer. In most cases, performance is not affected and each web site behaves as if it is being served by a dedicated server. However, if too

many virtual servers reside on the same computer, or if one virtual server starts hogging resources, Web pages will be delivered more slowly.

VPI and VCI

A VPI (*Virtual Path Identifier*) is an 8-bit field while VCI (*Virtual Channel Identifier*) is a 16-bit field in the ATM cell header. A VPI identifies a link formed by a virtual path and a VCI identifies a channel within a virtual path. In this way, the cells belonging to the same connection can be distinguished. A unique and separate VPI/VCI identifier is assigned in advance to indicate which type of cells follow; unassigned cells, physical layer OAM cells, metasignalling channel or a generic broadcast signaling channel. Your ISP should supply you with the values.

VPN

Short for *Virtual Private Network*, a network that is constructed by using public wires to connect nodes. For example, there are a number of systems that enable you to create networks using the Internet as the medium for transporting data. These systems use encryption and other security mechanisms to ensure that only authorized users can access the network and that the data cannot be intercepted.

- W -

WAN

Short for *Wide Area Network*. A computer network that spans a relatively large geographical area. Typically, a WAN consists of two or more Local Area Networks (LANs). Computers connected to a WAN are often connected through public networks, such as the telephone system.

WEP

Short for *Wired Equivalent Privacy*, a security protocol for wireless local area networks (WLANs) defined in the 802.11b standard. WEP is designed to provide the same level of security as that of a wired LAN. LANs are inherently more secure than WLANs because LANs are somewhat protected by the physicalities of their structure, having some or all part of the network inside a building that can be protected from unauthorized access. WLANs, which are over radio waves, do not have the same physical structure and therefore are more vulnerable to tampering. WEP aims to provide security by encrypting data over radio waves so that it is protected as it is transmitted from one end point to another.

WLAN

Short for *Wireless Local Area Network* which is a cellular computer network that transmits and receives data with radio signals instead of wires. Wireless adapter cards used on laptop and desktop systems, support the same protocols as Ethernet adapter cards.