

HM220d ADSL Modem User Guide

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1 Introduction

1.1 About this User Guide

This User Guide describes how to connect, install and configure the HM220d ADSL modem in a PC/Windows environment. The guide also gives information on how the modem operates and some technical and safety information.

1.1.1 Typographic conventions

This User Guide uses the following typographic conventions:

Example	Convention
View	Menus are printed in boldface.
Message Source Templates	Menu choices are printed in boldface
"Message Browser"	Windows are denoted by quotation marks.
GUI Design	Window choices are printed in boldface.
Next	Buttons (in windows) are printed in Arial boldface.
<u>Subscription Administration</u>	Hyperlinks are underlined.
<host>	Angle brackets mean that you should replace this part with what is indicated within the brackets.

Note:

Text written in this manner indicates that what follows presents clarification, specific instructions, comments, or interesting information.

1.2 About the HM220d ADSL modem

The Ericsson HM220d ADSL (Asymmetric Digital Subscriber Line) modem provides broadband services into your home using your existing telephone line.

Ericsson's HM220d ADSL modems comes in two versions: HM220dp and HM220di. Both products offer the same features, but they do rely on different types of phone lines to provide the ADSL service. HM220dp offers ADSL service over the Plain Old Telephone System or POTS lines, while HM220di uses the Integrated Services Digital Network or ISDN lines to provide the ADSL service.

The overwhelming majority of telephone connections in the world are based on POTS. If you have a "normal" or analog telephone in your home, HM220dp is the right modem for you. On the other hand, if you have an ISDN or digital phone, you will need HM220di. If you are not sure which version is the right one for you, please contact your service provider.

The modem sends and receives very high-speed signals via the regular telephone network, using Discrete Multi-tone (DMT) Digital Subscriber Line (DSL) transmission. HM220d utilizes the expanded capacity of ADSL-ready telephone lines to handle Internet and multimedia data, while allowing you to make and receive phone calls on the same line.

When installing the HM220d ADSL modem, you have the option of connecting it to your computer with either a USB connection (if supported by your computer) or an Ethernet connection. The plug-and-play aspect of USB simplifies installation, requiring only a cable plug-in and the installation of a driver (supplied on the CD-ROM). An Ethernet connection, which requires that a Network Interface Card (NIC) be installed on your computer, allows you to connect multiple computers to a single modem.

Once you are connected, a simple press of the PipeLock button (located on top of the modem) guarantees the security of your computer. When PipeLock is activated, the modem remains logged on to the network, but direct communication between your computer and the outside world is blocked. This prevents outsiders from gaining access to any information on your computer, even when you are not there. To resume Internet access, simply press the PipeLock button again.

Time and technological development never stand still. Ericsson will keep you updated with the latest technology, and let you download the latest software update.

1.3 Package contents

Your package should contain all the components listed below. If anything is missing or damaged, please contact the dealer/service provider from whom the equipment was purchased.

- The HM220d ADSL modem
- A power supply adapter with connecting cable
- Telephone/ADSL cable
- Ethernet cable
- USB cable
- Quick Guide
- CD-ROM containing the printable User Guide and other utilities.

1.4 Placement of the modem

The HM220d ADSL modem can be mounted to the wall, or simply placed on a flat surface.

Pick a location for the HM220d ADSL modem that:

- enables you to view the LEDs on top of the modem
- allows you to reach and press the PipeLock button on top of the modem
- is close to a power outlet, phone jack, and the computer (PC) to facilitate connections to these devices
- does not restrict air flow around the modem
- allows plenty of room for cables to be routed from the back of the modem without crimping the cables

1.4.1 Wall mounting instructions

The modem is mounted to the wall using two screws and the two mounting slots on the bottom of the unit.

Follow the step-by-step instructions below to mount the modem to the wall:

- 1 Insert and secure screws to the wall at a distance of 100 mm (3,9"). If needed, drill holes and insert plastic anchors or toggles first.
The screws should not be secured flush to the wall. Leave a gap of approximately 1/4" from the wall surface to the bottom of the screw head.
- 2 Slip the HM220d ADSL modem slots over the screw heads and pull down until the unit is seated securely. A slight adjustment to the screws may be necessary to provide a snug fit to the wall.

1.5 Filter installation

To maintain normal phone service, a special filter may need to be installed at your home. This filter, sometimes called a splitter, splits the voice (phone) signal from the ADSL (data) signal.

Set-up and installation charges for ADSL service typically include the filter installation. If you are not sure if a filter needs to be installed, contact your service provider.

2 Installation using Ethernet (for Windows 95 or higher PCs)

This chapter describes the installation and configuration process using the Ethernet interface in Windows 95 (or higher) PCs.

The Ethernet interface is used for those computers which do not have a USB interface, or for networking multiple computers on the same broadband line.

This requires a Network Interface Card (NIC). The NIC must be installed in the computer and the computer must be configured for TCP/IP. When this option is used, a standard Ethernet cable carries data between the modem and the computer. An Ethernet interface, used in conjunction with a hub, allows you to link up multiple computers to a single HM220d ADSL modem.

2.1 System requirements

To successfully connect and install the HM220d ADSL modem to the Ethernet connection you will need the following:

- An ADSL-ready telephone line
- 133 MHz Processor and 16 MB RAM.
- 10Base-T Network Interface Card
- CD-ROM drive
- Windows® 95 or higher.
- Internet browser - Internet Explorer 4.06 (or higher) or Netscape Navigator 4.5 (or higher).

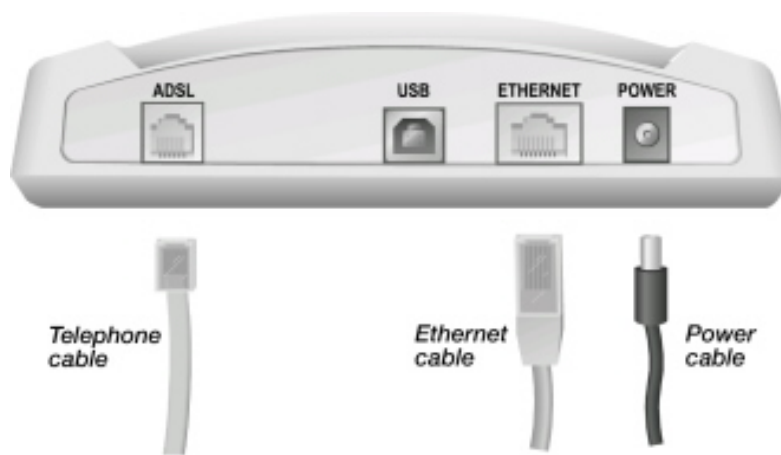
From the package you will need the following:

- The modem
- Telephone/ADSL cable
- Ethernet cable
- The power supply adapter with connecting cable.

2.2 Connecting equipment

To connect your HM220d ADSL modem via the Ethernet interface, follow these steps:

- 1 Connect one end of the **Telephone/ADSL cable** to the modem's **ADSL** port and the other end to the ADSL service port (wall jack or splitter/filter).
- 2 Connect one end of the **Ethernet cable** to the **ETHERNET** port on the back of the modem and connect the other end to the Ethernet 10Base-T network card on your computer.
- 3 Connect the **Power cable** to the **POWER** connector on the back of the modem. Plug the power supply adapter into a power source.



Figur 1: Connect via Ethernet interface

Assuming the modem has been connected properly, the modem will enter the power-up diagnostics state and verify the integrity of the hardware and software. Please refer to chapter 6.3 Operational states, for further information. When this happens all of the LEDs (light-emitting diodes) on top of the modem will turn ON briefly.

When the Power, Ethernet and ADSL LEDs have turned solid yellow, the modem is ready for operation.



Figur 2: LED symbols for Power, Ethernet and ADSL

If not, check that the cables have been securely connected to both the modem, PC, ADSL service port and power source.

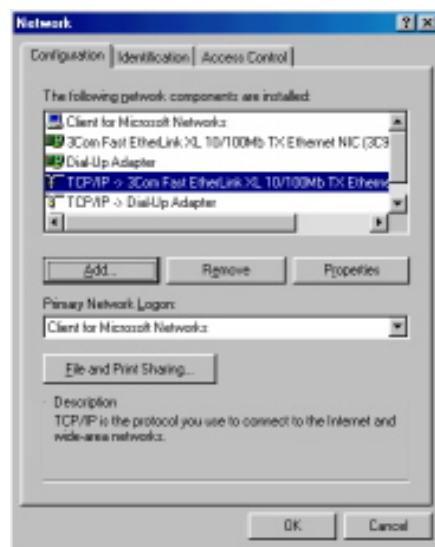
2.3 Configuring the PC

To be able to access the modem's built in web pages, the IP address for the PC must be on the same IP net as the modem. A recommended way is to configure the PC as a DHCP client and use the DHCP server in the modem to get a correct IP address.

If you are unsure how your PC is configured you can use the following instructions to check, and maybe change, your settings.

Check TCP/IP settings:

- 1 From the **Start** menu select **Settings** then **Control Panel**.
- 2 Double click on the **Network** icon and the "Network" dialog box appears:



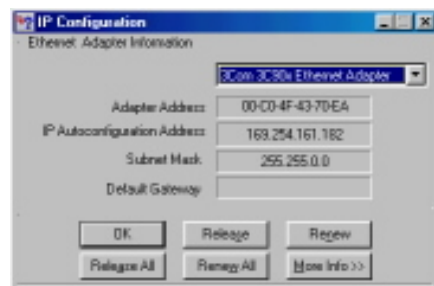
Figur 3: Network dialog box

- 3 Select the TCP/IP protocol (together with the name of the type of physical network adapter installed in your PC). See the above example.
- 4 Click the **Properties** button and the "TCP/IP Properties" dialog box will appear.
- 5 Select the **IP Address** tab and verify that "Obtain an IP address automatically" is selected. If not, then select this button and click **OK**.
- 6 You are now back in the "Network" dialog box. Click **OK**.
- 7 Close the **Control Panel** window.
- 8 If you made any changes, some configuration files will be copied on your hard disk and if a "Settings Changes" message asks if you wish to restart your computer you should answer **Yes**.

By following the next steps you can verify that your PC now has got a new IP address from the modem's DHCP server.

Check IP configuration:

- 1 From the **Start** menu select **Run...**
- 2 Type **winnipcfg** and click **OK**. The "IP Configuration" dialog box appears:



Figur 4: IP Configuration dialog box

- 3 From the scroll down menu at the top, select the Ethernet adapter according to the above example.
- 4 Verify that the "IP Address" is within the range 192.168.254.1 to 192.168.254.253.
- 5 If the "IP Address" field is empty or not within the specified range, click the **Release All** button and then the **Renew All** button. Verify the "IP Address" again according to step 4.
- 6 Click **OK** to close the "IP Configuration" dialog box.

Now, you are ready to configure your modem as described in chapter 5 - Configuring the modem.

3 Installation using USB (for Windows 98 PCs)

This chapter describes the installation and configuration process using the USB interface in Windows 98 PCs.

Many computers today are shipped with a Universal Serial Bus (USB) port. With a USB port, a Network Interface Card is not required, but a specific USB driver must be installed on the computer. The USB drivers required for the HM220d ADSL modem is provided on the CD-ROM, and is installed during the installation phase. This driver facilitates communication between the modem and the computer. Unlike an Ethernet connection, a USB connection does not allow for more than one computer to be linked to the modem.

3.1 System requirements

To successfully connect and install the HM220d ADSL modem to the USB interface you will need the following:

- An ADSL-ready telephone line
- 133 MHz Processor and 16 MB RAM.
- USB port
- CD-ROM drive
- Windows® 98 (Windows installation CD might be required when installing the USB driver).
- Internet browser - Internet Explorer 4.06 (or higher) or Netscape Navigator 4.5 (or higher).

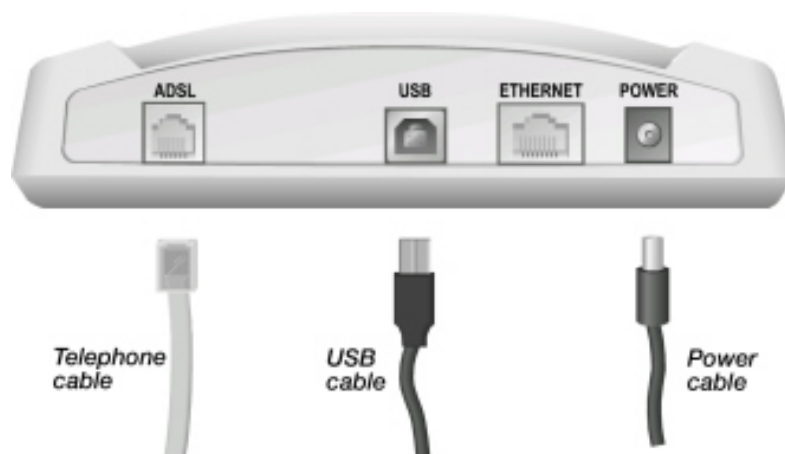
From the package you will need the following:

- The modem
- Telephone/ADSL cable
- USB cable
- The power supply with connecting cable
- The CD-ROM disk.

3.2 Connecting equipment

To connect your HM220d ADSL modem via the USB interface, follow these steps:

- 1 Connect one end of the **Telephone/ADSL cable** to the modem's **ADSL** port and the other end to the ADSL service port (wall jack or splitter/filter).
- 2 Connect the square plug of the **USB cable** to the **USB** port on the back of the modem and connect the rectangular plug of the cable to the USB port on the back of your PC.
- 3 Connect the **Power cable** to the **POWER** connector on the back of the modem. Plug the power supply adapter into a power source.



Figur 5: Connect via USB interface

- 4 Once the cables are connected, the PC will automatically search for the correct USB driver, specific to your operating system.

Note:

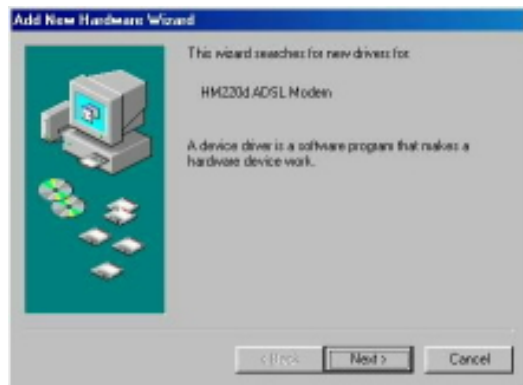
The USB drivers are located on the CD-ROM disk that is provided with the modem package. Insert the disk in your PC's CD-ROM drive.

Follow the instructions in the next section to install the USB drivers.

3.3 Installing USB drivers

Two USB drivers will be installed in two successive steps; one for USB and one for the Ethernet emulation of USB. Follow these steps to install the USB drivers:

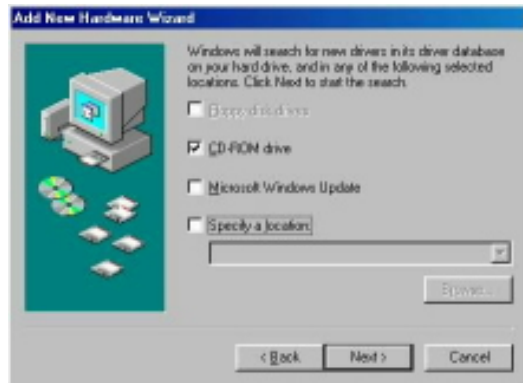
- 1 Once the cables are connected, the "New hardware found" dialog is shown for a few seconds and then the **Add New Hardware Wizard** appears:



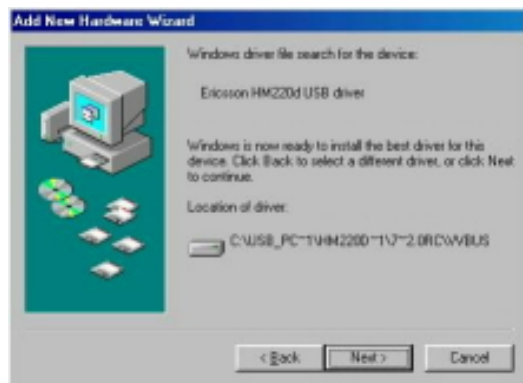
- 2 Click the **Next>** button. The following dialog appears:



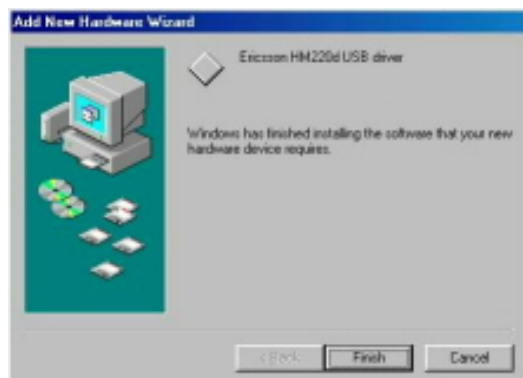
- 3 Select "Search for the best driver for your device" and click the **Next>** button.



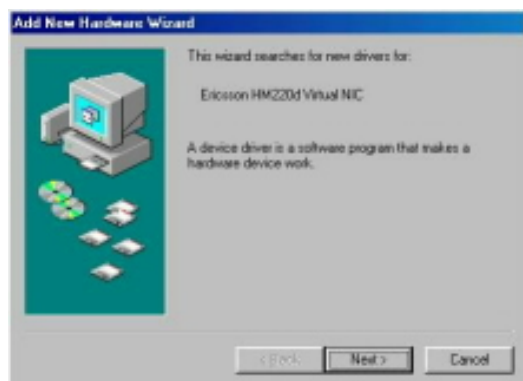
- 4 Select "CD-ROM drive" and make sure that the provided CD-ROM is in your PC's CD-ROM drive. Click the **Next>** button.



- 5 Windows now locates the appropriate files and shows the path. Click the **Next>** button and the software installation will start.
- 6 When the appropriate files have been copied the installation complete message is shown:



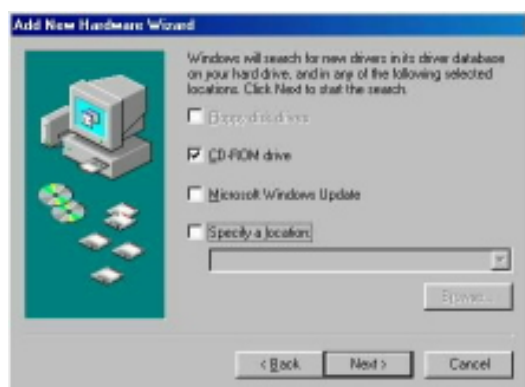
- 7 Click the **Finish** button. Windows 98 will now continue to the next phase of the installation.
- 8 The "New hardware found" dialog is now shown for a few seconds and then the **Add New Hardware Wizard** starts searching once again for the new driver for "Ericsson HM220d Virtual NIC":



- 9 Click the **Next>** button. The following dialog appears:



- 10 Select "Search for the best driver for your device" and click the **Next>** button.



- 11 Select "CD-ROM drive" and make sure that the provided CD-ROM is in your PC's CD-ROM drive. Click the **Next>** button.
- 12 Windows now locates the appropriate files and shows the path:

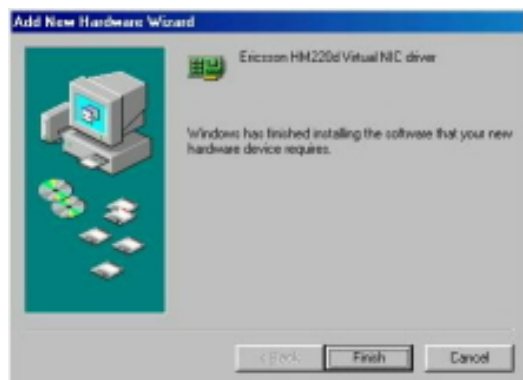


- 13 Click the **Next>** button and the software installation will start.
-

Note:

At this point there may be a need for you to insert the Windows installation CD. This CD was included in the original package of your PC and you used it to set up your system. There may be a need to install some Microsoft network components on the PC from the Windows installation CD. Insert the CD in the disk drive if prompted.

- 14 When all files have been copied the installation complete message is shown:



- 15 Click the **Finish** button. The "System Settings Change" dialog will appear.
16 Click **Yes** to restart your computer.

When the driver installation has been done and the Power, USB and ADSL LEDs have turned solid yellow, the modem is ready for operation.



Figur 16: LED symbols for Power, USB and ADSL

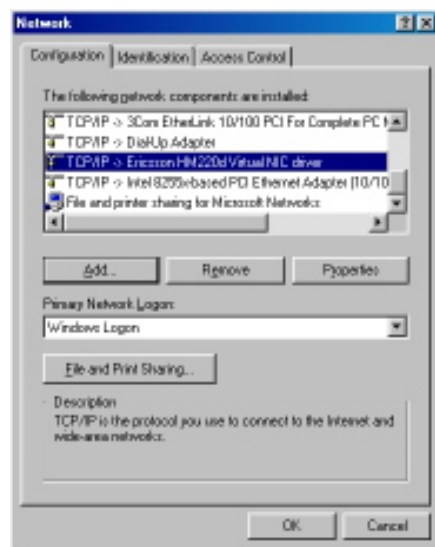
3.4 Configuring the PC

To be able to access the modem's built in web pages, the IP address for the PC must be on the same IP net as the modem. A recommended way is to configure the PC as a DHCP client and use the DHCP server in the modem to get a correct IP address.

If you are unsure how your PC is configured you can use the following instructions to check, and maybe change, your settings.

Check TCP/IP settings:

- 1 From the **Start** menu select **Settings** then **Control Panel**.
- 2 Double click on the **Network** icon and the "Network" dialog box appears:



Figur 17: Network dialog box

- 3 Select the **TCP/IP** protocol together with **Ericsson HM220d Virtual NIC driver** according to the above example.
- 4 Click the **Properties** button and the "TCP/IP Properties" dialog box will appear.
- 5 Select the **IP Address** tab and verify that "Obtain an IP address automatically" is selected. If not, then select this button and click **OK**.
- 6 You are now back in the "Network" dialog box. Click **OK**.
- 7 Close the **Control Panel** window.
- 8 If you made any changes, some configuration files might be copied on your hard disk and if a "Settings Changes" message asks if you wish to restart your computer you should answer **Yes**.

By following the next steps you can verify that your PC now has got a new IP address from the modem's DHCP server.

Check IP configuration:

- 1 From the **Start** menu select **Run...**
- 2 Type **windowsipcfg** and click **OK**. The "IP Configuration" dialog box appears:

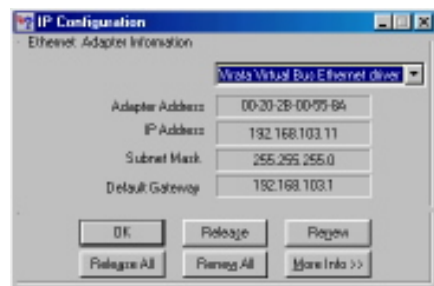


Figure 18: IP Configuration dialog box

- 3 From the scroll down menu at the top, select the "Virata Virtual Bus Ethernet driver" according to the above example.
- 4 Verify that the "IP Address" is within the range 192.168.254.1 to 192.168.254.253.
- 5 If the "IP Address" field is empty or not within the specified range, click the **Release All** button and then the **Renew All** button. Verify the "IP Address" again according to step 4.
- 6 Click **OK** to close the "IP Configuration" dialog box.

You are now ready to configure your modem as described in chapter 5 - Configuring the modem.

4 Installation using USB (for Windows 2000 PCs)

This chapter describes the installation and configuration process using the USB interface in Windows 2000 PCs.

Many computers today are shipped with a Universal Serial Bus (USB) port. With a USB port, a Network Interface Card is not required, but a specific USB driver must be installed on the computer. The USB driver required for the HM220d ADSL modem is provided on the CD-ROM, and is installed during the installation phase. This driver facilitates communication between the modem and the computer. Unlike an Ethernet connection, a USB connection does not allow for more than one computer to be linked to the modem.

4.1 System requirements

To successfully connect and install the HM220d ADSL modem to the USB interface you will need the following:

- An ADSL-ready telephone line
- 133 MHz Processor and 16 MB RAM.
- USB port
- CD-ROM drive
- Windows® 2000
- Internet browser - Internet Explorer 4.06 (or higher) or Netscape Navigator 4.5 (or higher).

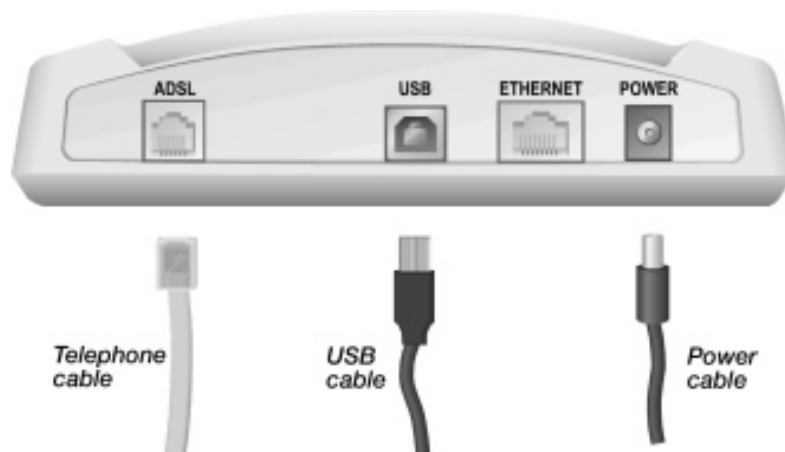
From the package you will need the following:

- The modem
- Telephone/ADSL cable
- USB cable
- The power supply adapter with connecting cable
- The CD-ROM disk.

4.2 Connecting equipment

To connect your HM220d ADSL modem via the USB interface, follow these steps:

- 1 Connect one end of the **Telephone/ADSL cable** to the modem's **ADSL** port and the other end to the ADSL service port (wall jack or splitter/filter).
- 2 Connect the square plug of the **USB cable** to the **USB** port on the back of the modem and connect the rectangular plug of the cable to the USB port on the back of your PC.
- 3 Connect the **Power cable** to the **POWER** connector on the back of the modem. Plug the power supply adapter into a power source.



Figur 19: Connect via USB interface

- 4 Once the cables are connected, the PC will automatically search for the correct USB driver, specific to your operating system.

Note:

The USB drivers are located on the CD-ROM disk that is provided with the modem package. Insert the disk in your PC's CD-ROM drive.

Follow the instructions in the next section to install the USB drivers.

4.3 Installing USB drivers

Two USB drivers will be installed in two successive steps; one for USB and one for the Ethernet emulation of USB. Follow these steps to install the USB drivers:

- 1 Once the cables are connected, the "Found new hardware" dialog is shown for a few seconds and then the **Found New Hardware Wizard** appears:



- 2 Click the **Next>** button. The following dialog appears:



- 3 Select "Search for a suitable driver for my device" and click the **Next>** button.



- 4 Select "CD-ROM drive" and make sure that the provided CD-ROM is in your PC's CD-ROM drive. Click the **Next>** button.



- 5 Windows now locates the appropriate files and shows the path. Click the **Next>** button and the software installation will start.
- 6 When the appropriate files have been copied the installation complete message is shown:



- 7 Click the **Finish** button. Windows 2000 will now continue to the next phase of the installation.
- 8 The "Found new hardware" dialog is now shown for a few seconds and then the **Found New Hardware Wizard** starts once again:



- 9 Click the **Next>** button. The following dialog appears:



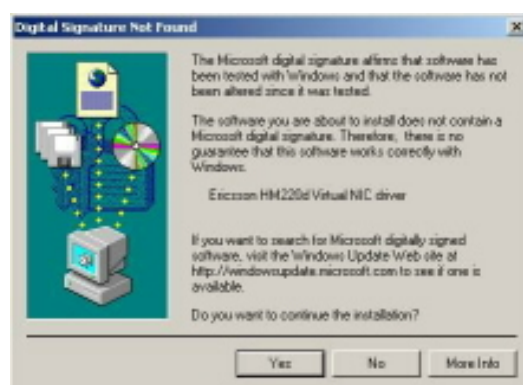
- 10 Select "Search for a suitable driver for my device" and click the **Next>** button.



- 11 Select "CD-ROM drive" and make sure that the provided CD-ROM is in your PC's CD-ROM drive. Click the **Next>** button.
- 12 Windows now locates the appropriate files and shows the path:



- 13 Click the **Next>** button and the following dialog appears:



- 14 Click the **Yes** button to start the installation. When the installation is finished the installation complete message is shown:



15 Click the **Finish** button.

When the driver installation has been done and the Power, USB and ADSL LEDs have turned solid yellow, the modem is ready for operation.



Figur 31: LED symbols for Power, USB and ADSL

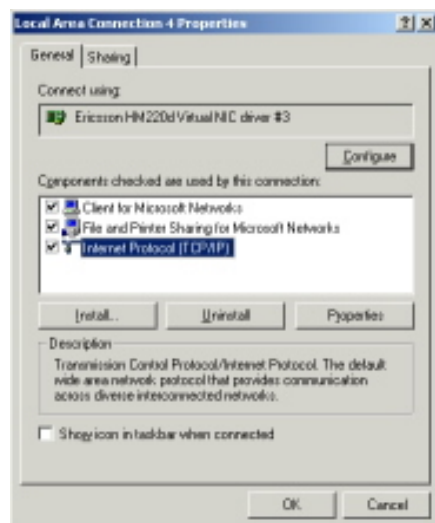
4.4 Configuring the PC

To be able to access the modem's built in web pages, the IP address for the PC must be on the same IP net as the modem. A recommended way is to configure the PC as a DHCP client and use the DHCP server in the modem to get a correct IP address.

If you are unsure how your PC is configured you can use the following instructions to check, and maybe change, your settings.

Check TCP/IP settings:

- 1 From the **Start** menu select **Settings** then **Control Panel**.
- 2 Double click on the **Network and Dial-up Connections**. A new view appears including icons for Local Area Connections.
- 3 Double click on the **Local Area Connection** icon for the **Ericsson HM220d Virtual NIC driver**. If you have several icons be sure you choose the right one. The "Local Area Connection Status" dialog box appears.
- 4 Click the **Properties** button to open the "Local Area Connection Properties" dialog box:



Figur 32: Local Area Connection Properties dialog box

- 5 Select "Internet Protocol (TCP/IP)" according to the above example.
- 6 Click the **Properties** button and the "Internet Protocol (TCP/IP) Properties" dialog box will appear.
- 7 Verify that "Obtain an IP address automatically" is selected. If not, then select this button and click **OK**.

- 8 You are now back in the "Local Area Connection Properties" dialog box. Click **OK**.
- 9 Click **Close** in the "Local Area Connection Status" dialog box and close the Network and Dial-up Connections window.

By following the next steps you can verify that your PC now has got a new IP address from the modem's DHCP server.

Check IP configuration:

- 1 From the **Start** menu select **Programs -> Accessories -> Command Prompt**. The "Command Prompt" window appears.
- 2 Type **ipconfig** and verify that the "IP Address" is within the range 192.168.254.1 to 192.168.254.253.
- 3 If the "IP Address" is not within the specified range, type **ipconfig/release** and when the C:\> appears again type **ipconfig/renew**
Verify the "IP Address" again according to step 2.
- 4 Close the "Command Prompt" window.

Now you are ready to configure your modem as described in chapter 5 - Configuring the modem.

5 Configuring the modem

The configuration of the HM220d ADSL modem is done either by using the Configuration Wizard or a flat structure. The Configuration Wizard is available in five languages: English, Français, Deutsch, Español and Português. Everything is done by using a web browser (Internet Explorer 4.01 or higher / Netscape Navigator 4.5 or higher) and accessing the web-based, graphical interface that comes installed on the modem itself.

The HM220d ADSL modem is shipped from the factory with particular default settings. However, you may need to change some of them depending on what service your Internet Service Provider (ISP) is providing.

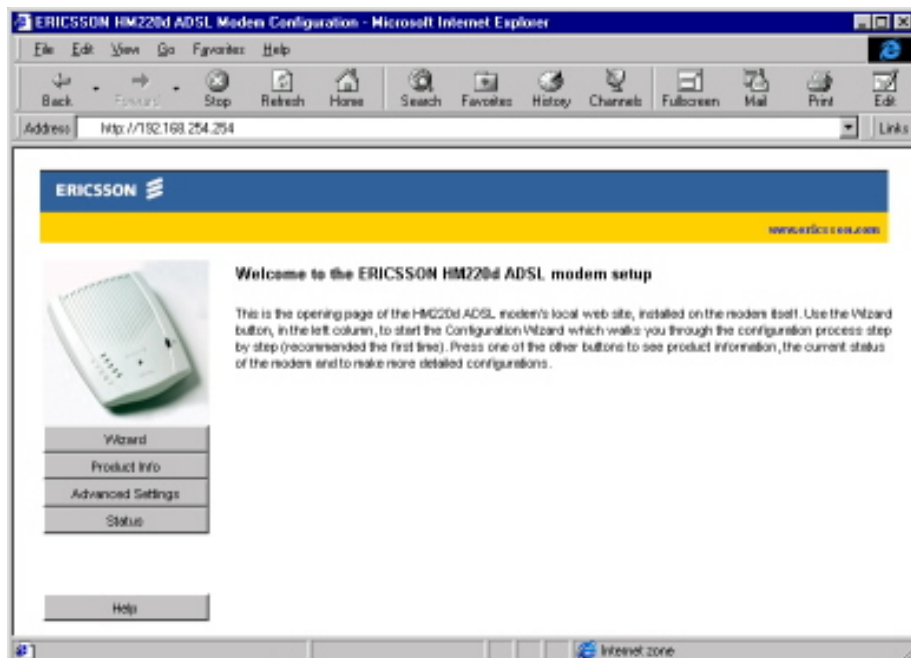
5.1 Accessing the modem's web pages

Access the modem's web pages by starting your web browser and enter the IP address of the modem - **http://192.168.254.254** - in the "Location" or "Address" area where you enter web page addresses.



Figur 33: Enter the IP address of the modem

The HM220d ADSL modem's "Welcome" page appears.



Figur 34: Welcome page

This is the opening page of the HM220d ADSL modem's local web pages.

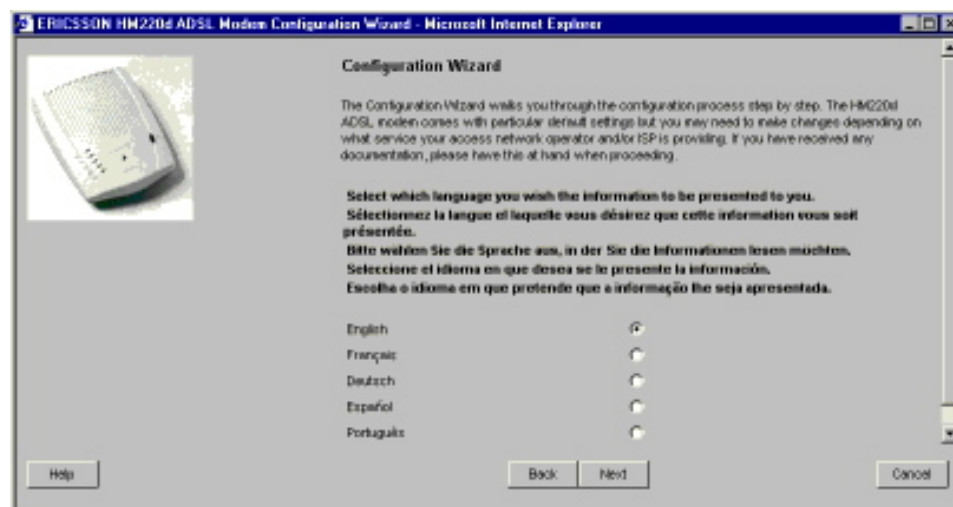
Click on the **Wizard** button, in the left column, to start the Configuration Wizard (available in five languages) which walks you through the configuration process step by step (recommended the first time).

Use the **Product Info** and **Status** buttons to see views of the current status of the modem and other product information. Described in section 5.6 - Product Information and 5.7 - Status.

The **Advanced Settings** button will bring up a new window including all parameters that can be set. This view can be used when reconfiguring the modem or just checking the settings. Described in section 5.5 - Advanced settings.

- Click on the **Wizard** button to enter the Configuration Wizard.

Select language



Figur 35: Configuration wizard - Select language

This is the first page of the Configuration Wizard where you select which language - English, Français, Deutsch, Español or Português - you wish the information to be presented to you.

All pages in the Configuration Wizard have the same buttons at the bottom:

Help - brings up a help window

Back - takes you back to the previous page of the wizard

Next - brings up the next page of the wizard

Cancel - closes the wizard and no settings will be saved.

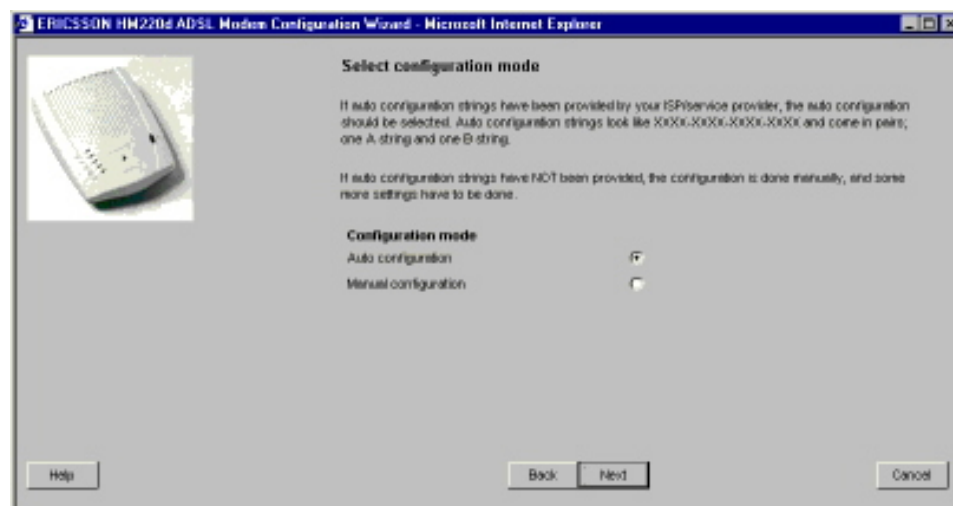
Note:

If you have received any documentation from your ISP/service provider, please have this at hand when carrying out the configuration process.

- Select the appropriate language and click on **Next**.

The configuration process is available in two different configuration modes as shown on the next page in the wizard.

Select configuration mode



Figur 36: Configuration wizard - Select configuration mode

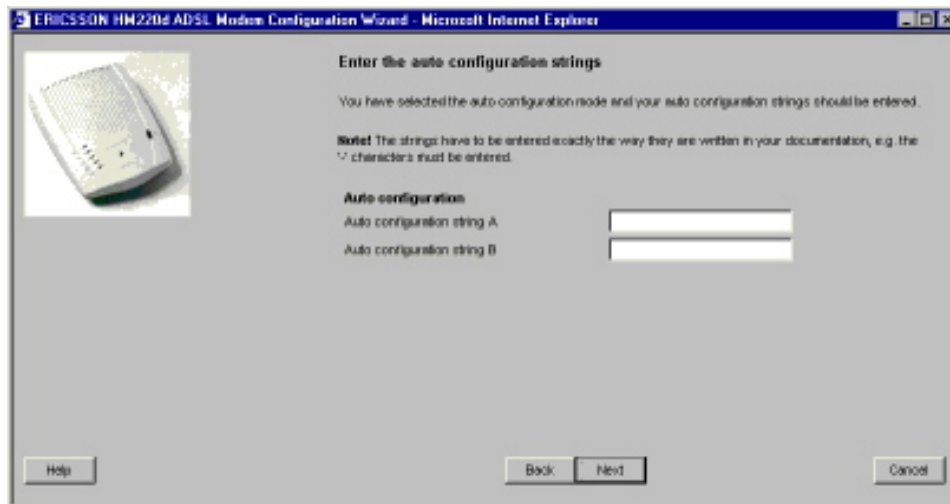
Auto configuration means that you must have been provided with auto configuration strings from your ISP/service provider. Auto configuration strings look like XXXX-XXXX-XXXX-XXXX and come in pairs; one A string and one B string. These strings contain all the detailed information needed for a correct operation of your modem, and then just a minimum of other settings has to be done.

Manual configuration should be used if auto configuration strings have not been provided, which means that the configuration is done more or less manually. In this mode you have to enter, or change, some more settings.

- Select the appropriate configuration mode and then click **Next**.

The Auto configuration is described in the next section and the Manual configuration in section 5.3 - Manual configuration.

5.2 Auto configuration



Figur 37: Configuration wizard - Enter the auto configuration strings

When using the **Auto configuration** mode you must have been provided with auto configuration strings (one A and one B string) by your ISP/service provider. The following pictures will guide you through the wizard and explain the settings.

- Enter your A and B auto configuration strings.

Note:

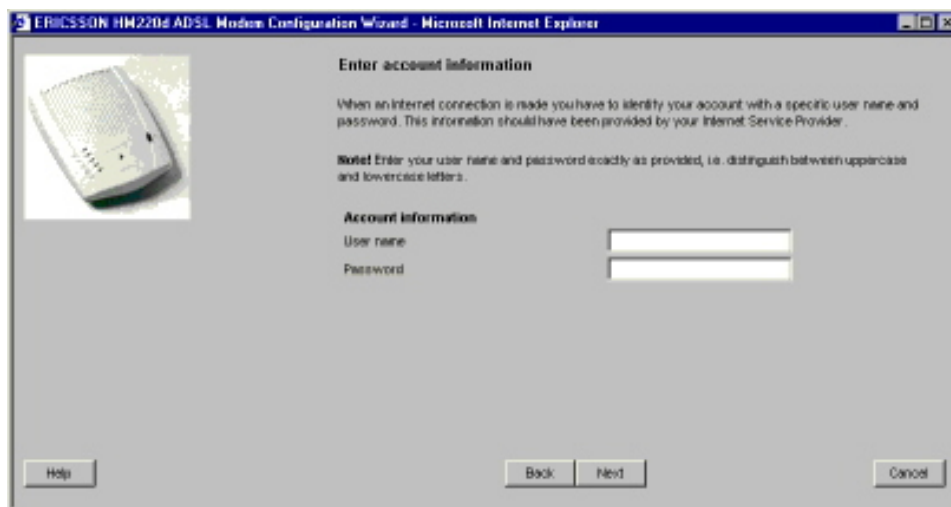
You have to enter the strings exactly the way they are written in the documentation from your ISP/service provider, e.g. the "-"characters must be entered. The letters "l" and "O" are not placed in the strings, so any character that looks like a zero is a zero and a one is a one.

- Click on **Next**.

Enter account information

Note:

This page might not be shown depending on which operating mode your service provider is using.



Figur 38: Configuration wizard - Enter account information

The Point-to-Point protocol (PPP) is used by the modem to establish connections over the ADSL ATM network and when a connection is made your account is identified by your User name and Password. This account information should have been provided by your ISP/service provider.

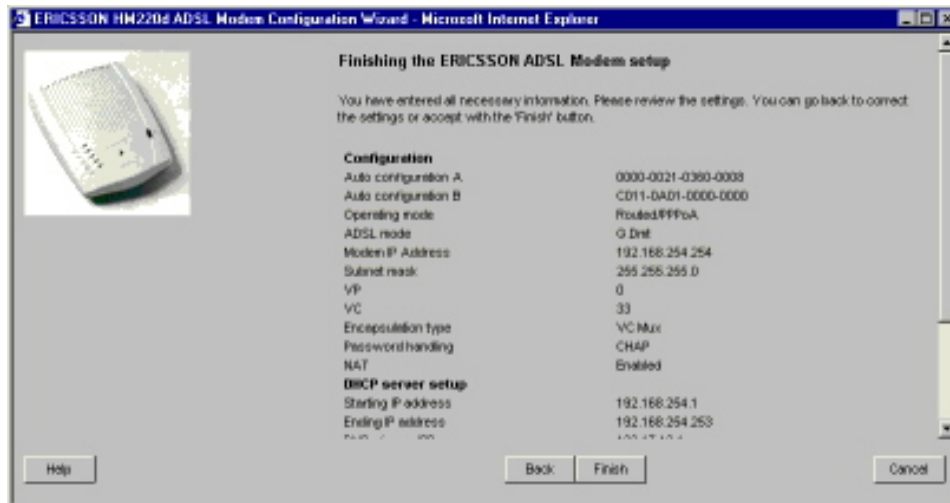
- Enter your User Name and Password.
-

Note:

You have to enter your User name and Password exactly as provided, i.e. distinguish between uppercase and lowercase letters.

- Click on **Next**.

Finishing the modem setup



Figur 39: Configuration wizard - Finishing the modem setup

This is the last page in the wizard and it includes all your settings. Review the list and:

- click the **Back** button to make any changes on previous pages
- click the **Finish** button to confirm all settings
- click the **Cancel** button to close the Configuration Wizard without saving any settings.

When you have accepted the settings (by clicking the **Finish** button) the parameters will be set and a check is performed that their values are correct.

Note:

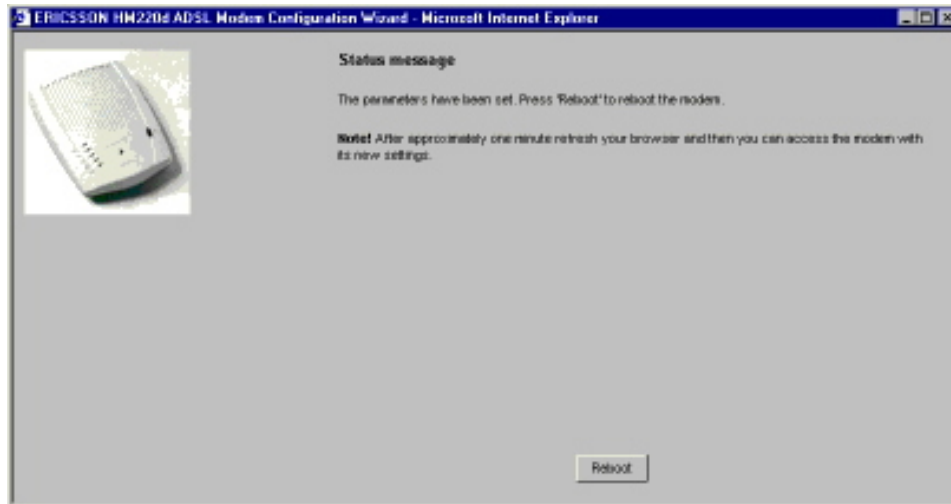
This will take a while, but just wait until the "Status message" appears.

If anything is incorrect you will be notified by the following status message: "The parameters could not be altered according to your changes. Check the settings and consult the documentation for help".

In that case, use the **Back** button to return to previous pages and make the necessary changes.

When your settings have been accepted the following status message is shown (picture on next page): "The parameters have been set. Press 'Reboot' to reboot the modem".

Status message



Figur 40: Configuration wizard - Status message

- Click the **Reboot** button.

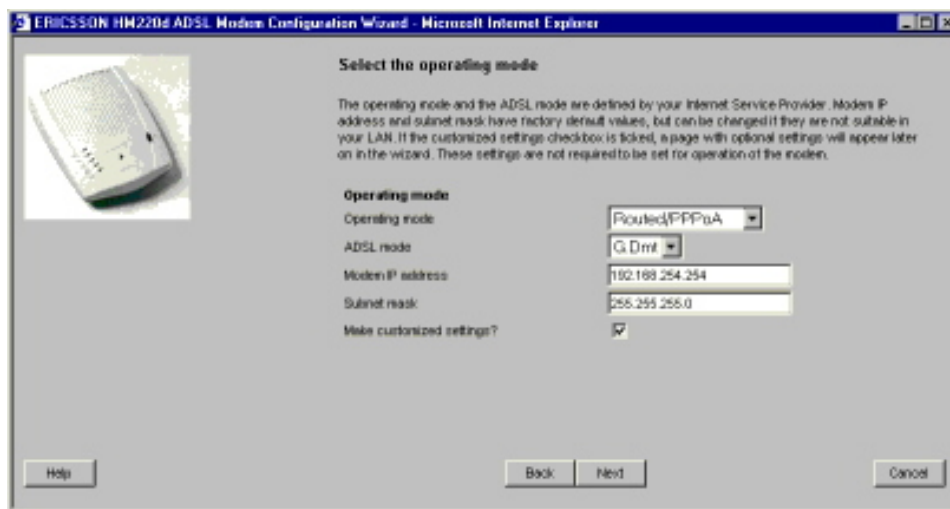
The wizard will now close and the modem is rebooting. This will take approximately one minute.

When the Power, Ethernet or USB (depending on which connection is used), and ADSL LEDs have turned solid yellow, the modem is ready for operation.

5.3 Manual configuration

Manual configuration is used if you have not been provided with any auto configuration strings. The following pictures will guide you through the wizard and explain the settings.

Select the operating mode



Figur 41: Configuration wizard - Select operating mode

Operating mode

ADSL modems operate in one of several modes determined by the DSLAM (equipment at the ISP side of the ADSL line), central office setup and also by the service offered. The HM220d ADSL modem can be configured to operate in three different modes:

Routed/PPPoA (default), **Routed/RFC1483** or **Bridged/RFC1483**. Which one you need to use depends on the configuration specified by your ISP/service provider.

ADSL mode

The **HM220dp** modem can work in four different ADSL modes: Multimode (default), T1.413, G.Dmt and G.Lite. The **HM220di** model can work in two ADSL modes: G.Dmt and DTAG. The ADSL-mode depends on what services you are offered and your ISP/service provider must provide this information.

Modem IP address and Subnet mask

These IP addresses belongs to the modem itself and have factory default values. They can be changed if they are not suitable in your LAN.

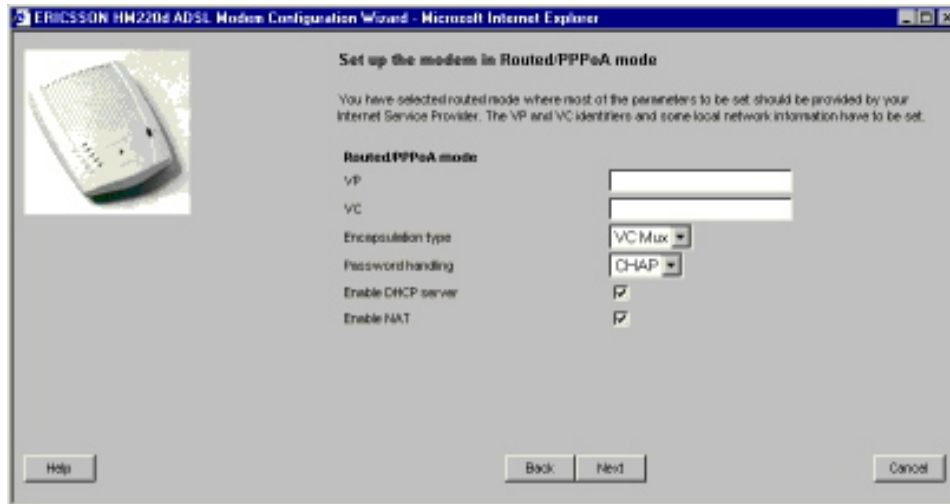
Make customized settings

If the "Make customized settings?" checkbox is ticked, a page with optional settings will appear later on in the wizard. These settings are not required to be set for operation of the modem.

- Enter your settings and click on **Next**.

If you have chosen the Routed/PPPoA mode, continue reading the next section. For Routed/RFC1483 mode, go on to section 5.3.2 and for Bridged/RFC183 mode, go on to section 5.3.3.

5.3.1 Routed/PPPoA mode



Figur 42: Configuration wizard - Routed/PPPoA mode

Set up the modem in Routed/PPPoA mode

For the Routed/PPPoA mode, information on VP/VC identifiers and some local network information has to be set. Refer to your ISP/service provider documentation when entering values or changing default settings.

VP and VC identifiers

Asynchronous Transfer Mode (ATM) is the technology used for data transmission. The data is transmitted over virtual channels that are designated by specific unique identifiers (virtual channel identifiers or VCIs). There can be multiple VCIs in one virtual path and the virtual path also has a unique virtual path identifier (VPI).

The parameters for VP and VC should be one pair identifying DSLAM (equipment at the ISP side of the ADSL line) and ISP router. This pair should be provided by the access network operator.

Encapsulation type

When data is transferred via ATM Virtual Channels it is encapsulated using a specific method. By default, the Routed/PPPoA mode uses VC Mux (VC Multiplexing), which uses a separate VC for each carried protocol. The second available method is LLC (Logical Link Control) encapsulation, which allows multiplexing of multiple protocols over a single ATM virtual circuit. Refer to your ISP/service provider documentation.

Password handling

The Point-to-Point protocol (PPP) is used by the modem to establish connections over the ADSL ATM network. When identifying your modem (password handling) an authentication protocol is used which can be either PAP (Password Authentication Protocol) or CHAP (Challenge-Handshake Authentication Protocol). Refer to your ISP/service provider documentation.

Enable DHCP server

The modem provides a user-configurable Dynamic Host Configuration Protocol (DHCP) which means that the modem will operate as a DHCP server and dynamically assign IP addresses to LAN nodes. The DHCP server supports DHCP client hosts on the LAN side only and will ignore all DHCP requests which arrive from the WAN interface. Refer to your ISP/service provider documentation.

Enable NAT

The modem also supports Network Address Translation (NAT) which translates IP addresses from private internal addresses to globally unique external addresses.

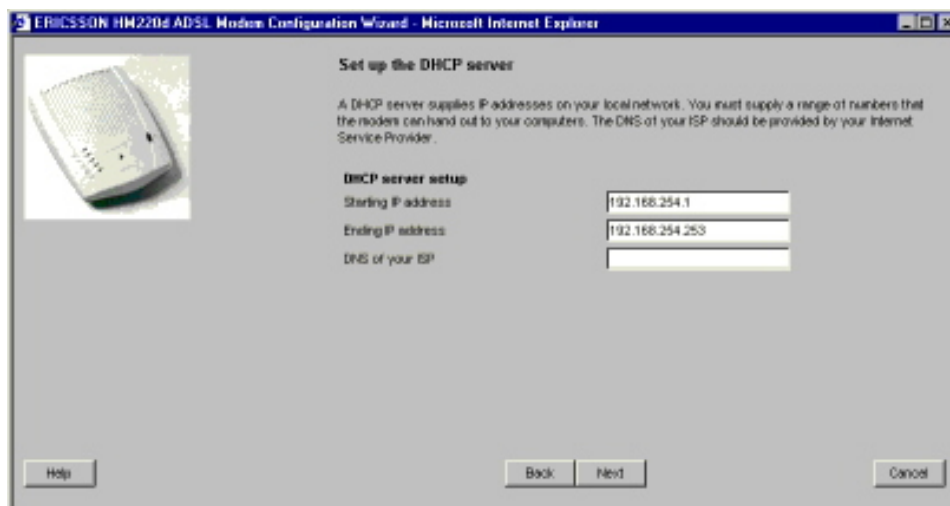
NAT should be enabled for most users. For users who have a public IP address, NAT may be disabled. If you are not sure, ask your ISP/service provider.

- Enter your settings and click on **Next**.

Set up the DHCP server

Note:

This page is only shown if you selected "Enable DHCP server" on the previous page in the wizard.



Figur 43: Configuration wizard - Set up the DHCP server

The DHCP server supplies IP addresses on your local network. You have to supply a range of numbers that the modem can hand out to your computer.

Starting IP address and Ending IP address

Change the default values if they are not suitable for your LAN.

Note:

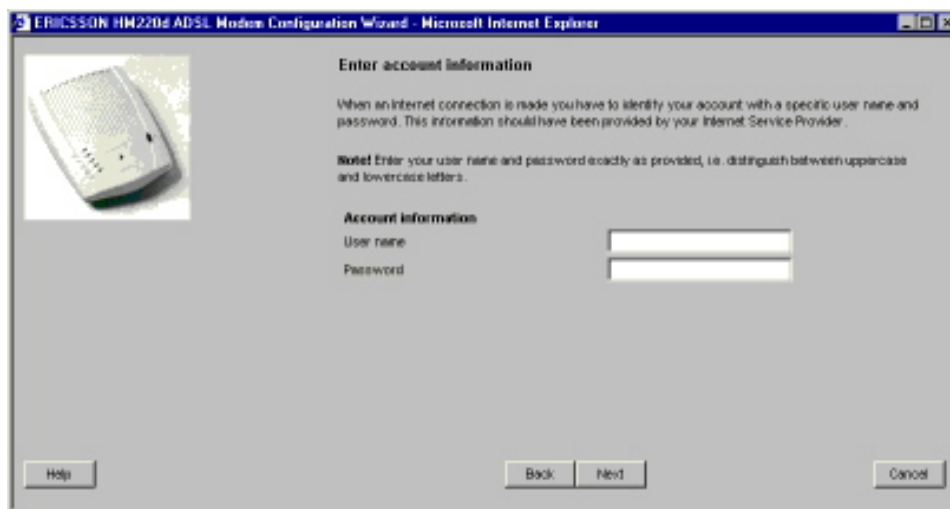
The "Modem IP address" MUST NOT be within the specified range, but MUST be on the same IP sub network.

DNS of your ISP

The IP address of the Domain Name System (DNS) should be provided by your ISP/service provider.

- Enter your settings and click on **Next**.

Enter account information



Figur 44: Configuration wizard - Enter account information

The Point-to-Point protocol (PPP) is used by the modem to establish connections over the ADSL ATM network and when a connection is made your account is identified by your User name and Password. This account information should have been provided by your ISP/service provider.

- Enter your User name and Password.

Note:

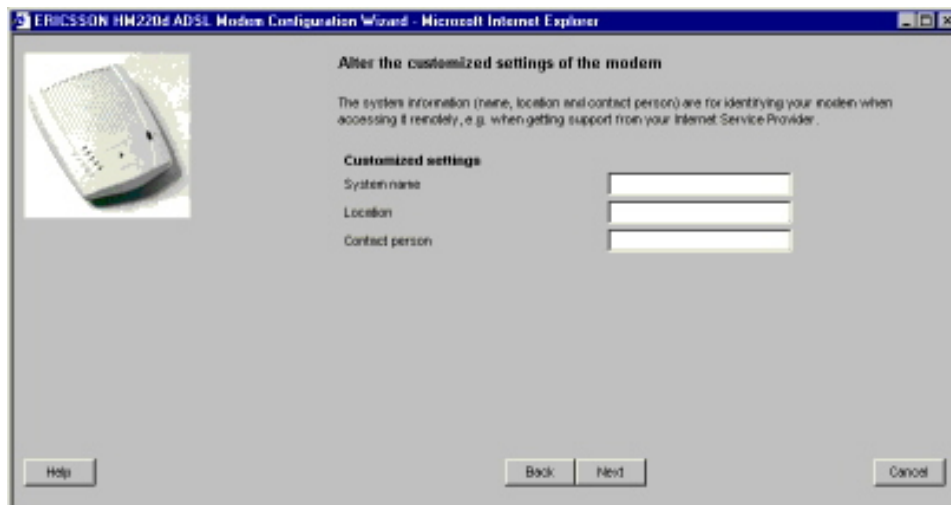
You have to enter your User name and Password exactly as provided, i.e. distinguish between uppercase and lowercase letters.

- Click on **Next**.

Alter the customized settings

Note:

This page is only shown if you ticked the "Make customized settings?" checkbox on a previous page in the wizard.



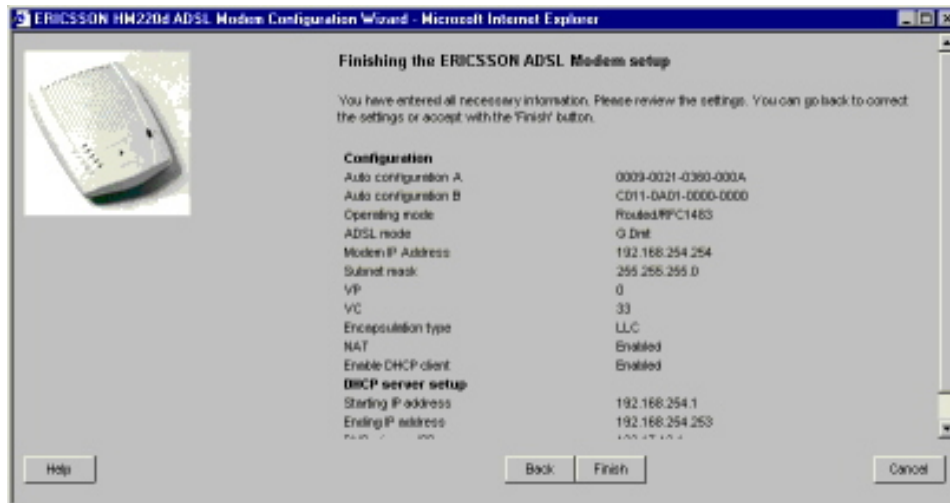
Figur 45: Configuration wizard - Alter the customized settings

System name, Location and Contact person

The system information are for identifying your modem, when accessing it remotely, e.g. with support from your ISP/service provider.

- Enter your identifying parameters and click on **Next**.

Finishing the modem setup



Figur 46: Configuration wizard - Finishing the modem setup

This is the last page in the wizard and it includes all your settings. Review the list and:

- click the **Back** button to make any changes to previous pages
- click the **Finish** button to confirm all settings
- click the **Cancel** button to close the Configuration Wizard without saving any settings.

When you have accepted the settings (by clicking the **Finish** button) the parameters will be set and a check is performed that their values are correct.

Note:

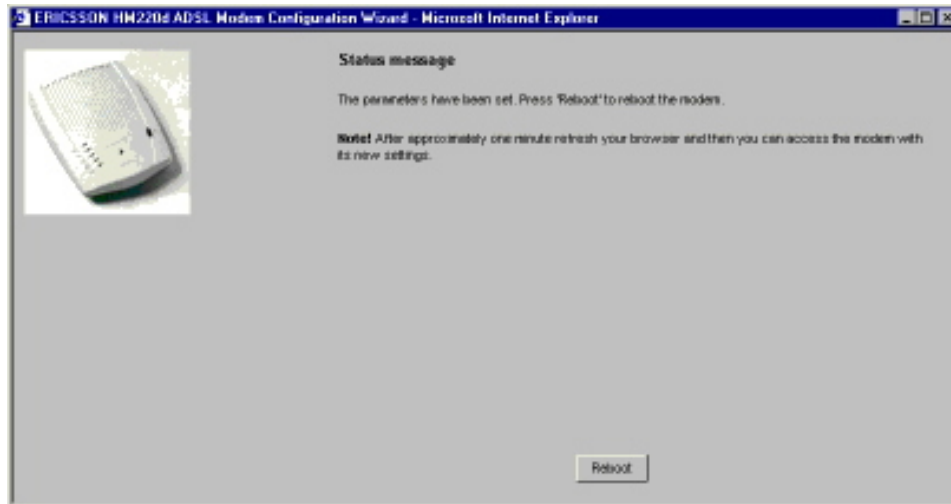
This will take a while, but just wait until the "Status message" appears.

If anything is incorrect you will be notified by the following status message: "The parameters could not be altered according to your changes. Check the settings and consult the documentation for help".

In that case, use the **Back** button to return to previous pages and make the necessary changes.

When your settings have been accepted the following status message is shown (picture on next page): "The parameters have been set. Press 'Reboot' to reboot the modem".

Status message



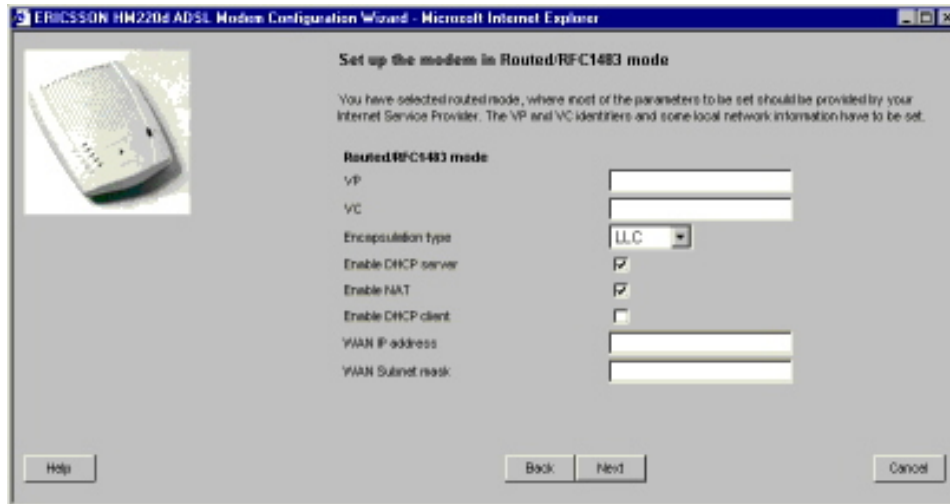
Figur 47: Configuration wizard - Status message

- Click the **Reboot** button.

The wizard will now close and the modem is rebooting. This will take approximately one minute.

When the Power, Ethernet or USB (depending on which connection is used), and ADSL LEDs have turned solid yellow, the modem is ready for operation.

5.3.2 Routed/RFC1483 mode



Figur 48: Configuration wizard - Routed/RFC1483 mode

Set up the modem in Routed/RFC1483 mode

For the Routed/RFC1483 mode, information on VP/VC identifiers and some local network information has to be set. Refer to your ISP/service provider documentation when entering values or changing default settings.

VP and VC identifiers

Asynchronous Transfer Mode (ATM) is the technology used for data transmission. The data is transmitted over virtual channels that are designated by specific unique identifiers (virtual channel identifiers or VCIs). There can be multiple VCIs in one virtual path and the virtual path also has a unique virtual path identifier (VPI).

The parameters for VP and VC should be one pair identifying DSLAM (equipment at the ISP side of the ADSL line) and ISP router. This pair should be provided by the access network operator.

Encapsulation type

When data is transferred via ATM Virtual Channels it is encapsulated using a specific method. By default, the Routed/RFC1483 mode uses LLC (Logical Link Control) encapsulation, which allows multiplexing of multiple protocols over a single ATM virtual circuit. The second available method is VC Mux (VC Multiplexing), which uses a separate VC for each carried protocol. Refer to your ISP/service provider documentation.

Enable DHCP server

The modem provides a user-configurable Dynamic Host Configuration Protocol (DHCP) which means that the modem will operate as a DHCP server and dynamically assign IP addresses to LAN nodes. The DHCP server supports DHCP client hosts on the LAN side only and will ignore all DHCP requests which arrive from the WAN interface. Refer to your ISP/service provider documentation.

Enable NAT

The modem also supports Network Address Translation (NAT) which translates IP addresses from private internal addresses to globally unique external addresses.

NAT should be enabled for most users. For users who have a public IP address, NAT may be disabled. If you are not sure, ask your ISP/service provider.

Enable DHCP client

If DHCP client is enabled the modems DHCP client will request the IP address and subnet mask for the modems WAN interface.

WAN IP address and WAN subnet mask

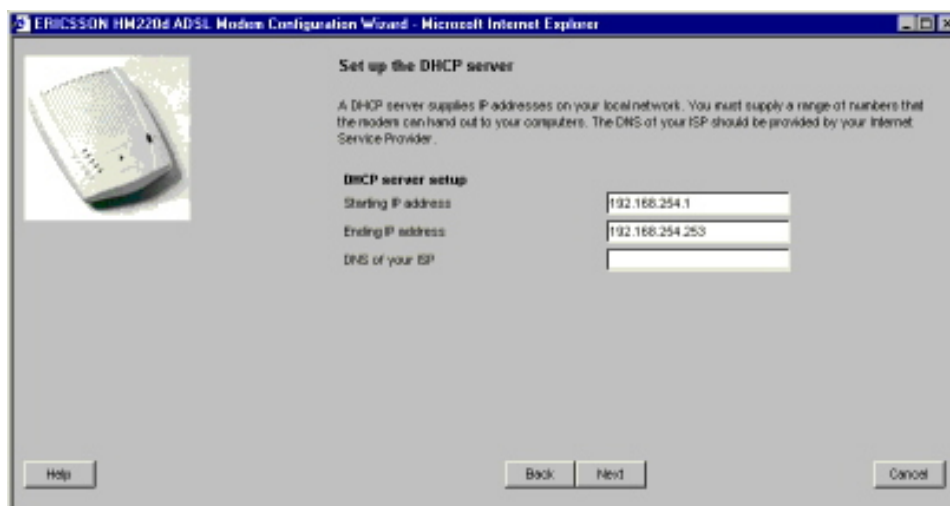
The IP address and subnet mask for the modems WAN interface. The values should be specified by your ISP/service provider. (If the DHCP client is enabled these parameters will be set automatically by the modem).

- Enter your settings and click on **Next**.

Set up the DHCP server

Note:

This page is only shown if you selected "Enable DHCP server" on the previous page in the wizard.



Figur 49: Configuration wizard - Setup the DHCP server

The DHCP server supplies IP addresses on your local network. You have to supply a range of numbers that the modem can hand out to your computer.

Starting IP address and Ending IP address

Change the default values if they are not suitable for your LAN.

Note:

The "Modem IP address" MUST NOT be within the specified range, but MUST be on the same IP sub network.

DNS of your ISP

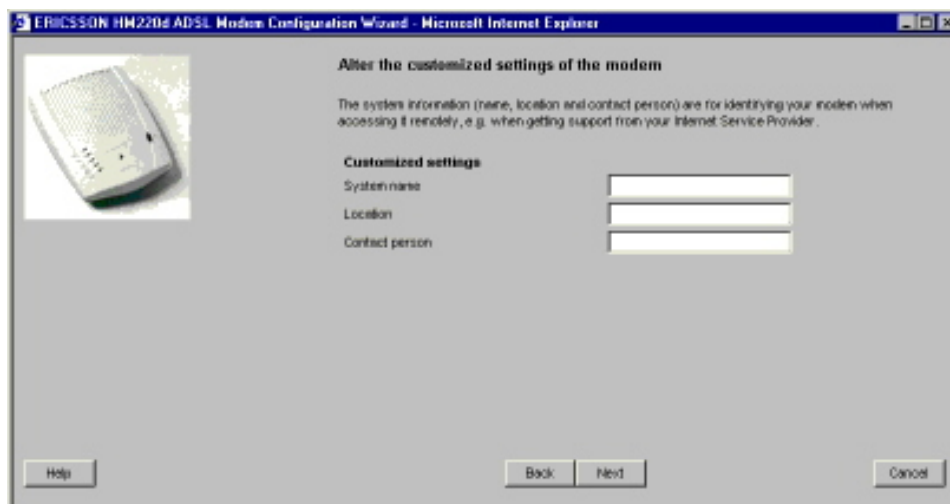
The IP address of the Domain Name System (DNS) should be provided by your ISP/service provider.

- Enter your settings and click on **Next**.

Alter the customized settings

Note:

This page is only shown if you ticked the "Make customized settings?" checkbox on a previous page in the wizard.



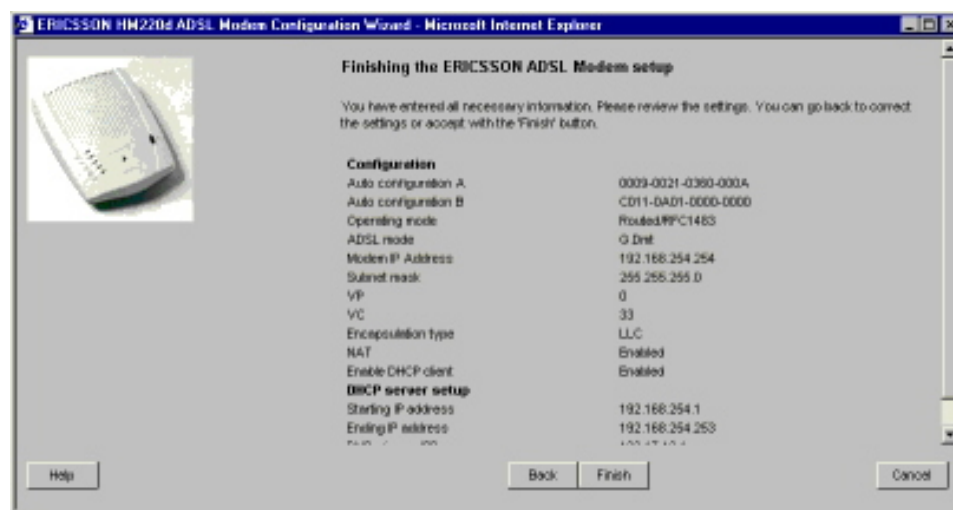
Figur 50: Configuration wizard - Alter the customized settings

System name, Location and Contact person

The system information are for identifying your modem, when accessing it remotely, e.g. with support from your ISP/service provider.

- Enter your identifying parameters and click on **Next**.

Finishing the modem setup



Figur 51: Configuration wizard - Finishing the modem setup

This is the last page in the wizard and it includes all your settings. Review the list and:

- click the **Back** button to make any changes to previous pages
- click the **Finish** button to confirm all settings
- click the **Cancel** button to close the Configuration Wizard without saving any settings.

When you have accepted the settings (by clicking the **Finish** button) the parameters will be set and a check is performed that their values are correct.

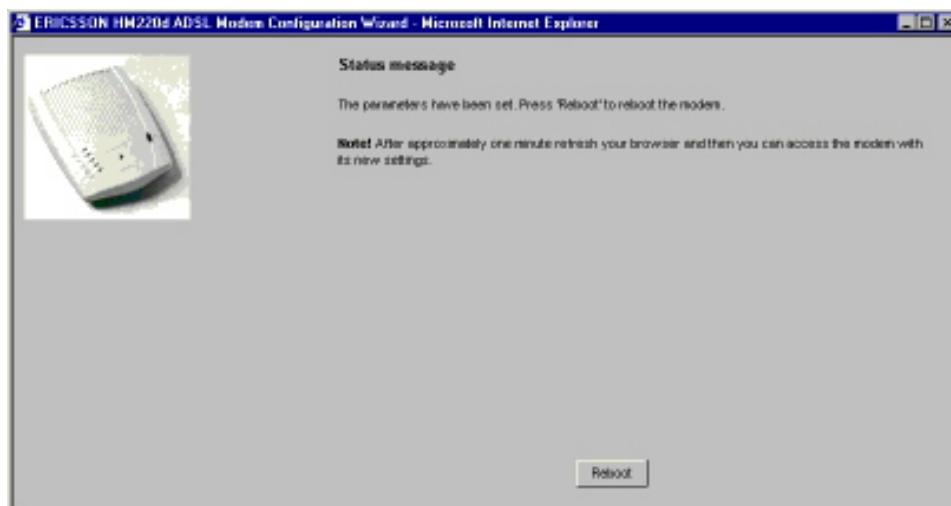
Note:

This will take a while, but just wait until the "Status message" appears.

If anything is incorrect you will be notified by the following status message: "The parameters could not be altered according to your changes. Check the settings and consult the documentation for help".

In that case, use the **Back** button to return to previous pages and make the necessary changes.

When your settings have been accepted the following status message is shown (picture on next page): "The parameters have been set. Press 'Reboot' to reboot the modem".

Status message

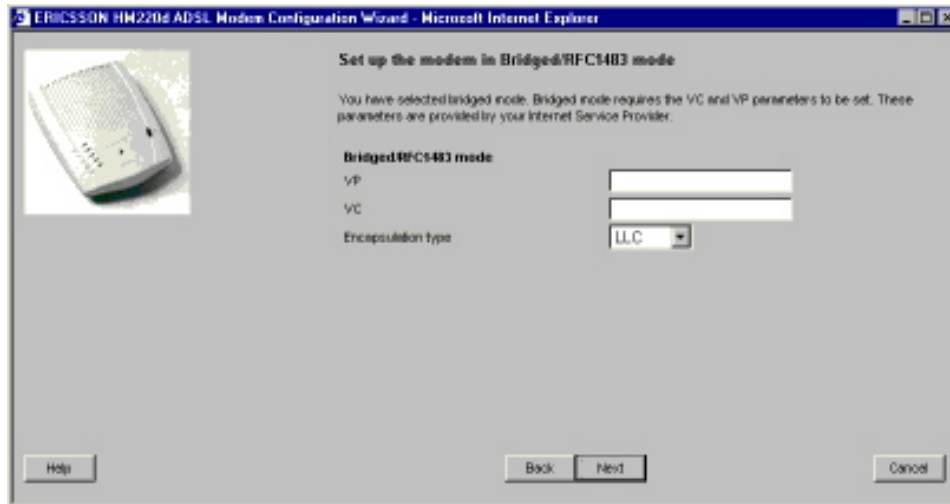
Figur 52: Configuration wizard - Status message

- Click the **Reboot** button.

The wizard will now close and the modem is rebooting. This will take approximately one minute.

When the Power, Ethernet or USB (depending on which connection is used), and ADSL LEDs have turned solid yellow, the modem is ready for operation.

5.3.3 Bridged/RFC1483 mode



Figur 53: Configuration wizard - Bridged/RFC1483 mode

Set up the modem in Bridged/RFC1483 mode

For the Bridged/RFC1483 mode there are a minimum of settings that have to be set.

VP and VC identifiers

Asynchronous Transfer Mode (ATM) is the technology used for data transmission. The data is transmitted over virtual channels that are designated by specific unique identifiers (virtual channel identifiers or VCIs). There can be multiple VCIs in one virtual path and the virtual path also has a unique virtual path identifier (VPI).

The parameters for VP and VC should be one pair identifying DSLAM (equipment at the ISP side of the ADSL line) and ISP router. This pair should be provided by the access network operator.

Encapsulation type

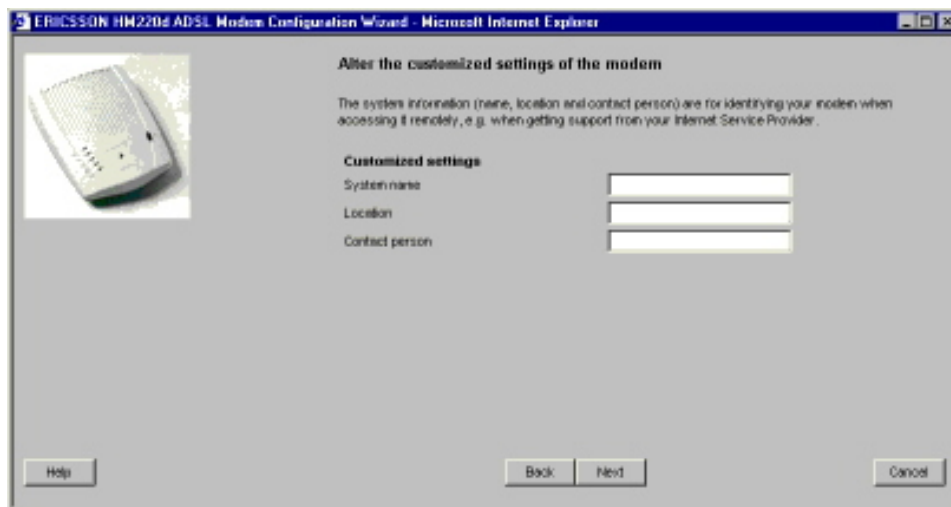
When data is transferred via ATM Virtual Channels it is encapsulated using a specific method. By default, the Bridged/RFC1483 mode uses LLC (Logical Link Control) encapsulation, which allows multiplexing of multiple protocols over a single ATM virtual circuit. The second available method is VC Mux (VC Multiplexing), which uses a separate VC for each carried protocol. Refer to your ISP/service provider documentation.

- Enter your settings and click on **Next**.

Alter the customized settings

Note:

This page is only shown if you ticked the "Make customized settings?" checkbox on a previous page in the wizard.



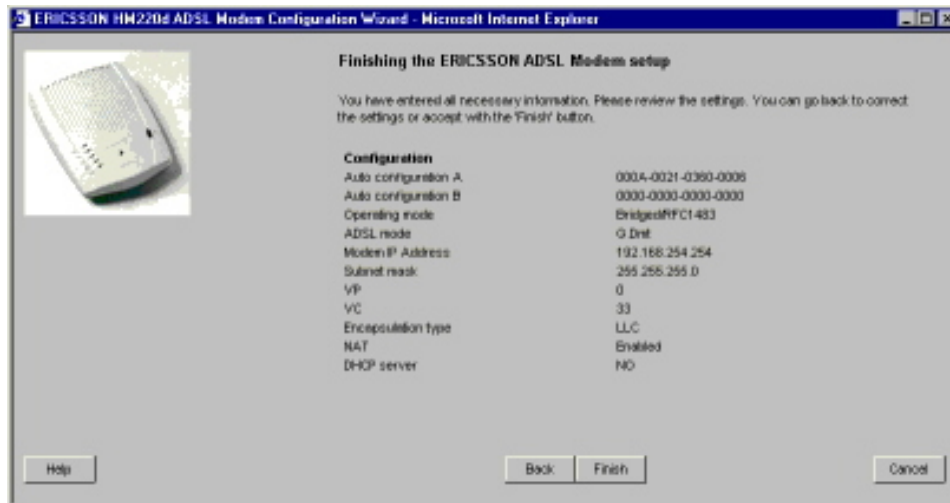
Figur 54: Configuration wizard - Alter the customized settings

System name, Location and Contact person

The system information are for identifying your modem, when accessing it remotely, e.g. with support from your ISP/service provider.

- Enter your identifying parameters and click on **Next**.

Finishing the modem setup



Figur 55: Configuration wizard - Finishing the modem setup

This is the last page in the wizard and it includes all your settings. Review the list and:

- click the **Back** button to make any changes to previous pages
- click the **Finish** button to confirm all settings
- click the **Cancel** button to close the Configuration Wizard without saving any settings.

When you have accepted the settings (by clicking the **Finish** button) the parameters will be set and a check is performed that their values are correct.

Note:

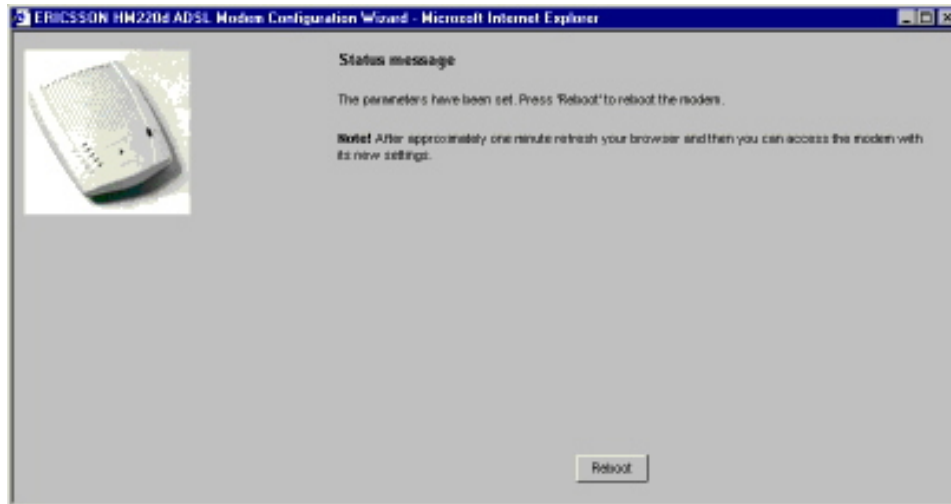
This will take a while, but just wait until the "Status message" appears.

If anything is incorrect you will be notified by the following status message: "The parameters could not be altered according to your changes. Check the settings and consult the documentation for help".

In that case, use the **Back** button to return to previous pages and make the necessary changes.

When your settings have been accepted the following status message is shown (picture on next page): "The parameters have been set. Press 'Reboot' to reboot the modem".

Status message



Figur 56: Configuration wizard - Status message

- Click the **Reboot** button.

The wizard will now close and the modem is rebooting. This will take approximately one minute.

When the Power, Ethernet or USB (depending on which connection is used), and ADSL LEDs have turned solid yellow, the modem is ready for operation.

5.4 Change configuration

If you want to change your modem configuration, just access the modem's web pages again by starting your web browser and enter the IP address of the modem **http://192.168.254.254** in the "Location" or "Address" area where you enter web page addresses.



Figur 57: Enter the IP address of the modem

The HM220d ADSL modem's "Welcome" page appears.

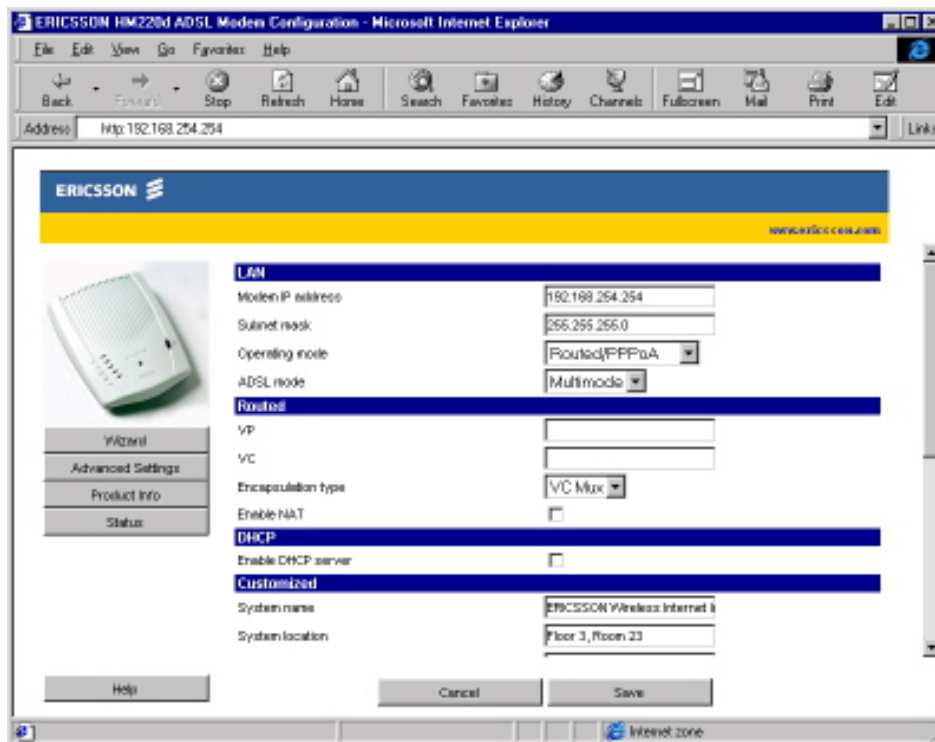
Note:

If you have changed the default IP address of the modem, you have to enter the new IP address to access the modem's web pages.

To change your modem configuration, you can either use the Configuration Wizard (click the **Wizard** button) or select the **Advanced Settings** button. The Advanced settings is described in the next section.

5.5 Advanced settings

Instead of going through the Configuration Wizard, you have the option to view all the parameters that can be changed in one view. From the modem's Welcome page, click the **Advanced Settings** button to bring up this view:



Figur 58: Advanced settings

This view includes two new buttons - **Save** and **Cancel**. When you have made any changes and want to save them, use the **Save** button. The **Cancel** button will restore your settings to its former state and no changes will be saved.

The information is divided into sections, as described below.

5.5.1 LAN

The "Modem IP address" and "Subnet mask" belong to the modem. The parameters have default settings and should only be changed if these are not suitable in your LAN.

ADSL modems operate in one of several modes determined by the DSLAM (equipment at the ISP side of the ADSL line), central office setup and also by service offered. The HM220d ADSL modem can be configured to operate in three different "Operating modes": **Routed/PPPoA** (default), **Routed/RFC1483** or **Bridged/RFC1483**. Which one you need to use depends on the configuration specified by your ISP/service provider.

The "ADSL mode" depends on what services you are offered and your ISP/service provider must provide this information. The **HM220dp** model can work in four different ADSL modes which are Multimode (default), T1.413, G.Dmt, and G.Lite. The **HM220di** model can work in two different ADSL modes which are G.Dmt and DTAG.

5.5.2 Routed

This section is only shown if either "Routed/PPPoA" or "Routed/RFC1483" operating mode is selected in the previous LAN section.

The information differs some between the Routed/PPPoA and Routed/RFC1483 mode. Password handling, User name and Password is only valid for Routed/PPPoA mode. DHCP client, WAN IP address and WAN Subnet mask are used in Routed/RFC1483 mode.

When the modem operates in Routed mode it sends packets from node to node based on IP addresses. An IP address can be viewed as a modifiable identifier that is mapped to the MAC address of network node. The IP address of a node may change dynamically or by user configuration. Therefore, there are protocols and databases on the network that must keep track of the IP address assignments for the nodes on the local area network (LAN).

For the Routed mode, information on VP/VC identifiers and some local network information has to be set.

The "VP and VC identifiers" refer to the technology, Asynchronous Transfer Mode, ATM, used for data transmission. The data is transmitted over virtual channels that are designated by specific unique identifiers (Virtual Channel Identifiers or VCIs). There can be multiple VCIs in one virtual path and the virtual path also has a unique Virtual Path Identifier, VPI.

The parameters for VP and VC should be one pair identifying DSLAM (equipment at the ISP side of the ADSL line) and ISP router. This pair should be provided by the access network operator.

"Encapsulation type" is the specific method used when data is transferred via ATM Virtual Channels. For Routed/PPPoA operating mode, the default value for the modem is VC Mux (VC Multiplexing), which uses a separate VC for each carried protocol. For Routed/RFC1483 operating mode the default value is LLC (Logical Link Control) encapsulation, which allows multiplexing of multiple protocols over a single ATM virtual circuit. Refer to your ISP/service provider documentation.

Password handling refers to the Point-to-Point protocol (PPP) which is used by the modem to establish connections over the ADSL ATM network. When identifying your modem (password handling) an authentication protocol is used which can be either PAP (Password Authentication Protocol) or CHAP (Challenge-Handshake Authentication Protocol). Refer to your ISP/service provider documentation.

The modem also supports Network Address Translation (NAT) which translates IP addresses from private internal addresses to globally unique external addresses. NAT should be enabled for most users. For users who have a public IP address, NAT may be disabled. If you are not sure, ask your ISP/service provider.

If "DHCP client" is enabled the modem's DHCP client will request the IP address and subnet mask for the WAN interface. Removing the need to manually configure those parameters.

If "DHCP client" is not enabled the WAN IP address and Subnet mask have to be set manually. The parameters should be provided by your ISP/service provider.

"User name" and "Password" should be provided by your ISP/service provider. This is your account information that identifies your modem when a connection is made.

5.5.3 DHCP

This section is only shown if either "Routed/PPPoA" or "Routed/RFC1483" operating mode is selected in the previous LAN section.

The modem provides a user-configurable Dynamic Host Configuration Protocol (DHCP) which means that the modem will operate as a DHCP server and dynamically assign IP addresses to LAN nodes. The DHCP server supports DHCP client hosts on the LAN side only and will ignore all DHCP requests which arrive from the WAN interface.

You have to supply a range of addresses (Starting IP address and Ending IP address) that the modem can hand out to your computer.

Note:

The "Modem IP address" MUST NOT be within the specified range, but MUST be on the same IP sub network.

The IP address of the Domain Name System (DNS) should be provided by your ISP/service provider.

5.5.4 Bridged

This section is only shown if "Bridged/RFC1483" operating mode is selected in the previous LAN section.

When the modem operates in Bridged mode, it is the MAC address of the sending and receiving computers or devices (nodes) on the network that determine where to send data packets between LAN segments. The MAC address is a unique identifier that is programmed into the network interface card installed in a network node. Bridging is a simple transmission scheme and there is little software management involved in the sending of packets. Packets are simply forwarded from one node to the next.

For the Bridged/RFC1483 mode, only a minimum of parameters have to be set.

The "VP and VC identifiers" refers to the technology, Asynchronous Transfer Mode, ATM, used for data transmission. The data is transmitted over virtual channels that are designated by specific unique identifiers (Virtual Channel Identifiers or VCIs). There can be multiple VCIs in one virtual path and the virtual path also has a unique Virtual Path Identifier, VPI.

The parameters for VP and VC should be one pair identifying DSLAM (equipment at the ISP side of the ADSL line) and ISP router. This pair should be provided by the access network operator.

"Encapsulation type" is the specific method used when data is transferred via ATM Virtual channels. For Bridged/RFC1483 operating mode, the default value for the modem is LLC (Logical Link Control) encapsulation, which allows multiplexing of multiple protocols over a single ATM virtual circuit. The second available method is VC Mux (VC Multiplexing), which uses a separate VC for each carried protocol. Refer to your ISP/service provider documentation.

5.5.5 Customized

The customized settings contain information on "System name", "System location" and "System contact person". This system information is used for identifying your modem when accessing it remotely, e.g. with support from your ISP/service provider.

5.5.6 Management

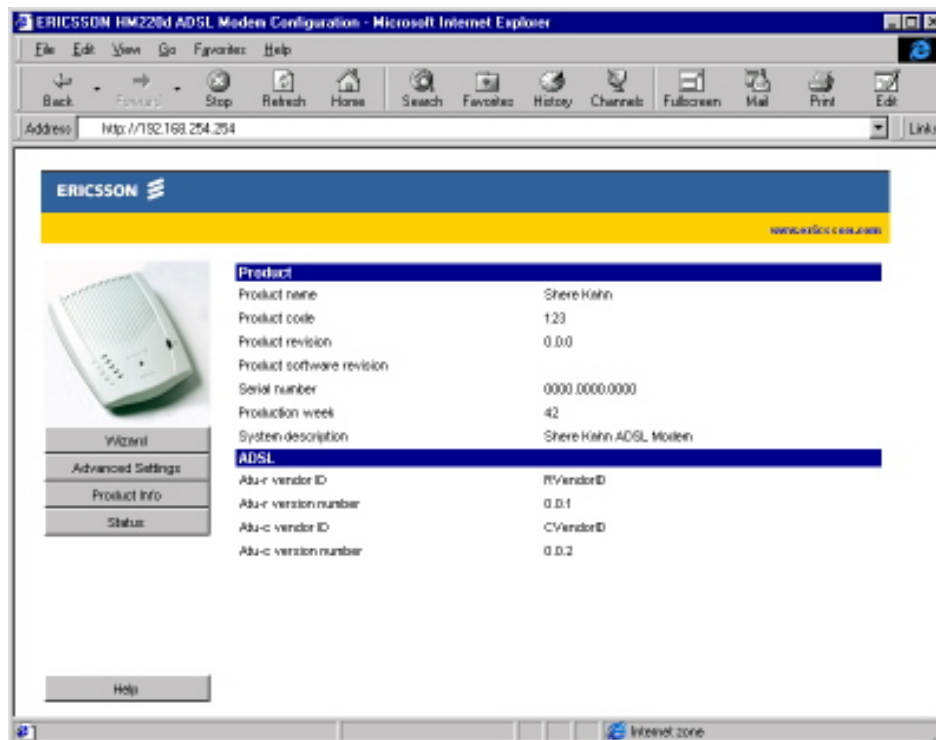
The OAM, Operation and Maintenance capability in the ADSL modem provides Performance and Fault management for the ATM network connections. The HM220d ADSL modem provides support for OAM Loopback cells, Fault Management and Continuous continuity monitoring. The OAM support is provided both on Virtual Paths (**OAM F4 Table**) and Virtual Channels (**OAM F5 Table**). The settings for the OAM parameters should be defined by the ISP/service provider.

The ATM Forum **ILMI** protocol support exchange of configuration information between interconnected ATM devices, such as an ADSL modem and a DSLAM. The setting for this parameter should be defined by the ISP/service provider.

The **trap destination IP** is the IP address to where the modem should send the SNMP trap messages. The setting for this parameter should be defined by the ISP/service provider.

5.6 Product Information

From the modem's Welcome page, click the **Product Info** button to get the following view:

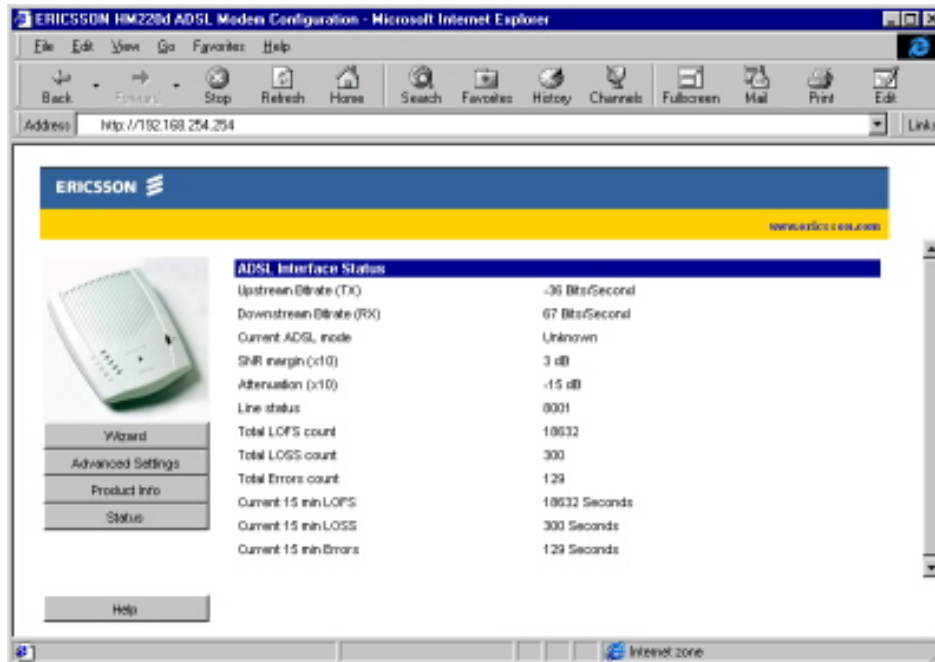


Figur 59: Product information

This page contains information on your HM220d modem and the ADSL site at the ISP.

5.7 Status

From the modem's Welcome page, click the **Status** button to get the following view:



Figur 60: Status

This view gives you the current status of the ADSL interface. Click on the links below the table to get the status of the different modem interfaces. The parameters shown and the different interface views are updated every 10th second.

5.8 Update the software

Ericsson will keep you updated with the latest technology, and let you download the latest software update.

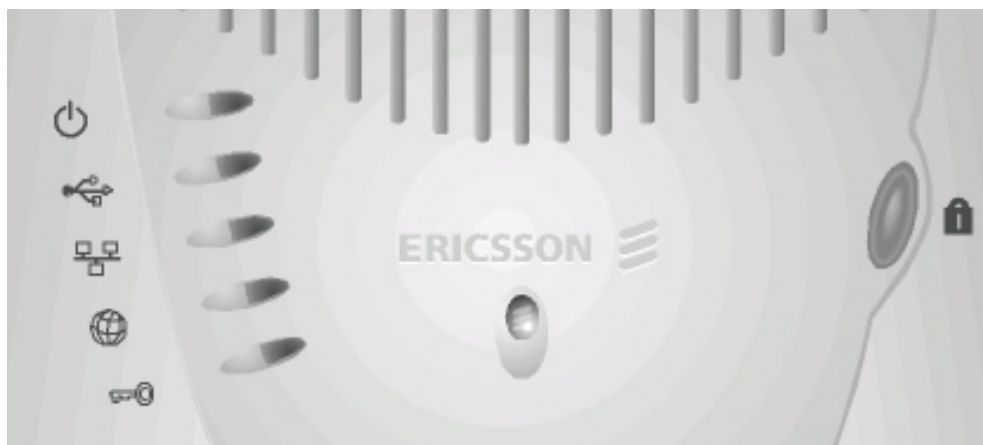
6 Operation

Once the HM220d ADSL modem has been properly connected and configured, simply open your Internet browser and you are instantly on-line. No logon procedures are necessary. The modem should be left on at all times; there is no need to turn it on and off, since PipeLock guarantees your security when you are not using the Internet.

The HM220d ADSL modem operates automatically and will rarely, if ever, require any intervention from you. There are some special features of the modem, such as the PipeLock, with which you should be familiar. You may also want to know more about the modem LEDs, which indicate the current operating state and provide useful diagnostic information.

6.1 Modem LED indicator description






Looking at the top of the HM220d ADSL modem, you will see five light-emitting diodes (LEDs) along the left side of the unit.



Figur 61: LEDs on HM220d ADSL modem

These LEDs indicate the current state of the modem and provide useful diagnostic information. Although the functions of the LEDs depend upon the operational state of the modem, the general purpose of each is described in the table below. Each LED can be ON (lit), OFF (unlit), flashing at a certain rate or blinking periodically to indicate activity.

The general purpose of each LED is described in the table on the next page.

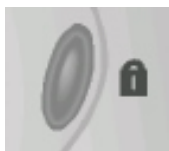
Symbol	Text	Description
	Power	The Power LED indicates whether or not there is power to the modem.
	USB	The USB LED indicates the status of the link (USB) between the modem and your computer. After the Power-up Diagnostics and Initialization have completed, the LED will turn solid yellow, and then begin to flash yellow when there is activity on the link.
	Ethernet	The Ethernet LED indicates the status of the link (Ethernet) between the modem and your computer. After the Power-up Diagnostics and Initialization have completed, the LED will turn solid yellow, and then begin to flash yellow when Ethernet traffic is flowing.
	ADSL	The ADSL LED will flash yellow while the DSL line is training to get the optimum transmission rate. When the line is trained, the LED turns solid yellow.
	PipeLock	The PipeLock LED indicates whether or not the PipeLock feature is currently activated.

Tabell 2: Description of LEDs on HM220d ADSL modem

6.2 PipeLock

Ericsson's unique PipeLock technology enables you to suspend communication between the modem and your computer with the touch of a button. This provides added security when the modem is not in use. When PipeLock is activated, the modem remains logged on, but direct communication between your computer and your service provider is blocked. Since PipeLock does not interrupt communication between the modem and the service provider network, a second touch of the button instantly restores communication.

To activate PipeLock, simply press the **PipeLock** button located to the right on top of the modem.



Figur 62: PipeLock button

Press the button again to instantly regain Internet access. The PipeLock LED will indicate whether PipeLock is activated (LED lit) or not (LED unlit) at any time.



Figur 63: PipeLock LED symbol

The PipeLock status will be retained if the modem is reset or if the power is interrupted. That is, if PipeLock is activated just prior to a power interruption or reset, it will return to the active state when the power-up diagnostics are complete.

6.3 Operational states

As the HM220d ADSL modem is powered up and goes through its startup and operation phases, there are a number of different operational states that it may pass through. Each of these states and its associated LEDs are described in the following sections.

6.3.1 Power-up diagnostics

In the Power-up Diagnostics state, the HM220d ADSL modem executes diagnostics to verify the integrity of the hardware and software. This state is entered when the modem is first powered up or after a power cycle.

When Power-up Diagnostics starts, all of the LEDs will turn ON briefly. This allows you to verify that all LEDs are functioning properly. The Power LED will remain ON and the remaining LEDs will remain OFF while the diagnostics routine completes.



Figur 64: LED symbols for Power, USB, Ethernet, ADSL and PipeLock

6.3.2 Initialization

During the Initialization state, the HM220d ADSL modem performs all the steps necessary to register with the system, including finding a downstream channel, registering with the service provider, and so on. This state is entered when the Power-up Diagnostics state successfully completes or when the downstream channel is lost.

During this state, the ADSL LED flashes slowly. The USB or Ethernet LED is normally ON, and blinks when there is activity.



Figur 65: LED symbols for USB, Ethernet and ADSL

6.3.3 Operational

The Operational state is entered when the HM220d ADSL modem completes the initialization process and is ready to begin sending and receiving data. This is the normal state of operation for the modem.

During this state, the ADSL and USB/Ethernet LEDs are normally ON, flashing when there is activity on the respective link.



Figur 66: LED symbols for USB, Ethernet and ADSL

6.3.4 PipeLock mode

When PipeLock is activated, it blocks communication between your computer and your service provider, thus preventing outsiders from accessing information on your computer.

The PipeLock LED is ON when the PipeLock feature is activated and OFF when PipeLock is deactivated.



Figur 67: PipeLock LED symbol

6.3.5 Access restricted

When in the Access Restricted state, the HM220d ADSL modem will complete initialization and respond to Management traffic, but will not allow data transfer between your computer and your service provider. This is an indication that the service provider is not allowing your modem on the system. When the LEDs indicate an Access Restricted state, you should contact your service provider.

During this state, the ADSL LED flashes slowly. The USB/Ethernet LED is normally ON, and blinks when there is activity.

6.3.6 Power cycle

When a fatal error has occurred you should perform a power cycle by unplugging the power connector and then reconnect it again after 30 seconds.

7 Technical reference

7.1 Factory default configuration

The table below shows the default settings of your modem.

Configurable item	Default settings
Operating mode	Routed/PPPoA
Ethernet interface	IP address: 192.168.254.254 Subnet mask: 255.255.255.0
VP/VC identifiers	None (operator specific)
Encapsulation type	VC Mux
Password handling	CHAP
DHCP server	Enabled Starting IP address: 192.168.254.1 Ending IP address: 192.168.254.253
NAT	Enabled
DNS	None (operator specific)
ADSL mode	Multimode (HM220dp) G.Dmt (HM220di)

7.2 Specification of the HM220d ADSL modem

	Description
Dimensions	Height: 47 mm Width: 168 mm Depth: 205 mm
Environment (climat)	Normal operating range: Temperature ± 0 to $+40^{\circ}\text{C}$. Humidity 5 to 90% RH Transport: Temperature -40 to $+70^{\circ}\text{C}$. Humidity 5 to 100% RH. Storage: Temperature -25 to $+55^{\circ}\text{C}$. Humidity 5 to 100% RH.
Power consumption	9 Watts
Colour	Off white
ADSL Standards	HM220dp (POTS) - Multimode, T1.413, G.Dmt and G.Lite. HM220di (ISDN) - G.Dmt and DTAG
Bit rate	Downstream: up to 8 Mbps Upstream: up to 864 kbps <div style="text-align: center;">Note: Service provider may limit available bandwidth.</div>
Interfaces	Ethernet: 10 Base-T RJ45 connector USB: USB Series B connector ADSL: Standard RJ11 telephone connector

8 Trouble shooting

8.1 Configuring your PC when not using DHCP

When accessing the modem's built-in web pages and the Configuration wizard, your computer should be configured to use DHCP as described in previous sections.

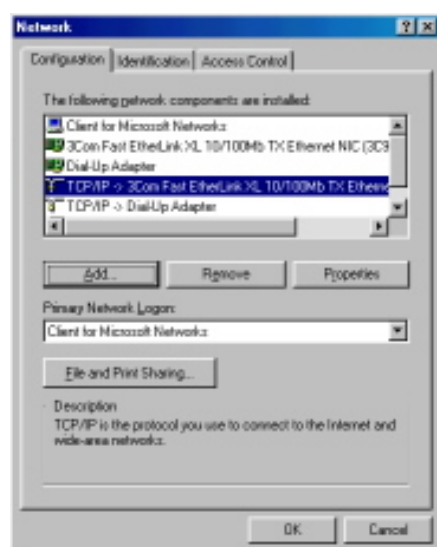
If your settings, according to information from your ISP/service provider, does not include the use of DHCP you have to reconfigure your PC again before you can access the modem.

Follow the step-by-step instructions below to configure your computer to not using DHCP.

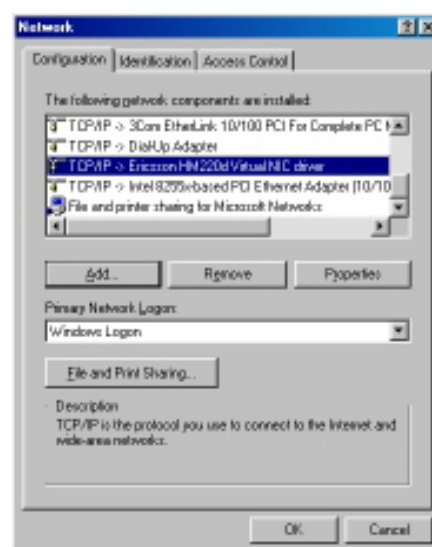
Installation using Ethernet in Windows 95 (or higher) or USB in Windows 98:

- 1 From the **Start** menu select **Settings -> Control panel**. The "Control Panel" dialog box will appear.
- 2 Double-click on the **Network** icon and the "Network" dialog box will appear.

Ethernet installation



USB installation (Windows 98)

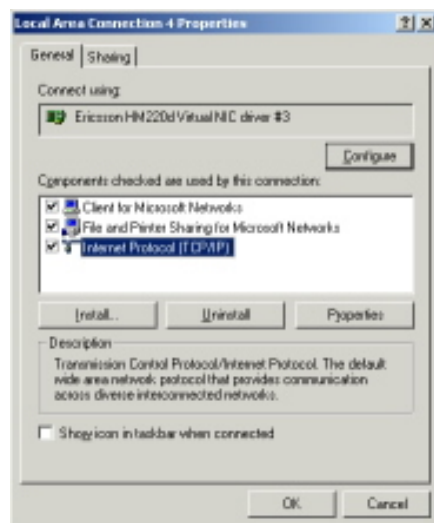


- 3 Select the TCP/IP protocol according to the pictures above.
- 4 Click the **Properties** button and the "TCP/IP Properties" dialog box will appear.

- 5 Select the **IP Address** tab and select **Specify and IP address**.
- 6 Enter the **IP address** and **Subnet mask** and click on **OK**.
- 7 You are now back in the "Network" dialog box. Click **OK**.
- 8 Close the **Control Panel** window.
- 9 Some configuration files might be copied onto your hard disk and if a "Setting Changes" message asks you if you wish to restart your computer you should answer **Yes**.

Installation using USB in Windows 2000:

- 1 From the **Start** menu select **Settings -> Control Panel**.
- 2 Double click on the **Network and Dial-up Connections**. A new view appears including icons for Local Area Connections.
- 3 Double click the **Local Area Connection** icon for the **Ericsson HM220d Virtual NIC driver**. If you have several icons be sure you choose the right one. The "Local Area Connection Status" dialog box appears.
- 4 Click the **Properties** button to open the "Local Area Connection Properties" dialog box:



Figur 68: Local Area Connection Properties

- 5 Select "Internet Protocol (TCP/IP)" according to the above example.
- 6 Click the **Properties** button and the "Internet Protocol (TCP/IP) Properties" dialog box will appear.
- 7 Select "Specify and IP address" and enter the IP addresses specified by your ISP/service provider. Click **OK**.
- 8 You are now back in the "Local Area Connection Properties" dialog box. Click **OK**.

- 9 Click Close in the "Local Area Connection Status" dialog box and close the Network and Dial-up Connections windows.

8.2 Reset the modem to factory default configuration

Failure to access your HM220d ADSL modem may occur if wrongly configured or simply by forgetting the preconfigured IP address. You may end up in a situation where restoring all of the original default is the only solution.

The following procedure will reset ALL of the modem's configurable values back to their original defaults, including the IP address.

- 1 Unplug the power supply cable from the **POWER** connector on the back of the modem.
- 2 Press the **PipeLock** button on the top of the modem and hold it down.
- 3 Reconnect the power supply cable and keep the **PipeLock** button pressed for at least 5 seconds before releasing it.
- 4 The modem will reboot and finally it will come back online with the original default settings.
- 5 Reconfigure the modem according to the data supplied by your ISP/service provider.
- 6 Save your new configuration and reboot the modem.

9 Important information

9.1 Product care and maintenance

Note:

Guidelines for Safe and Efficient Use. Read this information before using your HM220d ADSL modem.

Your HM220d ADSL modem is a highly sophisticated electronic device. To get the most out of your modem, read this text about product care, safety and efficient use.

Do not expose your product to liquid or moisture.

Do not expose your product to extreme hot or cold temperatures.

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

Do not drop, throw or try to bend the product since rough treatment could damage your product.

Do not attempt to disassemble your product, a broken warranty seal will void the warranty. The product does not contain consumer serviceable components. Service should only be performed by Certified Service Centres.

Do not use any other accessories than Ericsson originals. Failure to do so may result in loss of performance, damage to the product, fire, electric shock or injury, and will void the warranty.

Do not allow children to play with your modem since it contains small parts that could become 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 the power transformer that came with the unit. Replacement transformers can be obtained by contacting Ericsson.

Treat your product with care, keep it in a clean and dust free place. Only use a soft damp cloth to clean your product.

9.2 Licence agreement

This is a legal agreement, Agreement, between you Licensee, the recipient of the enclosed Software on compact disc, diskette or any other media and any upgrades thereof, and Ericsson Mobile Communications AB, the Vendor. By opening the sealed software package and/or using the software you are agreeing to be bound by the terms of this Agreement.

9.2.1 Licence

The Licensee is hereby granted a non-transferable, non-exclusive, restricted right and licence to use the software included herein, Software. However, the Software licensed hereunder may be delivered in an inseparable package also containing other software programs than the Software.

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9.2.2 Term

Your licence remains effective from the date of receipt until terminated. You can terminate it at any other time by destroying the Software together with all copies of the Software in any form. Your licence will also automatically terminate without notice if you fail to comply with any term or condition of this Agreement. Upon any termination you must destroy all copies of the Software in any form.

9.2.3 Limited warranty

Vendor warrants the media, on which the Software is provided, to be free of defects in materials and workmanship under normal use for ninety (90) days after the date of receipt. The Vendor's and its suppliers' entire liability and your exclusive remedy under this warranty (which is subject to you returning the Software to an certified reseller with a copy of your receipt) will be, at Vendor's option, to replace the disc(s)/ diskette(s) or refund the purchase price for the Software and terminate this Agreement.

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.

9.2.4 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 iindustry 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 to tangibles or environmental damage.

9.2.5 Limitation of liability

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 suppliers entire liability under this Agreement shall be limited to the amount actually paid by Licensee for the Software.

9.2.6 Governing law

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

9.3 Regulatory information**9.3.1 Safety Standards**

The HM220d ADSL high speed modem is cULus approved according to UL 1950.

9.3.2 Power Supply

The HM220d ADSL high speed modem is equipped with an external power supply adapter of 120 VAC/60 Hz converting to 12 VDC/1A unregulated output voltage.

The supplied adapter has the following output specifications:

- 12 VDC unregulated output voltage.
- Maximum 1A output current.

9.3.3 CE Requirement

Hereby, Ericsson Mobile Communications AB, declares that this HM220d ADSL high speed modem, is in conformity with the essential requirements and other relevant provisions of the R&TTE directive 1999/5/EC.

9.3.4 USA

This information is only applicable for units sold for the U.S. market.

Note:

The HM220d ADSL high speed modem is for use only with AC/DC Adapter Ericsson Model BML 901 92/2 and minimum AWG 26 cable required for telecommunications connection.

Note:

In the event of equipment malfunction, replace only with AC/DC Adapter Ericsson Model BML 901 92/2.

9.3.4.1 Declaration of Conformity**9.3.4.1.1 FCC Part 15**

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 instruction, may cause harmful interference to radio or television reception. However, there is no guarantee that interference will occur in a 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 HM220d ADSL modem and the affected equipment.
- Connect the HM220d ADSL modem 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.

9.3.4.1.2 FCC Part 68

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).

Glossary

ADSL

Short for Asymmetric Digital Subscriber Line, a new technology that allows more data to be sent over existing copper telephone lines (POTS). ADSL supports data rates of from 1.5 to 9 Mbps when receiving data (known as the downstream rate) and from 16 to 640 Kbps when sending data (known as the upstream rate). ADSL requires a special ADSL modem.

ATM

Short for Asynchronous Transfer Mode, a network technology based on transferring data 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 ensures that no single type of data hogs the line. ATM creates a fixed channel, or route, between two points whenever data transfer begins. This differs from TCP/IP, in which messages are divided into packets and each packet can take a different route from source to destination.

Authentication

The process of identifying an individual, usually based on a username and password. Authentication merely ensures that the individual is who he or she claims to be, but says nothing about the access rights of the individual.

Bandwidth

The amount of data that can be transmitted in a fixed amount of time. For digital devices, the bandwidth is usually expressed in bits per second (bps) or bytes per second.

Bridge

A device that connects two local area networks (LANs), or two segments of the same LAN. Unlike routers, bridges are protocol independent. They simply forward packets without analyzing and rerouting messages.

CHAP

Short for Challenge Handshake Authentication Protocol, a type of authentication in which the authentication agent (typically a network server) sends the client program a key to be used to encrypt the username and password. This enables the username and password to be transmitted in an encrypted form to protect them against eavesdroppers.

Configuration

The way a system is set up, or the assortment of components that make up the system. Configuration can refer to either hardware or software, or the combination of both. When you install a new device or program, you sometimes need to configure it, which means to define values of parameters (for software).

Data Interface Connection

The link that provides the communication channel between two or more devices, allowing them to pass data to one another.

Default

A value or setting that a device or program automatically selects if you do not specify a substitute.

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, a protocol for assigning dynamic IP addresses to devices on a network. With dynamic addressing, a device can have a different IP address every time it connects to the network. DHCP also supports a mix of static and dynamic IP addresses. Dynamic addressing simplifies network administration because the software keeps track of IP addresses rather than requiring an administrator to manage the task. This means that a new computer can be added to a network without the hassle of manually assigning it a unique IP address. Many ISPs use dynamic IP addressing for dial-up users.

DNS

Short for Domain Name System (or Service), an Internet service that translates domain names into IP addresses. Because domain names are alphabetic, they are 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 does not know how to translate a particular domain name, it asks another one, and so on, until the correct IP address is returned.

Downstream

The direction of a downstream signal is from the headend to the user's computer.

Driver

A program that controls a device. A driver acts like a translator between the device and programs that use the device.

DSLAM

A Digital Subscriber Line Access Multiplexer is 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.

DSL

xDSL refers collectively to all types of Digital Subscriber Lines, the two main categories being ADSL and SDSL. DSL technologies use sophisticated modulation schemes to pack data onto copper wires. They are sometimes referred to as last-mile technologies because they are used only for connections from a telephone switching station to a home or office,

not between switching stations. xDSL is similar to ISDN in as much as both operate over existing copper telephone lines (POTS) and both require the short runs to a central telephone office. However, xDSL offers much higher speeds.

DTAG

One of two ADSL modes that the **HM220di** ADSL modem can operate in. DTAG is a proprietary ADSL mode used on ISDN lines mainly in Germany.

Encapsulation

A technology that enables one network to send its data via another network's connections.

Ethernet

A Local Area Network (LAN) protocol which is one of the most widely implemented LAN standards.

Gateway

A combination of hardware and software that links two different types of networks.

G.Dmt/ISDN

One of two ADSL modes that the **HM220di** ADSL modem can operate in. Asymmetric Digital Subscriber Line full rate according to the ITU G992.1 Annex B standard, which allows the ADSL line to support up to 8 Mbps downstream and 864 kbps upstream. G.Dmt/ISDN ADSL is used to cooperate with a ISDN telephone line and requires that a device called a ISDN splitter be installed at the subscriber or business premises.

G.Dmt/POTS

One of four ADSL modes that the **HM220dp** ADSL modem can operate in. Asymmetric Digital Subscriber Line full rate according to the ITU G992.1 Annex A standard, which allows the ADSL line to support up to 8 Mbps downstream and 864 kbps upstream. G.Dmt/POTS ADSL is used to cooperate with a POTS telephone line and requires that a device called a POTS splitter be installed at the subscriber or business premises.

G.Lite

One of four ADSL modes that the **HM220dp** ADSL modem can operate in. Asymmetric Digital Subscriber Line, according to the ITU G992.2 Annex A standard. A lower-speed version of ADSL that eliminates the need for the telco to install and maintain a premises-based POTS splitter.

Hub

A common connection point for devices in a network. Hubs are commonly used to connect segments of a LAN. A hub contains multiple ports.

Internet

A global network connecting millions of computers. There are a variety of ways to access the Internet and one way can be to gain access through a commercial Internet Service Provider (ISP).

IP

Abbreviation of Internet Protocol, pronounced as two separate letters. IP specifies the format of packets, also called datagrams, and the addressing scheme. Most networks combine IP with a higher-level protocol called Transport Control Protocol (TCP), which establishes a virtual connection between a destination and a source. IP by itself is something like the postal system. It allows you to address a package and drop it in the system, but there is no direct link between you and the recipient. TCP/IP, on the other hand, establishes a connection between two hosts so that they can send messages back and forth for a period of time.

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, 1.160.10.240 could be an IP address. Within isolated network, you can assign IP addresses at random as long as each one is unique. However, connecting a private network to the Internet requires using registered IP addresses (called Internet addresses) to avoid duplicates.

ISDN

Short for Integrated Services Digital Network, an international communications standard for sending voice, video and data over digital telephone lines or normal telephone wires.

ISP

Short for Internet Service Provider, a company that provides access to the Internet. In addition to serving individuals, ISPs also serve large companies, providing a direct connection from the company's networks to the Internet. ISPs themselves are connected to one another through Network Access Points (NAPs).

LAN

Short for Local Area Network which is a computer network that spans a relatively small area. Most LANs are confined to a single building or group of buildings. Most LANs connect workstations and personal computers and each node (individual computer) has its own CPU with which it executes programs. There are many different types of LANs, where Ethernet being the most common for PCs.

LED

Short for Light Emitting Diode, an electronic device that lights up when electricity is passed through it.

MAC address

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

Modem

Acronym for MOdulator-DEModulator. A modem is a device or program that enables a computer to transmit data over telephone lines. Computer information is stored digitally, whereas information transmitted over telephone lines is transmitted in the form of analog waves. A modem converts between these two forms.

Multimode

One of four ADSL modes that the **HM220dp** ADSL modem can operate in. In multimode the modem will automatically detect the ADSL mode (T1.413, G.Dmt or G.Lite) using handshaking with the DSLAM equipment.

NAT

Short for Network Address Translation, an Internet standard that enables a local area network (LAN) to use one set of IP addresses for internal traffic and a second set of addresses for external traffic. A NAT box located where the LAN meets the Internet makes all necessary IP address translations.

NIC

An abbreviation of Network Interface Card, 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.

Node

A node can be a computer or some other device, such as a printer. Every node has a unique network address, sometimes called a Data Link Control (DLC) address or Media Access Control (MAC) address.

NSP

Short for Network Service Provider, a company that provides Internet access to ISPs. Sometimes called backbone providers, NSPs offer direct access to the Internet backbone and the Network Access Points (NAPs).

PAP

Short for Password Authentication Protocol, the most basic form of authentication, in which a user's name and password are transmitted over a network and compared to a table of name-password pairs.

Password

A secret series of characters that enables a user to access a file, computer or program. On multiuser systems, each user must enter his or her password before the computer will respond to commands.

Plug-and-play

Refers to the ability of a computer system to automatically configure expansions boards and other devices. You should be able to plug in a device and play with it, without worrying about configuration elements.

PipeLock

A security feature of the HM220d ADSL modem that temporarily blocks communication between the computer and the service provider.

POTS

Short for Plain Old Telephone Service, which refers to the standard telephone service that most homes use. In contrast, telephone services based on high-speed, digital communications lines, such as ISDN, are not POTS. The main differences between POTS and non-POTS services are speed and bandwidth. 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 is stable and provides error checking features.

Protocol

A agreed-upon format for transmitting data between two devices. From a user's point of view, the only interesting aspect about protocols is that your computer or device must support the right ones if you want to communicate with other computers. The protocol can be implemented either in hardware or in software.

PSTN

Short for Public Switched Telephone Network which refers to the international telephone system based on copper wires carrying analog voice data. This is in contrast to newer telephone networks based on digital technologies, such as ISDN. Telephone service carried by the PSTN is often called Plain Old Telephone Service (POTS).

Remote

Remote refers to files, devices and other resources that are not connected directly to your workstation. Resources at your workstation are considered local.

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 (Internet Control Message Protocol) to communicate with each other and configure the best route between any two hosts. Very little filtering of data is done through routers and they do not care about the type of data they handle.

SDSL

Short for Symmetric Digital Subscriber Line, a new technology that allows more data to be sent over existing copper telephone lines (POTS). SDSL is called symmetric because it supports the same data rates for upstream and downstream traffic. A similar technology that supports different data rates for upstream and downstream data is called Asymmetric Digital Subscriber Line (ADSL).

SNMP

Short for Simple Network Management Protocol, a set of protocols for managing complex networks.

10Base-T

One of several adaptations of the Ethernet standard for Local Area Networks (LANs). The 10Base-T standard (also called Twisted Pair Ethernet) uses a twisted-pair cable with maximum lengths of 100 metres. Cables in the 10Base-T system connect with RJ-45 connectors.

T1.413

One of four ADSL modes that the **HM220dp** ADSL modem can operate in. Asymmetric Digital Subscriber Line full rate according to ANSI T1.413 Issue 2 standard, which allows the ADSL line to support up to 8 Mbps downstream and 864 kbps upstream. T1.413 ADSL is used to cooperate with a POTS telephone line and requires that a device called a POTS splitter be installed at the subscriber's or business premises.

TCP

Short for 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 communications protocols used to connect hosts on the Internet. TCP/IP uses several protocols, the two main ones being TCP and IP. TCP/IP is built into the UNIX operating system and is used by the Internet, making it the de facto standard for transmitting data over networks.

Upstream

The direction of an upstream signal is from the user's computer to the headend.

URL

Abbreviation of Uniform Resource Locator, the global address of documents and other resources on the World Wide Web. The first part of the address indicates what protocol to use, and the second part specifies the IP address or the domain name where the resource is located.

USB

Short for Universal Serial Bus, a new external bus standard that supports data transfer rates of 12 Mbps. A single USB port can be used to connect up to 127 peripheral devices, such as mice, modems and keyboards. USB also supports Plug-and-Play installation and hot plugging.

User name

A name used to gain access to a computer system. User names (and often passwords) are required in multiuser systems.

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.

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.

Web browser

A computer program used for accessing the World Wide Web.

World Wide Web

World Wide Web (WWW) is a system of Internet servers that support specially formatted documents. The documents are formatted in a language called HTML (HyperText Markup Language) that support links to other documents, as well as graphics, audio and video files. This means you can jump from one document to another simply by clicking on hyperlinks.