DSL Gateway
HIGH-SPEED INTERNET CONNECTION

User Manual

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CONNECTING PEOPLE

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Nokia M/MW Gateways
M1112, M1122, MW1112,
MW1122, MW1324, MW1352

User Manual
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Contents

1   About this manual

Before using your Nokia M/MW gateway it is important to read the safety instructions. You find them both on paper and in the CD delivered with the gateway.

Also, take time to read this User Manual.

1.1   Purpose of this manual

This manual is designed to help you set up your gateway and also make some basic configurations. The configurations needed depend on your service provider.

For configuration, you can use the gateway's web interface.

If a complete configuration and customisation is desired, the command line interface (CLI) and the CLI commands are to be used.

Note

If your operator/ISP has configured the gateway for you, you need not change the gateway's settings.

In some cases, however, you must change some of the wireless LAN settings.

1.2   Models covered in this manual

This User Manual covers the following Nokia M and MW models:

- M1112, M1122

- MW1112, MW1122

- MW1324, MW1352

For readability, all these models are referred to as "gateway". Similarly, Internet Service Provider is abbreviated as "ISP".

The examples given in this manual represent typical operational situations; the web pages of your gateway may differ from them, depending on the configuration and model of your gateway.

2 Introduction to Nokia M and MW Gateways

Nokia M and MW gateways utilise ADSL/SHDSL technology, providing high-speed Internet connections for home users, small offices and telecommuters.

The highly integrated Nokia MW series gateways can support wireless (WLAN) and Ethernet clients within your local network.

Nokia M series gateways have the same features except that they do not have a WLAN interface.

MW1324 also supports Home Phoneline (HPNA) function. With HomePNA 2.0, home networkers are able to use a wide variety of applications at a higher speed using the existing wiring at home.

Regardless of the LAN interface used for the clients, they all can belong to the same subnet for seamless networking.

Figure 1. Product example: Nokia MW1324 and Nokia C111 Wireless LAN card & antenna (optional)

3 Preparations

You must have all the necessary hardware and software installed before you can access the Internet with your gateway. See the list below.

3.1 What you need to access the Internet

- Correctly configured PC, equipped with 10Base-T Ethernet Card

- Operational DSL line (contact your ISP to make sure that DSL services are available)

- User account provided by your ISP

- Nokia M/MW gateway which is configured according to your ISP's instructions

- All the accessories included in the gateway's sales package

- Web browser (Netscape Navigator, Microsoft Internet Explorer or equivalent)

- MW models only: If you want to use the wireless feature, you must have wireless LAN adapters installed in all the computers which will be used in your wireless network.

- MW1324 only: If you want to utilise the HomePNA feature, you either need a HomePNA adapter or a preconfigured PC.

3.2 Check the contents of the package

Check that the gateway and the items delivered with it are undamaged.

The package contains the following items:

- Gateway

- Wireless LAN card and antenna (MW series only, optional)

- DSL line cable

- 10Base-T Ethernet cable

  In M models, straight through Ethernet cables are used

  In MW models, crossover Ethernet cables are used

- Power cord

- Serial adapter

- User Manual

3.3 Get acquainted with your gateway's indicator lights and connectors

Indicator lights

There are six (MW1324: seven) indicator lights in the front panel: DSL, HPNA (MW1324 only), ETH, COL, WLAN, STA and PWR. STA indicator is red. The other indicators are green.

The indicator lights are located in the gateway's front panel.

Models M1112 and M1122 have four ETH indicator lights (ETH1–ETH4) in the front panel.
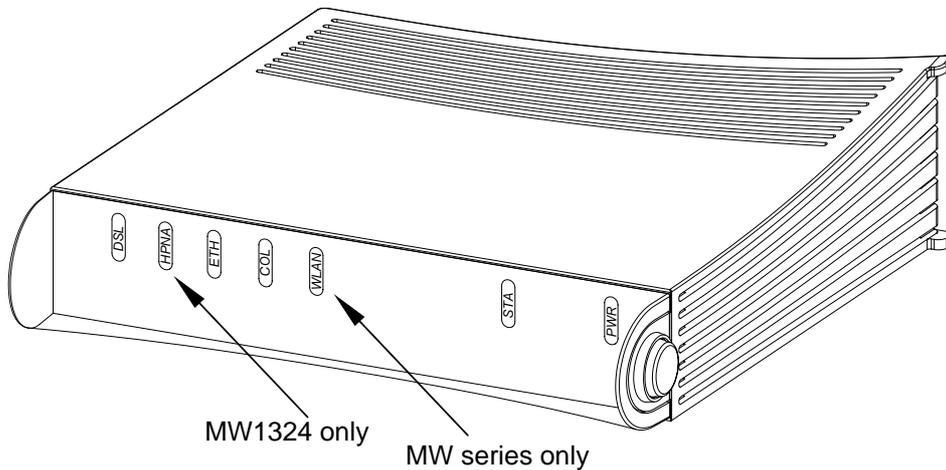
Figure 2.   Front panel indicators

(DSL) GREEN
Off   ADSL/SHDSL link is down.
Blinks   ADSL/SHDSL connection is being established.
On   ADSL/SHDSL link is up.

(HPNA) GREEN (MW1324 only)
Off   No stations detected.
On   Stations detected but no traffic.
Blinks   Traffic detected at HPNA interface.

(ETH) GREEN
Off   Ethernet is down.
On   10Base-T Ethernet is functional.
Blinks   Traffic detected on Ethernet.

(COL) GREEN
Blinks   Collisions on the Ethernet. Note, that it is normal that some
                         collisions occur on the Ethernet.

(WLAN) GREEN (MW series only)
Off   No stations on the WLAN, or WLAN PC Card not inserted.
On   Stations on the WLAN but no traffic.
Blinks   Receives traffic through the WLAN interface.

(STA) RED
Off   OK
On   Hardware malfunction.
Blinks   The gateway is booting.

(PWR) GREEN
Off   Power off.
On   Power on.

Connectors and power switch

The gateway's power switch, mains connector and data connectors are located in
the back panel. For MW models, see figure 3. For M models, see figure 4.

Power switch
Mains connector
Command line interface (CLI)
WLAN (PC card)
Ethernet
DSL
HPNA(MW1324 only)
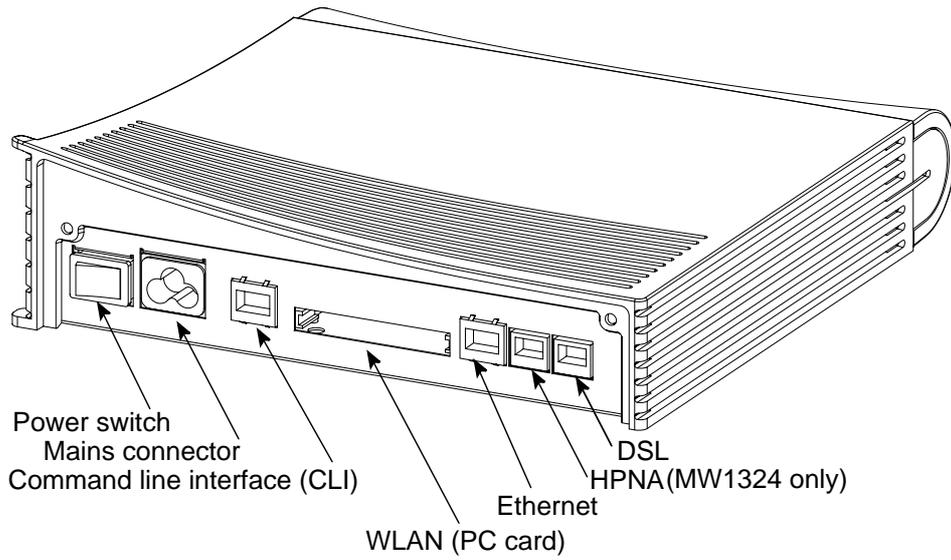
Figure 3.   Back panel, MW models

Power switch
Mains connector
Command line interface (CLI)
Ethernet ports
(ETH-1, ETH-2,
ETH-3, ETH-4)
DSL
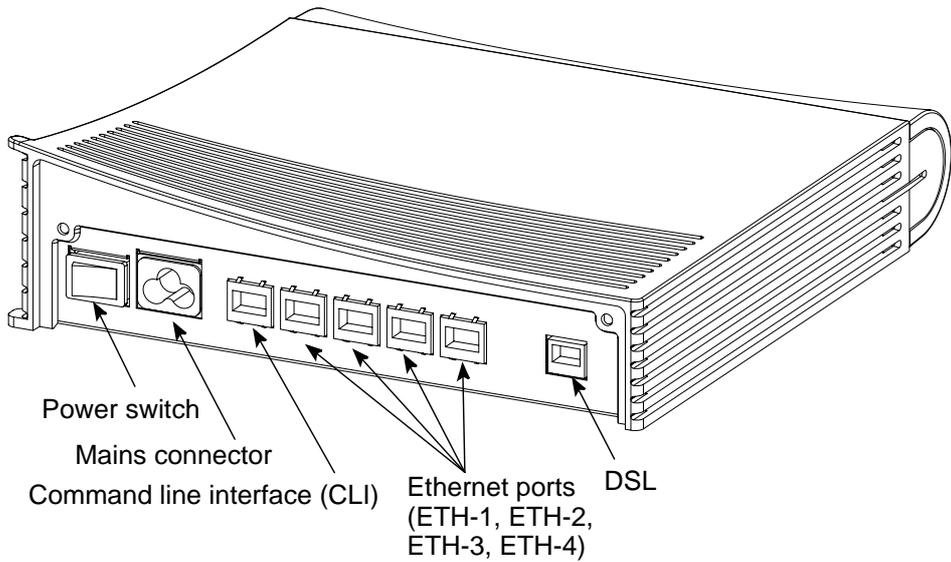
Figure 4.   Back panel, M models

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4 Physical installation

4.1 Placing the gateway on a table or desk
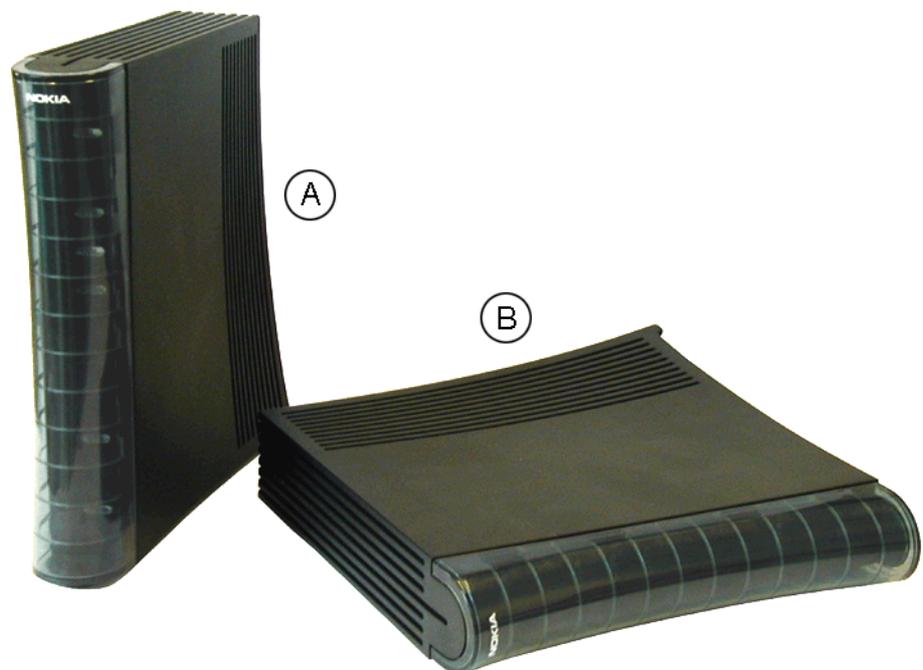
Figure 5.   Placing the gateway in a vertical (A) or horizontal (B) position

4.2 Installing the gateway on a wall

The gateway can also be wall mounted. Figure 6 shows the installation procedure.

Depending on the wall material, you may have to drill holes and use plastic plugs to install the gateway on the wall. Certain wall materials do not require drilled holes or plugs.

⚠️ **WARNING**

Before drilling and/or fixing the screws, make sure that there are no electric cables, phone cables, waterpipes or any other objects at the drilling points inside the wall. Electric cables and telephone cables carry voltages which can cause dangerous electric shocks.

If drilling holes and the use of plugs are required, do the following:

1.   Drill two holes (6 mm in diameter) on the wall. The distance between the holes must be 155 mm.

2.   Insert the plugs into the holes.

3.   Fix the screws.

4.   Mount the gateway on the wall as shown in Figure 6. Make sure the gateway is seated firmly.

If drilling and plugs are not required, do the following:

1.   Fix the screws on the wall. Do not use plugs. The distance between the screws must be 155 mm.

2.   Mount the gateway on the wall as shown in Figure 6. Make sure the gateway is seated firmly.

1.

If drilled holes are needed,
insert these plugs into the holes.

Ø 6 mm

155 mm

2.
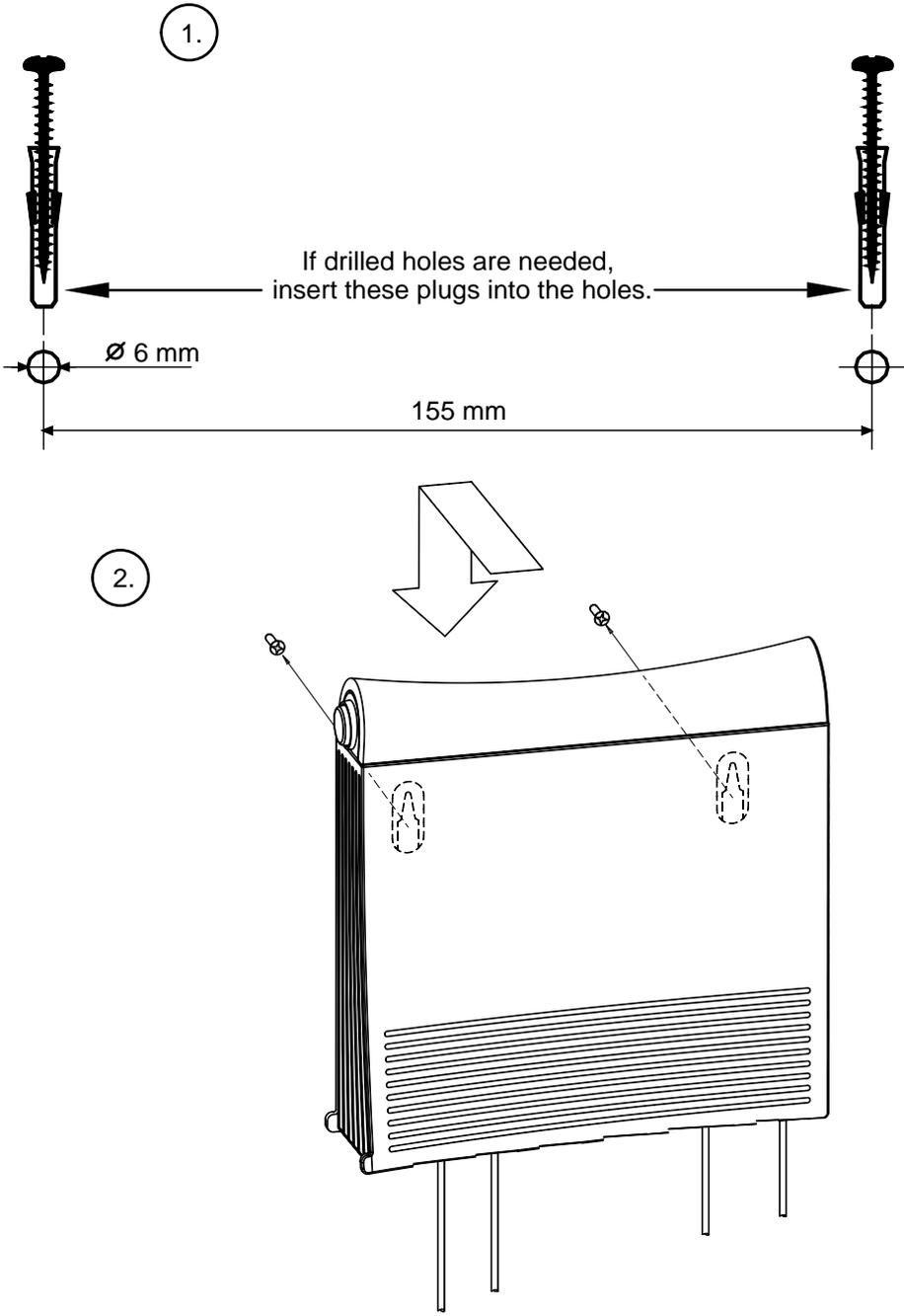
Figure 6.   Wall installation

4.3   Connecting the data cables (and WLAN cards)

⚠️ **WARNING**

Do not connect the gateway's power cord yet!

Note

If you are using WLAN cards, note that the installation procedure described below only covers the physical installation of the WLAN cards.

Before you can use your gateway's wireless feature, you must first install Nokia C110/C111 WLAN card software on your computer. The software and installation guide are delivered with the optional Nokia C110/C111 WLAN card.

Connect the data cables

1. Connect the 8-pin Ethernet cable between the computer's Ethernet card and the gateway's Ethernet connector located in the gateway's back panel.

   Steps 2 and 3 are for MW1324 only.

2. If you use a splitter with your MW1324, connect an additional DSL/HPNA cable (RJ-12) between the HPNA connector of your MW1324 and a phone wall socket after the splitter.

   If you use a microfilter before each phone, you do not need to install the additional DSL/HPNA cable. In such a case, leave the HPNA connector unconnected. (The HPNA signal uses the same cable as ADSL, so no additional cabling is needed.)

3. Connect each PC in your home network to your home phoneline network (without microfilters). Your PC's must be equipped with HPNA network adapters.

4. Connect the 6-pin DSL cable between the gateway's DSL connector and your DSL phone wall socket.

MW models only: connect the WLAN cards

1.   Insert one WLAN card gently into the card slot located in the back panel of the gateway.

2.   Insert the other WLAN card(s) gently into the WLAN card slot(s) of your PC(s).

Connect the gateway's power cable

1.   Plug the gateway's power cord into the mains connector located in gateway's back panel.

2.   Connect the gateway's power cord plug into an earthed wall mains socket.

3.   Switch on the power on your gateway.

Use filters if you want to use telephone and Internet simultaneously

Use in-line filters to block the high-frequency signals (data) from travelling through the phone cord to your telephone, fax or answering machine. DSL and HomePNA use the high bandwidth of your telephone line to transmit and receive data.

Use approved filters only and install them according to the manufacturer's instructions.

4.4   Installing an external WLAN antenna (MW series only)

To obtain a better coverage for your wireless network, you can use external antennas.

With Nokia C111 WLAN card, up to two external antennas can be used.

If you use only one external antenna, connect the external antenna to the right antenna connector of the wireless LAN card. See figure 7.

Install the external antenna on the wall or on the ceiling according to figure 8. For further information, refer to the WLAN card User's Guide.

Connect the external
antenna here
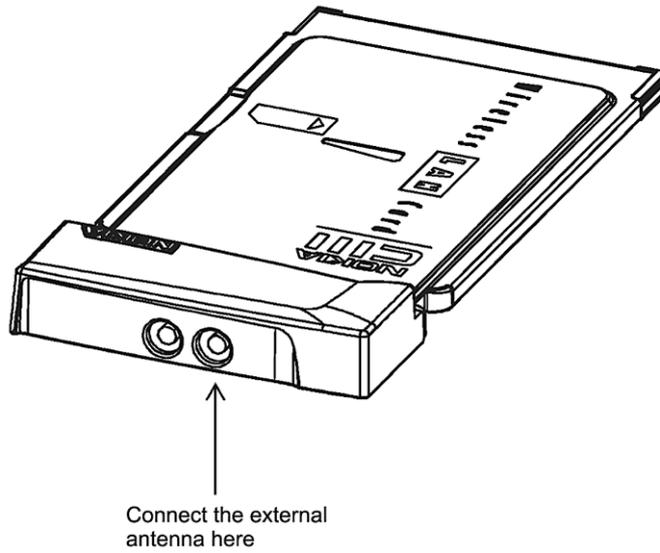
Figure 7.   External antenna connector
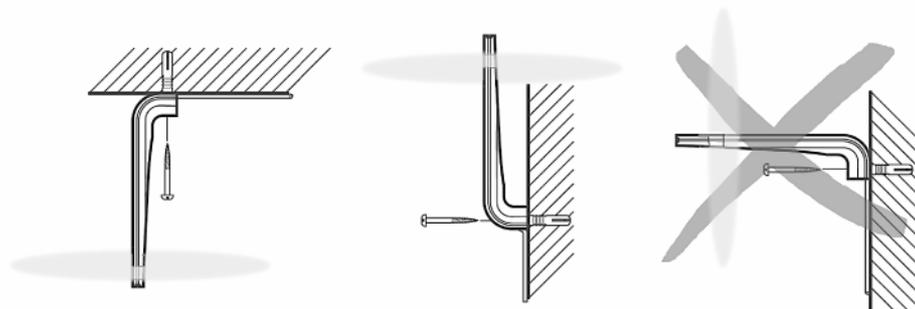
Figure 8.   External antenna installation

5 Configuring your PC(s) and gateway for use

This chapter describes briefly the basic configuration of your PC and gateway so that they can communicate with each other.

You must create a connection between your PC and gateway.

For the connection, you need a browser (Netscape Navigator, Microsoft Internet Explorer or equivalent).

Once a connection between your gateway and PC is established, you have access to the gateway's web page.

After you have made all the necessary configurations for your gateway and PC, you are ready to use the Internet.

Before proceeding, take some time to check that all the cables are properly connected and that your PC is set up properly.

5.1 Finding out the gateway's IP address or name

The gateway has a web interface with which you can configure the gateway and view the gateway's web pages.

First, you have to create a connection between your PC and the gateway.

For this, you need to know either the gateway's IP address or the name assigned to it.

You have two options:

Your ISP has given a fixed IP address for the gateway. Use this address for the browser connection.

or

Your gateway uses Dynamic Host Configuration Protocol (DHCP) and Domain Name Server. In this case the name is *M1112, M1122, MW1112, MW1122, MW1324 or MW1352*, depending on the model.

To find out the IP address, you can also run winipcfg.exe (Windows 95/98/Me) or ipconfig.exe (Windows 2000/NT). See the instructions below.

To find out the IP address in Win95/98/Me

1.   Click **Start**, and then click **Run**.

2.   In the **Open** box, type:

3.   **winipcfg** (IP dialog box opens)

4.   Now the program displays the IP parameters on the screen. Default Gateway is your gateway's IP address. **Use this address for the browser connection**.

To find out the IP address in Windows NT and Windows 2000

1.   Click **Start** , and then click **Run**.

2.   In the Open field, type **cmd**. A DOS box opens.

3.   In the DOS box, type **ipconfig**.

4.   Now the program displays the IP parameters on the screen. The Default Gateway is your gateway's IP address. Use this address for the browser connection.

5.2   Opening a connection to the gateway with a browser

To create a connection, do the following

1.   Open the web browser (Netscape Navigator, Microsoft Internet Explorer or equivalent).

2.   Switch on your gateway. The booting takes a few moments during which some of the gateway's indicator lights blink.

After booting, the PWR and ETH lights should remain lit. If this does not happen, see Chapter 7 Troubleshooting.

3.   Enter the IP address or name of your gateway in the **Address** (Internet Explorer) or **Location/Go to** (Netscape Navigator) field of the browser.

In the example presented in figure 9, Netscape Navigator and the default gateway address, as shown by the ipconfig command, is used.
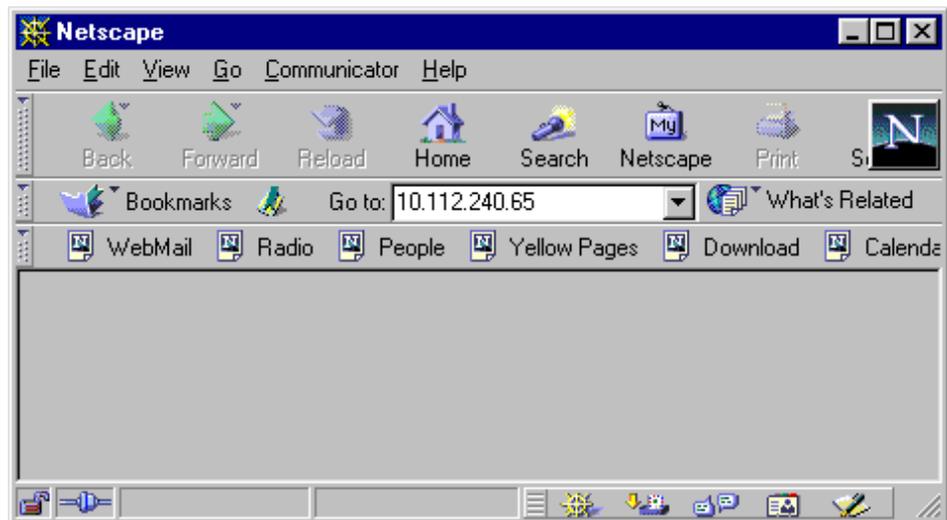
Figure 9.   Opening a connection to the gateway using an IP address

4.   Press Enter on your keyboard.

5.   Enter username and password which were provided by your ISP. If no username/password is required, just click OK to prodeed.

6.   The gateway's Main page appears, see figure 10.

You now have a connection between your PC and the gateway.

If the browser does not find the gateway's Main page, see Chapter 7 Troubleshooting.

Main Page

Figure 10. Main page

5.3   Configuring your computer settings

Usually, all you have to do is make some simple changes in your computer's network settings. You must make these changes according to your ISP's instructions.

6   Basic WLAN configurations (MW models only)

If you are using WLAN, you may have to change some of your wireless network settings.

You find these settings on the Wireless LAN and WLAN Clients web pages presented in figures 11 and 12.

If you have purchased your gateway from a store, you may need to make more configurations. For further information, consult your ISP.

6.1   Changing the wireless LAN settings

On the Wireless LAN page you can change the following settings:

- Network name

- Regulatory domain

- Radio channel

- Transmit power level

You can *activate* the new settings by clicking the **Apply** button.

If you want to *save* the new settings, first go to **Save config** page and click **Save configuration**.
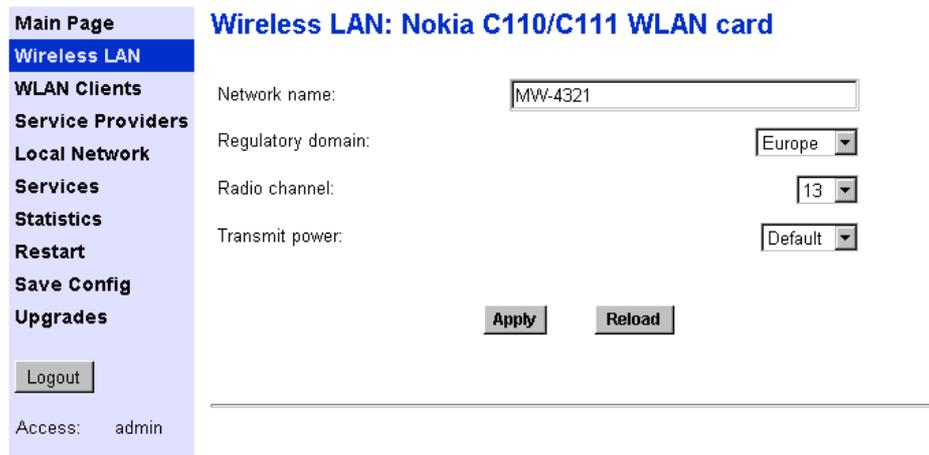
Figure 11.   Wireless LAN page

6.2   Enabling admission control

On the **WLAN Clients** page you can enable access control based on the MAC addresses of the wireless LAN clients (that is the PC's or laptops in your wireless network).

When access control is enabled, only the wireless stations on the client table have access to your wireless network.

To add a client in the client table, do the following:

1.   Choose a name for the wireless client and write it in the **Name** field. (The fields used for adding new clients are located next to the **Add new** button).

2.   Write the client's MAC address in the **MAC address** field. Depending on your Windows version, refer to the instrutions below on how to find out the MAC address(es) of the computer(s) in your wireless network.

3.   Select the encryption key length from the **WEP key length** menu. If you select the key length (that is, your choice is other than "None"), you must also enter the encryption key.

4.   Select the **Client table MAC address** option from the **Admission method** pull-down menu.

5. Select the encryption method you want to use for this client from the **Encryption** pull-down menu. For more information on encryption, refer to section 6.3.

6. Click the **Apply** button.

To find out the MAC address in Win95/98/Me

1. Click **Start**, and then click **Run**.

2. In the **Open** box, type:

3. **winipcfg** (IP dialog box opens)

4. Now the program displays the IP parameters on the screen. The information you need is "Adapter Address". Use this address (called MAC address in your gateway) when creating an access list on **WLAN clients** page.

To find out the MAC address in Windows NT and Windows 2000

1. Click **Start** , and then click **Run**.

2. In the Open field, type **cmd**. A DOS box opens.

3. In the DOS box, type **ipconfig/all**.

4. Now the program displays the IP parameters on the screen. The information you need is Ethernet adapter´s "Physical Address" . Use this address (called MAC address in your gateway) when creating an access list on **WLAN clients** page.

Figure 12. WLAN clients page

6.3   Enabling wireless encryption

On the **WLAN Clients** page you can also:

•   activate Wired Equivalent Privacy (WEP) encryption

•   set the encryption key parameters

It is recommended that you use encryption in your wireless network and use an encryption key.

Ensure that wireless LAN clients (that is, the wireless devices you want to use in your network) have the same configuration as the wireless LAN card in the gateway and that they are in the Infrastructure mode.

When you have set the network name to your wireless client, the wireless connection is established and the WLAN indicator on the gateway's front panel lights up.

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7 Troubleshooting

This chapter informs you how to correct the most common problems you may encounter when using your gateway. If you cannot find a solution to the problem, contact your ISP or the store from which you bought the gateway.

⚠️ **WARNING**

Do not try to repair the gateway yourself. The gateway does not contain any user-serviceable parts. Do not open or remove the gateway covers. There are dangerous voltages inside the gateway.

Problems indicated by the front panel lights

Front panel light	Status	Description	Solution
PWR	Off	Power is off.	1. Switch the power on. 2. Check the power cable.
STA	Solid red	Hardware malfunction	1. Switch the power off. 2. Pull the power cord out of the wall socket. 3. Contact your ISP's help desk. *Note that during startup the red STA indicator blinks. This is normal.*
WLAN (MW models only)	Off	No active WLAN clients (PC's, laptops etc.) in range	1. Check the WLAN card instructions of the gateway and of the client. 2. Bring your WLAN client closer to your gateway. 3. Check your WLAN client installation and settings (radio channel, network name, etc.). See the WLAN client's user manual for further assistance.

Front panel light	Status	Description	Solution
ETH	Off	No Ethernet connection	1. Check that the computer is operating. 2. Check the Ethernet cable. Use the Ethernet cable provided in the package. If you have purchased the cable yourself, check that the cable type is correct: - M series: straight through type - MW series: crossover type
HPNA (MW1324 only)	Off	No stations detected	1. Check that the computer is operating. 2. Check the HPNA cabling.
DSL	Off	DSL link is down	It takes 1 to 10 minutes for the DSL line to become operative. If the DSL indicator light is off after this period, contact your ISP's help desk.

Appendix A. Technical specifications

A.1   Technical specifications

Features	
ADSL (MW1122, MW1324)	
Physical layer	ANSI T1.413 Issue 2 (ANSI ADSL), ITU-T G.992.1 (ITU-T ADSL), ITU-T G.992.2 (G.lite), and ITU-T G.994.1 (Handshake) compatible
ADSL (M1112, MW1112)	
Physical layer	ETSI TS 101 388 compatible
ADSL line connector(all models)	RJ-12
ATM over ADSL (all models except MW1352)	
ATM connections	PVC, up to 8 virtual circuits for data
Service categories	UBR
Encapsulations	RFC2684 ETH-LLC, RFC2684 IP-LLC, RFC2364 PPP-VC, RFC2364 TUNNELLED-PPP-VC, RFC2516 PPPoE-LLC
SHDSL (MW1352 only)	
Physical layer	ITU-T G.991.2 (ITU-T SHDSL)
SHDSL line connector	RJ-12
ATM over SHDSL (MW1352 only)	
ATM connections	PVC, up to 8 virtual circuits
Service categories	UBR
Encapsulations	RFC2684 ETH-LLC, RFC2684 IP-LLC, RFC2364 PPP-VC, RFC2364 TUNNELED-PPP-VC, PPPoE-LLC
Ethernet interface	
Ethernet	10Base-T, half duplex
Encapsulation	DIXv2 (transmit), IEEE 802.3 and DIXv2 (receive)
Ethernet connectors	RJ-45
HomePNA 2.0 interface (MW1324 only)	
HPNA	Half duplex, 4 - 16 Mbit/s
Modes	HPNA 1.0, 1.1 and 2.0 specifications data rates up to 16 Mbit/s

Encapsulation	Ethernet compatible
Connector	RJ-12
Wireless LAN interface (MW models only)	
Wireless LAN	IEEE 802.11b DSSS
Data connector	PC Card slot type 2
Routing	
Routing protocols	RIPv1, RIPv2, and static routes
Other	NAPT, IGMP proxy, DHCP server, DHCP relay, DHCP client, DNS relay, PPTP local tunnelling, PPPoE client
Class of Service	Weighted fair queueing
Firewall	Stateful inspection firewall
Bridging	
Bridging	Self-learning bridge, bridges between all interfaces. Possibility to disable bridging between WAN interfaces.
MAC table	1024 entries
Class of Service	Weighted fair queueing
Command line interface (CLI) for local management	
Physical layer	Electrically RS-232, TxD, RxD and GND signals
Data format	Asynchronous, 8+no parity + 1 stop bit (8-N-1)
Bit rate	9600 bps
Flow control	None
CLI connector	RJ-45
Dedicated ATM management channel	
Service categories	UBR
Encapsulations	RFC2684 ETH-LLC, RFC2684 IP-LLC, RFC2364 PPP-VC
IP addressing	Statically configured Through IPCP when PPP over ATM is used
Routing	Static routes RIPv1, RIPv2
Management protocols	Telnet/TCP/IP for command line interface, TFTP/UDP/IP for software and configuration download, HTTP/web server
Management through payload	
Management protocols	Telnet/TCP/IP for command line interface, TFTP/UDP/IP for software and configuration download, HTTP/web server

Indicator lights	
DSL	ADSL line status
HPNA (MW1324 only)	HomePNA activity and status
ETH	Ethernet activity and status
COL	Ethernet collision
WLAN	WLAN activity and status
STA	M/MW startup
PWR	Power on
Mechanical construction and power supply	
Width	255 mm
Height	65 mm
Depth	230 mm
Weight	1 kg
Mains connection	
Voltage	100 Vrms-240 Vrms AC (nominal values)
Frequency	50/60 Hz
Power consumption	10 W
Ambient confitions, EMC and safety	
Operating temperature	5 to 45°C
Humidity	10% to 90%, non-condensing
EMC	
M/MW complies with the following specifications provided that the device is connected to an earthed socket outlet.	
Emission	EN55022: 1998 class B
Immunity	EN55024: 1998
EMC	EN300286–2: 1997, FCC part 15 class B
Overvoltage	ITU-T K.21, FCC PART 68
Safety	
Safety	EN 60950, UL 1950, 3rd edition

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Glossary

Abbreviations

ADSL	Asymmetric Digital Subscriber Line
ANSI	American National Standards Institute
ATM	Asynchronous Transfer Mode
CHAP	Challenge Handshake Authentication Protocol
CLI	Command Line Interface
COL	Collision
CoS	Class of Service
DHCP	Dynamic Host Configuration Protocol
DNS	Domain Name Server
DNS	Domain Name System
DSL	Digital Subscriber Line
EMC	Electromagnetic Compatibility
ETH	Ethernet
ETSI	European Telecommunications Standards Institute
FCC	Federal Communications Commission
FTP	File Transfer Protocol
HPNA	Home Phone Line Network Alliance
HTTP	HyperText Transfer Protocol
ICMP	Internet Control Message Protocol
IGMP	Internet Group Management Protocol
IP	Internet Protocol
IPCP	Internet Protocol Control Protocol
ISDN	Integrated Services Digital Network
ISP	Internet Service Provider

ITU-T	International Telecommunication Union - Telecommunication Standardization Sector
LAN	Local Area Network
LLC	Logical Link Control
MAC	Media Access Control
NAPT	Network Address and Port Translation
PAP	Password Authentication Protocol
PPP	Point-to-Point Protocol
PPPoE	PPP over Ethernet
PPTP	Point-to-Point Tunnelling Protocol
PVC	Permanent Virtual Circuit
PWR	Power
RFC	Request For Comments
RIP	Routing Information Protocol
SHDSL	Single pair High bit rate Digital Subscriber Line
SIF	Stateful Inspection Firewall
SNMP	Simple Network Management Protocol
STA	Status
TCP	Transmission Control Protocol
TC-PAM	Trellis Coded Pulse Amplitude Modulation.
TFTP	Trivial File Transfer Protocol
UBR	Unspecified Bit Rate
UDP	User Datagram Protocol
VCC	Virtual Channel Connection
VPN	Virtual Private Network
WAN	Wide Area Network

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WEP	Wired Equivalent Privacy
WFQ	Weighted Fair Queueing
WLAN	Wireless Local Area Network
WWW	World Wide Web

Terms

10Base-T	10 Mbit/s Ethernet LAN specification using two pairs of twisted cabling. 10Base-T is a part of the IEEE 802.3 specification.
Authentication	Determining the identity of a user that is attempting to access a network.
Asymmetric digital subscriber line, ADSL	High-speed transmission technology using existing copper telephone lines. Data is transmitted in general from a server to a user.
Bridge	Device or software that transmits data from a source network to a destination network. These two networks normally use the same protocol.
Broadcast	Transmitting data to everyone on the network. Rf. multicast.
Command line interface, CLI	Character-based man-machine interface for configuring a device.
Digital subscriber line, xDSL	Generic abbreviation for various different DSL types. For example ADSL, HDSL, SDSL, and VDSL.
Domain name server, DNS	Server used on the Internet for translating names of network nodes into IP addresses. A name server lets users access networks nodes by name instead of having to remember IP address numbers.
Domain name system, DNS	System containing domain name servers.
Encapsulation	Method for using multiple protocols within the same network. This is done by enclosing a data unit of one protocol into a data unit of another protocol.
Encryption	For data security, transforming data into an unreadable form to prevent any but the intended receiver from reading it.
Encryption key	Character or bit sequence which is used for encryption, decryption or authentication of data.
Ethernet	Local area network that connects devices like computers, printers, and terminals. Ethernet operates over twisted-pair or coaxial cable.
Gateway	Device or software in an information network which links two networks that use differents communications protocols.

HomePNA, HPNA	Technology for the home network based on Ethernet and using existing phone lines. Voice and data travel on the same wires without interfering with each other.
IP address	Numerical identification individualising a device connected to the Internet or a network. For example 192.168.1.2.
Local area network, LAN	Data transmission network covering a small area, for example a flat or a house. Usually based on Ethernet technology.
MAC address	Unique fixed address of a piece of hardware, normally set at the time of manufacture and used in LAN protocols.
Multicast	Transmitting data to a select group of recipients at the same time, for example sending an e-mail message to a mailing list. Rf. broadcast.
Network address port translation, NAPT	Method by which IP addresses and translating transport identifiers (for example TCP and UDP port numbers, ICMP query identifiers) are mapped from one address realm to another, providing transparent routing to end hosts.
Packet Internet Groper, ping	Program used to test whether a particular network destination is accessible, by sending an ICMP (Internet control message protocol) echo request and waiting for a response. Ping is used primarily to troubleshoot Internet connections.
Ping	See Packet Internet Groper.
Proxy server	Server which retrieves information from the Internet and stores the information that users frequently use to speed up the retrieval. For example, in using the web the proxy server speeds up the downloading of those web pages located behind slow or congested network connections.
Request for comments, RFC	Document series which describes the Internet suite of protocols and related experiments.
Router	Device or software which transmits data from a source network to a destination network in accordance with an address.
Single pair high bit rate digital subscriber line, SHDSL	High-speed transmission technology using existing copper telephone lines.
Stateful inspection firewall, SIF	Firewall which provides access control at the network layer by inspecting the contents of incoming packets and accepting or rejecting them depending upon their content.
Subnet mask	Numerical indentification used to determine what subnetwork an IP address belongs to, for example 255.255.255.0.
Tunnelling	Technique to improve the rate, reliability, and security of transmission in a network by creating for transmission a permanent connection, called tunnel, which is often secured by encryption.

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Unspecified bit rate, UBR	Quality of service QoS where there are no guarantees in terms of data loss rate and delay. UBR is very efficient, but not used for critical data.
Vbridge	Gateway/bridge management interface used as a bridge host interface or gateway interface depending on the operation mode On the gateway's web pages, the VBRIDGE is called gateway or bridge IP interface.
Virtual private network, VPN	Network which is constructed by using a public information network and which uses encryption. The terminal equipment can be situated all over the world but they function as if they were connected to a local area network LAN.
Weighted fair queueing, WFQ	Traffic management technique which controls transmission bandwidth allocation determined by the bandwidth needed for the traffic flow.
Wide area network, WAN	Data communications network that serves users across a broad geographic area.
Wi-Fi, Wireless Fidelity	Wireless LAN standard (IEEE 802.11b) developed to maximise multi-vendor interoperability as well as to introduce a variety of performance improvements and benefits to the wireless networking technology.
Wired equivalent privacy, WEP	Security protocol used to provide data security by encrypting data over radio waves. The WEP is defined in IEEE 802.11 standard and it is designed to provide the same level of security as that of a wired LAN.
Wireless LAN Card, Nokia C111	Card which enables to wirelessly connect compatible laptop computers, hand-held devices, desktop PCs, and other devices with a type II or II PC card slot to a wired local area network through an access point.
Wireless local area network, WLAN	Local area network using wireless connections as transmission path.
WLAN clients	The wireless devices (for example PC's and laptops) inside your wireless network.