



DSL-224

**Wireless N300 VDSL2 Router with
ADSL2+/Ethernet WAN Support**

Contents

Chapter 1. Introduction	4
Contents and Audience	4
Conventions	4
Document Structure	4
Chapter 2. Overview	5
General Information	5
Specifications	6
Product Appearance	10
Upper Panel	10
Back and Bottom Panels	11
Delivery Package	12
Chapter 3. Installation and Connection	13
Before You Begin	13
Connecting to PC	14
PC with Ethernet Adapter	14
Obtaining IP Address Automatically (OS Windows 7)	15
Obtaining IP Address Automatically (OS Windows 10)	20
PC with Wi-Fi Adapter	24
Obtaining IP Address Automatically and Connecting to Wireless Network (OS Windows 7)	25
Obtaining IP Address Automatically and Connecting to Wireless Network (OS Windows 10)	28
Connecting to Web-based Interface	31
Web-based Interface Structure	33
Summary Page	33
Home Page	35
Menu Sections	36
Notifications	37
Chapter 4. Configuring via Web-based Interface	38
Initial Configuration Wizard	38
Selecting Operation Mode	40
Configuring LAN Port as WAN Port	42
Creating WAN Connection	43
<i>Static IPv4 or IPoA Connection</i>	44
<i>Static IPv6 Connection</i>	45
<i>PPPoE, PPPoA, IPv6 PPPoE, PPPoE Dual Stack Connections</i>	46
Configuring Wireless Network	47
Configuring LAN Ports for IPTV/VoIP	48
Changing Web-based Interface Password	50
Connection of Multimedia Devices	52
Statistics	56
Network Statistics	56
DHCP	57
Routing Table	58
Clients and Session	59
Multicast Groups	60
DSL Status	61

Connections Setup	62
WAN.....	62
<i>Creating Dynamic IPv4, Static IPv4, or IPoA WAN Connection</i>	64
<i>Creating Dynamic IPv6 or Static IPv6 WAN Connection</i>	71
<i>Creating PPPoE or PPPoA WAN Connection</i>	78
<i>Creating PPPoE IPv6 or PPPoE Dual Stack WAN Connection</i>	86
<i>Creating Bridge WAN Connection</i>	93
LAN.....	99
IPv4.....	99
IPv6.....	104
Wi-Fi	107
Basic Settings.....	107
Client Management.....	115
WPS.....	116
<i>Using WPS Function via Web-based Interface</i>	118
<i>Using WPS Function without Web-based Interface</i>	119
WMM.....	120
Additional.....	123
MAC Filter.....	126
Roaming.....	128
Advanced	130
Interface Grouping.....	131
WAN Remapping.....	133
DNS.....	134
DDNS.....	136
Routing.....	138
TR-069 Client.....	140
UPnP IGD.....	142
xDSL.....	143
IGMP.....	144
ALG/Passthrough.....	145
Firewall	147
IP Filter.....	147
Virtual Servers.....	151
DMZ.....	154
MAC Filter.....	155
URL Filter.....	157
Remote Access.....	158
System	160
Configuration.....	161
Firmware Update.....	163
<i>Local Update</i>	164
<i>Remote Update</i>	165
Log.....	166
Ping.....	168
Traceroute.....	170
Telnet.....	172
System Time.....	173
Chapter 5. Operation Guidelines	175
Safety Rules and Conditions	175
Wireless Installation Considerations	176
Chapter 6. Abbreviations and Acronyms	177

CHAPTER 1. INTRODUCTION

Contents and Audience

This manual describes the router DSL-224 and explains how to configure and operate it.

This manual is intended for users familiar with basic networking concepts, who create an in-home local area network, and system administrators, who install and configure networks in offices.

Conventions

Example	Description
text	The body text of the manual.
<i>Before You Begin</i>	A reference to a chapter or section of this manual.
<i>“Quick Installation Guide”</i>	A reference to a document.
Change	A name of a menu, menu item, control (field, checkbox, drop-down list, button, etc.).
192.168.1.1	Data that you should enter in the specified field.
 <u>Information</u>	An important note.

Document Structure

Chapter 1 describes the purpose and structure of the document.

Chapter 2 gives an overview of the router's hardware and software features and describes its appearance and the package contents.

Chapter 3 explains how to install the wireless router DSL-224 and configure a PC in order to access its web-based interface.

Chapter 4 describes all pages of the web-based interface in detail.

Chapter 5 includes safety instructions and tips for networking.

Chapter 6 introduces abbreviations and acronyms most commonly used in User Manuals for D-Link customer premises equipment.

CHAPTER 2. OVERVIEW

General Information

DSL-224 is an affordable high-end VDSL/ADSL router with Wi-Fi and built-in switch.

The router is equipped with a DSL port to connect to a high-speed VDSL line and 4 Ethernet ports to connect workstations. Due to this feature, DSL-224 represents a moderate-priced solution for creating wired networks without an additional switch. In addition, any Ethernet port of the device can be used to connect to a private Ethernet line.

DSL-224 can operate as a base station for connecting wireless devices of the standards 802.11b, 802.11g, and 802.11n. The router supports multiple functions for the wireless interface: several security standards (WEP, WPA/WPA2), MAC address filtering, WPS, WMM.

In addition, the device is equipped with a button for switching the Wi-Fi network off/on. If needed, for example, when you leave home, you can easily switch the router's WLAN by pressing the button, and devices connected to the LAN ports of the router will stay online.

Smart adjustment of Wi-Fi clients is useful for networks based on several D-Link access points or routers – when the smart adjustment function is configured on each of them, a client always connects to the access point (router) with the highest signal level.

Support of guest Wi-Fi network allows you to create a separate wireless network with individual security settings and maximum rate limitation. Devices connected to the guest network will be able to access the Internet, but will be isolated from the devices and resources of the router's LAN.

The wireless router DSL-224 includes a built-in firewall. The advanced security functions minimize threats of hacker attacks, prevent unwanted intrusions to your network, and block access to unwanted websites for users of your LAN.

You can configure the settings of the wireless router DSL-224 via the user-friendly web-based interface (the interface is available in several languages).

The fast and easy configuration wizard allows you to specify all needed parameters in several simple steps.

Also DSL-224 supports configuration and management via mobile application for Android and iPhone smartphones.

You can simply update the firmware: the router itself finds approved firmware on D-Link update server and notifies when ready to install it.

Specifications*

Hardware	
Processor	<ul style="list-style-type: none"> · RTL8685S (500MHz)
RAM	<ul style="list-style-type: none"> · 32MB, DDR2 SDRAM
Flash	<ul style="list-style-type: none"> · 8MB, SPI
Interfaces	<ul style="list-style-type: none"> · RJ-11 DSL port · 4 10/100BASE-TX LAN ports
LEDs	<ul style="list-style-type: none"> · Power · Internet · DSL · 4 LAN LEDs · WLAN · WPS
Buttons	<ul style="list-style-type: none"> · POWER button to power on/power off · RESET button to restore factory default settings · WPS button to set up wireless connection · WIFI button to enable/disable wireless network
Antenna	<ul style="list-style-type: none"> · Two external non-detachable omnidirectional antennas (5dBi gain)
MIMO	<ul style="list-style-type: none"> · 2 x 2
Power connector	<ul style="list-style-type: none"> · Power input connector (DC)

DSL Parameters	
VDSL/ADSL Standards	<ul style="list-style-type: none"> · VDSL2: ITU G.993.2, support of 8a, 8b, 8c, 8d, 12a, 12b, 17a, 30a profiles · ADSL: Multi-mode, ANSI T1.413 Issue 2, ITU-T G.992.1 (G.dmt) Annex A, ITU-T G.992.2 (G.lite) Annex A, ITU-T G.994.1 (G.hs) · ADSL2: ITU-T G.992.3 (G.dmt.bis) Annex A/L/M, ITU-T G.992.4 (G.lite.bis) Annex A · ADSL2+: ITU-T G.992.5 Annex A/L/M
ATM/PPP Protocols	<ul style="list-style-type: none"> · Bridged and routed Ethernet encapsulation · VC-based or LLC-based multiplexing · ATM Forum UNI3.1/4.0 PVC (up to 8 PVCs) · ATM Adaptation Layer Type 5 (AAL5) · ITU-T I.610 OAM F4/F5 loopback · ATM QoS · PPP over ATM (RFC 2364) · PPP over Ethernet (PPPoE) · Keep-alive for PPP connections

* The device features are subject to change without notice. For the latest versions of the firmware and relevant documentation, visit www.dlink.ru.

Software	
WAN connection types	<ul style="list-style-type: none"> · PPPoA · PPPoE · IPv6 PPPoE · PPPoE Dual Stack · IPoA · Static IPv4 / Dynamic IPv4 · Static IPv6 / Dynamic IPv6 · Bridge
Network functions	<ul style="list-style-type: none"> · DHCP server/relay · Advanced configuration of built-in DHCP server · Stateful/Stateless mode for IPv6 address assignment, IPv6 prefix delegation · DNS relay · Dynamic DNS · Static IPv4/IPv6 routing · IGMP Proxy · IGMP snooping · RIP · Support of UPnP IGD · Support of VLAN · WAN ping respond · Support of SIP ALG · Support of RTSP · LAN/WAN conversion
Firewall functions	<ul style="list-style-type: none"> · Network Address Translation (NAT) · Stateful Packet Inspection (SPI) · IPv4/IPv6 filter · MAC filter · URL filter · DMZ · Virtual servers
VPN	<ul style="list-style-type: none"> · IPsec/PPTP/L2TP/PPPoE pass-through
QoS	<ul style="list-style-type: none"> · Interface grouping · VLAN priority (802.1p)
Management and monitoring	<ul style="list-style-type: none"> · Local and remote access to settings through TELNET/WEB (HTTP/HTTPS) · Multilingual web-based interface for configuration and management · Support of D-Link Assistant application for Android and iPhone smartphones · Firmware update via web-based interface · Automatic notification on new firmware version · Saving/restoring configuration to/from file · Support of logging to remote host · Automatic synchronization of system time with NTP server and manual time/date setup · Ping utility · Traceroute utility · TR-069 client

Wireless Module Parameters	
Standards	<ul style="list-style-type: none"> · IEEE 802.11b/g/n

Wireless Module Parameters	
Frequency range <i>The frequency range depends upon the radio frequency regulations applied in your country</i>	<ul style="list-style-type: none"> · 2400 ~ 2483.5MHz
Wireless connection security	<ul style="list-style-type: none"> · WEP · WPA/WPA2 (Personal/Enterprise) · MAC filter · WPS (PBC/PIN)
Advanced functions	<ul style="list-style-type: none"> · WMM (Wi-Fi QoS) · Information on connected Wi-Fi clients · Advanced settings · Smart adjustment of Wi-Fi clients · Guest Wi-Fi / support of MBSSID · Limitation of wireless network rate · Periodic scan of channels, automatic switch to least loaded channel · Autonegotiation of channel bandwidth in accordance with environment conditions (20/40 Coexistence)
Wireless connection rate	<ul style="list-style-type: none"> · IEEE 802.11b: 1, 2, 5.5, and 11Mbps · IEEE 802.11g: 6, 9, 12, 18, 24, 36, 48, and 54Mbps · IEEE 802.11n: from 6.5 to 300Mbps (from MCS0 to MCS15)
Transmitter output power <i>The maximum value of the transmitter output power depends upon the radio frequency regulations applied in your country</i>	<ul style="list-style-type: none"> · 802.11b 15dBm (+/-1dB) · 802.11g 14dBm (+/-1dB) · 802.11n 14dBm (+/-1dB)
Receiver sensitivity	<ul style="list-style-type: none"> · 802.11b -86dBm · 802.11g -72dBm · 802.11n HT20 -67dBm HT40 -65dBm
Modulation schemes	<ul style="list-style-type: none"> · 802.11b: CCK (11, 5.5Mbps), DQPSK (2Mbps), DBPSK (1Mbps), DSSS · 802.11g: PSK/CCK, DBPSK, DQPSK, OFDM, BPSK, QPSK, 16QAM, 64QAM · 802.11n: PSK/CCK, DBPSK, DQPSK, OFDM, etc.

Physical Parameters	
Dimensions (L x W x H)	<ul style="list-style-type: none"> · 205 x 139 x 32 mm (8 x 5.5 x 1.3 in)
Weight	<ul style="list-style-type: none"> · 260 g (0.6 lb)

Operating Environment	
Power	<ul style="list-style-type: none"> · Output: 12V DC, 1A

Temperature	<ul style="list-style-type: none">· Operating: from 0 to 40 °C· Storage: from -20 to 70 °C
Humidity	<ul style="list-style-type: none">· From 5% to 95% (non-condensing)

Product Appearance

Upper Panel

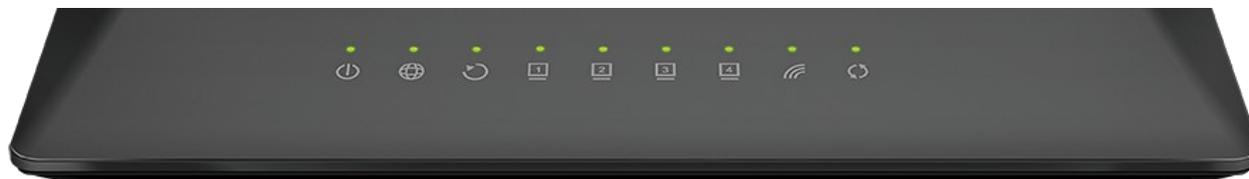


Figure 1. Upper panel view.

LED	Mode	Description
Power	<i>Solid green</i>	The router is powered on.
	<i>No light</i>	The router is powered off.
Internet	<i>Solid green</i>	The default WAN connection is on.
	<i>Solid red</i>	The router is in the crash recovery mode.
	<i>No light</i>	<ul style="list-style-type: none"> The default WAN connection is off, or there are no WAN connections created.
DSL	<i>Solid green</i>	DSL has been synchronized.
	<i>Blinking green</i>	Detecting a carrier signal and synchronizing DSL.
	<i>No light</i>	No carrier signal.
LAN 1-4	<i>Solid green</i>	A device is connected to the port of the router (for the LAN port configured as the WAN port: the router is connected to an Ethernet line).
	<i>Blinking green</i>	Data transfer through the relevant LAN port.
	<i>No light</i>	The cable is not connected to the relevant port.
WLAN	<i>Solid green</i>	A client has connected to the WLAN.
	<i>Blinking green</i>	The router's WLAN is on.
	<i>No light</i>	The router's WLAN is off.
WPS	<i>Blinking green</i>	Attempting to add a wireless device via the WPS function.
	<i>No light</i>	The WPS function is not in use.

Back and Bottom Panels



Figure 2. Back panel view.

Port	Description
DSL	A DSL port to connect the router to the telephone line.
LAN 1-4	4 Ethernet ports to connect Ethernet devices.
WIFI	A button to enable/disable wireless network. To disable the router's wireless network: with the device turned on, press the button and release. The WLAN LED should turn off.
WPS	A button to set up a wireless connection (the WPS function). To use the WPS function: with the device turned on, press the button and immediately release it. The WPS LED should start blinking.
POWER	A button to turn the router on/off.

Also, the power connector is located on the back panel of the router.

The **RESET** button located on the bottom panel of the router is designed to restore the factory default settings. To restore the factory defaults, push the button (with the device turned on), hold it for 10 seconds, and then release the button.

The device is also equipped with two external non-detachable Wi-Fi antennas.

Delivery Package

The following should be included:

- Router DSL-224
- Power adapter DC 12V/1A
- RJ-11 telephone cable
- Ethernet cable
- Splitter
- “***Quick Installation Guide***” (brochure).

The “***User Manual***” and “***Quick Installation Guide***” documents are available on D-Link website (see www.dlink.ru).

- Using a power supply with a different voltage rating than the one included will cause damage and void the warranty for this product.

CHAPTER 3. INSTALLATION AND CONNECTION

Before You Begin

Please, read this manual prior to installing the device. Make sure that you have all the necessary information and equipment.

Computer or Mobile Device

Configuration of the VDSL/ADSL router DSL-224 with Wi-Fi and built-in switch (hereinafter referred to as “the router”) is performed via the built-in web-based interface. The web-based interface is available from any operating system that supports a web browser.

Also you can use D-Link Assistant application for Android or iPhone mobile devices (smartphones or tablets).

PC Web Browser

The following web browsers are recommended:

- Apple Safari 8 and later
- Google Chrome 48 and later
- Microsoft Internet Explorer 10 and later
- Microsoft Edge 20.10240 and later
- Mozilla Firefox 44 and later
- Opera 35 and later.

For successful operation, JavaScript should be enabled on the web browser. Make sure that JavaScript has not been disabled by other software (such as virus protection or web user security packages) running on your computer.

Wired or Wireless NIC (Ethernet or Wi-Fi Adapter)

Any computer that uses the router should be equipped with an Ethernet or Wi-Fi adapter (NIC). If your computer is not equipped with such a device, install an Ethernet or Wi-Fi adapter prior to using the router.

Wireless Connection

Wireless workstations from your network should be equipped with a wireless 802.11b, g, or n NIC (Wi-Fi adapter). In addition, you should specify the values of SSID, channel number and security settings defined in the web-based interface of the router for all these wireless workstations.

Connecting to PC

PC with Ethernet Adapter

1. Connect an Ethernet cable between any of LAN ports located on the back panel of the router and the Ethernet port of your PC.
2. **To connect the device to a DSL line:** Connect a phone cable between the DSL port of the router and the **MODEM** port of the splitter. Connect your phone to the **PHONE** port of the splitter. Then connect another phone cable between a phone jack and the **LINE** port of the splitter.
3. **To connect the device to an Ethernet line:** Please connect the router to the ISP's Ethernet line only after setting the WAN port and creating the Internet connection (see the **Initial Configuration Wizard** section, page 38).
4. Connect the power cord to the power connector port on the back panel of the router, then plug the power adapter into an electrical outlet or power strip.
5. Turn on the router by pressing the **POWER** button on the back panel.

Then make sure that your PC is configured to obtain an IP address automatically (as DHCP client).

Obtaining IP Address Automatically (OS Windows 7)

1. Click the **Start** button and proceed to the **Control Panel** window.
2. Select the **Network and Sharing Center** section. (If the Control Panel has the category view (the **Category** value is selected from the **View by** drop-down list in the top right corner of the window), choose the **View network status and tasks** line under the **Network and Internet** section.)

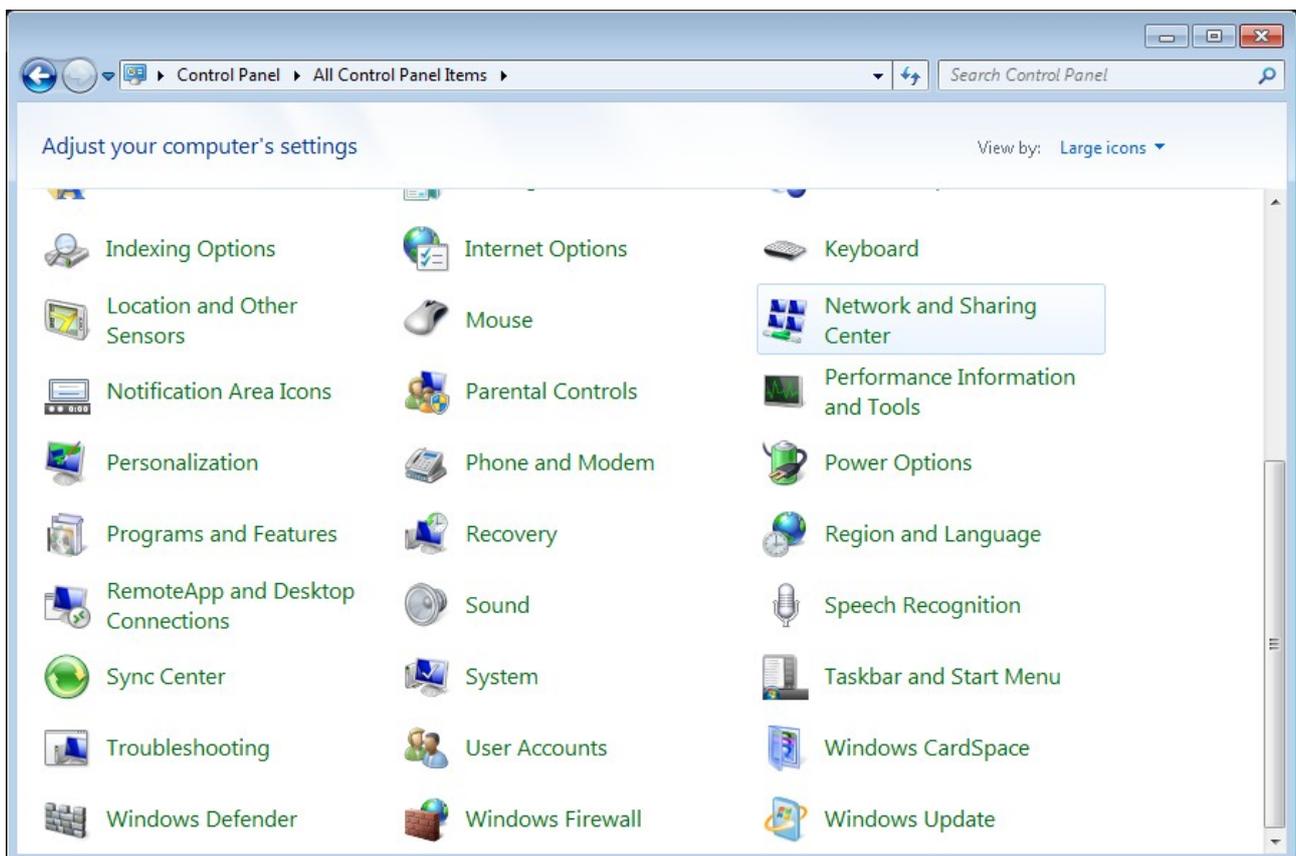


Figure 3. The **Control Panel** window.

3. In the menu located on the left part of the window, select the **Change adapter settings** line.

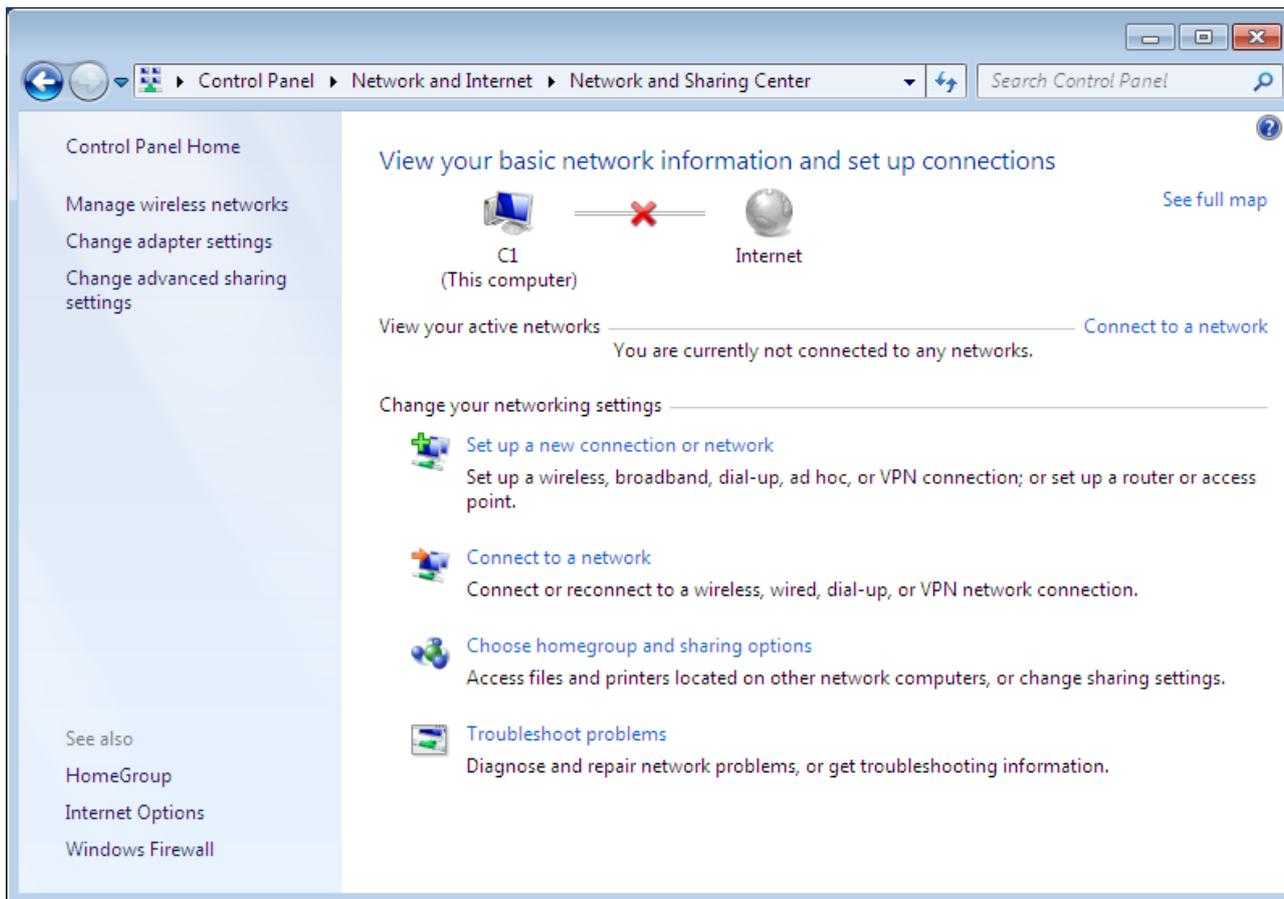


Figure 4. The **Network and Sharing Center** window.

4. In the opened window, right-click the relevant **Local Area Connection** icon and select the **Properties** line in the menu displayed.

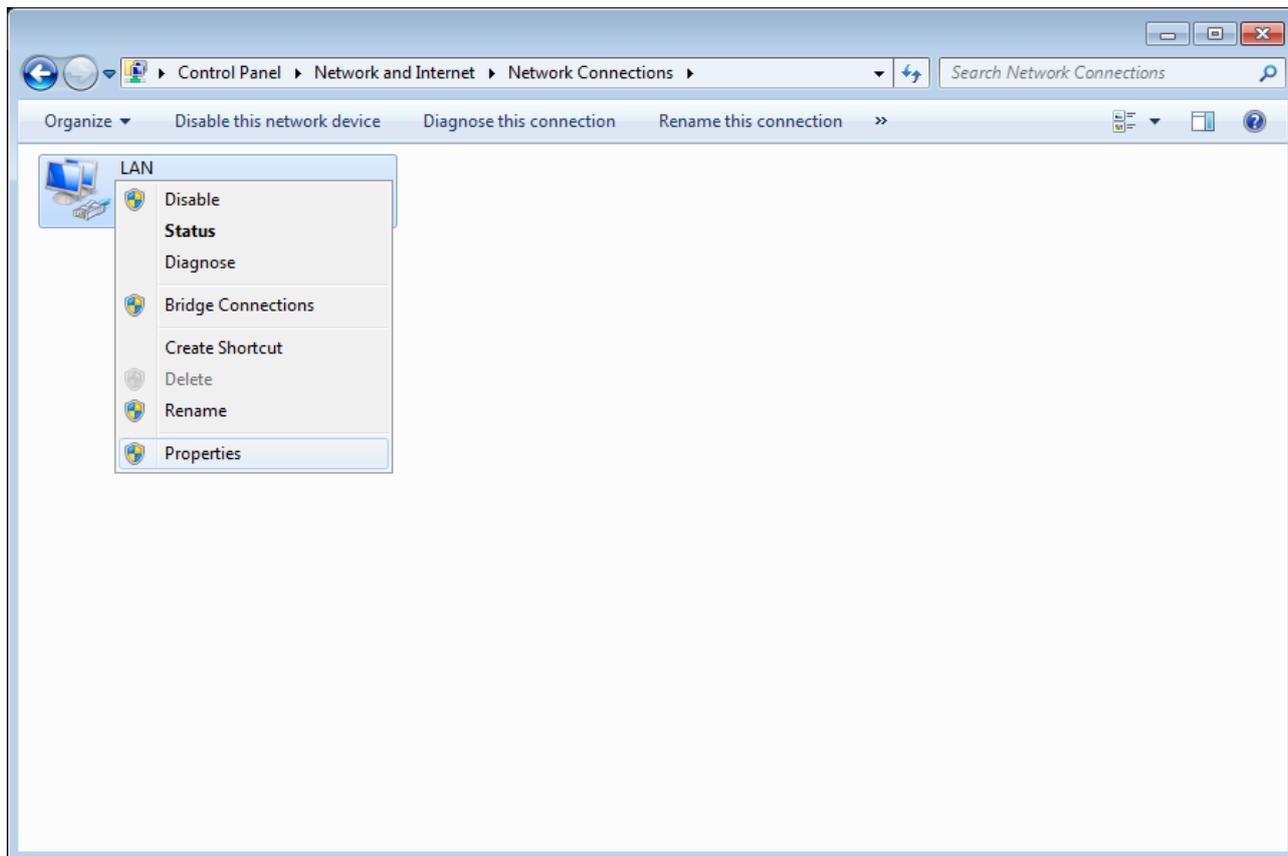


Figure 5. The **Network Connections** window.

5. In the **Local Area Connection Properties** window, on the **Networking** tab, select the **Internet Protocol Version 4 (TCP/IPv4)** line. Click the **Properties** button.

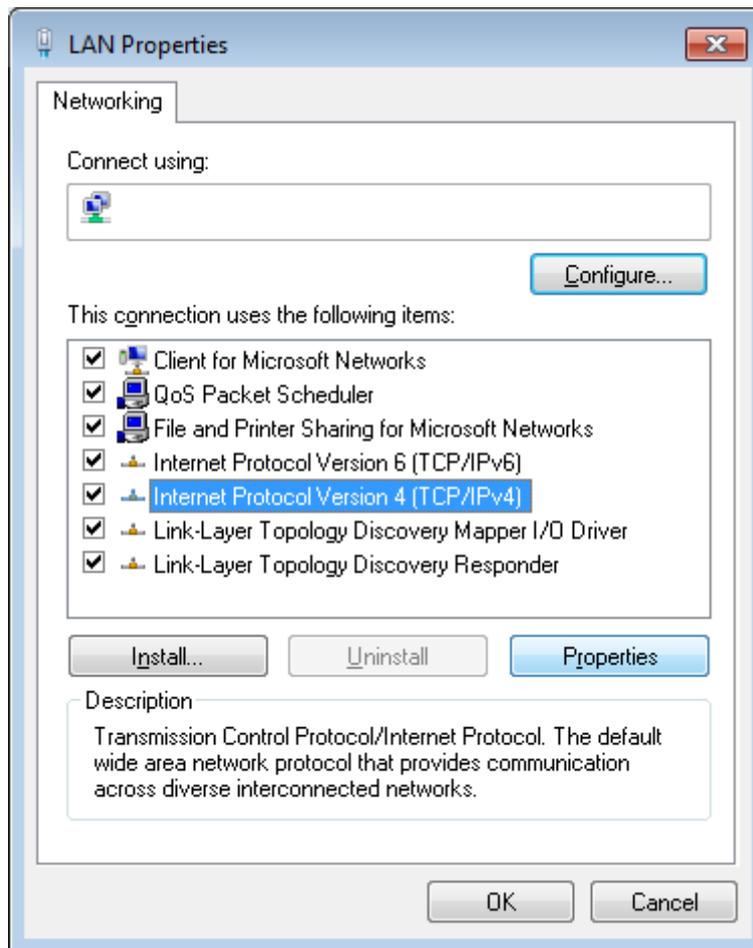


Figure 6. The **Local Area Connection Properties** window.

6. Make sure that the **Obtain an IP address automatically** and **Obtain DNS server address automatically** choices of the radio buttons are selected. Click the **OK** button.

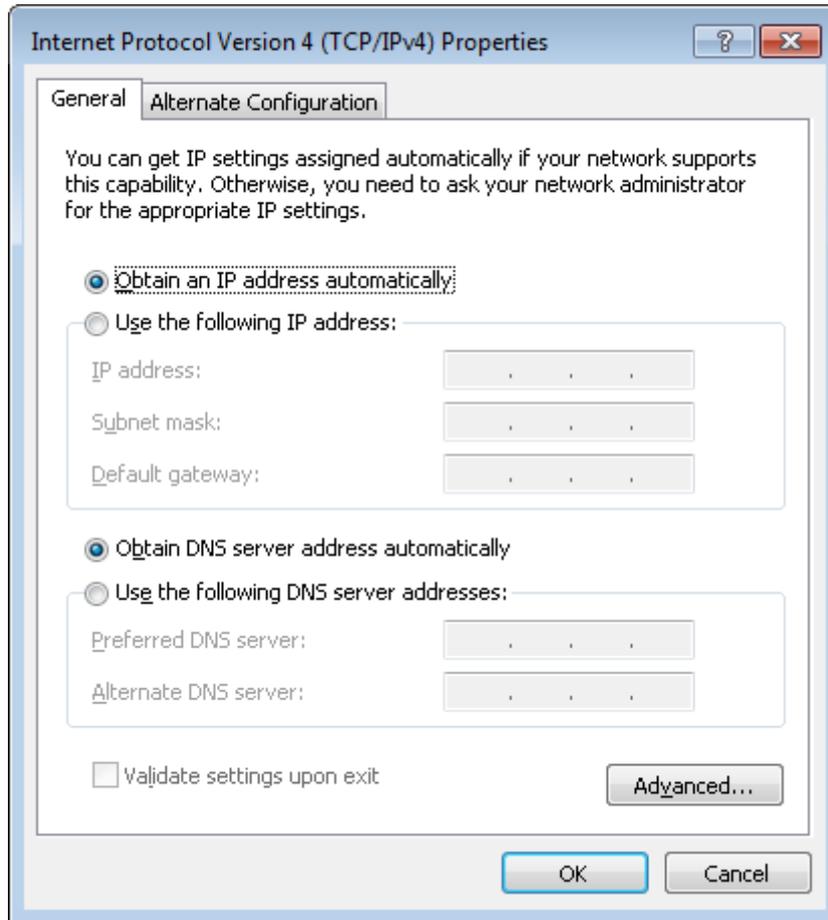


Figure 7. The **Internet Protocol Version 4 (TCP/IPv4) Properties** window.

7. Click the **OK** button in the connection properties window.

Obtaining IP Address Automatically (OS Windows 10)

1. Click the **Start** button and proceed to the **Settings** window.
2. Select the **Network & Internet** section.

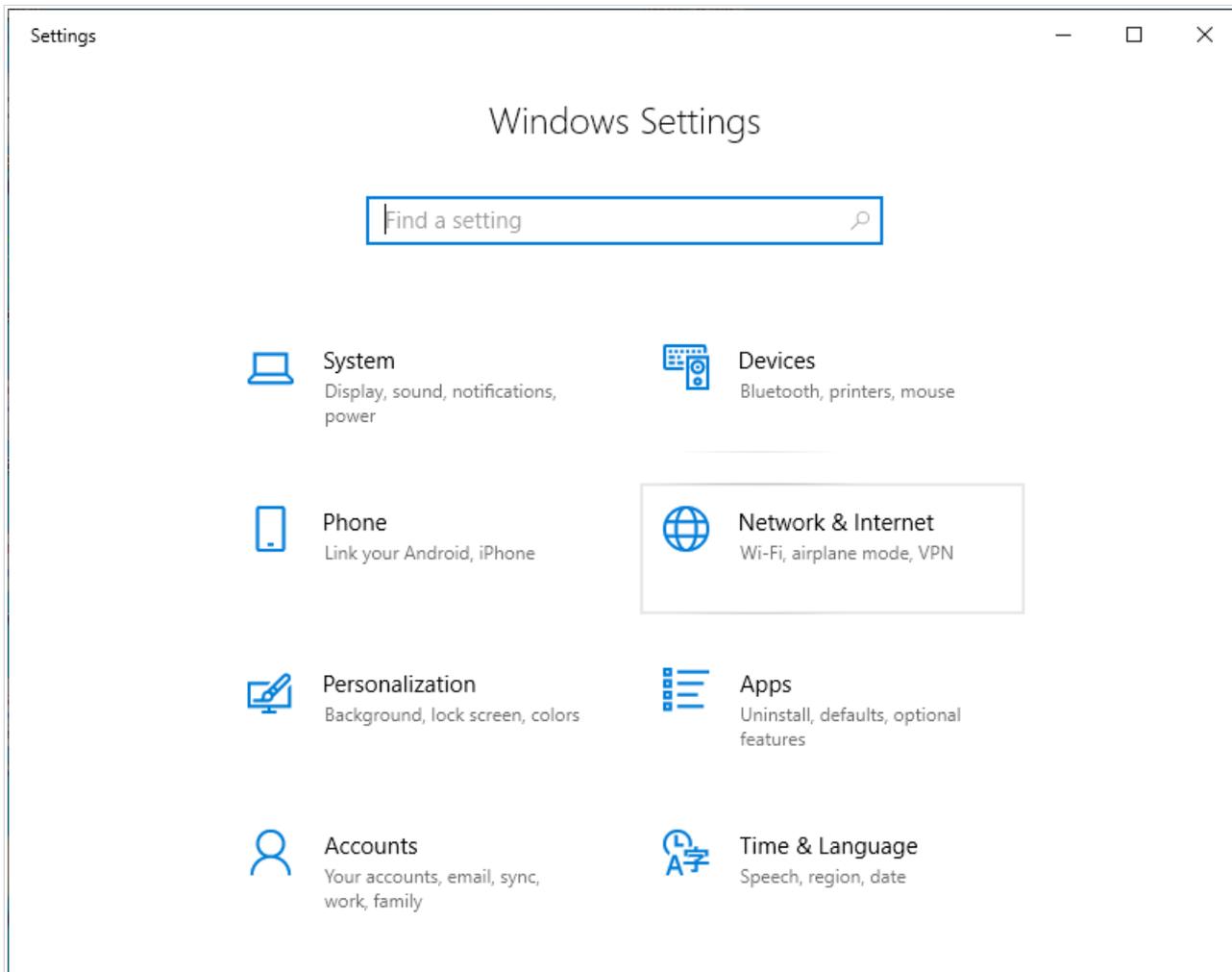


Figure 8. The **Windows Settings** window.

3. In the **Change your network settings** section, select the **Change adapter options** line.

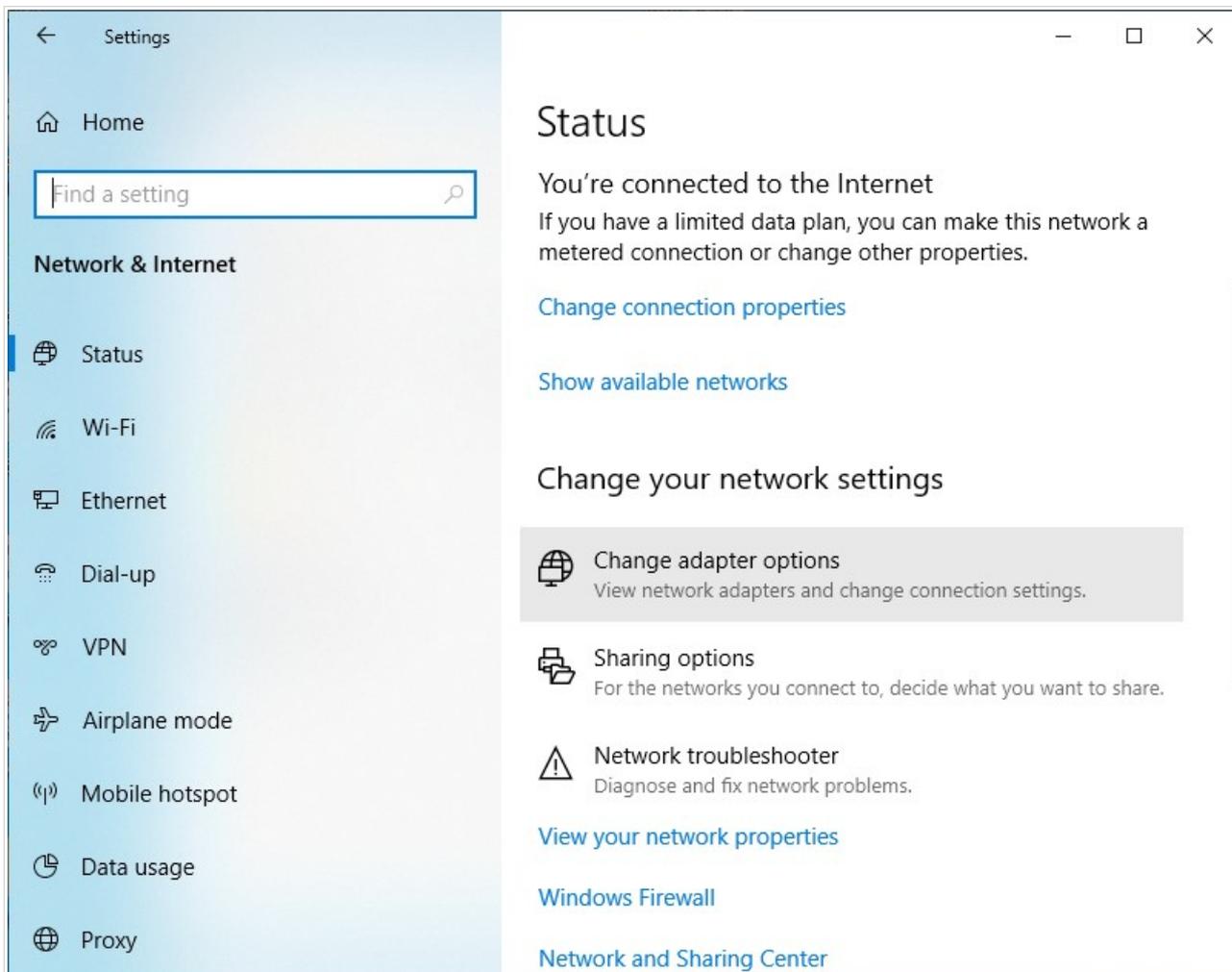


Figure 9. The **Network & Internet** window.

4. In the opened window, right-click the relevant **Local Area Connection** icon and select the **Properties** line in the menu displayed.

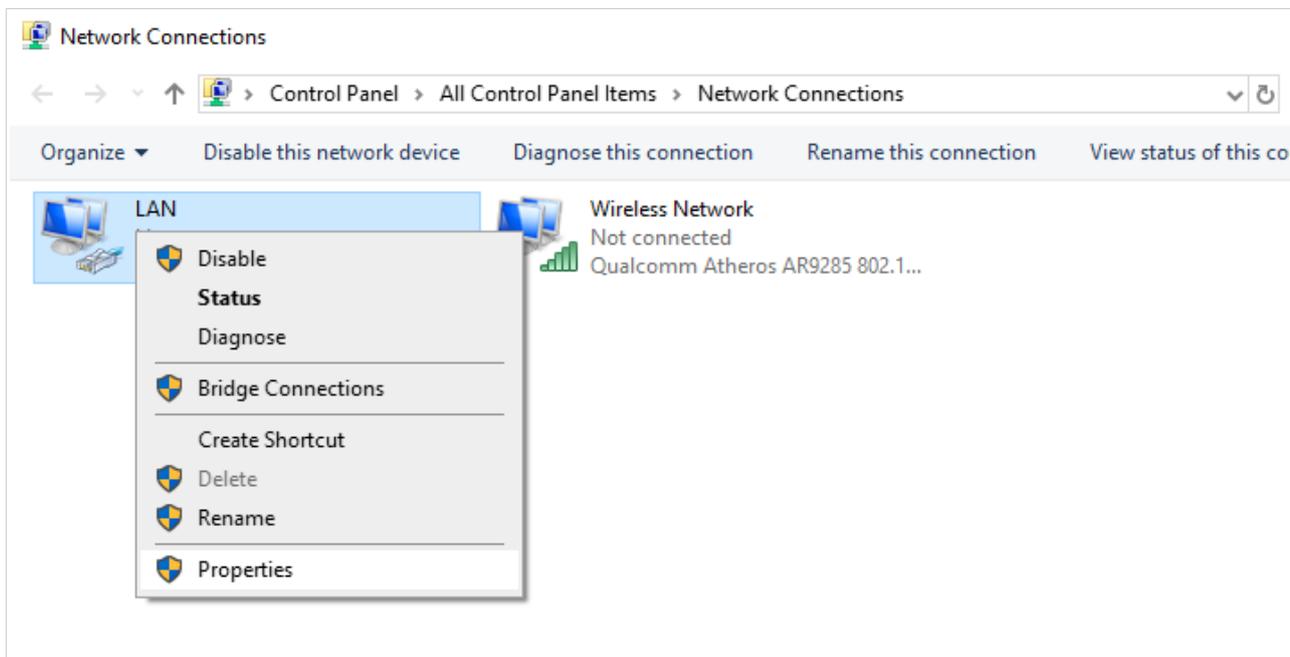


Figure 10. The **Network Connections** window.

5. In the **Local Area Connection Properties** window, on the **Networking** tab, select the **Internet Protocol Version 4 (TCP/IPv4)** line. Click the **Properties** button.

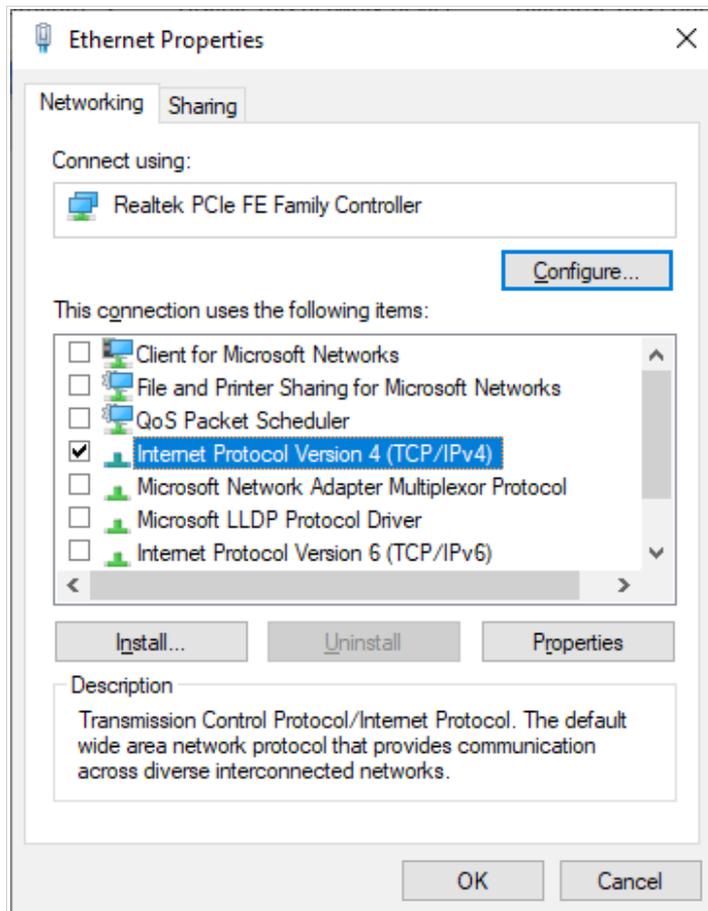


Figure 11. The local area connection properties window.

6. Make sure that the **Obtain an IP address automatically** and **Obtain DNS server address automatically** choices of the radio buttons are selected. Click the **OK** button.

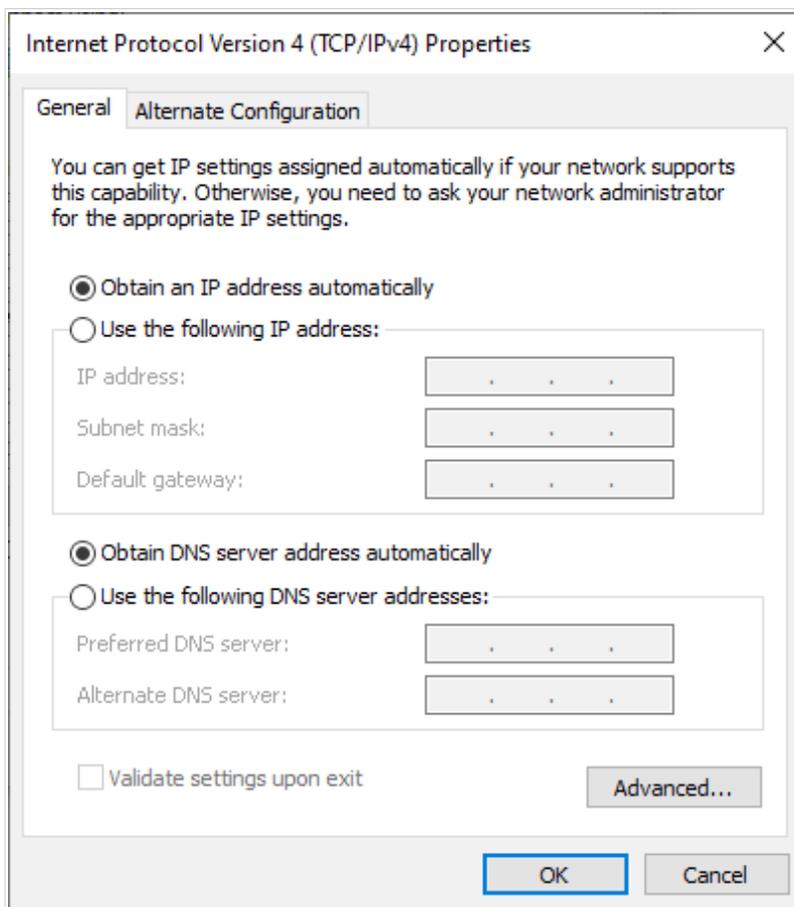


Figure 12. The **Internet Protocol Version 4 (TCP/IPv4) Properties** window.

7. Click the **Close** button in the connection properties window.

PC with Wi-Fi Adapter

1. **To connect the device to a DSL line:** Connect a phone cable between the DSL port of the router and the **MODEM** port of the splitter. Connect your phone to the **PHONE** port of the splitter. Then connect another phone cable between a phone jack and the **LINE** port of the splitter.
2. **To connect the device to an Ethernet line:** Please connect the router to the ISP's Ethernet line only after setting the WAN port and creating the Internet connection (see the *Initial Configuration Wizard* section, page 38).
3. Connect the power cord to the power connector port on the back panel of the router, then plug the power adapter into an electrical outlet or power strip.
4. Turn on the router by pressing the **POWER** button on its back panel.
5. Make sure that your Wi-Fi adapter is on. As a rule, modern notebooks with built-in wireless NICs are equipped with a button or switch that turns on/off the wireless adapter (refer to your PC documents). If your PC is equipped with a pluggable wireless NIC, install the software provided with your Wi-Fi adapter.

Then make sure that your Wi-Fi adapter is configured to obtain an IP address automatically (as DHCP client).

Obtaining IP Address Automatically and Connecting to Wireless Network (OS Windows 7)

1. Click the **Start** button and proceed to the **Control Panel** window.
2. Select the **Network and Sharing Center** section. (If the Control Panel has the category view (the **Category** value is selected from the **View by** drop-down list in the top right corner of the window), choose the **View network status and tasks** line under the **Network and Internet** section.)

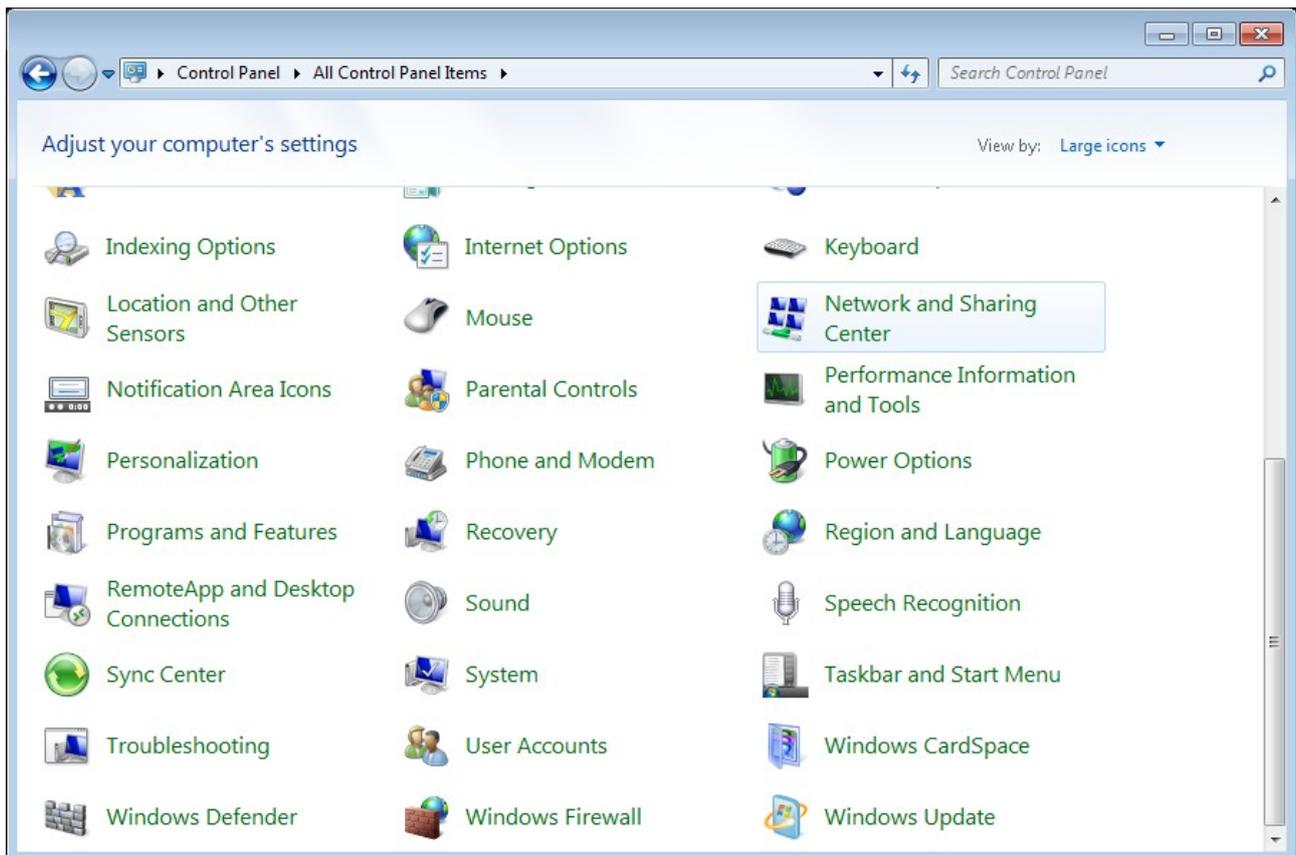


Figure 13. The **Control Panel** window.

3. In the menu located on the left part of the window, select the **Change adapter settings** line.
4. In the opened window, right-click the relevant **Wireless Network Connection** icon. Make sure that your Wi-Fi adapter is on, then select the **Properties** line in the menu displayed.
5. In the **Wireless Network Connection Properties** window, on the **Networking** tab, select the **Internet Protocol Version 4 (TCP/IPv4)** line. Click the **Properties** button.

6. Make sure that the **Obtain an IP address automatically** and **Obtain DNS server address automatically** choices of the radio buttons are selected. Click the **OK** button.

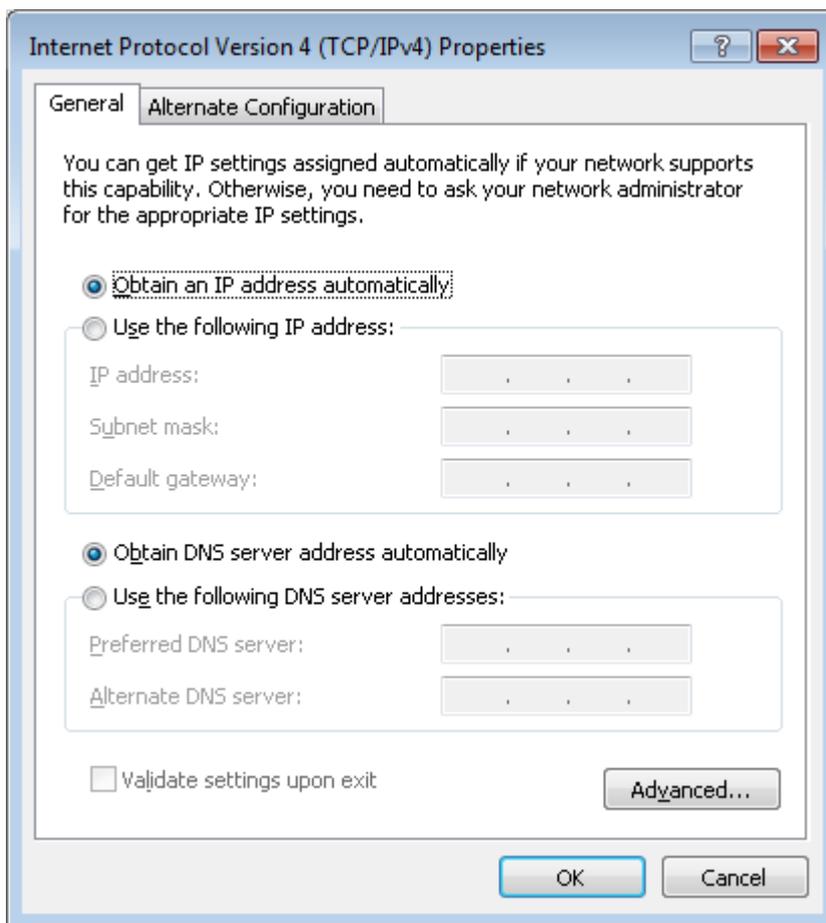


Figure 14. The **Internet Protocol Version 4 (TCP/IPv4) Properties** window.

7. Click the **OK** button in the connection properties window.
8. To open the list of available wireless networks, select the icon of the wireless network connection and click the **Connect To** button or left-click the network icon in the notification area located on the right side of the taskbar.



Figure 15. The notification area of the taskbar.

- In the opened window, in the list of available wireless networks, select the wireless network **DSL-224** and click the **Connect** button.

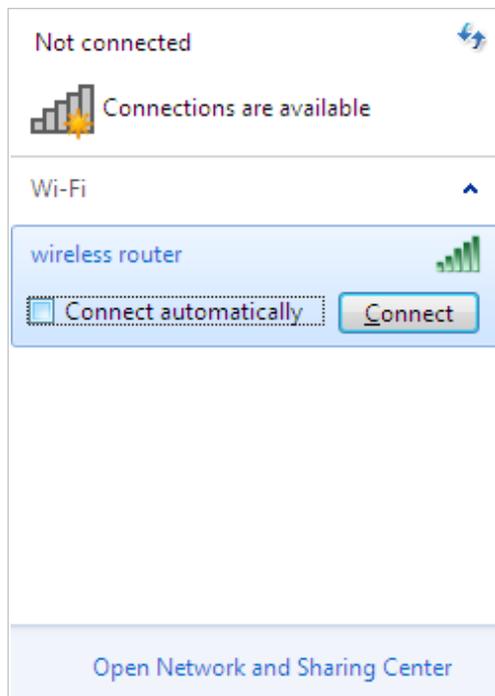


Figure 16. The list of available networks.

- In the opened window, enter the network key (see WPS PIN on the barcode label on the bottom panel of the device) in the **Security key** field and click the **OK** button.
- Wait for about 20-30 seconds. After the connection is established, the network icon will be displayed as the signal level scale.

! If you perform initial configuration of the router via Wi-Fi connection, note that immediately after changing the wireless default settings of the router you will need to reconfigure the wireless connection using the newly specified settings.

Obtaining IP Address Automatically and Connecting to Wireless Network (OS Windows 10)

1. Click the **Start** button and proceed to the **Settings** window.
2. Select the **Network & Internet** section.

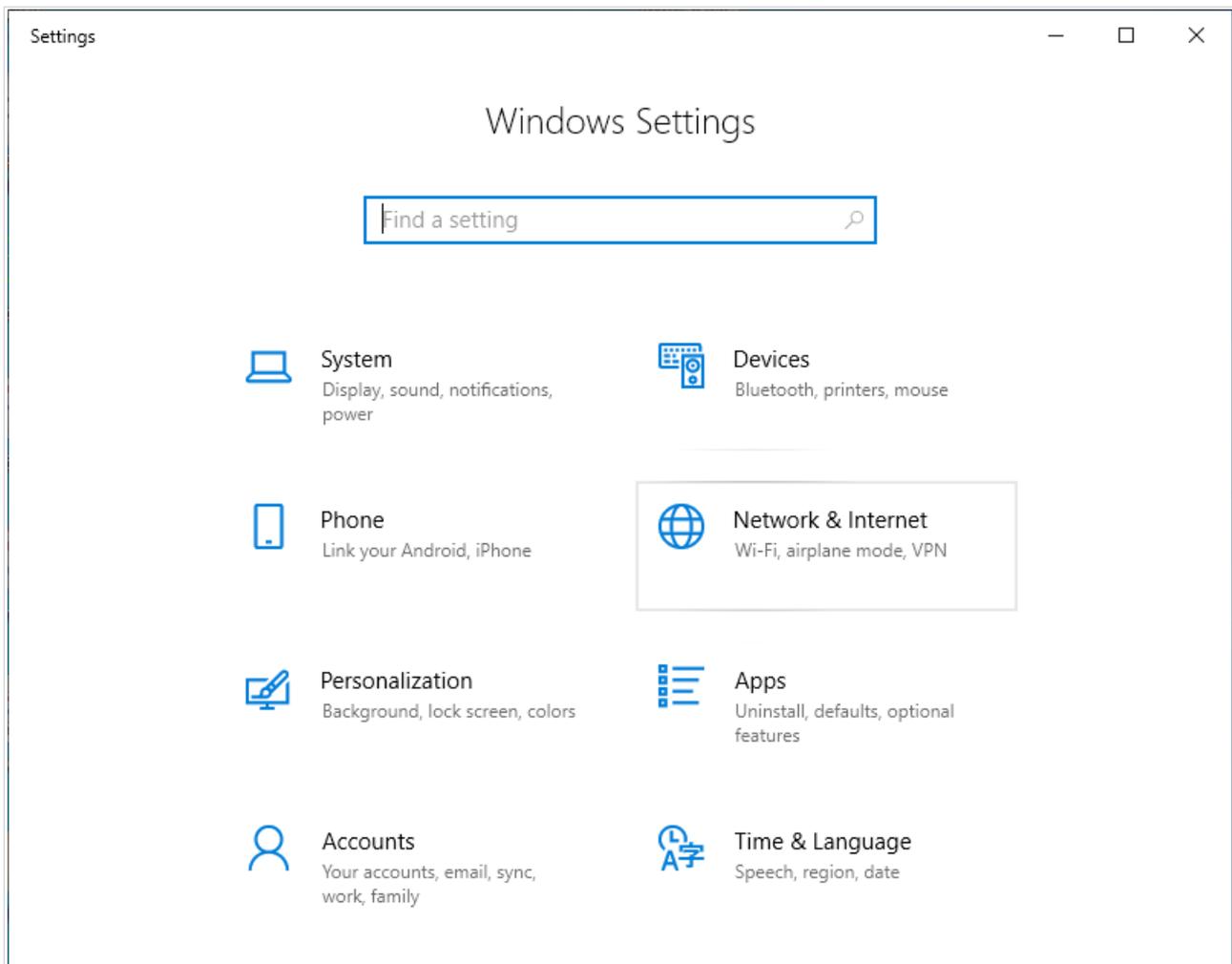


Figure 17. The **Windows Settings** window.

3. In the **Change your network settings** section, select the **Change adapter options** line.
4. In the opened window, right-click the relevant **Wireless Network Connection** icon. Make sure that your Wi-Fi adapter is on, then select the **Properties** line in the menu displayed.
5. In the **Wireless Network Connection Properties** window, on the **Networking** tab, select the **Internet Protocol Version 4 (TCP/IPv4)** line. Click the **Properties** button.

6. Make sure that the **Obtain an IP address automatically** and **Obtain DNS server address automatically** choices of the radio buttons are selected. Click the **OK** button.

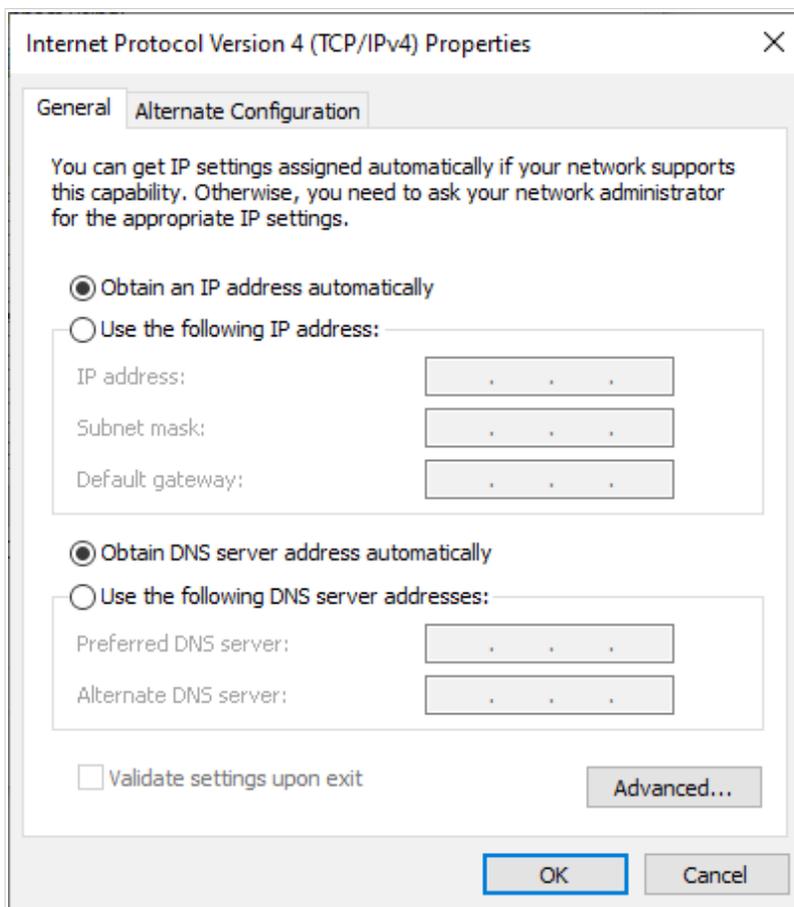


Figure 18. The **Internet Protocol Version 4 (TCP/IPv4) Properties** window.

7. Click the **Close** button in the connection properties window.
8. To open the list of available wireless networks, select the icon of the wireless network connection and click the **Connect To** button or left-click the network icon in the notification area located on the right side of the taskbar.



Figure 19. The notification area of the taskbar.

- In the opened window, in the list of available wireless networks, select the wireless network **DSL-224** and click the **Connect** button.

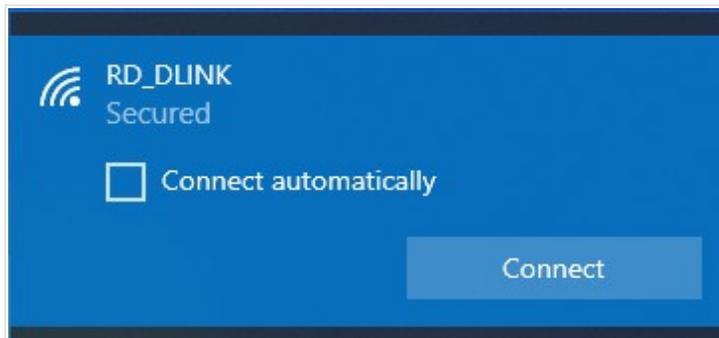


Figure 20. The list of available networks.

- In the opened window, enter the network key (see WPS PIN on the barcode label on the bottom panel of the device) in the **Security key** field and click the **Next** button.
- Allow or forbid your PC to be discoverable by other devices on this network (**Yes / No**).



Figure 21. PC discovery settings.

- Wait for about 20-30 seconds. After the connection is established, the network icon will be displayed as a dot with curved lines indicating the signal level.

! If you perform initial configuration of the router via Wi-Fi connection, note that immediately after changing the wireless default settings of the router you will need to reconfigure the wireless connection using the newly specified settings.

Connecting to Web-based Interface

When you have configured your computer, you can access the web-based interface and configure needed parameters (create a WAN connection, change the parameters of the wireless network, specify the settings of the firewall, etc.)

Start a web browser (see the *Before You Begin* section, page 13). In the address bar of the web browser, enter the domain name of the router (by default, **dlinkrouter.local**) with a dot at the end and press the **Enter** key. Also you can enter the IP address of the device (by default, **192.168.1.1**).



Figure 22. Connecting to the web-based interface of the DSL-224 device.



If the error “The page cannot be displayed” (or “Unable to display the page”/“Could not connect to remote server”) occurs upon connecting to the web-based interface of the router, make sure that you have properly connected the router to your computer.

If the device has not been configured previously or the default settings have been restored, after access to the web-based interface the Initial Configuration Wizard opens (see the *Initial Configuration Wizard* section, page 38).

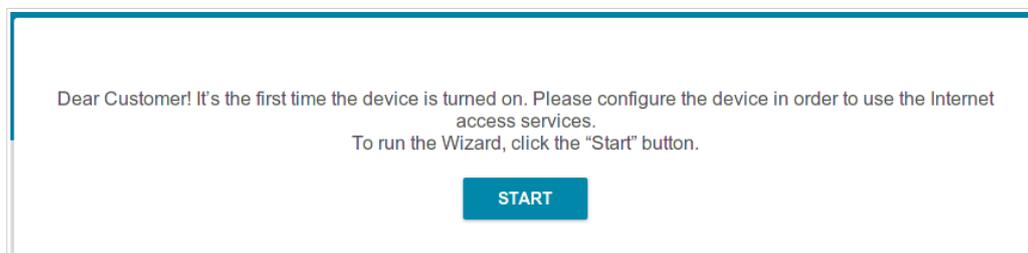


Figure 23. The page for running the Initial Configuration Wizard.

If you configured the device previously, after access to the web-based interface the login page opens. Enter the username (**admin**) in the **Username** field and the password you specified in the **Password** field, then click the **LOGIN** button.

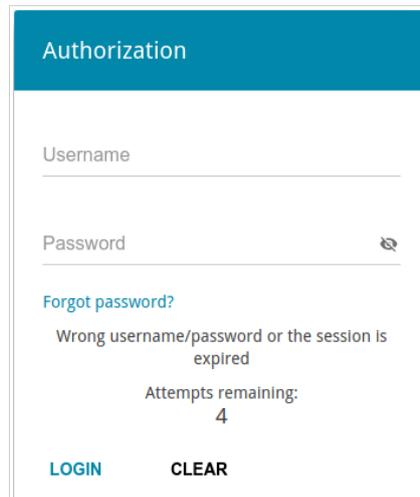


Figure 24. The login page.

If you enter a wrong password several times, the web-based interface will be blocked for a while. Please wait for one minute and reenter the password you specified.

Web-based Interface Structure

Summary Page

On the **Summary** page, detailed information on the device state is displayed.

The screenshot shows the 'Summary' page of the DSL-224 web-based interface. The page has a teal header with a 'Home' button and a 'Summary' title. The content is organized into several panels:

- Device Information:** Model: DSL-224; Hardware version: R1; Firmware version: 3.0.10; Build time: Thu Nov 24 2022 6:05:40 PM MSK; UI version: 1.36.0.908e3e2-embedded; Vendor: D-Link Russia; Serial number: 1234567890123; Support: support@dlink.ru; Summary: Root filesystem image for DSL-224; Uptime: 10 min.
- WAN IPv4:** Connection type: Dynamic IPv4; Status: Connected (green dot); MAC address: 40:16:7E:36:E2:C2; IP address: 192.168.161.225.
- LAN:** LAN IPv4: 192.168.1.1; LAN IPv6: fd01::1/64; Wireless connections: -; Wired connections: 1.
- LAN Ports:** LAN1: Off (grey dot); LAN2: On (green dot); LAN3: Off (grey dot).
- Wi-Fi 2.4 GHz:** Status: On (green dot); Broadcasting: On (green dot); Additional networks: 0; Network name (SSID): DSL-224-E2C2; Security: WPA2-PSK (lock icon).
- DSL Status:** Line status: Off (grey dot).

Figure 25. The summary page.

The **Device Information** section displays the model and hardware version of the router, the firmware version, and other data.

To contact the technical support group (to send an e-mail), left-click the support e-mail address. After clicking the line, the e-mail client window for sending a new letter to the specified address opens.

The **Wi-Fi 2.4 GHz** section displays data on the state of the device's wireless network, its name and the authentication type, and availability of an additional wireless network.

In the **WAN** section, data on the type and status of the existing WAN connection are displayed.

In the **LAN** section, the IPv4 and IPv6 address of the router and the number of wired and wireless clients of the device are displayed.

The **LAN Ports** section displays the state of the device's LAN ports.

In the **DSL Status** section, data on the DSL connection state is displayed.

Home Page

The **Home** page displays links to the most frequently used pages with device's settings.

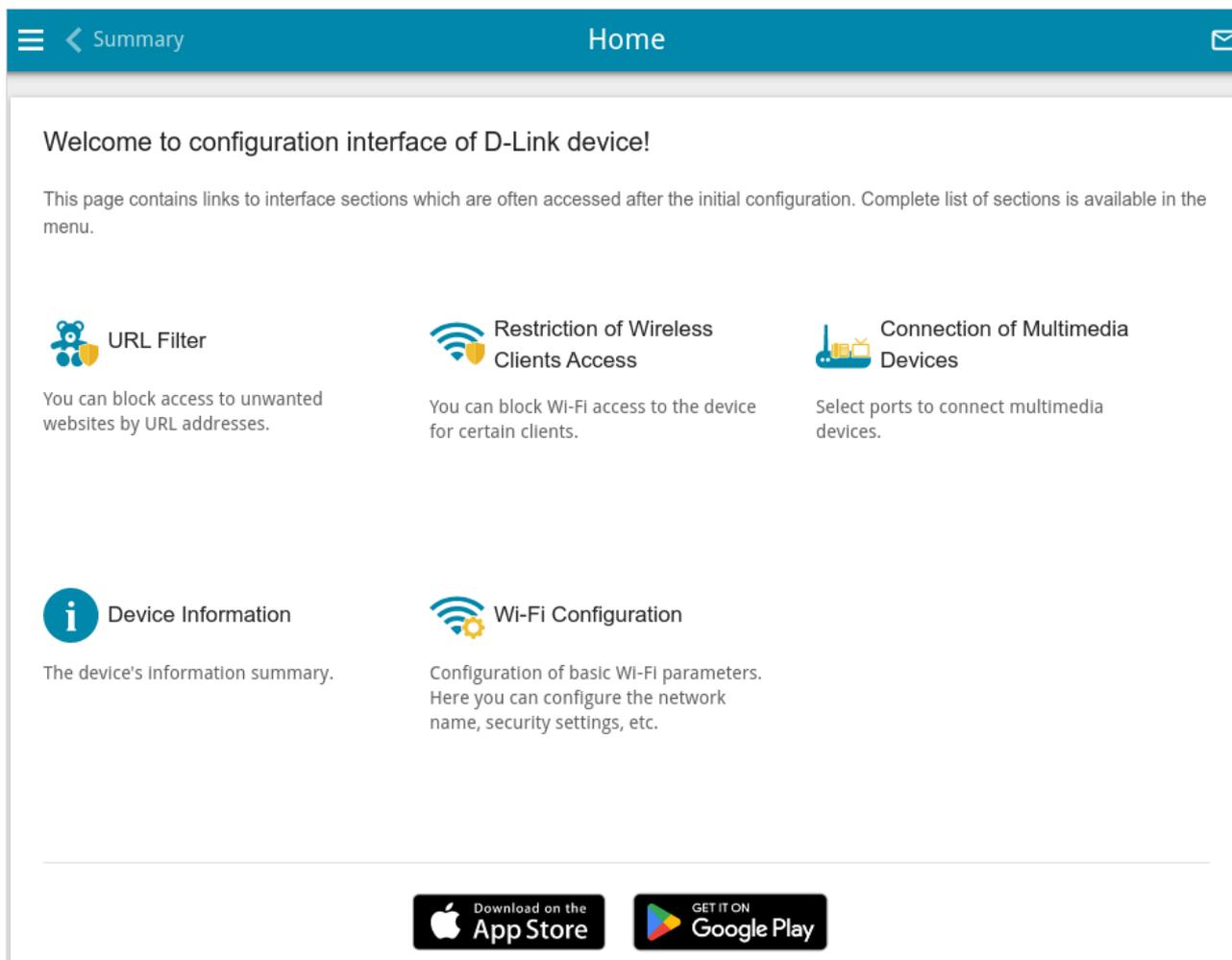


Figure 26. The **Home** page.

Other settings of the router are available in the menu in the left part of the page.

Menu Sections

To configure the router use the menu in the left part of the page.

In the **Initial Configuration** section you can run the Initial Configuration Wizard. The Wizard allows you to configure the router for operation in the needed mode and specify all parameters necessary for getting started (for the description of the Wizard, see the *Initial Configuration Wizard* section, page 38).

The pages of the **Statistics** section display data on the current state of the router (for the description of the pages, see the *Statistics* section, page 56).

The pages of the **Connections Setup** section are designed for configuring basic parameters of the LAN interface of the router and creating a connection to the Internet (for the description of the pages, see the *Connections Setup* section, page 62).

The pages of the **Wi-Fi** section are designed for specifying all needed settings of the router's wireless network (for the description of the pages, see the *Wi-Fi* section, page 107).

The pages of the **Advanced** section are designed for configuring additional parameters of the router (for the description of the pages, see the *Advanced* section, page 130).

The pages of the **Firewall** section are designed for configuring the firewall of the router (for the description of the pages, see the *Firewall* section, page 147).

The pages of the **System** section provide functions for managing the internal system of the router (for the description of the pages, see the *System* section, page 160).

To exit the web-based interface, click the **Logout** line of the menu.

Notifications

The router's web-based interface displays notifications in the top right part of the page.



Figure 27. The web-based interface notifications.

Click the icon displaying the number of notifications to view the complete list and click the relevant button.

CHAPTER 4. CONFIGURING VIA WEB-BASED INTERFACE

Initial Configuration Wizard

To start the Initial Configuration Wizard, go to the **Initial Configuration** section. On the opened page, click the **OK** button and wait until the factory default settings are restored.

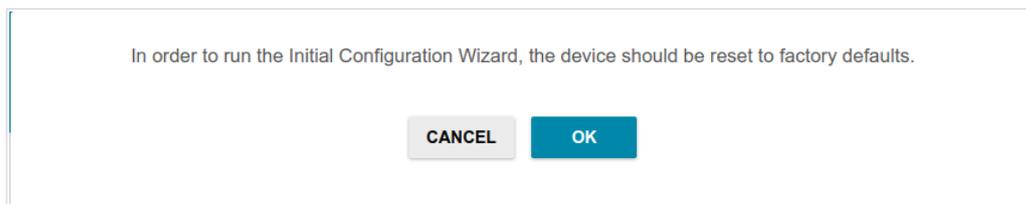


Figure 28. Restoring the default settings in the Wizard.

If you perform initial configuration of the router via Wi-Fi connection, please make sure that you are connected to the wireless network of DSL-224 (see the WLAN name (SSID) on the barcode label on the bottom panel of the device) and click the **NEXT** button.

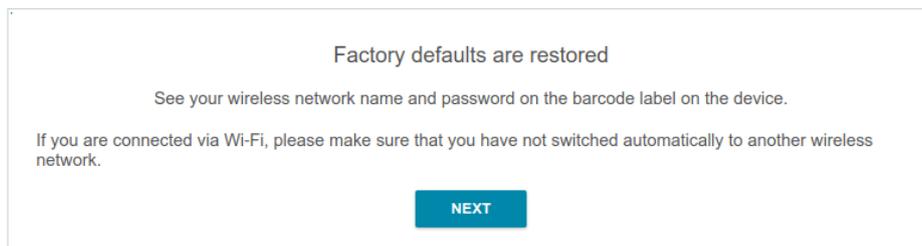


Figure 29. Checking connection to the wireless network.

Click the **START** button.

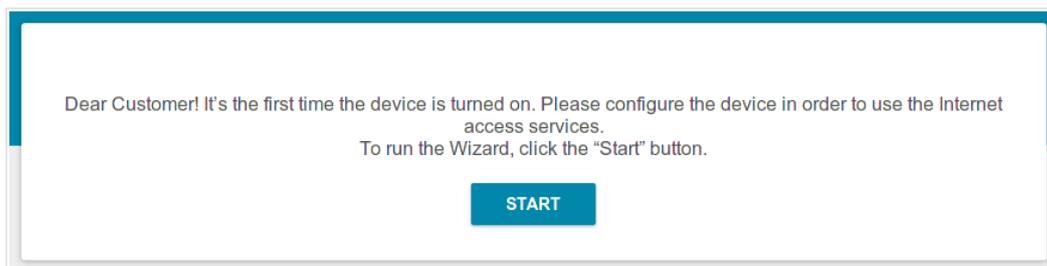


Figure 30. Starting the Wizard.

On the opened page, click **YES** in order to leave the current language of the web-based interface or click **NO** to select another language.

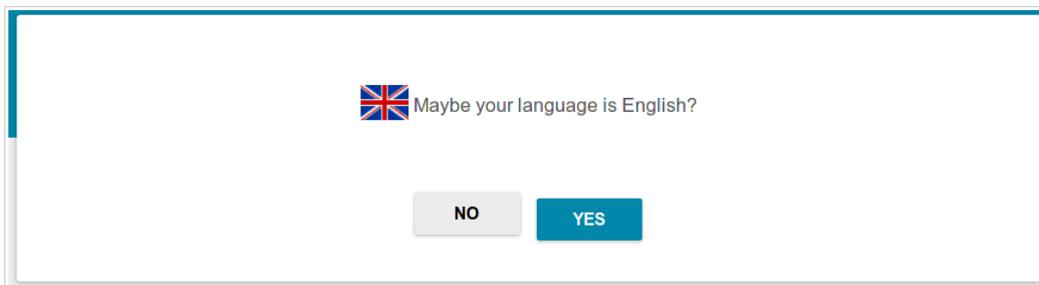


Figure 31. Selecting a language.

You can finish the wizard earlier and go to the menu of the web-based interface. To do this, click the **ADVANCED SETTINGS** button. On the opened page, change the default settings: specify the administrator password in the **User's interface password** and **Password confirmation** fields and the name of the wireless network in the **Network name (SSID)** field. Then click the **APPLY** button.

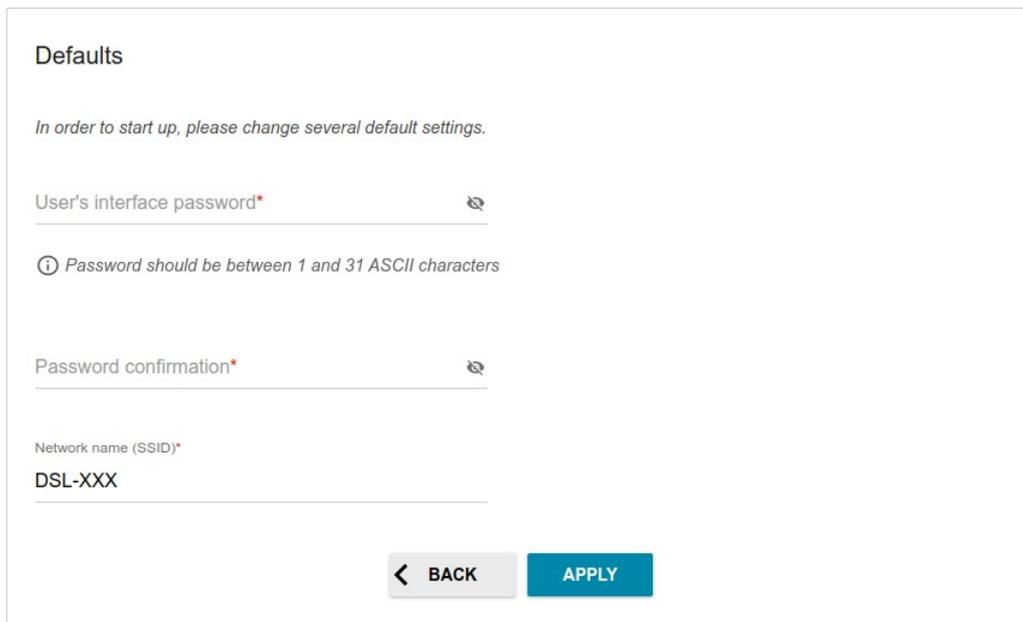


Figure 32. Changing the default settings.

To continue the configuration of the router via the Wizard, click the **CONTINUE** button.

Selecting Operation Mode

In order to connect your device to a VDSL or ADSL line, on the **Device mode** page, from the **Connection method** list, select the **VDSL** or **ADSL** value correspondingly. In this mode you can configure a WAN connection, set your own settings for the wireless network, configure LAN ports to connect an STB or VoIP phone, and set your own password for access to the web-based interface of the device.

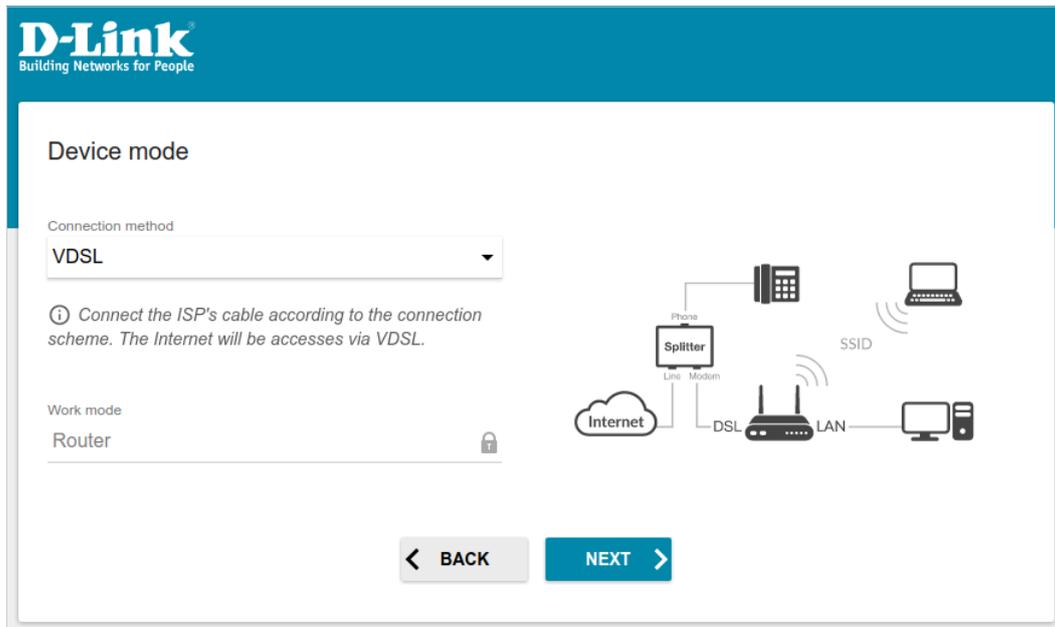


Figure 33. Selecting an operation mode. The **VDSL** connection method.

In order to connect your device to a private Ethernet line, on the **Device mode** page, from the **Connection method** list, select the **Ethernet (LAN)** value. In this mode you can configure one of the router's LAN port as the WAN port, configure a WAN connection, set your own settings for the wireless network, configure LAN ports to connect an STB or VoIP phone, and set your own password for access to the web-based interface of the device.

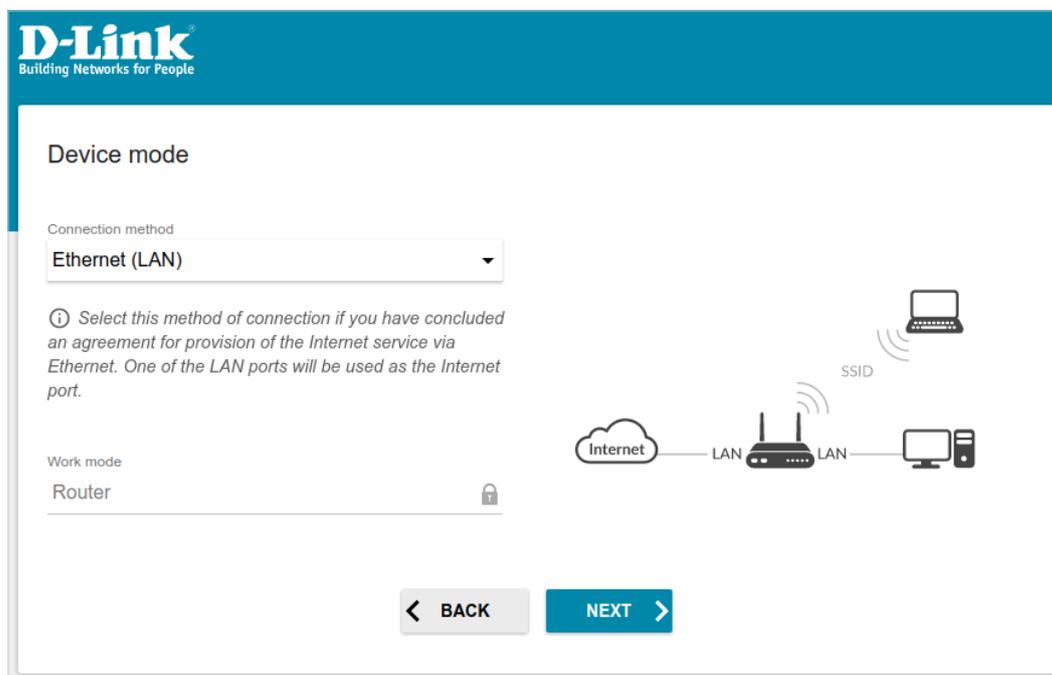


Figure 34. Selecting an operation mode. The **Ethernet (LAN)** connection method.

When the operation mode is selected, click the **NEXT** button.

Configuring LAN Port as WAN Port

This configuration step is available for the **Ethernet (LAN)** mode.

1. On the **Device connection** page, select a free LAN port which will be used as the WAN port.



Figure 35. The page for configuring a LAN port as the WAN port.

2. Click the **NEXT** button to continue or click the **BACK** button to return to the previous page.

Creating WAN Connection

! You should configure your WAN connection in accordance with data provided by your Internet service provider (ISP). Make sure that you have obtained all necessary information prior to configuring your connection. Otherwise contact your ISP.

1. On the **Internet connection type** page, from the **Connection type** list, select the connection type used by your ISP and fill in the fields displayed on the page.
2. Specify the settings necessary for the connection of the selected type.
3. *For the **VDSL, Ethernet (LAN)** modes:* If a particular MAC address was registered by your ISP upon concluding the agreement, from the **MAC address assignment method** drop-down list, select the **Manual** value and enter this address in the **MAC address** field. Choose the **Clone MAC address of your device** value to place the MAC address of your network interface card in the field, or leave the **Default MAC address** value to place the router's WAN interface MAC address in the field.
4. *For the **VDSL, Ethernet (LAN)** modes:* If the Internet access is provided via a VLAN channel, select the **Use VLAN** checkbox and fill in the **VLAN ID** field.
5. *For the **ADSL** mode:* Specify the VPI and VCI values in the relevant fields.
6. Click the **NEXT** button to continue or click the **BACK** button to return to the previous page.

Static IPv4 or IPoA Connection

The screenshot shows a web-based configuration interface for setting up a Static IPv4 WAN connection. The page is titled "Internet connection type". At the top, there is a dropdown menu for "Connection type" with "Static IPv4" selected. Below this, an information icon and text state: "A connection of this type allows you to use a fixed IP address provided by your ISP." There are four input fields: "IP address*", "Subnet mask*", "Gateway IP address*", and "DNS IP address*", each with a red asterisk indicating it is required. Below these fields is a dropdown menu for "MAC address assignment method" with "Default MAC address" selected. Underneath, the "MAC address" field contains the value "40:16:7E:36:E2:C2" and has a lock icon to its right. Another information icon and text note: "In some ISP's networks, it is required to register a certain MAC address in order to get access to the Internet." At the bottom, there are four checkboxes: "Use VLAN" (unchecked), "Use IGMP" (checked), and "Ping" (unchecked). An information icon and text explain: "Select the checkbox if the Internet access is provided via a VLAN channel." and "Internet Group Management Protocol is designed to manage multicast traffic in IP-based networks." At the very bottom, there are two buttons: a grey "BACK" button with a left arrow and a blue "NEXT" button with a right arrow.

Figure 36. The page for configuring Static IPv4 WAN connection.

The **IPoA** connection type is available for the **ADSL** mode only.

Fill in the following fields: **IP address**, **Subnet mask**, **Gateway IP address**, and **DNS IP address**.

Static IPv6 Connection

Internet connection type

Connection type
Static IPv6

ⓘ A connection of this type allows you to use a fixed IP address provided by your ISP.

IP address*

Prefix*

Gateway IP address*

DNS IP address*

MAC address assignment method
Default MAC address

MAC address
40:16:7E:36:E2:C2

ⓘ In some ISP's networks, it is required to register a certain MAC address in order to get access to the Internet.

Use VLAN

ⓘ Select the checkbox if the Internet access is provided via a VLAN channel.

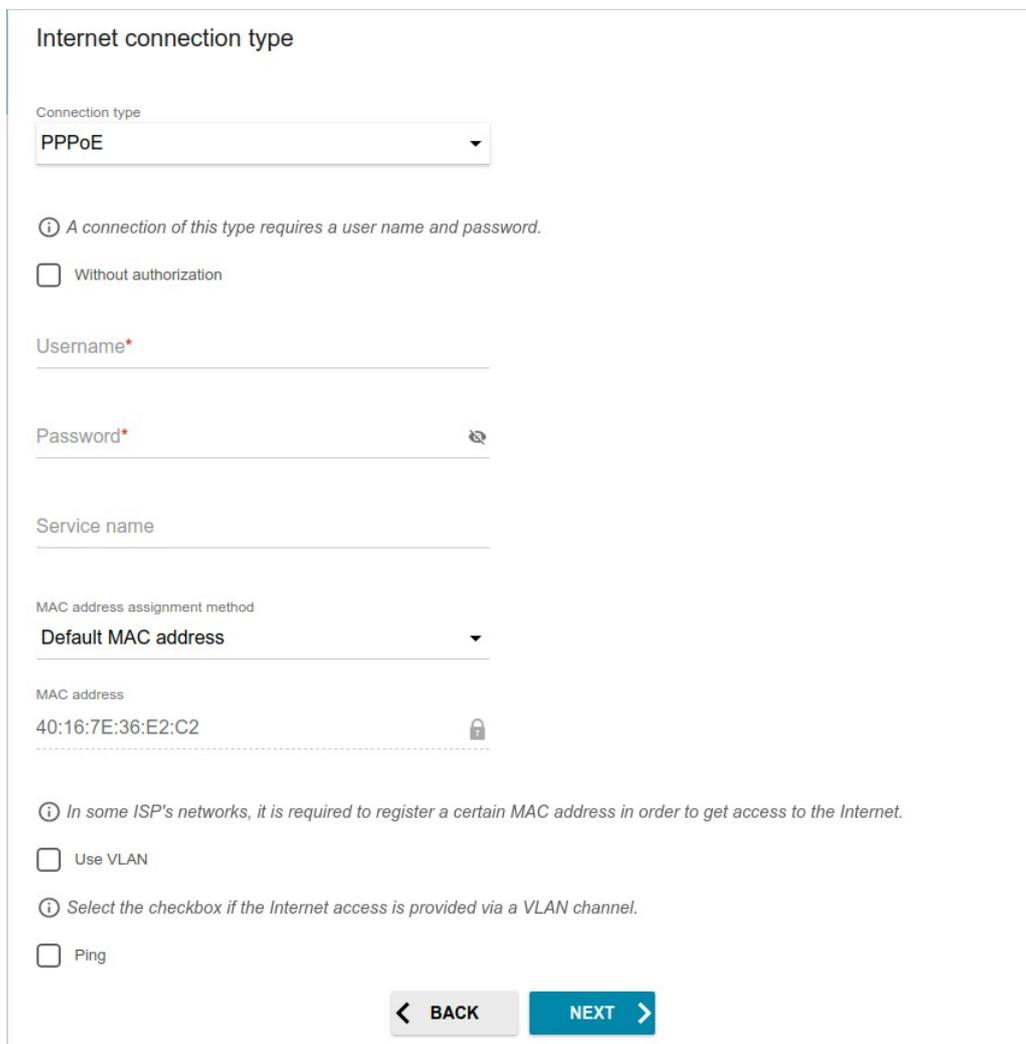
Ping

[← BACK](#) [NEXT →](#)

Figure 37. The page for configuring Static IPv6 WAN connection.

Fill in the following fields: **IP address**, **Prefix**, **Gateway IP address**, and **DNS IP address**.

PPPoE, PPPoA, IPv6 PPPoE, PPPoE Dual Stack Connections



The screenshot shows a web-based configuration page titled "Internet connection type". The "Connection type" dropdown menu is set to "PPPoE". Below this, there is an information icon and a note: "A connection of this type requires a user name and password." There is a checkbox labeled "Without authorization" which is currently unchecked. The "Username*" field is empty. The "Password*" field contains a masked password and has a "Show" icon (an eye with a slash) to its right. The "Service name" field is empty. The "MAC address assignment method" dropdown menu is set to "Default MAC address". The "MAC address" field contains "40:16:7E:36:E2:C2" and has a lock icon to its right. Below this, there is an information icon and a note: "In some ISP's networks, it is required to register a certain MAC address in order to get access to the Internet." There are three checkboxes: "Use VLAN" (unchecked), "Select the checkbox if the Internet access is provided via a VLAN channel." (unchecked), and "Ping" (unchecked). At the bottom of the form, there are two buttons: "BACK" and "NEXT".

Figure 38. The page for configuring PPPoE WAN connection.

The **PPPoA** connection type is available for the **ADSL** mode only.

In the **Username** field enter the login and in the **Password** field enter the password provided by your ISP. Click the **Show** icon (👁) to display the entered password. If authorization is not required, select the **Without authorization** checkbox.

Configuring Wireless Network

1. On the **Wireless Network 2.4 GHz** page, in the **Network name** field, specify your own name for the wireless network or leave the value suggested by the router.
2. In the **Password** field, specify your own password for access to the wireless network or leave the value suggested by the router (WPS PIN of the device, see the barcode label).
3. You can restore the parameters of the wireless network specified before resetting to factory defaults. To do this, click the **RESTORE** button.

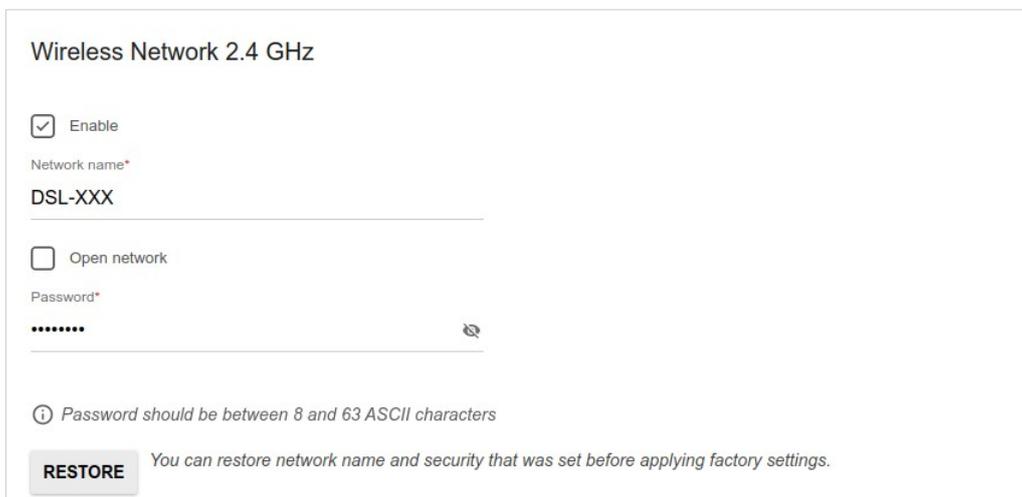


Figure 39. The page for configuring the wireless network.

4. If you want to create an additional wireless network isolated from your LAN, select the **Enable guest network** checkbox.

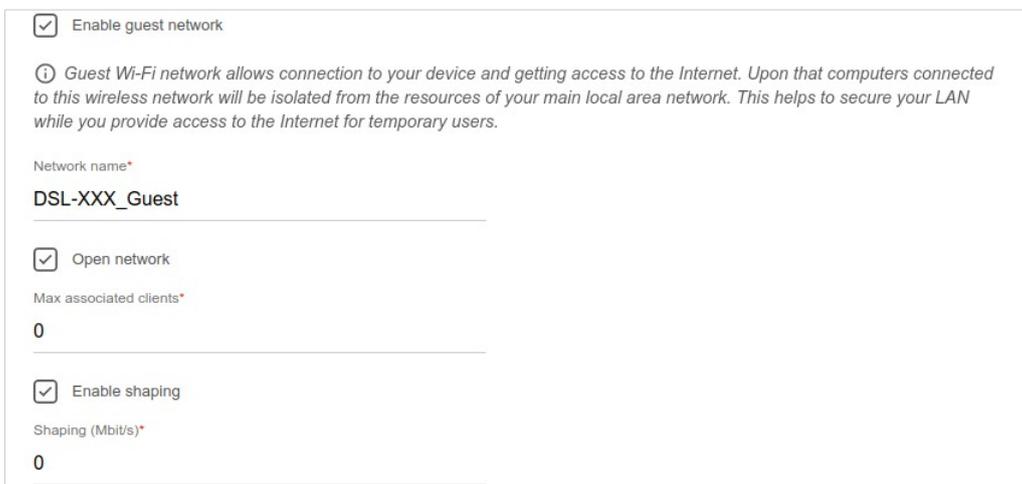


Figure 40. The page for configuring the wireless network.

5. In the **Network name** field, specify your own name for the guest wireless network or leave the value suggested by the router.
6. If you want to create a password for access to the guest wireless network, deselect the **Open network** checkbox and fill in the **Password** field.
7. If you want to limit the bandwidth of the guest wireless network, select the **Enable shaping** checkbox and fill in the **Shaping** field.
8. Click the **NEXT** button to continue or click the **BACK** button to specify other settings.

Configuring LAN Ports for IPTV/VoIP

1. On the **IPTV** page, select the **Is an STB connected to the device** checkbox.

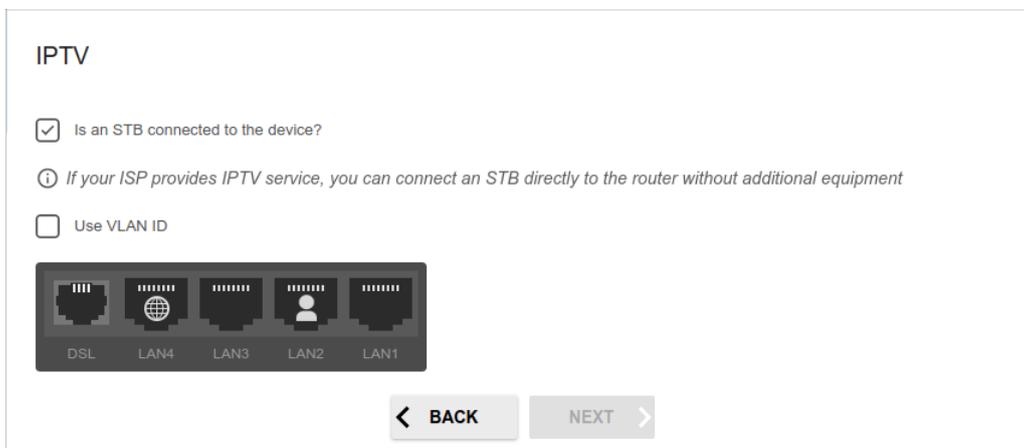


Figure 41. The page for selecting a LAN port to connect an IPTV set-top box.

2. Select a free LAN port for connecting your set-top box.
3. For the **VDSL, Ethernet (LAN)** modes: If the IPTV service is provided via a VLAN channel, select the **Use VLAN ID** checkbox and fill in the **VLAN ID** field.
4. For the **ADSL** mode: Specify the VPI and VCI values in the relevant fields.
5. Click the **NEXT** button to continue or click the **BACK** button to specify other settings.

6. On the **VoIP** page, select the **Is an IP phone connected to the device** checkbox.

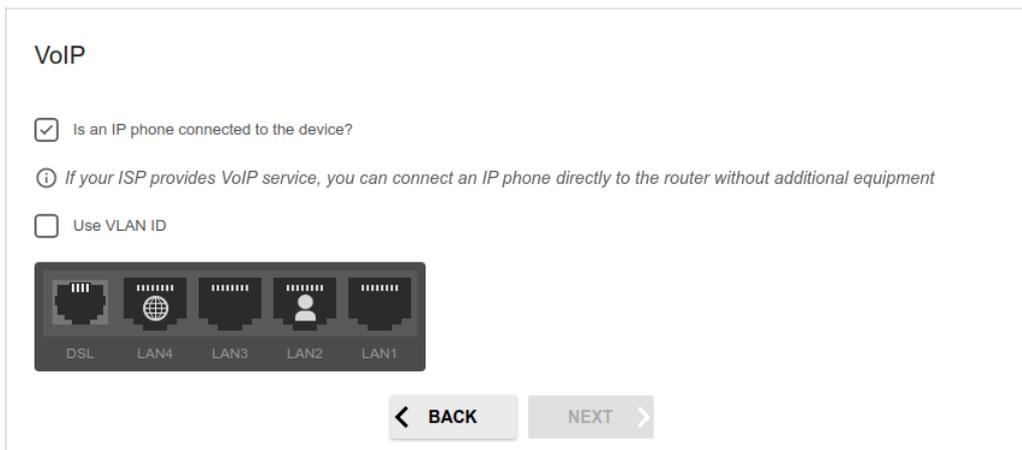
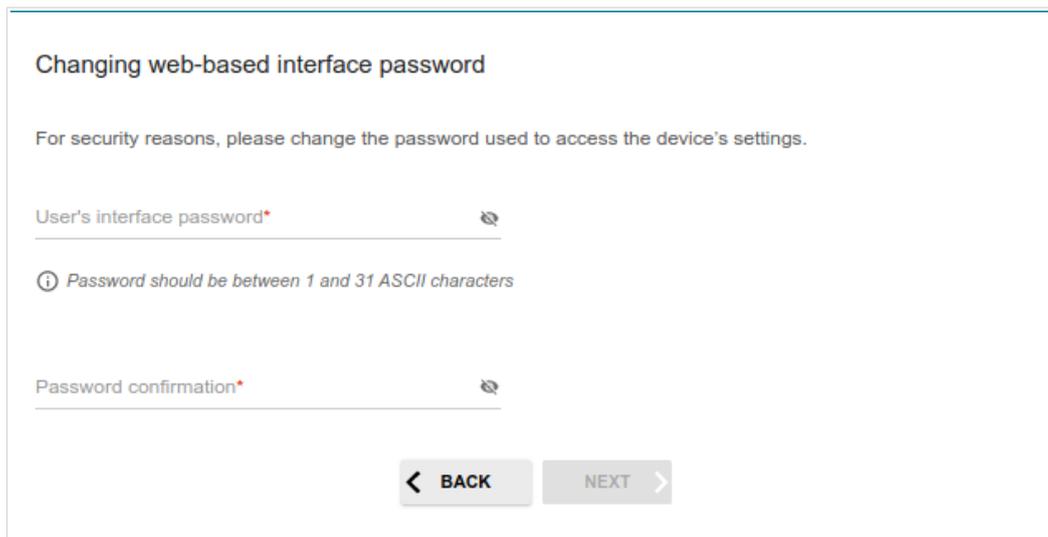


Figure 42. The page for selecting a LAN port to connect a VoIP phone.

7. Select a free LAN port for connecting your IP phone.
8. For the **VDSL, Ethernet (LAN)** modes: If the VoIP service is provided via a VLAN channel, select the **Use VLAN ID** checkbox and fill in the **VLAN ID** field.
9. For the **ADSL** mode: Specify the VPI and VCI values in the relevant fields.
10. Click the **NEXT** button to continue or click the **BACK** button to specify other settings.

Changing Web-based Interface Password

On this page, you should change the default administrator password. To do this, enter a new password in the **User's interface password** and **Password confirmation** fields. You may set any password except **admin**. Use digits, Latin letters (uppercase and/or lowercase), and other characters available in the US keyboard layout.¹



Changing web-based interface password

For security reasons, please change the password used to access the device's settings.

User's interface password*

ⓘ Password should be between 1 and 31 ASCII characters

Password confirmation*

< BACK NEXT >

Figure 43. The page for changing the web-based interface password.

! Remember or write down the new password for the administrator account. In case of losing the new password, you can access the settings of the router only after restoring the factory default settings via the hardware **RESET** button. This procedure wipes out all settings that you have configured for your router.

Click the **NEXT** button to continue or click the **BACK** button to return to the previous page.

On the next page, check all specified settings.

Also you can save a text file with parameters set by the Wizard to your PC. To do this, click the **SAVE CONFIGURATION FILE** button and follow the dialog box appeared.

To finish the Wizard, click the **APPLY** button. The router will apply settings and reboot. Click the **BACK** button to specify other settings.

¹ 0-9, A-Z, a-z, space, !"#\$%&'()*+,-./:;<=>?@[]^_`{|}~.

If the Wizard has configured a WAN connection, after clicking the **APPLY** button, the page for checking the Internet availability opens.

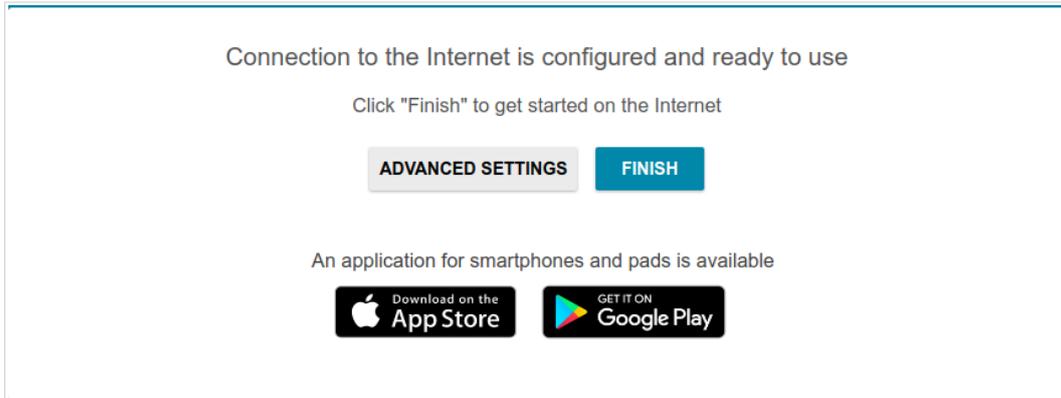


Figure 44. Checking the Internet availability.

If the router has been successfully connected to the Internet, click the **FINISH** button.

If problems appeared when connecting to the Internet, click the **CHECK AGAIN** button to recheck the state of the WAN connection.

If problems of connection have not been solved, contact the technical support of your ISP (as a rule, the technical support phone is provided with the agreement) or the D-Link technical support (the phone number will be displayed on the page after several attempts of checking the connection).

To specify other settings, click the **ADVANCED SETTINGS** button. After clicking the **ADVANCED SETTINGS** button, the **Home** page opens (see the *Home Page* section, page 35).

Connection of Multimedia Devices

The Multimedia Devices Connection Wizard helps to configure LAN ports or available wireless interfaces of the router for connecting additional devices, for example, an IPTV set-top box or IP phone. Contact your ISP to clarify if you need to configure DSL-224 in order to use these devices.

To start the Wizard, on the **Home** page, select the **Connection of Multimedia Devices** section.

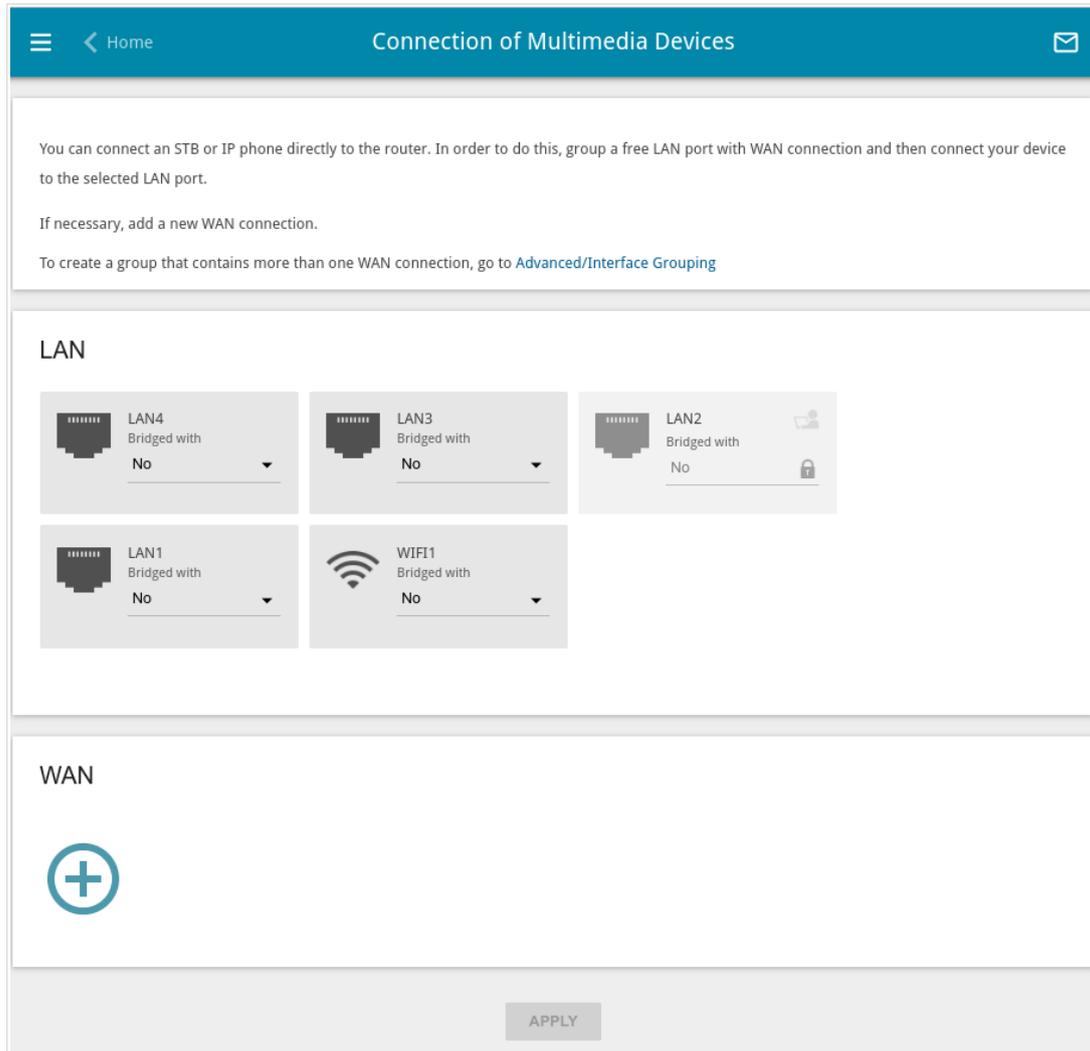


Figure 45. The Multimedia Devices Connection Wizard.

In the **WAN** section, click the **Add** icon ().

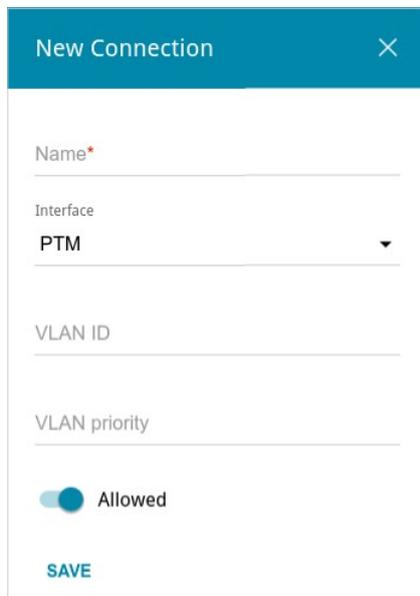


Figure 46. Adding a connection.

You can specify the following parameters:

Parameter	Description
Name	A name for the connection for easier identification (you can specify any name).
Interface	Select the value corresponding to the LAN port specified as the WAN port for connection to an Ethernet line. Select the PTM value for connection to a VDSL line or the ATM value for connection to an ADSL line.
VPI	<i>For the ATM value only.</i> Virtual Path Identifier. The valid range is from 0 to 255.
VCI	<i>For the ATM value only.</i> Virtual Circuit Identifier. The valid range is from 32 to 65535.
Encapsulation	<i>For the ATM value only.</i> Select LLC or VCMUX from the drop-down list.

Parameter	Description
<p>QoS class</p>	<p><i>For the ATM value only.</i></p> <p>A class of traffic for this connection.</p> <p>UBR</p> <p><i>(Unspecified Bit Rate):</i> The UBR service is used for applications that allow various delays and losses of packets. It is appropriate to use the UBR service for text/data/image transfer applications, as well as messaging, distribution, retrieval, and remote terminal applications.</p> <p>UBR with PCR</p> <p><i>(Unspecified Bit Rate with Peak Cell Rate):</i> The UBR service is used for applications that allow various delays and losses of packets. The Peak Cell Rate is a determining factor in how often cells are sent in an effort to minimize lag or jitter caused by traffic inconsistencies. When you select this value from the drop-down list, the Peak cell rate field is displayed. Specify a required value (in cells per second).</p> <p>CBR</p> <p><i>(Constant Bit Rate):</i> This service is used for applications that require a constant data rate. It is mostly used for transferring uncompressed audio and video, e.g. videoconferencing, interactive audio (telephony), audio/video distribution (television, distance education, e-shops), and retrieval (video-on demand, audio libraries). When you select this value from the drop-down list, the Peak cell rate field is displayed. Specify a required value (in cells per second).</p> <p>Non Realtime VBR</p> <p><i>(Non-Real-time Variable Bit Rate):</i> This service can be used for transferring data that have critical response-time requirements, e.g. air ticket booking, bank transactions, and process monitoring. When you select this value from the drop-down list, the Peak cell rate, Sustainable cell rate, and Maximum burst size fields are displayed. Specify required values.</p> <p>Realtime VBR</p> <p><i>(Real-time Variable Bit Rate):</i> This service is used for delay-sensitive applications such as real time video. The Rt-VBR provides higher network flexibility than the CBR service. When you select this value from the drop-down list, the Peak cell rate, Sustainable cell rate, and Maximum burst size fields are displayed. Specify required values.</p>
<p>VLAN ID</p>	<p>If the service used by your additional equipment is provided via a VLAN channel with a tag (VLAN ID), specify the needed value.</p>

Parameter	Description
VLAN priority	A priority tag for the type of traffic transmitted.
Allowed	Move the switch to the right to enable the connection. Move the switch to the left to disable the connection.

Click the **SAVE** button.

Then in the **LAN** section, from the **Bridged with** drop-down list of the element corresponding to the LAN port or wireless interface to which the additional device is connected, select the created connection. Click the **APPLY** button.

 The selected port or wireless interface cannot use the default connection to access the Internet.

To deselect the port or wireless interface, select the **No** value from the **Bridged with** drop-down list of the element corresponding to the needed LAN port or interface. Then in the **WAN** section, select the connection which will not be used any longer and click the **DELETE** button. Then click the **APPLY** button.

Statistics

The pages of this section display data on the current state of the router:

- network statistics
- IP addresses leased by the DHCP server
- the routing table
- data on devices connected to the router's network and its web-based interface, and information on current sessions of these devices
- addresses of active multicast groups
- DSL connection status.

Network Statistics

On the **Statistics / Network Statistics** page, you can view statistics for all connections existing in the system (WAN connections, LAN, WLAN). For each connection the following data are displayed: name and state (when the connection is on, its name is highlighted in green, when the connection is off, its name is highlighted in red), IP address and subnet mask, and volume of data received and transmitted (with increase of the volume the units of measurement are changed automatically: byte, Kbyte, Mbyte, Gbyte).

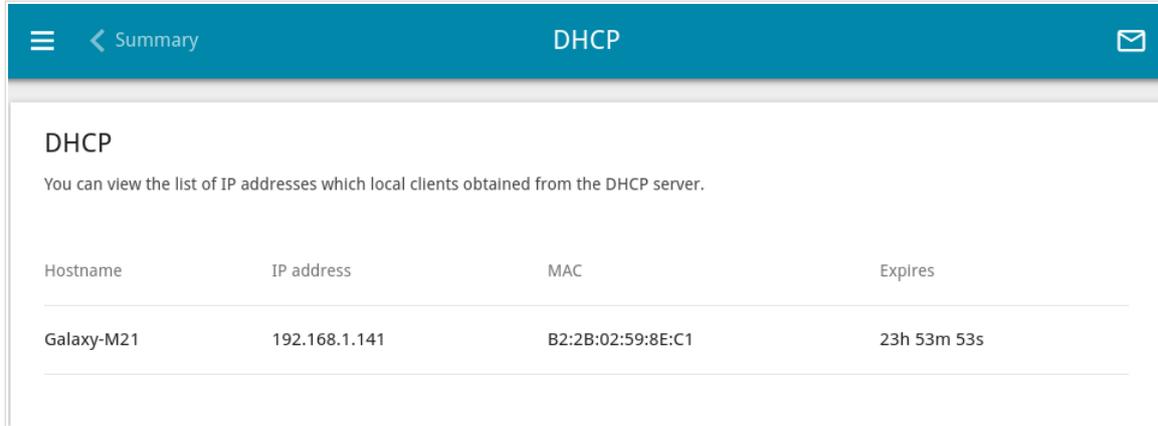
Name	IP - Gateway	Rx/Tx	Rx/Tx errors	Duration
LAN	IPv4: 192.168.1.1/24 – 192.168.1.1 IPv6: fd01::1/64 – -	1.34 Mbyte / 3.65 Mbyte	0 / 0	-
Dynamic_IPv4_37	-	-	-	-
Dynamic_IPV4_1	-	-	-	-
WIFI	-	11.58 Mbyte / 57.42 Kbyte	0 / 0	-

Figure 47. The **Statistics / Network Statistics** page.

To view data on a connection, click the line corresponding to this connection.

DHCP

The **Statistics / DHCP** page displays the information on devices that have been identified by hostnames and MAC addresses and have got IP addresses from the DHCP server of the router.

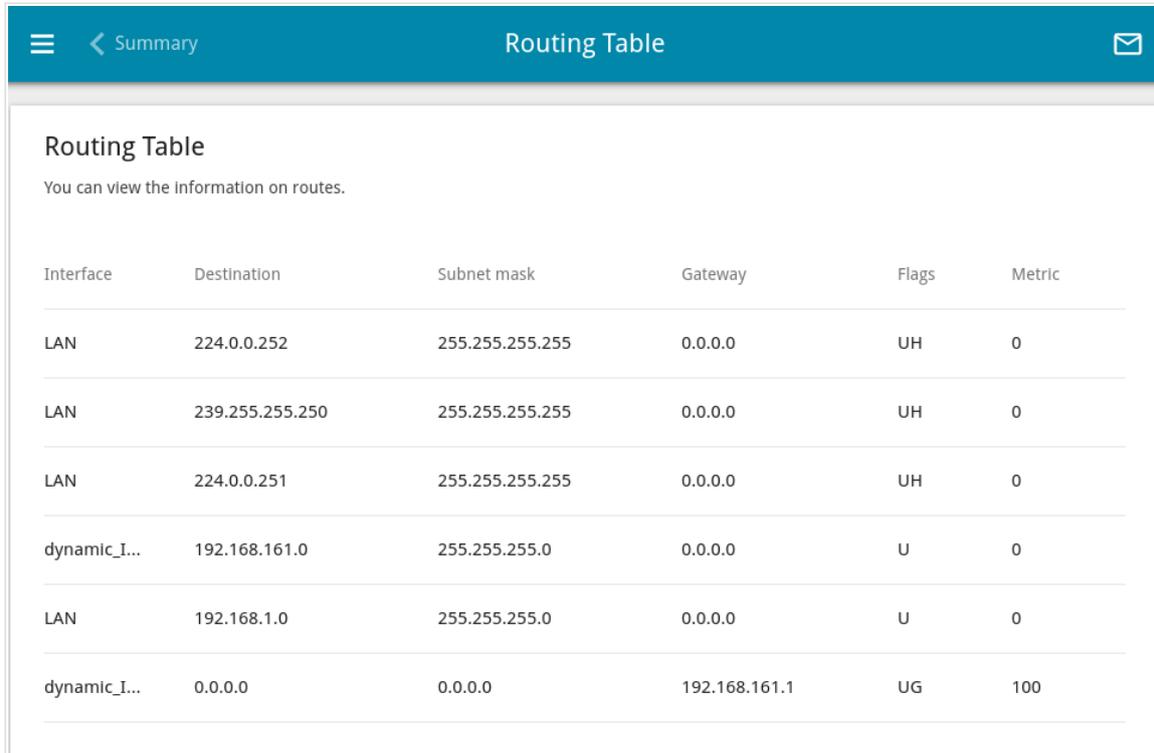


Hostname	IP address	MAC	Expires
Galaxy-M21	192.168.1.141	B2:2B:02:59:8E:C1	23h 53m 53s

Figure 48. The **Statistics / DHCP** page.

Routing Table

The **Statistics / Routing Table** page displays the information on routes. The table contains destination IP addresses, gateways, subnet masks, and other data.

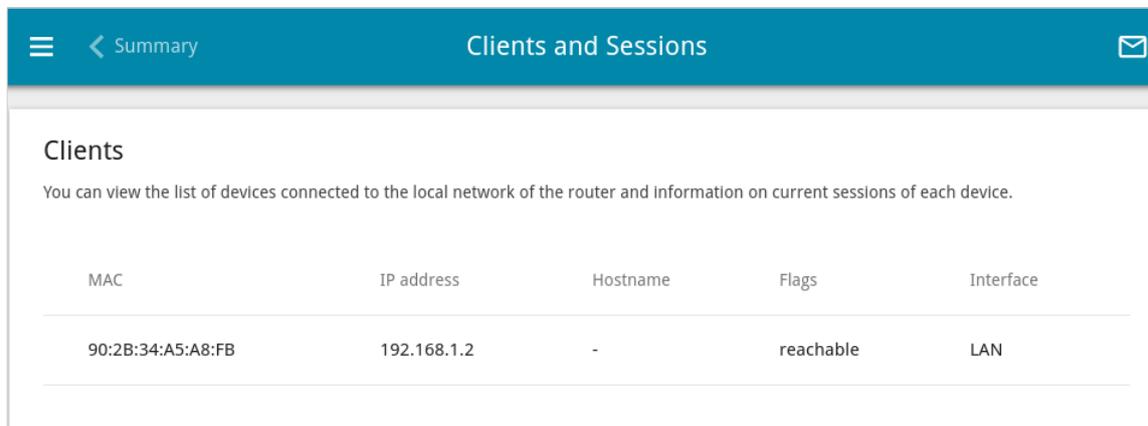


Interface	Destination	Subnet mask	Gateway	Flags	Metric
LAN	224.0.0.252	255.255.255.255	0.0.0.0	UH	0
LAN	239.255.255.250	255.255.255.255	0.0.0.0	UH	0
LAN	224.0.0.251	255.255.255.255	0.0.0.0	UH	0
dynamic_I...	192.168.161.0	255.255.255.0	0.0.0.0	U	0
LAN	192.168.1.0	255.255.255.0	0.0.0.0	U	0
dynamic_I...	0.0.0.0	0.0.0.0	192.168.161.1	UG	100

Figure 49. The **Statistics / Routing Table** page.

Clients and Session

On the **Statistics / Clients and Session** page, you can view the list of devices connected to the local network of the router and information on current sessions of each device.



MAC	IP address	Hostname	Flags	Interface
90:2B:34:A5:A8:FB	192.168.1.2	-	reachable	LAN

Figure 50. The **Statistics / Clients and Session** page.

For each device the following data are displayed: the IP address, the MAC address, and the network interface to which the device is connected.

To view the information on current sessions of a device, select this device in the table. On the opened page, the following data for each session of the selected device will be displayed: the protocol for network packet transmission, the source IP address and port, and the destination IP address and port.

Multicast Groups

The **Statistics / Multicast Groups** page displays addresses of active multicast groups (including IPTV channels and groups for transferring service information) to which the device is subscribed, and the interface through which the device is subscribed.

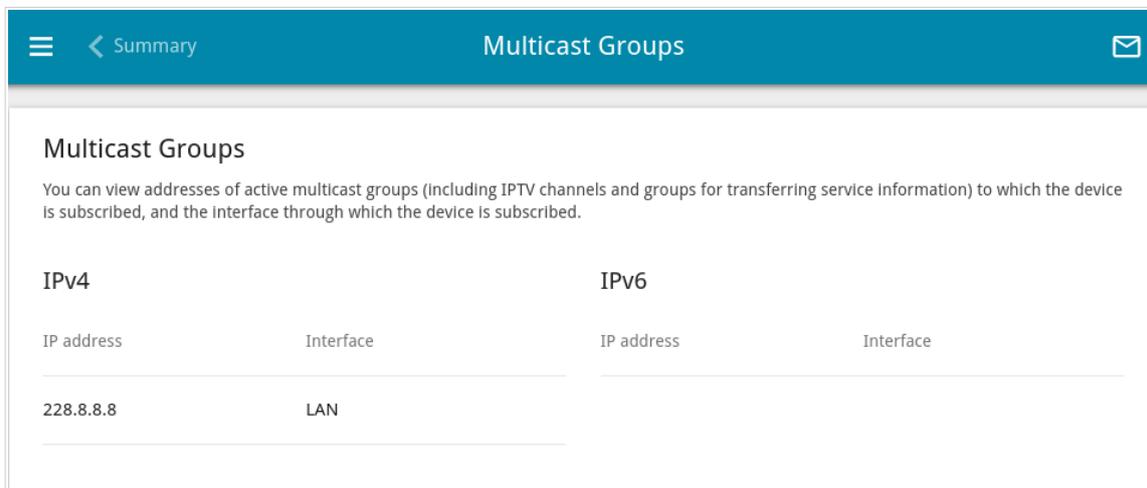


Figure 51. The **Statistics / Multicast Groups** page.

DSL Status

The information shown on the **Statistics / DSL Status** page can be used for troubleshooting and diagnosing connection problems.

In the **DSL Status** and **Line** sections you can view data on your DSL line: the line state, data transfer rate (downstream/upstream traffic), physical parameters of the line (SNR, output power), and other data. The **Framing** section displays information on transmitted DSL frames.

DSL Status

You can view data on your DSL line.

Line status:	Off <input type="radio"/>	Trellis:	Enable
Downstream rate:	0 Kbit/s	Uptime:	-
Upstream rate:	0 Kbit/s	G.Vector:	Off
Link Power State:	L0	Synchronization number:	0

Line

Parameter	Up	Down
Rate	-	-
Attainable rate	-	-
SNR Margin	-	-
Attenuation	-	-
Output power	-	-
CRC errors	-	-
G.Inp	Off	Off
INP (DMT frame)	0.000	0.000

Framing

Parameter	Up	Down
K (number of bytes in DMT frame)	-	-
R (number of check bytes in RS code word)	-	-
S (RS code word size in DMT frame)	-	-
D (interleaver depth)	-	-

Figure 52. The **Statistics / DSL Status** page.

Connections Setup

In this menu you can configure basic parameters of the router's local area network and configure connection to the Internet (a WAN connection).

WAN

On the **Connections Setup / WAN** page, you can create and edit connections used by the router. By default, VDSL and ADSL connections of the **Dynamic IPv4** type are configured in the system. They are assigned to the DSL port of the router. You can edit these connections or delete them.

! Please reboot the router after creating, editing, or removing an ADSL WAN connection.

! Prior to creating an Ethernet WAN connection, specify a LAN port that will be used as the WAN port (see the **WAN Remapping** section, page 133).

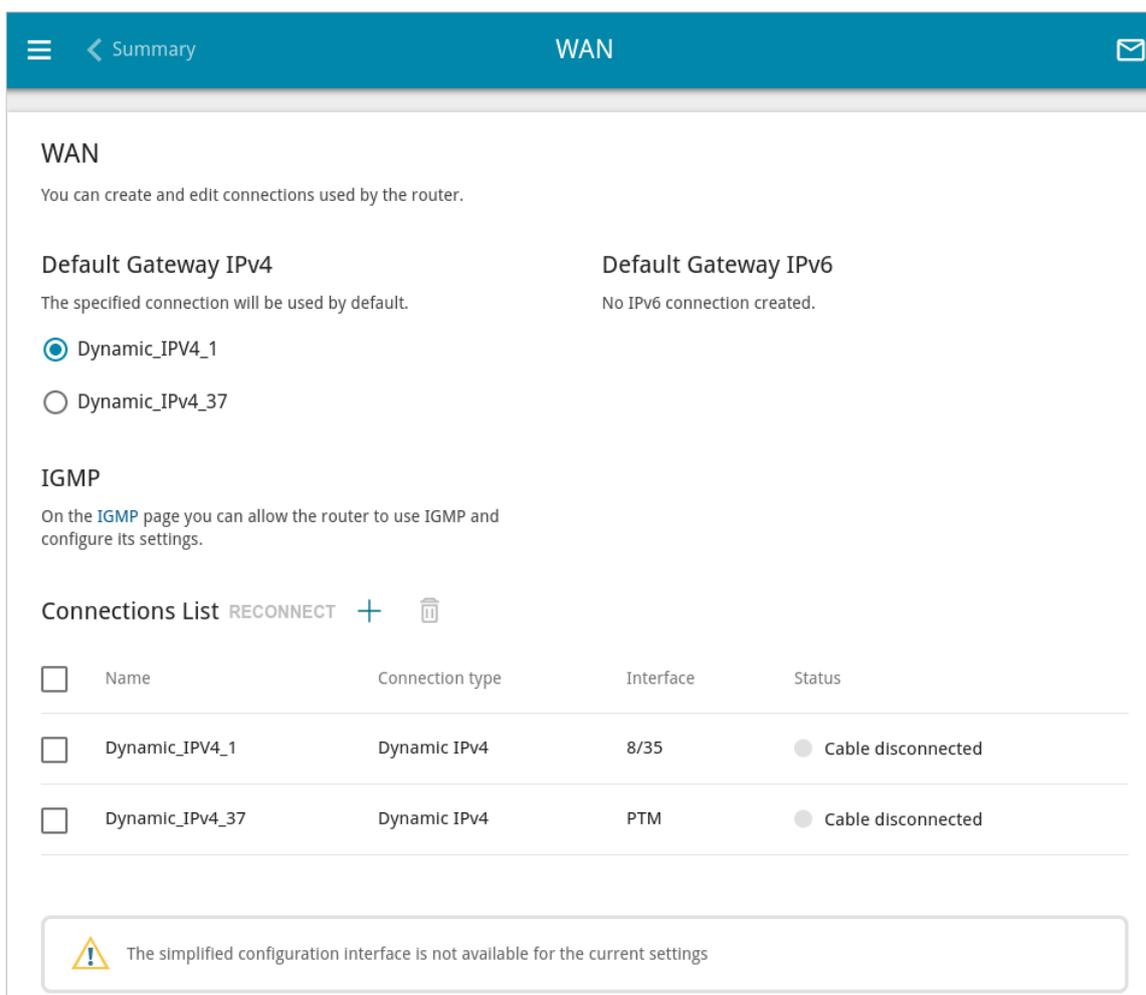


Figure 53. The **Connections Setup / WAN** page. The advanced mode.

To create a new connection, click the **ADD** button () in the **Connections List** section. Upon that the connection creation page opens.

To edit an existing connection, in the **Connections List** section, left-click the relevant line in the table. On the opened page, change the needed parameters and click the **APPLY** button.

To disconnect a connection and establish it again, select the checkbox located to the left of the relevant line in the table and click the **RECONNECT** button.

To remove a connection, in the **Connections List** section, select the checkbox located to the left of the relevant line in the table and click the **DELETE** button (.

To allow multicast traffic (e.g. streaming video) for a connection, click the **IGMP** link (for the description of the page, see the **IGMP** section, page 144).

To use one of existing WAN connections as the default IPv4 or IPv6 connection, in the **Default Gateway** section, select the choice of the radio button which corresponds to this connection.

To return to the simplified mode, click the **SIMPLIFIED MODE** button (the button is unavailable if several WAN connections are created).

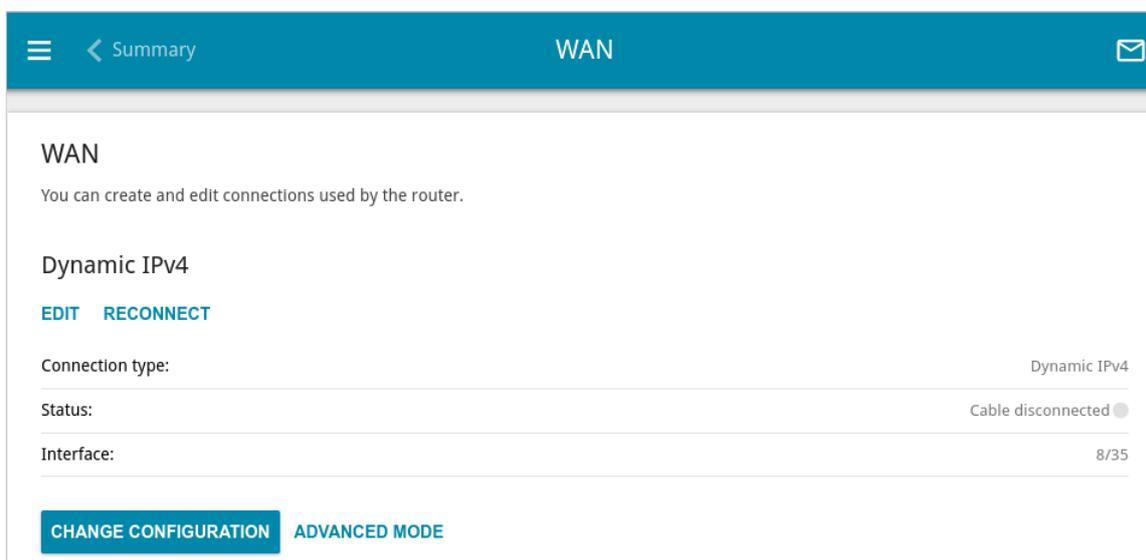


Figure 54. The **Connections Setup / WAN** page. The simplified mode.

To edit an existing connection, click the **EDIT** button. On the opened page, change the needed parameters and click the **APPLY** button.

To disconnect a connection and establish it again, click the **RECONNECT** button.

To remove an existing connection and create a new one, click the **CHANGE CONFIGURATION** button. Upon that the connection creation page opens.

To create several WAN connections, go to the advanced mode. To do this, click the **ADVANCED MODE** button.

! When connections of some types are created, the **Connections Setup / WAN** page is automatically displayed in the advanced mode.

Creating Dynamic IPv4, Static IPv4, or IPoA WAN Connection

On the connection creation page, in the **General Settings** section, select the relevant value from the **Connection type** drop-down list and specify the needed values.

General Settings

Connection type
 Static IPv4 ▼

Interface
 Add new ATM PVC ▼

Connection name*
 statip_25

Enable connection

NAT

ⓘ The network address translation function. It is recommended not to disable unless your ISP requires it.

Firewall

ⓘ Protection against external connections for the LAN devices. For security reasons, it is recommended not to disable.

Ping

ⓘ WAN Ping Respond allows the device to respond to ping requests from the external network.

RIP

Figure 55. The page for creating a new **Static IPv4** connection. The **General Settings** section.

Parameter	Description
General Settings	
Interface	<p><i>For the Dynamic IPv4 and Static IPv4 types only.</i></p> <p>A physical interface to which the new connection will be assigned.</p> <p>In order to create an Ethernet WAN connection, select the value corresponding to the LAN port specified as the WAN port.</p> <p>In order to create a VDSL WAN connection, select the PTM value.</p> <p>In order to create an ADSL WAN connection, select the value corresponding to the existing interface or the Add new ATM PVC value for creating a new interface at the physical layer.</p>
Connection name	A name for the connection for easier identification.
Enable connection	<p>Move the switch to the right to enable the connection.</p> <p>Move the switch to the left to disable the connection.</p>

Parameter	Description
NAT	If the switch is moved to the right, the network address translation function for IPv4 is enabled. Do not disable the function unless your ISP requires this.
Firewall	If the switch is moved to the right, protection against external connections for the LAN devices is enabled (for example, against attempts to get information about the LAN devices or to hack a device from the LAN). For security reasons, it is recommended not to disable this function.
Ping	If the switch is moved to the right, the router responds to ping requests from the external network through this connection. For security reasons, it is recommended to disable this function.
RIP	Move the switch to the right to allow using RIP for this connection.

The **Ethernet** section is displayed for Ethernet WAN connections.

Ethernet

MAC address*

40:16:7e:36:e2:c2

Clone MAC address of your NIC (90:2B:34:A5:A8:FB)

RESTORE DEFAULT MAC ADDRESS

MTU*

1500

Figure 56. The page for creating a new **Static IPv4** connection. The **Ethernet** section.

Parameter	Description
Ethernet	
MAC address	<p>A MAC address assigned to the interface. This parameter is mandatory if your ISP uses MAC address binding. In the field, enter the MAC address registered by your ISP upon concluding the agreement.</p> <p>To set the MAC address of the network interface card (of the computer that is being used to configure the router at the moment) as the MAC address of the WAN interface, move the Clone MAC address of your NIC switch to the right. When the switch is moved to the right, the field is unavailable for editing.</p> <p>To set the router's MAC address, click the RESTORE DEFAULT MAC ADDRESS button (the button is available when the switch is moved to the right).</p>
MTU	The maximum size of units transmitted by the interface.

The **PTM** section is displayed for VDSL WAN connections.

PTM

MAC address
 40:16:7E:36:E2:C2

Clone MAC address of your NIC (90:2B:34:A5:A8:FB)

RESTORE DEFAULT MAC ADDRESS

Figure 57. The page for creating a new **Static IPv4** connection. The **PTM** section.

Parameter	Description
PTM	
MAC address	<p>A MAC address assigned to the interface. This parameter is mandatory if your ISP uses MAC address binding. In the field, enter the MAC address registered by your ISP upon concluding the agreement.</p> <p>To set the MAC address of the network interface card (of the computer that is being used to configure the router at the moment) as the MAC address of the WAN interface, move the Clone MAC address of your NIC switch to the right. When the switch is moved to the right, the field is unavailable for editing.</p> <p>To set the router's MAC address, click the RESTORE DEFAULT MAC ADDRESS button (the button is available when the switch is moved to the right).</p>

The **ATM** section is displayed for ADSL WAN connections.

ATM

VPI (0-255)*
 0

VCI (32 - 65535)*
 35

Encapsulation
 LLC ▼

QoS class
 UBR ▼

Figure 58. The page for creating a new **Static IPv4** connection. The **ATM** section.

Parameter	Description
ATM	
VPI	Virtual Path Identifier. The valid range is from 0 to 255.
VCI	Virtual Circuit Identifier. The valid range is from 32 to 65535.
Encapsulation	Select LLC or VCMUX from the drop-down list.
QoS class	<p>A class of traffic for this connection.</p> <ul style="list-style-type: none"> • UBR (<i>Unspecified Bit Rate</i>): The UBR service is used for applications that allow various delays and losses of packets. It is appropriate to use the UBR service for text/data/image transfer applications, as well as messaging, distribution, retrieval, and remote terminal applications. • UBR with PCR (<i>Unspecified Bit Rate with Peak Cell Rate</i>): The UBR service is used for applications that allow various delays and losses of packets. The Peak Cell Rate is a determining factor in how often cells are sent in an effort to minimize lag or jitter caused by traffic inconsistencies. When you select this value from the drop-down list, the Peak cell rate field is displayed. Specify a required value (in cells per second). • CBR (<i>Constant Bit Rate</i>): This service is used for applications that require a constant data rate. It is mostly used for transferring uncompressed audio and video, e.g. videoconferencing, interactive audio (telephony), audio/video distribution (television, distance education, e-shops), and retrieval (video-on demand, audio libraries). When you select this value from the drop-down list, the Peak cell rate field is displayed. Specify a required value (in cells per second). • Non Realtime VBR (<i>Non-Real-time Variable Bit Rate</i>): This service can be used for transferring data that have critical response-time requirements, e.g. air ticket booking, bank transactions, and process monitoring. When you select this value from the drop-down list, the Peak cell rate, Sustainable cell rate, and Maximum burst size fields are displayed. Specify required values.

Parameter	Description
	<ul style="list-style-type: none"> • Realtime VBR (<i>Real-time Variable Bit Rate</i>): This service is used for delay-sensitive applications such as real time video. The Rt-VBR provides higher network flexibility than the CBR service. When you select this value from the drop-down list, the Peak cell rate, Sustainable cell rate, and Maximum burst size fields are displayed. Specify required values.
	<div style="border: 1px solid #ccc; padding: 10px;"> <p>IPv4</p> <p>IP address*</p> <hr/> <p>Subnet mask*</p> <hr/> <p>Gateway IP address*</p> <hr/> <p>Primary DNS*</p> <hr/> <p>Secondary DNS</p> <hr/> <p><small>ⓘ If the connection is created for the IPTV service only and no data on IP addressing is given by your ISP, then you can set the following values: IP address = 1.0.0.1, Netmask = 255.255.255.252, Gateway IP address = 1.0.0.2, Primary DNS server = 1.0.0.2</small></p> </div>

Figure 59. The page for creating a new **Static IPv4** connection. The **IPv4** section.

Parameter	Description
IPv4	
<i>For Static IPv4 and IPoA types</i>	
IP address	Enter an IP address for this WAN connection.
Subnet mask	Enter a subnet mask for this WAN connection.
Gateway IP address	Enter an IP address of the gateway used by this WAN connection.
Primary DNS / Secondary DNS	Enter addresses of the primary and secondary DNS servers in the relevant fields.

Parameter	Description
<i>For Dynamic IPv4 type</i>	
Obtain DNS server addresses automatically	Move the switch to the right to configure automatic assignment of DNS server addresses. Upon that the Primary DNS and Secondary DNS fields are not available for editing.
Primary DNS / Secondary DNS	Enter addresses of the primary and secondary DNS servers in the relevant fields.
Vendor ID	The identifier of your ISP. <i>Optional.</i>
Hostname	A name of the router specified by your ISP. <i>Optional.</i>

VLAN

Use VLAN

VLAN ID*

VLAN priority

0 ▼

Figure 60. The page for creating a new **Static IPv4** connection. The **VLAN** section.

Parameter	Description
VLAN	
Use VLAN	Move the switch to the right to allow the router to use tagged VLAN connections.
VLAN ID	An identifier for the VLAN. The field is displayed when the Use VLAN switch is moved to the right.
VLAN priority	A priority tag for the type of traffic transmitted. Select the needed value from the drop-down list. The list is displayed when the Use VLAN switch is moved to the right.

When all needed settings are configured, click the **APPLY** button.

Creating Dynamic IPv6 or Static IPv6 WAN Connection

On the connection creation page, in the **General Settings** section, select the relevant value from the **Connection type** drop-down list and specify the needed values.

The screenshot shows the 'General Settings' section of a web interface. It contains the following elements:

- Connection type:** A dropdown menu with 'Static IPv6' selected.
- Interface:** A dropdown menu with 'Add new ATM PVC' selected.
- Connection name*:** A text input field containing 'statipv6_9'.
- Enable connection:** A toggle switch that is turned on (blue).
- Firewall:** A toggle switch that is turned on (blue). Below it is a note: 'Protection against external connections for the LAN devices. For security reasons, it is recommended not to disable.'
- Ping:** A toggle switch that is turned off (grey).
- WAN Ping Respond:** A toggle switch that is turned off (grey). Below it is a note: 'WAN Ping Respond allows the device to respond to ping requests from the external network.'
- RIP:** A toggle switch that is turned off (grey).

Figure 61. The page for creating a new **Static IPv6** connection. The **General Settings** section.

Parameter	Description
General Settings	
Interface	A physical interface to which the new connection will be assigned. In order to create an Ethernet WAN connection, select the value corresponding to the LAN port specified as the WAN port. In order to create a VDSL WAN connection, select the PTM value. In order to create an ADSL WAN connection, select the value corresponding to the existing interface or the Add new ATM PVC value for creating a new interface at the physical layer.
Connection name	A name for the connection for easier identification.
Enable connection	Move the switch to the right to enable the connection. Move the switch to the left to disable the connection.

Parameter	Description
Firewall	If the switch is moved to the right, protection against external connections for the LAN devices is enabled (for example, against attempts to get information about the LAN devices or to hack a device from the LAN). For security reasons, it is recommended not to disable this function.
Ping	If the switch is moved to the right, the router responds to ping requests from the external network through this connection. For security reasons, it is recommended to disable this function.
RIP	Move the switch to the right to allow using RIP for this connection.

The **Ethernet** section is displayed for Ethernet WAN connections.

Figure 62. The page for creating a new **Static IPv6** connection. The **Ethernet** section.

Parameter	Description
Ethernet	
MAC address	<p>A MAC address assigned to the interface. This parameter is mandatory if your ISP uses MAC address binding. In the field, enter the MAC address registered by your ISP upon concluding the agreement.</p> <p>To set the MAC address of the network interface card (of the computer that is being used to configure the router at the moment) as the MAC address of the WAN interface, move the Clone MAC address of your NIC switch to the right. When the switch is moved to the right, the field is unavailable for editing.</p> <p>To set the router's MAC address, click the RESTORE DEFAULT MAC ADDRESS button (the button is available when the switch is moved to the right).</p>
MTU	The maximum size of units transmitted by the interface.

The **PTM** section is displayed for VDSL WAN connections.

PTM

MAC address
 40:16:7E:36:E2:C2

Clone MAC address of your NIC (90:2B:34:A5:A8:FB)

RESTORE DEFAULT MAC ADDRESS

Figure 63. The page for creating a new **Static IPv6** connection. The **PTM** section.

Parameter	Description
PTM	
MAC address	<p>A MAC address assigned to the interface. This parameter is mandatory if your ISP uses MAC address binding. In the field, enter the MAC address registered by your ISP upon concluding the agreement.</p> <p>To set the MAC address of the network interface card (of the computer that is being used to configure the router at the moment) as the MAC address of the WAN interface, move the Clone MAC address of your NIC switch to the right. When the switch is moved to the right, the field is unavailable for editing.</p> <p>To set the router's MAC address, click the RESTORE DEFAULT MAC ADDRESS button (the button is available when the switch is moved to the right).</p>

The **ATM** section is displayed for ADSL WAN connections.

ATM

VPI (0-255)*
 0

VCI (32 - 65535)*
 35

Encapsulation
 LLC

QoS class
 UBR

Figure 64. The page for creating a new **Static IPv6** connection. The **ATM** section.

Parameter	Description
ATM	
VPI	Virtual Path Identifier. The valid range is from 0 to 255.
VCI	Virtual Circuit Identifier. The valid range is from 32 to 65535.
Encapsulation	Select LLC or VCMUX from the drop-down list.
QoS class	<p>A class of traffic for this connection.</p> <ul style="list-style-type: none"> • UBR (<i>Unspecified Bit Rate</i>): The UBR service is used for applications that allow various delays and losses of packets. It is appropriate to use the UBR service for text/data/image transfer applications, as well as messaging, distribution, retrieval, and remote terminal applications. • UBR with PCR (<i>Unspecified Bit Rate with Peak Cell Rate</i>): The UBR service is used for applications that allow various delays and losses of packets. The Peak Cell Rate is a determining factor in how often cells are sent in an effort to minimize lag or jitter caused by traffic inconsistencies. When you select this value from the drop-down list, the Peak cell rate field is displayed. Specify a required value (in cells per second).

Parameter	Description
	<ul style="list-style-type: none">• CBR (<i>Constant Bit Rate</i>): This service is used for applications that require a constant data rate. It is mostly used for transferring uncompressed audio and video, e.g. videoconferencing, interactive audio (telephony), audio/video distribution (television, distance education, e-shops), and retrieval (video-on demand, audio libraries). When you select this value from the drop-down list, the Peak cell rate field is displayed. Specify a required value (in cells per second).• Non Realtime VBR (<i>Non-Real-time Variable Bit Rate</i>): This service can be used for transferring data that have critical response-time requirements, e.g. air ticket booking, bank transactions, and process monitoring. When you select this value from the drop-down list, the Peak cell rate, Sustainable cell rate, and Maximum burst size fields are displayed. Specify required values.• Realtime VBR (<i>Real-time Variable Bit Rate</i>): This service is used for delay-sensitive applications such as real time video. The Rt-VBR provides higher network flexibility than the CBR service. When you select this value from the drop-down list, the Peak cell rate, Sustainable cell rate, and Maximum burst size fields are displayed. Specify required values.

IPv6

IPv6 address*

Prefix*

Gateway IPv6 address*

Primary IPv6 DNS server*

Secondary IPv6 DNS server

Figure 65. The page for creating a new **Static IPv6** connection. The **IPv6** section.

Parameter	Description
IPv6	
<i>For Static IPv6 type</i>	
IPv6 address	Enter an IPv6 address for this WAN connection.
Prefix	The length of the subnet prefix. The value 64 is used usually.
Gateway IPv6 address	Enter an IPv6 address of the gateway used by this WAN connection.
Primary IPv6 DNS server / Secondary IPv6 DNS server	Enter addresses of the primary and secondary IPv6 DNS servers in the relevant fields.
<i>For Dynamic IPv6 type</i>	
Get IPv6	Select a method for IPv6 address assignment from the drop-down list or leave the Automatically value.
Gateway by SLAAC	Move the switch to the right to automatically assign the IPv6 gateway address with help of SLAAC (<i>Stateless Address Autoconfiguration</i>).
Gateway IPv6 address	The address of the IPv6 gateway. The field is available for editing if the Gateway by SLAAC switch is moved to the left.
Obtain DNS server addresses automatically	Move the switch to the right to configure automatic assignment of IPv6 DNS server addresses. Upon that the Primary IPv6 DNS server and Secondary IPv6 DNS server fields are not available for editing.

Parameter	Description
Primary IPv6 DNS server / Secondary IPv6 DNS server	Enter addresses of the primary and secondary IPv6 DNS servers in the relevant fields.

VLAN

Use VLAN

VLAN ID*

VLAN priority

0 ▼

Figure 66. The page for creating a new **Static IPv6** connection. The **VLAN** section.

Parameter	Description
VLAN	
Use VLAN	Move the switch to the right to allow the router to use tagged VLAN connections.
VLAN ID	An identifier for the VLAN. The field is displayed when the Use VLAN switch is moved to the right.
VLAN priority	A priority tag for the type of traffic transmitted. Select the needed value from the drop-down list. The list is displayed when the Use VLAN switch is moved to the right.

When all needed settings are configured, click the **APPLY** button.

Creating PPPoE or PPPoA WAN Connection

On the connection creation page, in the **General Settings** section, select the relevant value from the **Connection type** drop-down list and specify the needed values.

The screenshot shows the 'General Settings' section of a web interface. It contains the following elements:

- Connection type:** A dropdown menu with 'PPPoE' selected.
- Interface:** A dropdown menu with 'Add new ATM PVC' selected.
- Connection name:** A text input field containing 'pppoe_3'.
- Enable connection:** A toggle switch that is turned on (blue).
- NAT:** A toggle switch that is turned on (blue). Below it is a note: 'The network address translation function. It is recommended not to disable unless your ISP requires it.'
- Firewall:** A toggle switch that is turned on (blue). Below it is a note: 'Protection against external connections for the LAN devices. For security reasons, it is recommended not to disable.'
- Ping:** A toggle switch that is turned off (grey).
- RIP:** A toggle switch that is turned off (grey). Below it is a note: 'WAN Ping Respond allows the device to respond to ping requests from the external network.'

Figure 67. The page for creating a new **PPPoE** connection. The **General Settings** section.

Parameter	Description
General Settings	
Interface	<p><i>For the PPPoE type only.</i></p> <p>A physical interface to which the new connection will be assigned.</p> <p>In order to create an Ethernet WAN connection, select the value corresponding to the LAN port specified as the WAN port.</p> <p>In order to create a VDSL WAN connection, select the PTM value.</p> <p>In order to create an ADSL WAN connection, select the value corresponding to the existing interface or the Add new ATM PVC value for creating a new interface at the physical layer.</p>
Connection name	A name for the connection for easier identification.
Enable connection	<p>Move the switch to the right to enable the connection.</p> <p>Move the switch to the left to disable the connection.</p>

Parameter	Description
NAT	If the switch is moved to the right, the network address translation function for IPv4 is enabled. Do not disable the function unless your ISP requires this.
Firewall	If the switch is moved to the right, protection against external connections for the LAN devices is enabled (for example, against attempts to get information about the LAN devices or to hack a device from the LAN). For security reasons, it is recommended not to disable this function.
Ping	If the switch is moved to the right, the router responds to ping requests from the external network through this connection. For security reasons, it is recommended to disable this function.
RIP	Move the switch to the right to allow using RIP for this connection.

The **Ethernet** section is displayed for Ethernet WAN connections.

Ethernet

MAC address*
 40:16:7e:36:e2:c2

Clone MAC address of your NIC (90:2B:34:A5:A8:FB)

RESTORE DEFAULT MAC ADDRESS

MTU*
 1500

Figure 68. The page for creating a new **PPPoE** connection. The **Ethernet** section.

Parameter	Description
Ethernet	
MAC address	<p>A MAC address assigned to the interface. This parameter is mandatory if your ISP uses MAC address binding. In the field, enter the MAC address registered by your ISP upon concluding the agreement.</p> <p>To set the MAC address of the network interface card (of the computer that is being used to configure the router at the moment) as the MAC address of the WAN interface, move the Clone MAC address of your NIC switch to the right. When the switch is moved to the right, the field is unavailable for editing.</p> <p>To set the router's MAC address, click the RESTORE DEFAULT MAC ADDRESS button (the button is available when the switch is moved to the right).</p>
MTU	The maximum size of units transmitted by the interface.

The **PTM** section is displayed for VDSL WAN connections.

PTM

MAC address
 40:16:7E:36:E2:C2

Clone MAC address of your NIC (90:2B:34:A5:A8:FB)

[RESTORE DEFAULT MAC ADDRESS](#)

Figure 69. The page for creating a new **PPPoE** connection. The **PTM** section.

Parameter	Description
PTM	
MAC address	<p>A MAC address assigned to the interface. This parameter is mandatory if your ISP uses MAC address binding. In the field, enter the MAC address registered by your ISP upon concluding the agreement.</p> <p>To set the MAC address of the network interface card (of the computer that is being used to configure the router at the moment) as the MAC address of the WAN interface, move the Clone MAC address of your NIC switch to the right. When the switch is moved to the right, the field is unavailable for editing.</p> <p>To set the router's MAC address, click the RESTORE DEFAULT MAC ADDRESS button (the button is available when the switch is moved to the right).</p>

The **ATM** section is displayed for ADSL WAN connections.

ATM

VPI (0-255)*
 0

VCI (32 - 65535)*
 35

Encapsulation
 LLC

QoS class
 UBR

Figure 70. The page for creating a new **PPPoE** connection. The **ATM** section.

Parameter	Description
ATM	
VPI	Virtual Path Identifier. The valid range is from 0 to 255.
VCI	Virtual Circuit Identifier. The valid range is from 32 to 65535.
Encapsulation	Select LLC or VCMUX from the drop-down list.
QoS class	<p>A class of traffic for this connection.</p> <ul style="list-style-type: none"> • UBR (<i>Unspecified Bit Rate</i>): The UBR service is used for applications that allow various delays and losses of packets. It is appropriate to use the UBR service for text/data/image transfer applications, as well as messaging, distribution, retrieval, and remote terminal applications. • UBR with PCR (<i>Unspecified Bit Rate with Peak Cell Rate</i>): The UBR service is used for applications that allow various delays and losses of packets. The Peak Cell Rate is a determining factor in how often cells are sent in an effort to minimize lag or jitter caused by traffic inconsistencies. When you select this value from the drop-down list, the Peak cell rate field is displayed. Specify a required value (in cells per second).

Parameter	Description
	<ul style="list-style-type: none"> • CBR (<i>Constant Bit Rate</i>): This service is used for applications that require a constant data rate. It is mostly used for transferring uncompressed audio and video, e.g. videoconferencing, interactive audio (telephony), audio/video distribution (television, distance education, e-shops), and retrieval (video-on demand, audio libraries). When you select this value from the drop-down list, the Peak cell rate field is displayed. Specify a required value (in cells per second). • Non Realtime VBR (<i>Non-Real-time Variable Bit Rate</i>): This service can be used for transferring data that have critical response-time requirements, e.g. air ticket booking, bank transactions, and process monitoring. When you select this value from the drop-down list, the Peak cell rate, Sustainable cell rate, and Maximum burst size fields are displayed. Specify required values. • Realtime VBR (<i>Real-time Variable Bit Rate</i>): This service is used for delay-sensitive applications such as real time video. The Rt-VBR provides higher network flexibility than the CBR service. When you select this value from the drop-down list, the Peak cell rate, Sustainable cell rate, and Maximum burst size fields are displayed. Specify required values.

PPP

Without authorization

Username*

Password* 🔒

Service name

MTU*

1492

Authentication protocol

AUTO ▼

Keep Alive

LCP interval*

30

LCP fails*

3

Dial on demand

Maximum idle time (in seconds) 🔒

PPP IP extension

PPP debug

Figure 71. The page for creating a new **PPPoE** connection. The **PPP** section.

Parameter	Description
PPP	
Without authorization	Move the switch to the right if you don't need to enter a username and password to access the Internet.
Username	A username (login) to access the Internet.
Password	A password to access the Internet. Click the Show icon (🔒) to display the entered password.
Service name	The name of the PPPoE authentication server.
MTU	The maximum size of units transmitted by the interface.
Authentication protocol	Select a required authentication method from the drop-down list or leave the AUTO value.

Parameter	Description
Keep Alive	If the switch is moved to the right, the router sends echo requests in order to check the connection state. After several consecutive unanswered requests the router restarts the PPP connection. If needed, change the interval (in seconds) between requests and the number of unanswered requests in the LCP interval and LCP fails fields correspondingly or leave the default values.
Dial on demand	Move the switch to the right if you want the router to establish connection to the Internet on demand. In the Maximum idle time field, specify a period of inactivity (in seconds) after which the connection should be terminated.
PPP IP extension	This option is used by some ISPs. Contact your ISP to clarify if this option needs to be enabled. If it is required, move the switch to the right.
PPP debug	Move the switch to the right if you want to log all data on this PPP connection debugging. Upon that the Debugging messages value should be selected from the Level drop-down list on the System / Log page (see the Log section, page 166).

VLAN

Use VLAN

VLAN ID*

VLAN priority

0 ▼

Figure 72. The page for creating a new **PPPoE** connection. The **VLAN** section.

Parameter	Description
VLAN	
Use VLAN	Move the switch to the right to allow the router to use tagged VLAN connections.
VLAN ID	An identifier for the VLAN. The field is displayed when the Use VLAN switch is moved to the right.
VLAN priority	A priority tag for the type of traffic transmitted. Select the needed value from the drop-down list. The list is displayed when the Use VLAN switch is moved to the right.

When all needed settings are configured, click the **APPLY** button.

Creating PPPoE IPv6 or PPPoE Dual Stack WAN Connection

On the connection creation page, in the **General Settings** section, select the relevant value from the **Connection type** drop-down list and specify the needed values.

The screenshot shows the 'General Settings' section of a web interface. It contains the following elements:

- Connection type:** A dropdown menu with 'PPPoE IPv6' selected.
- Interface:** A dropdown menu with 'Add new ATM PVC' selected.
- Connection name*:** A text input field containing 'pppoev6_98'.
- Enable connection:** A toggle switch that is turned on (blue).
- Firewall:** A toggle switch that is turned on (blue).
- Ping:** A toggle switch that is turned off (grey).
- RIP:** A toggle switch that is turned off (grey).

Information icons (i) are present next to the Firewall, Ping, and RIP options, with the following text:

- Firewall:** Protection against external connections for the LAN devices. For security reasons, it is recommended not to disable.
- Ping:** WAN Ping Respond allows the device to respond to ping requests from the external network.

Figure 73. The page for creating a new **PPPoE IPv6** connection. The **General Settings** section.

Parameter	Description
General Settings	
Interface	A physical interface to which the new connection will be assigned. In order to create an Ethernet WAN connection, select the value corresponding to the LAN port specified as the WAN port. In order to create a VDSL WAN connection, select the PTM value. In order to create an ADSL WAN connection, select the value corresponding to the existing interface or the Add new ATM PVC value for creating a new interface at the physical layer.
Connection name	A name for the connection for easier identification.
Enable connection	Move the switch to the right to enable the connection. Move the switch to the left to disable the connection.
NAT	<i>For the PPPoE Dual Stack type only.</i> If the switch is moved to the right, the network address translation function for IPv4 is enabled. Do not disable the function unless your ISP requires this.

Parameter	Description
Firewall	If the switch is moved to the right, protection against external connections for the LAN devices is enabled (for example, against attempts to get information about the LAN devices or to hack a device from the LAN). For security reasons, it is recommended not to disable this function.
Ping	If the switch is moved to the right, the router responds to ping requests from the external network through this connection. For security reasons, it is recommended to disable this function.
RIP	Move the switch to the right to allow using RIP for this connection.

The **Ethernet** section is displayed for Ethernet WAN connections.

Figure 74. The page for creating a new **PPPoE IPv6** connection. The **Ethernet** section.

Parameter	Description
Ethernet	
MAC address	<p>A MAC address assigned to the interface. This parameter is mandatory if your ISP uses MAC address binding. In the field, enter the MAC address registered by your ISP upon concluding the agreement.</p> <p>To set the MAC address of the network interface card (of the computer that is being used to configure the router at the moment) as the MAC address of the WAN interface, move the Clone MAC address of your NIC switch to the right. When the switch is moved to the right, the field is unavailable for editing.</p> <p>To set the router's MAC address, click the RESTORE DEFAULT MAC ADDRESS button (the button is available when the switch is moved to the right).</p>
MTU	The maximum size of units transmitted by the interface.

The **PTM** section is displayed for VDSL WAN connections.

PTM

MAC address
 40:16:7E:36:E2:C2

Clone MAC address of your NIC (90:2B:34:A5:A8:FB)

RESTORE DEFAULT MAC ADDRESS

Figure 75. The page for creating a new **PPPoE IPv6** connection. The **PTM** section.

Parameter	Description
PTM	
MAC address	<p>A MAC address assigned to the interface. This parameter is mandatory if your ISP uses MAC address binding. In the field, enter the MAC address registered by your ISP upon concluding the agreement.</p> <p>To set the MAC address of the network interface card (of the computer that is being used to configure the router at the moment) as the MAC address of the WAN interface, move the Clone MAC address of your NIC switch to the right. When the switch is moved to the right, the field is unavailable for editing.</p> <p>To set the router's MAC address, click the RESTORE DEFAULT MAC ADDRESS button (the button is available when the switch is moved to the right).</p>

The **ATM** section is displayed for ADSL WAN connections.

ATM

VPI (0-255)*
 0

VCI (32 - 65535)*
 35

Encapsulation
 LLC ▼

QoS class
 UBR ▼

Figure 76. The page for creating a new **PPPoE IPv6** connection. The **ATM** section.

Parameter	Description
ATM	
VPI	Virtual Path Identifier. The valid range is from 0 to 255.
VCI	Virtual Circuit Identifier. The valid range is from 32 to 65535.
Encapsulation	Select LLC or VCMUX from the drop-down list.
QoS class	<p>A class of traffic for this connection.</p> <ul style="list-style-type: none"> • UBR (<i>Unspecified Bit Rate</i>): The UBR service is used for applications that allow various delays and losses of packets. It is appropriate to use the UBR service for text/data/image transfer applications, as well as messaging, distribution, retrieval, and remote terminal applications. • UBR with PCR (<i>Unspecified Bit Rate with Peak Cell Rate</i>): The UBR service is used for applications that allow various delays and losses of packets. The Peak Cell Rate is a determining factor in how often cells are sent in an effort to minimize lag or jitter caused by traffic inconsistencies. When you select this value from the drop-down list, the Peak cell rate field is displayed. Specify a required value (in cells per second). • CBR (<i>Constant Bit Rate</i>): This service is used for applications that require a constant data rate. It is mostly used for transferring uncompressed audio and video, e.g. videoconferencing, interactive audio (telephony), audio/video distribution (television, distance education, e-shops), and retrieval (video-on demand, audio libraries). When you select this value from the drop-down list, the Peak cell rate field is displayed. Specify a required value (in cells per second). • Non Realtime VBR (<i>Non-Real-time Variable Bit Rate</i>): This service can be used for transferring data that have critical response-time requirements, e.g. air ticket booking, bank transactions, and process monitoring. When you select this value from the drop-down list, the Peak cell rate, Sustainable cell rate, and Maximum burst size fields are displayed. Specify required values.

Parameter	Description
	<ul style="list-style-type: none"> • Realtime VBR (<i>Real-time Variable Bit Rate</i>): This service is used for delay-sensitive applications such as real time video. The Rt-VBR provides higher network flexibility than the CBR service. When you select this value from the drop-down list, the Peak cell rate, Sustainable cell rate, and Maximum burst size fields are displayed. Specify required values.

PPP

Without authorization

Username*

Password* 🔒

Service name

MTU*

1492

Authentication protocol

AUTO ▼

Keep Alive

LCP interval*

30

LCP fails*

3

Dial on demand

Maximum idle time (in seconds) 🔒

PPP IP extension

PPP debug

Figure 77. The page for creating a new **PPPoE IPv6** connection. The **PPP** section.

Parameter	Description
PPP	
Without authorization	Move the switch to the right if you don't need to enter a username and password to access the Internet.
Username	A username (login) to access the Internet.

Parameter	Description
Password	A password to access the Internet. Click the Show icon (🔓) to display the entered password.
Service name	The name of the PPPoE authentication server.
MTU	The maximum size of units transmitted by the interface.
Authentication protocol	Select a required authentication method from the drop-down list or leave the AUTO value.
Keep Alive	If the switch is moved to the right, the router sends echo requests in order to check the connection state. After several consecutive unanswered requests the router restarts the PPP connection. If needed, change the interval (in seconds) between requests and the number of unanswered requests in the LCP interval and LCP fails fields correspondingly or leave the default values.
Dial on demand	Move the switch to the right if you want the router to establish connection to the Internet on demand. In the Maximum idle time field, specify a period of inactivity (in seconds) after which the connection should be terminated.
PPP IP extension	This option is used by some ISPs. Contact your ISP to clarify if this option needs to be enabled. If it is required, move the switch to the right.
PPP debug	Move the switch to the right if you want to log all data on this PPP connection debugging. Upon that the Debugging messages value should be selected from the Level drop-down list on the System / Log page (see the Log section, page 166).

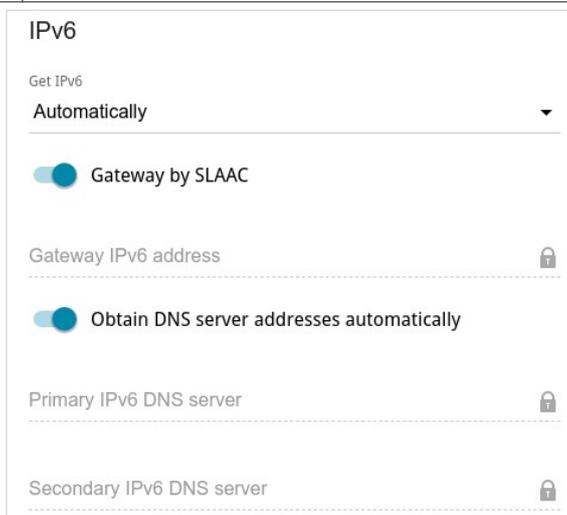


Figure 78. The page for creating a new **PPPoE Pv6** connection. The **IPv6** section.

Parameter	Description
IPv6	
Get IPv6	Select a method for IPv6 address assignment from the drop-down list or leave the Automatically value.
Gateway by SLAAC	Move the switch to the right to automatically assign the IPv6 gateway address with help of SLAAC (<i>Stateless Address Autoconfiguration</i>).
Gateway IPv6 address	The address of the IPv6 gateway. The field is available for editing if the Gateway by SLAAC switch is moved to the left.
Obtain DNS server addresses automatically	Move the switch to the right to configure automatic assignment of IPv6 DNS server addresses. Upon that the Primary IPv6 DNS server and Secondary IPv6 DNS server fields are not available for editing.
Primary IPv6 DNS server / Secondary IPv6 DNS server	Enter addresses of the primary and secondary IPv6 DNS servers in the relevant fields.

VLAN

Use VLAN

VLAN ID*

VLAN priority

0 ▼

Figure 79. The page for creating a new **PPPoE IPv6** connection. The **VLAN** section.

Parameter	Description
VLAN	
Use VLAN	Move the switch to the right to allow the router to use tagged VLAN connections.
VLAN ID	An identifier for the VLAN. The field is displayed when the Use VLAN switch is moved to the right.
VLAN priority	A priority tag for the type of traffic transmitted. Select the needed value from the drop-down list. The list is displayed when the Use VLAN switch is moved to the right.

When all needed settings are configured, click the **APPLY** button.

Creating Bridge WAN Connection

On the connection creation page, go to the **General Settings** tab. Then select the relevant value from the **Connection type** drop-down list and specify the needed values.

Figure 80. The page for creating a new **Bridge** connection. The **General Settings** section.

Parameter	Description
General Settings	
Interface	<p>A physical interface to which the new connection will be assigned.</p> <p>In order to create an Ethernet WAN connection, select the value corresponding to the LAN port specified as the WAN port.</p> <p>In order to create a VDSL WAN connection, select the PTM value.</p> <p>In order to create an ADSL WAN connection, select the value corresponding to the existing interface or the Add new ATM PVC value for creating a new interface at the physical layer.</p>
Connection name	A name for the connection for easier identification.
Enable connection	<p>Move the switch to the right to enable the connection.</p> <p>Move the switch to the left to disable the connection.</p>

The **Ethernet** section is displayed for Ethernet WAN connections.

Ethernet

MAC address*
 40:16:7e:36:e2:c2

Clone MAC address of your NIC (90:2B:34:A5:A8:FB)

RESTORE DEFAULT MAC ADDRESS

MTU*
 1500

Figure 81. The page for creating a new **Bridge** connection. The **Ethernet** section.

Parameter	Description
Ethernet	
MAC address	<p>A MAC address assigned to the interface. This parameter is mandatory if your ISP uses MAC address binding. In the field, enter the MAC address registered by your ISP upon concluding the agreement.</p> <p>To set the MAC address of the network interface card (of the computer that is being used to configure the router at the moment) as the MAC address of the WAN interface, move the Clone MAC address of your NIC switch to the right. When the switch is moved to the right, the field is unavailable for editing.</p> <p>To set the router's MAC address, click the RESTORE DEFAULT MAC ADDRESS button (the button is available when the switch is moved to the right).</p>
MTU	The maximum size of units transmitted by the interface.

The **PTM** section is displayed for VDSL WAN connections.

PTM

MAC address
 40:16:7E:36:E2:C2

Clone MAC address of your NIC (90:2B:34:A5:A8:FB)

RESTORE DEFAULT MAC ADDRESS

Figure 82. The page for creating a new **Bridge** connection. The **PTM** section.

Parameter	Description
PTM	
MAC address	<p>A MAC address assigned to the interface. This parameter is mandatory if your ISP uses MAC address binding. In the field, enter the MAC address registered by your ISP upon concluding the agreement.</p> <p>To set the MAC address of the network interface card (of the computer that is being used to configure the router at the moment) as the MAC address of the WAN interface, move the Clone MAC address of your NIC switch to the right. When the switch is moved to the right, the field is unavailable for editing.</p> <p>To set the router's MAC address, click the RESTORE DEFAULT MAC ADDRESS button (the button is available when the switch is moved to the right).</p>

The **ATM** section is displayed for ADSL WAN connections.

ATM

VPI (0-255)*
 0

VCI (32 - 65535)*
 35

Encapsulation
 LLC ▼

QoS class
 UBR ▼

Figure 83. The page for creating a new **Bridge** connection. The **ATM** section.

Parameter	Description
ATM	
VPI	Virtual Path Identifier. The valid range is from 0 to 255.
VCI	Virtual Circuit Identifier. The valid range is from 32 to 65535.
Encapsulation	Select LLC or VCMUX from the drop-down list.
QoS class	<p>A class of traffic for this connection.</p> <ul style="list-style-type: none"> • UBR (<i>Unspecified Bit Rate</i>): The UBR service is used for applications that allow various delays and losses of packets. It is appropriate to use the UBR service for text/data/image transfer applications, as well as messaging, distribution, retrieval, and remote terminal applications. • UBR with PCR (<i>Unspecified Bit Rate with Peak Cell Rate</i>): The UBR service is used for applications that allow various delays and losses of packets. The Peak Cell Rate is a determining factor in how often cells are sent in an effort to minimize lag or jitter caused by traffic inconsistencies. When you select this value from the drop-down list, the Peak cell rate field is displayed. Specify a required value (in cells per second).

Parameter	Description
	<ul style="list-style-type: none"> • CBR (<i>Constant Bit Rate</i>): This service is used for applications that require a constant data rate. It is mostly used for transferring uncompressed audio and video, e.g. videoconferencing, interactive audio (telephony), audio/video distribution (television, distance education, e-shops), and retrieval (video-on demand, audio libraries). When you select this value from the drop-down list, the Peak cell rate field is displayed. Specify a required value (in cells per second). • Non Realtime VBR (<i>Non-Real-time Variable Bit Rate</i>): This service can be used for transferring data that have critical response-time requirements, e.g. air ticket booking, bank transactions, and process monitoring. When you select this value from the drop-down list, the Peak cell rate, Sustainable cell rate, and Maximum burst size fields are displayed. Specify required values. • Realtime VBR (<i>Real-time Variable Bit Rate</i>): This service is used for delay-sensitive applications such as real time video. The Rt-VBR provides higher network flexibility than the CBR service. When you select this value from the drop-down list, the Peak cell rate, Sustainable cell rate, and Maximum burst size fields are displayed. Specify required values.

VLAN

Use VLAN

VLAN ID*

VLAN priority

0 ▼

Figure 84. The page for creating a new **Bridge** connection. The **VLAN** section.

Parameter	Description
VLAN	
Use VLAN	Move the switch to the right to allow the router to use tagged VLAN connections.
VLAN ID	An identifier for the VLAN. The field is displayed when the Use VLAN switch is moved to the right.

Parameter	Description
VLAN priority	A priority tag for the type of traffic transmitted. Select the needed value from the drop-down list. The list is displayed when the Use VLAN switch is moved to the right.

When all needed settings are configured, click the **APPLY** button.

LAN

To configure the router's local interface, go to the **Connections Setup / LAN** page.

IPv4

Go to the **IPv4** tab to change IPv4 address, configure the built-in DHCP server, or specify MAC address and IP address pairs.

Local IP Address

IP address*

192.168.1.1

Mask*

255.255.255.0

Hostname

dlinkrouter.local

ⓘ Specify a domain name ending with .local. In order to access the web-based interface using the domain name, enter this name with a dot and slash at the end in the address bar of the web browser (for example,

Figure 85. Configuring the local interface. The IPv4 tab. The Local IP Address section.

Parameter	Description
Local IP Address	
IP address	The IP address of the router in the local subnet. By default, the following value is specified: 192 . 168 . 1 . 1 .
Mask	The mask of the local subnet. By default, the following value is specified: 255 . 255 . 255 . 0 .
Hostname	The name of the device assigned to its IPv4 address in the local subnet.

Dynamic IP Addresses

Mode of IPv4 address assignment
DHCP ▼

Start IP*
192.168.1.100

End IP*
192.168.1.200

SELECT ADDRESS RANGE

Lease time (in minutes)*
1440

DNS relay

ⓘ Assigns the LAN IP address of the device as the DNS server for connected clients.

Figure 86. Configuring the local interface. The IPv4 tab. The **Dynamic IP Addresses** section.

Parameter	Description
Dynamic IP Addresses	
Mode of IPv4 address assignment	<p>An operating mode of the router's DHCP server.</p> <ul style="list-style-type: none"> Disable: The router's DHCP server is disabled, clients' IP addresses are assigned manually. DHCP: The router assigns IP addresses to clients automatically in accordance with the specified parameters. When this value is selected, the Start IP, End IP, Lease time fields, the SELECT ADDRESS RANGE button, and the DNS relay switch are displayed on the tab. Also when this value is selected, the DHCP Options and Static IP Addresses sections are displayed on the tab. Relay: An external DHCP server is used to assign IP addresses to clients. When this value is selected, the External DHCP server IP and Option 82 Remote ID fields are displayed on the tab.
Start IP	The start IP address of the address range used by the DHCP server to distribute IP addresses to clients.
End IP	The end IP address of the address range used by the DHCP server to distribute IP addresses to clients.

Parameter	Description
SELECT ADDRESS RANGE	Use the button to set one of the available IP address ranges. In the window displayed, select the needed range and click the SAVE button to automatically fill in the Start IP and End IP fields.
Lease time	The lifetime of IP addresses leased by the DHCP server. At the end of this period the leased IP address is revoked and can be distributed to another device, unless the previous device has confirmed the need to keep the address.
DNS relay	Move the switch to the right so that the devices connected to the router obtain the address of the router as the DNS server address. Move the switch to the left so that the devices connected to the router obtain the address transmitted by the ISP or specified on the Advanced / DNS page as the DNS server address.
External DHCP server IP	The IPv4 address of the external DHCP server which assigns IPv4 addresses to the router's clients. To specify several IPv4 addresses, click the ADD button, and in the line displayed, enter an IPv4 address. To remove the IPv4 address, click the Delete button () in the line of the address.
Option 82 Remote ID	The value of the Remote ID field of DHCP option 82 in accordance with RFC3046. Do not fill in the field unless your ISP or the administrator of the external DHCP server provided this value.

When all needed settings are configured, click the **APPLY** button.

In the **DHCP Options** section, you can change default values for some options of DHCP protocol (IP address, subnet mask, DNS servers) or specify additional parameters which the built-in DHCP server should send to clients to configure the local network.



Figure 87. Configuring the local interface. The **IPv4** tab. The section for configuring DHCP options.

To do this, click the **ADD** button ().

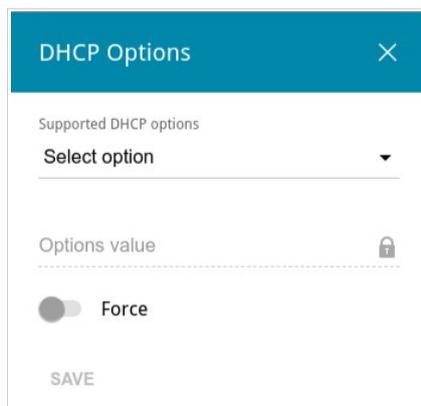


Figure 88. Configuring the local interface. The **IPv4** tab. The window for configuring a DHCP option.

In the opened window, you can specify the following parameters:

Parameter	Description
Supported DHCP options	From the drop-down list, select an option which you want to configure.
Options value	Specify the value for the selected option.
Force	<p>Move the switch to the right to let the DHCP server send the selected option regardless of the client's request.</p> <p>Move the switch to the left to let the DHCP server send the selected option only when the client requests it.</p>

After specifying the needed parameters, click the **SAVE** button.

To edit the parameters of an option, left-click the relevant line in the table. In the opened window, change the needed parameters and click the **SAVE** button.

To remove the value of an option, select the checkbox located to the left of the relevant line in the table and click the **DELETE** button (). Then click the **APPLY** button.

In the **Static IP Addresses** section, you can specify MAC address and IPv4 address pairs (set a fixed IPv4 address in the local area network for a device with a certain MAC address). The router assigns IPv4 addresses in accordance with the specified pairs only when the DHCP server is enabled (in the **Dynamic IP Addresses** section, the **DHCP** value is selected from the **Mode of IPv4 address assignment** drop-down list).

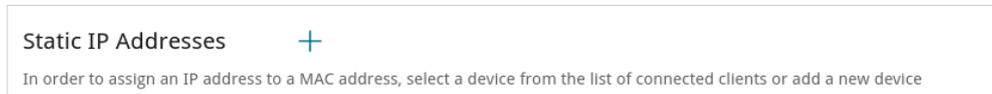


Figure 89. Configuring the local interface. The **IPv4** tab. The section for creating MAC-IPv4 pairs.

To create a MAC-IPv4 pair, click the **ADD** button (). In the opened window, fill in the **MAC address** field. You can choose a device connected to the router's LAN at the moment. To do this, select the relevant MAC address from the drop-down list (the field will be filled in automatically). Then in the **IP address** field, enter an IPv4 address which will be assigned to the device with the specified MAC address. In the **Hostname** field, specify a network name of the device for easier identification. To limit the time of the specified IPv4 address assignment, specify the required value in the **Lease time** field. Click the **SAVE** button.

To edit the settings for an existing MAC-IPv4 pair, left-click the relevant line in the table. In the opened window, change the needed parameters and click the **SAVE** button.

To remove a MAC-IPv4 pair, select the checkbox located to the left of the relevant line in the table and click the **DELETE** button (). Then click the **APPLY** button.

IPv6

Go to the **IPv6** tab to change IPv6 address of the router, configure IPv6 addresses assignment settings, or specify MAC address and IPv6 address pairs.

Local IPv6 Address

Mode of local IP address assignment
 Prefix delegation

IPv6 address
 fd01::1/64

Hostname
 dlinkrouter.local

Specify a domain name ending with .local. In order to access the web-based interface using the domain name, enter this name with a dot and slash at the end in the address bar of the web browser (for example, dlinkrouter.local/)

Figure 90. Configuring the local interface. The **IPv6** tab. The **Local IPv6 Address** section.

Parameter	Description
Local IPv6 Address	
Mode of local IP address assignment	Select the needed value from the drop-down list. <ul style="list-style-type: none"> Static: An IPv6 address and a prefix are specified manually. Prefix delegation: The router requests a prefix to configure an IPv6 address from a delegating router.
IPv6 address	The IPv6 address of the router in the local subnet. By default, the following value is specified: fd01::1 . The field is available for editing if the Static value is selected from the Mode of local IP address assignment drop-down list.
Hostname	The name of the device assigned to its IPv6 address in the local subnet.

Dynamic IP Addresses

Mode of IPv6 address assignment
Stateful

Start IP*

End IP*

SELECT ADDRESS RANGE

Lease time (in minutes)*

① Lease time will be chosen by ISP based on the delegated prefix life time.

DNS relay

① Assigns the LAN IP address of the device as the DNS server for connected clients.

Figure 91. Configuring the local interface. The IPv6 tab. The **Dynamic IP Addresses** section.

Parameter	Description
Dynamic IP Addresses	
Mode of IPv6 address assignment	Select the needed value from the drop-down list. <ul style="list-style-type: none"> Disable: Clients' IPv6 addresses are assigned manually. Stateless: Clients themselves configure IPv6 addresses using the prefix. Stateful: The built-in DHCPv6 server of the router allocates addresses from the range specified in the Start IP and End IP fields. Also when this value is selected, the Static IP Addresses section is displayed on the tab.
Start IP / End IP	The start and the end values for the latest hextet (16 bit) of the range of IPv6 addresses which the DHCPv6 server distributes to clients.
SELECT ADDRESS RANGE	Use the button to set one of the available IP address ranges. In the window displayed, select the needed range and click the SAVE button to automatically fill in the Start IP and End IP fields.
Lease time	The lifetime of IPv6 addresses provided to clients.
DNS relay	Move the switch to the right so that the devices connected to the router obtain the address of the router as the DNS server address. Move the switch to the left so that the devices connected to the router obtain the address transmitted by the ISP or specified on the Advanced / DNS page as the DNS server address.

When all needed settings are configured, click the **APPLY** button.

In the **Static IP Addresses** section, you can specify MAC address and IPv6 address pairs (set a fixed IPv6 address in the local area network for a device with a certain MAC address). The router assigns IPv6 addresses in accordance with the specified pairs only when the **Stateful** value is selected from the **Mode of IPv6 address assignment** drop-down list in the **Dynamic IP Addresses** section.

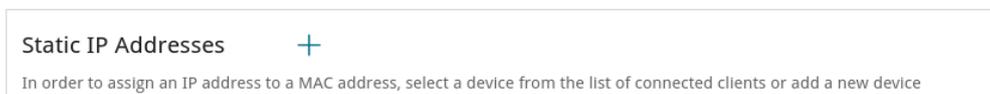


Figure 92. Configuring the local interface. The **IPv6** tab. The section for creating MAC-IPv6 pairs.

To create a MAC-IPv6 pair, click the **ADD** button (). In the opened window, fill in the **MAC address** field. You can choose a device connected to the router's LAN at the moment. To do this, select the relevant MAC address from the drop-down list (the field will be filled in automatically). Then in the **IP address** field, enter an IPv6 address which will be assigned to the device with the specified MAC address. In the **Hostname** field, specify a network name of the device for easier identification. To limit the time of the specified IPv6 address assignment, specify the required value in the **Lease time** field. Click the **SAVE** button.

To edit the settings for an existing MAC-IPv6 pair, left-click the relevant line in the table. In the opened window, change the needed parameters and click the **SAVE** button.

To remove a MAC-IPv6 pair, select the checkbox located to the left of the relevant line in the table and click the **DELETE** button (). Then click the **APPLY** button.

Wi-Fi

In this menu you can specify all needed settings for your wireless network.

Basic Settings

In the **Wi-Fi / Basic Settings** section, you can change basic parameters for the wireless interface of the router and configure the basic and additional wireless networks.

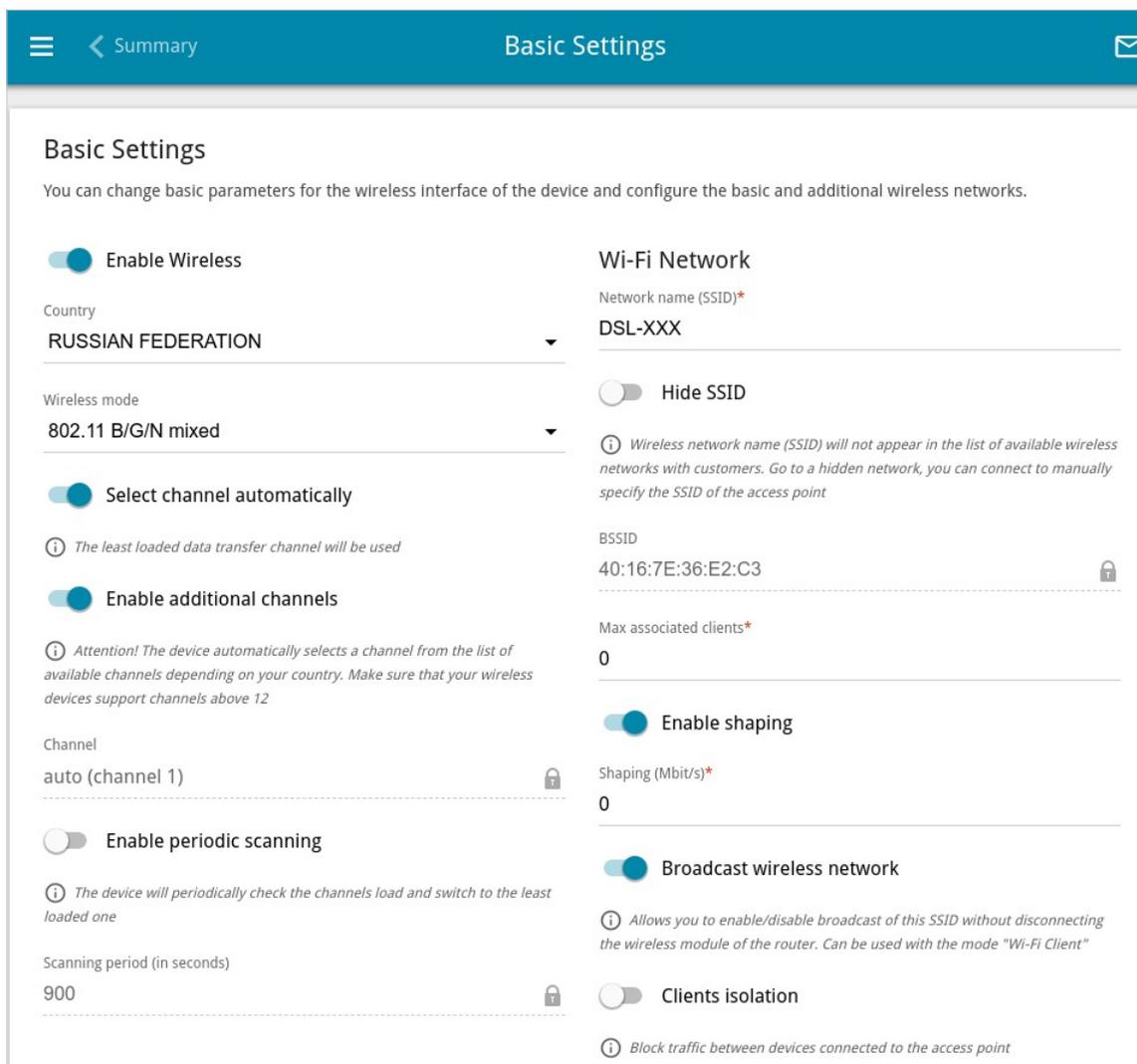


Figure 93. Basic settings of the wireless LAN.

In the **Basic Settings** section, the following parameters are available:

Parameter	Description
Enable Wireless	To enable Wi-Fi connection, move the switch to the right. To disable Wi-Fi connection, move the switch to the left.
Country	The country you are in. Select a value from the drop-down list.

Parameter	Description
Wireless mode	Operating mode of the wireless network of the router. This parameter defines standards of the devices that will be able to use your wireless network. Select a value from the drop-down list.
Select channel automatically	Move the switch to the right to let the router itself choose the channel with the least interference.
Enable additional channels	If the switch is moved to the left, the device automatically selects one of available standard channels. To use additional channels (the 12th and 13th), move the switch to the right.
Channel	The wireless channel number. To select a channel manually, left-click; in the opened window, select a channel and click the SAVE button. The action is available, when the Select channel automatically switch is moved to the left.
Enable periodic scanning	Move the switch to the right to let the router search for a free channel in certain periods of time. When the switch is moved to the right, the Scanning period field is available for editing.
Scanning period	Specify a period of time (in seconds) after which the router rescans channels.

When you have configured the parameters, click the **APPLY** button.

To edit the settings of the basic wireless network, in the **Wi-Fi Network** section, change the needed parameters and click the **APPLY** button.

Also you can create an additional wireless network. To do this, click the **ADD WI-FI NETWORK** button. On the opened page, specify the relevant parameters.

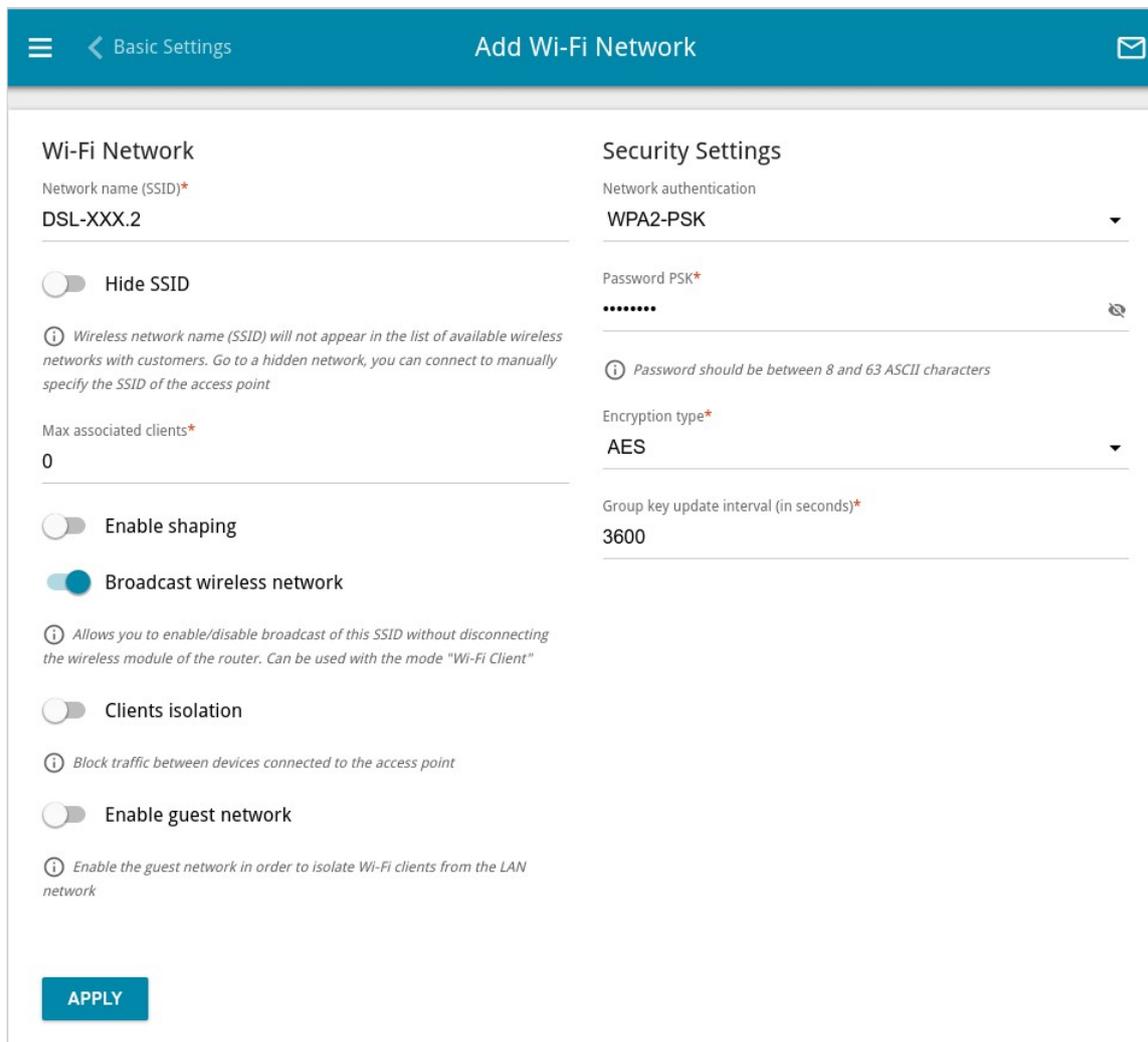


Figure 94. Creating a wireless network.

Parameter	Description
Wi-Fi Network	
Network name (SSID)	A name for the wireless network.
Hide SSID	If the switch is moved to the right, other users cannot see your Wi-Fi network. It is recommended not to hide the network in order to simplify initial configuration of the wireless network.
BSSID	The unique identifier for this wireless network. You cannot change the value of this parameter, it is determined in the device's internal settings. The field is displayed in the settings of the existing wireless network.

Parameter	Description
Max associated clients	The maximum number of devices connected to the wireless network. When the value 0 is specified, the device does not limit the number of connected clients.
Enable shaping	Move the switch to the right to limit the maximum bandwidth of the wireless network. In the Shaping field displayed, specify the maximum value of speed (Mbps). Move the switch to the left not to limit the maximum bandwidth.
Broadcast wireless network	If the wireless network broadcasting is disabled, devices cannot connect to the wireless network. Upon that DSL-224 can connect to another access point as a wireless client.
Clients isolation	Move the switch to the right to forbid wireless clients of this wireless network to communicate to each other.
Enable guest network	This function is available for the additional network. Move the switch to the right if you want the devices connected to the additional network to be isolated from the devices and resources of the router's LAN.

In the **Security Settings** section, you can change security settings of the wireless network.

By default, the **WPA2-PSK** network authentication type of the wireless network is specified. WPS PIN from the barcode label is used as the network key.

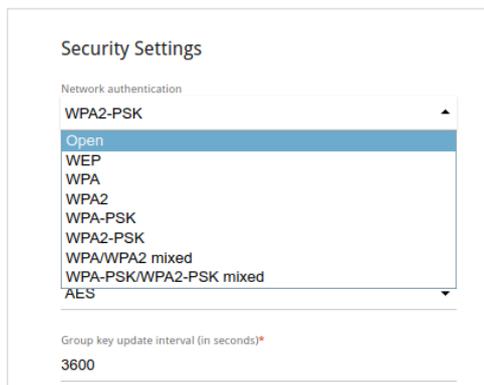


Figure 95. Network authentication types supported by the router.

The router supports the following authentication types:

Authentication type	Description
Open	Open authentication (with WEP encryption for wireless network modes not supporting 802.11n devices).

Authentication type	Description
WEP	Authentication with a shared key with WEP encryption. This authentication type is not available when a mode supporting 802.11n devices is selected from the Wireless mode drop-down list on the Wi-Fi / Basic Settings page.
WPA	WPA-based authentication using a RADIUS server.
WPA-PSK	WPA-based authentication using a PSK.
WPA2	WPA2-based authentication using a RADIUS server.
WPA2-PSK	WPA2-based authentication using a PSK.
WPA/WPA2 mixed	A mixed type of authentication. When this value is selected, devices using the WPA authentication type and devices using the WPA2 authentication type can connect to the wireless network.
WPA-PSK/WPA2-PSK mixed	A mixed type of authentication. When this value is selected, devices using the WPA-PSK authentication type and devices using the WPA2-PSK authentication type can connect to the wireless network.

 The **WPA**, **WPA2**, and **WPA/WPA2 mixed** authentication types require a RADIUS server.

When the **Open** or **WEP** value is selected, the following settings are displayed on the page (unavailable for the wireless network operating modes which support the standard 802.11n):

The screenshot shows the 'Security Settings' section of a web interface. Under 'Network authentication', the 'Open' option is selected in a dropdown menu. Below this, there is a toggle switch for 'Enable encryption WEP' which is turned on. The 'Default key ID' is set to '1' in a dropdown menu. A note below states: 'It is recommended to use the first key by default to ensure compatibility with many devices.' There is also a toggle switch for 'Encryption key WEP as HEX' which is turned off. A note below states: 'Length of WEP key should be 5 or 13 characters'. At the bottom, there are four input fields for 'Encryption key 1*', 'Encryption key 2*', 'Encryption key 3*', and 'Encryption key 4*', each with a 'Show' icon (an eye with a slash) to its right.

Figure 96. The **Open** value is selected from the **Network authentication** drop-down list.

Parameter	Description
Enable encryption WEP	For Open authentication type only. To activate WEP encryption, move the switch to the right. Upon that the Default key ID drop-down list, the Encryption key WEP as HEX switch, and four Encryption key fields are displayed on the page.
Default key ID	The number of the key (from first to fourth) which will be used for WEP encryption.
Encryption key WEP as HEX	Move the switch to the right to set a hexadecimal number as a key for encryption.
Encryption key (1-4)	Keys for WEP encryption. The router uses the key selected from the Default key ID drop-down list. It is required to specify all the fields. Click the Show icon () to display the entered key.

When the **WPA-PSK**, **WPA2-PSK**, or **WPA-PSK/WPA2-PSK mixed** value is selected, the following fields are displayed on the page:

The screenshot shows a 'Security Settings' form. Under 'Network authentication', 'WPA2-PSK' is selected in a dropdown menu. Below it is a 'Password PSK*' field containing several dots and a 'Show' icon (an eye with a slash). A note below the password field states: 'Password should be between 8 and 63 ASCII characters'. The 'Encryption type*' dropdown is set to 'TKIP'. At the bottom, the 'Group key update interval (in seconds)*' is set to '3600'.

Figure 97. The **WPA2-PSK** value is selected from the **Network authentication** drop-down list.

Parameter	Description
Password PSK	A password for WPA encryption. The password can contain digits, Latin letters (uppercase and/or lowercase), and other characters available in the US keyboard layout. ² Click the Show icon (👁) to display the entered password.
Encryption type	An encryption method: TKIP , AES , or TKIP+AES .
Group key update interval	The time period (in seconds), at the end of which a new key for WPA encryption is generated. When the value 0 is specified for this field, the key is not renewed.

² 0-9, A-Z, a-z, space, !"#\$%&'()*+,-./:;<=>?@[]^_`{|}~.

When the **WPA**, **WPA2**, or **WPA/WPA2 mixed** value is selected, the following settings are displayed on the page:

The screenshot shows the 'Security Settings' section of a web interface. It features a 'Network authentication' dropdown menu with 'WPA2' selected. Below this is a 'WPA2 Pre-authentication' toggle switch, which is currently turned off. Further down are input fields for 'IP address RADIUS server*' (192.168.0.254), 'RADIUS server port*' (1812), 'RADIUS encryption key*' (dlink), 'Encryption type*' (AES), and 'Group key update interval (in seconds)*' (3600).

Figure 98. The **WPA2** value is selected from the **Network authentication** drop-down list.

Parameter	Description
WPA2 Pre-authentication	Move the switch to the right to activate preliminary authentication (displayed only for the WPA2 and WPA/WPA2 mixed authentication types).
IP address RADIUS server	The IP address of the RADIUS server.
RADIUS server port	A port of the RADIUS server.
RADIUS encryption key	The password which the router uses for communication with the RADIUS server (the value of this parameter is specified in the RADIUS server settings).
Encryption type	An encryption method: TKIP , AES , or TKIP+AES .
Group key update interval	The time period (in seconds), at the end of which a new key for WPA encryption is generated. When the value 0 is specified for this field, the key is not renewed.

When you have configured the parameters, click the **APPLY** button.

To edit the basic or additional wireless network, left-click the relevant line in the table. On the opened page, change the needed parameters and click the **APPLY** button.

To remove the additional network, select the checkbox located to the left of the relevant line in the table and click the **DELETE** button (). Then click the **APPLY** button.

Client Management

On the **Wi-Fi / Client Management** page, you can view the list of wireless clients connected to the router.

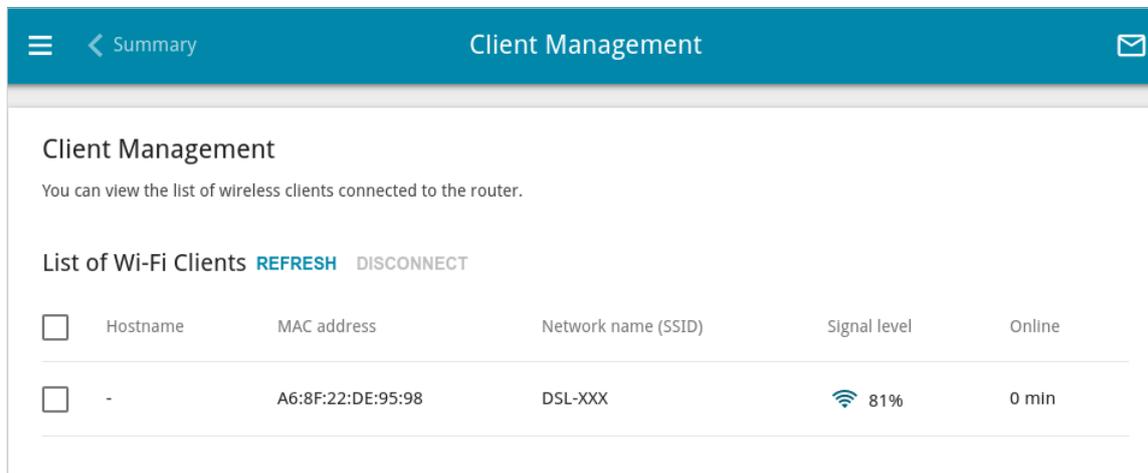


Figure 99. The page for managing the wireless clients.

If you want to disconnect a wireless device from your WLAN, select the checkbox in the line containing the MAC address of this device and click the **DISCONNECT** button.

To view the latest data on the devices connected to the WLAN, click the **REFRESH** button.

WPS

On the **Wi-Fi / WPS** page, you can enable the function for configuration of the WLAN and select a method for connection to the WLAN.

The WPS function helps to configure the protected wireless network automatically. Devices connecting to the wireless network via the WPS function must support the WPS function.

! The WPS function allows adding devices only to the basic wireless network of the router.

! Before using the function you need to configure one of the following authentication types: **Open** with no encryption, **WPA2-PSK** or **WPA-PSK/WPA2-PSK mixed** with the **AES** encryption method. When other security settings are specified, controls of the **WPS** page are not available.

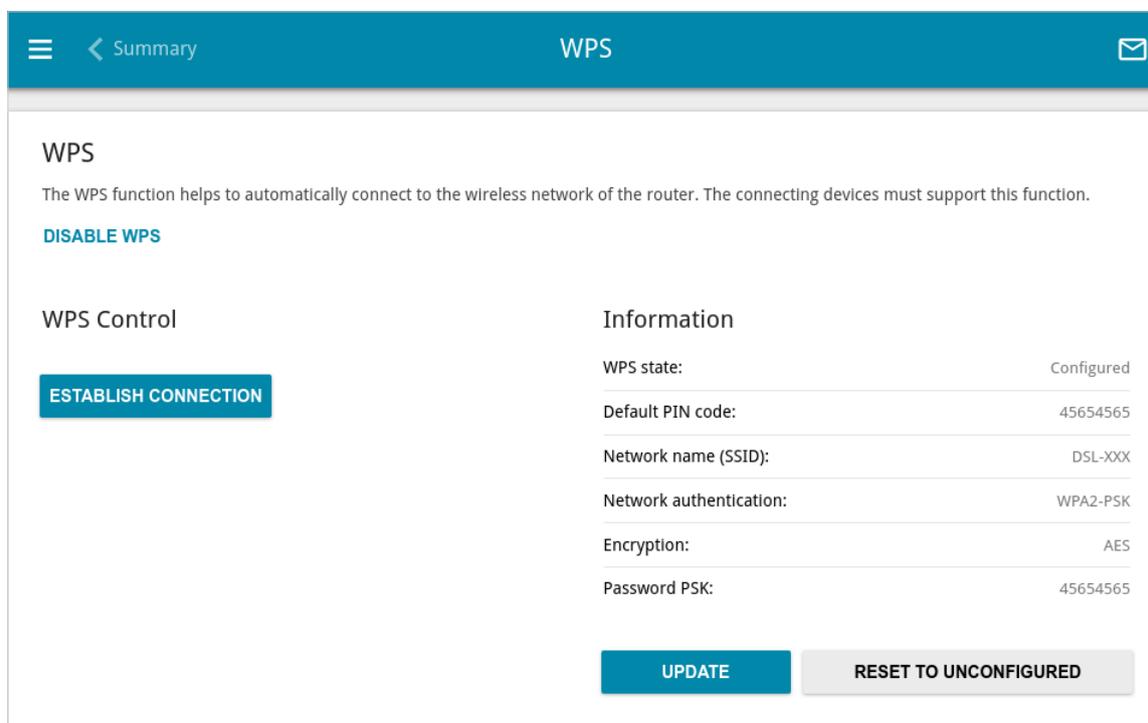


Figure 100. The page for configuring the WPS function.

To activate the WPS function, click the **ENABLE WPS** button.

When the WPS function is enabled, the **Information** section is available on the page.

Parameter	Description
WPS state	The state of the WPS function: <ul style="list-style-type: none">• Configured (all needed settings are specified; these settings will be used upon establishing the wireless connection)• Unconfigured (after activating the WPS function, the SSID and the encryption key will be configured automatically, the network authentication type will be changed to WPA2-PSK).
Default PIN code	The PIN code of the router. This parameter is used when connecting the router to a registrar to set the parameters of the WPS function.
Network name (SSID)	The name of the router's wireless network.
Network authentication	The network authentication type specified for the wireless network.
Encryption	The encryption type specified for the wireless network.
Password PSK	The encryption password specified for the wireless network.
UPDATE	Click the button to update the data on the page.
RESET TO UNCONFIGURED	Click the button to reset the parameters of the WPS function.

Using WPS Function via Web-based Interface

To connect to the basic wireless network via the PIN method of the WPS function, follow the next steps:

1. Click the **ENABLE WPS** button.
2. In the **WPS Control** section, click the **ESTABLISH CONNECTION** button.
3. In the opened window, select the **PIN** value from the **WPS method** drop-down list.
4. Select the PIN method in the software of the wireless device that you want to connect to the router's WLAN.
5. Click the relevant button in the software of the wireless device that you want to connect to the WLAN.
6. Right after that, enter the PIN code specified on the cover of the wireless device or in its software in the **PIN code** field.
7. Click the **CONNECT** button in the web-based interface of the router.

To connect to the basic wireless network via the PBC method of the WPS function, follow the next steps:

1. Click the **ENABLE WPS** button.
2. In the **WPS Control** section, click the **ESTABLISH CONNECTION** button.
3. In the opened window, select the **PBC** value from the **WPS method** drop-down list.
4. Select the PBC method in the software of the wireless device that you want to connect to the router's WLAN.
5. Click the relevant button in the software or press the WPS button on the cover of the wireless device that you want to connect to the WLAN.
6. Right after that, click the **CONNECT** button in the web-based interface of the router.

Using WPS Function without Web-based Interface

You can use the WPS function without accessing the web-based interface of the router. To do this, you need to configure the following router's settings:

1. Specify relevant security settings for the wireless network of the router.
2. Click the **ENABLE WPS** button.
3. Save the settings and close the web-based interface (click the **Logout** line of the menu).

Later you will be able to add wireless devices to the WLAN by pressing the **WPS** button of the router.

1. Select the PBC method in the software of the wireless device that you want to connect to the router's WLAN.
2. Click the relevant button in the software or press the WPS button on the cover of the wireless device that you want to connect to the WLAN.
3. Press the **WPS** button of the router and release. The **WPS** LED will start blinking.

WMM

On the **Wi-Fi / WMM** page, you can enable the Wi-Fi Multimedia function.

The WMM function implements the QoS features for Wi-Fi networks. It helps to improve the quality of data transfer over Wi-Fi networks by prioritizing different types of traffic.

Select the needed action from the **Work mode** drop-down list to configure the WMM function:

- **Auto:** the settings of the WMM function are configured automatically (the value is specified by default).
- **Manual:** the settings of the WMM function are configured manually. When this value is selected, the **Access Point** and **Station** sections are displayed on the page.
- **Disabled:** the WMM function is disabled.

Wi-Fi Multimedia
 The mechanism for improving Wi-Fi network performance. It is recommended for users not to change the specified values

Work mode
Manual

Access Point							Station					
AC	AIFSN	CWMin	CWMax	TXOP	ACM	ACK	AC	AIFSN	CWMin	CWMax	TXOP	ACM
BK	7	15	1023	0	off	off	BK	7	15	1023	0	off
BE	3	15	63	0	off	off	BE	3	15	1023	0	off
VI	1	7	15	3008	off	off	VI	2	7	15	3008	off
VO	1	3	7	1504	off	off	VO	2	3	7	1504	off

Figure 101. The page for configuring the WMM function.

! All needed settings for the WMM function are specified in the device's system. Changing parameters manually may negatively affect your WLAN!

The WMM function allows assigning priorities for four Access Categories (AC):

- **BK** (*Background*), low priority traffic (print jobs, file downloads, etc.).
- **BE** (*Best Effort*), traffic from legacy devices or devices/applications that do not support QoS.
- **VI** (*Video*).
- **VO** (*Voice*).

Parameters of the Access Categories are defined for both the router itself (in the **Access Point** section) and wireless devices connected to it (in the **Station** section).

To edit the parameters of an Access Category, left-click the relevant line. In the opened window, change the needed parameters.

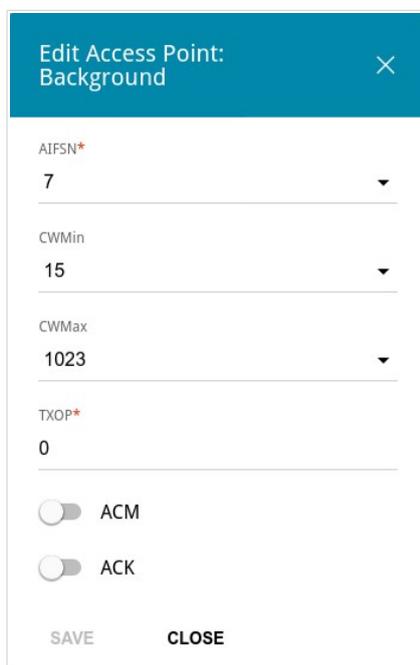


Figure 102. The window for changing parameters of the WMM function.

Parameter	Description
AIFSN	<i>Arbitrary Inter-Frame Space Number.</i> This parameter influences time delays for the relevant Access Category. The lower the value, the higher is the Access Category priority.
CWMin/CWMax	<i>Contention Window Minimum/Contention Window Maximum.</i> Both fields influence time delays for the relevant Access Category. The CWMax field value should not be lower, than the CWMin field value. The lower the difference between the CWMax field value and the CWMin field value, the higher is the Access Category priority.
TXOP	<i>Transmission Opportunity.</i> The higher the value, the higher is the Access Category priority.

Parameter	Description
ACM	<i>Admission Control Mandatory.</i> If the switch is moved to the right, the device cannot use the relevant Access Category.
ACK	<i>Acknowledgment.</i> Answering response requests while transmitting. Displayed only in the Access Point section. If the switch is moved to the left, the router answers requests. If the switch is moved to the right, the router does not answer requests.

Click the **SAVE** button.

Additional

On page of the **Wi-Fi / Additional** section, you can define additional parameters for the WLAN of the router.

! Changing parameters presented on this page may negatively affect your WLAN!

The screenshot shows the 'Additional' settings page for the router's Wi-Fi. The page has a teal header with a menu icon, a back arrow labeled 'Summary', the title 'Additional', and an envelope icon. Below the header, the section is titled 'Wi-Fi Additional Settings' with a subtitle 'You can define additional parameters for the WLAN of the router.' The settings are organized into two columns. The left column includes: 'Bandwidth' set to '20/40 MHz' with a dropdown arrow; an information icon and text 'Using bandwidth of one or several channels of the wireless network simultaneously'; another information icon and text 'Current bandwidth: 40 MHz'; a toggle switch for 'Autonegotiation 20/40 (Coexistence)' which is turned off; an information icon and text 'Automatic change of bandwidth in the loaded environment'; 'TX power (in percent)' set to '100' with a dropdown arrow; a toggle switch for 'Drop multicast' which is turned off; and an information icon and text 'Disables multicasting (IGMP, SSDP, etc.) for the wireless network. In some cases this helps to improve performance'. The right column includes: 'B/G protection' set to 'Auto' with a dropdown arrow; 'Short GI' set to 'Enable' with a dropdown arrow; 'Method of channel auto select' set to 'BSS (by signal level)' with a dropdown arrow; 'Beacon period (in milliseconds)*' set to '100'; 'RTS threshold (in bytes)*' set to '2347'; 'Frag threshold (in bytes)*' set to '2346'; 'DTIM period (in beacon frames)*' set to '1'; and 'Station Keep Alive (in seconds)*' set to '0'. At the bottom left of the settings area is a grey 'APPLY' button.

Figure 103. Additional settings of the WLAN.

The following fields are available on the page:

Parameter	Description
Bandwidth	The channel bandwidth for 802.11n standard. <ul style="list-style-type: none"> • 20 MHz: 802.11n clients operate at 20MHz channels. • 20/40 MHz: 802.11n clients operate at 20MHz or 40MHz channels.

Parameter	Description
Autonegotiation 20/40 (Coexistence)	Move the switch to the right to let the router automatically choose the most suitable channel bandwidth (20MHz or 40MHz) for the connected devices (this setting can substantially lower the data transfer rate of your wireless network). The switch is displayed when the 20/40 MHz value is selected from the Bandwidth drop-down list.
TX power	The transmit power (in percentage terms) of the router.
Drop multicast	Move the switch to the right to disable multicasting for the router's WLAN. Move the switch to the left to enable multicasting from the WAN connection selected on the Advanced / IGMP page.
B/G protection	<p>The 802.11b and 802.11g protection function is used to minimize collisions between devices of your wireless network.</p> <p>Select a value from the drop-down list.</p> <ul style="list-style-type: none"> • Auto: The protection function is enabled and disabled automatically depending on the state of the network (this value is recommended if your wireless local area network consists of both 802.11b and 802.11g devices). • Always On: The protection function is always enabled (this setting can substantially lower the efficiency of your wireless network). • Always Off: The protection function is always disabled.
Short GI	<p>Guard interval (in nanoseconds). This parameter defines the interval between symbols transmitted when the router is communicating to wireless devices.</p> <ul style="list-style-type: none"> • Enable: the router uses the 400 ns short guard interval. Only for the wireless network operating modes which support 802.11n standard (see the value of the Wireless mode drop-down list on the Wi-Fi / Basic Settings page). • Disable: the router uses the 800 ns standard guard interval.

Parameter	Description
Method of channel auto select	A method of automatic channel selection. <ul style="list-style-type: none"> • BSS (by signal level) (<i>Basic Service Set</i>): When this value is selected, the router analyzes the signal levels of the neighboring wireless networks and selects a channel with the minimum value of the total level of interference from these networks. • FA & CCA (by volume of data transmitted) (<i>False Alarm and Clear Channel Assessment</i>): When this value is selected, the router analyzes the volume of data transmitted in the neighboring wireless networks and selects a channel with the minimum value of the total number of packets transmitted in these networks upon scanning them.
Beacon period	The time interval (in milliseconds) between packets sent to synchronize the wireless network.
RTS threshold	The minimum size (in bytes) of a packet for which an RTS frame is transmitted.
Frag threshold	The maximum size (in bytes) of a non-fragmented packet. Larger packets are fragmented (divided).
DTIM period	The number of beacon frames between sending DTIM messages (messages notifying on broadcast or multicast transmission).
Station Keep Alive	The time interval (in seconds) between keep alive checks of wireless devices from your WLAN. When the value 0 is specified, the checking is disabled.

When you have configured the parameters, click the **APPLY** button.

MAC Filter

On the **Wi-Fi / MAC Filter** page, you can define a set of MAC addresses of devices which will be allowed to access the WLAN, or define MAC addresses of devices which will not be allowed to access the WLAN.

! It is recommended to configure the Wi-Fi MAC filter through a wired connection to DSL-224.

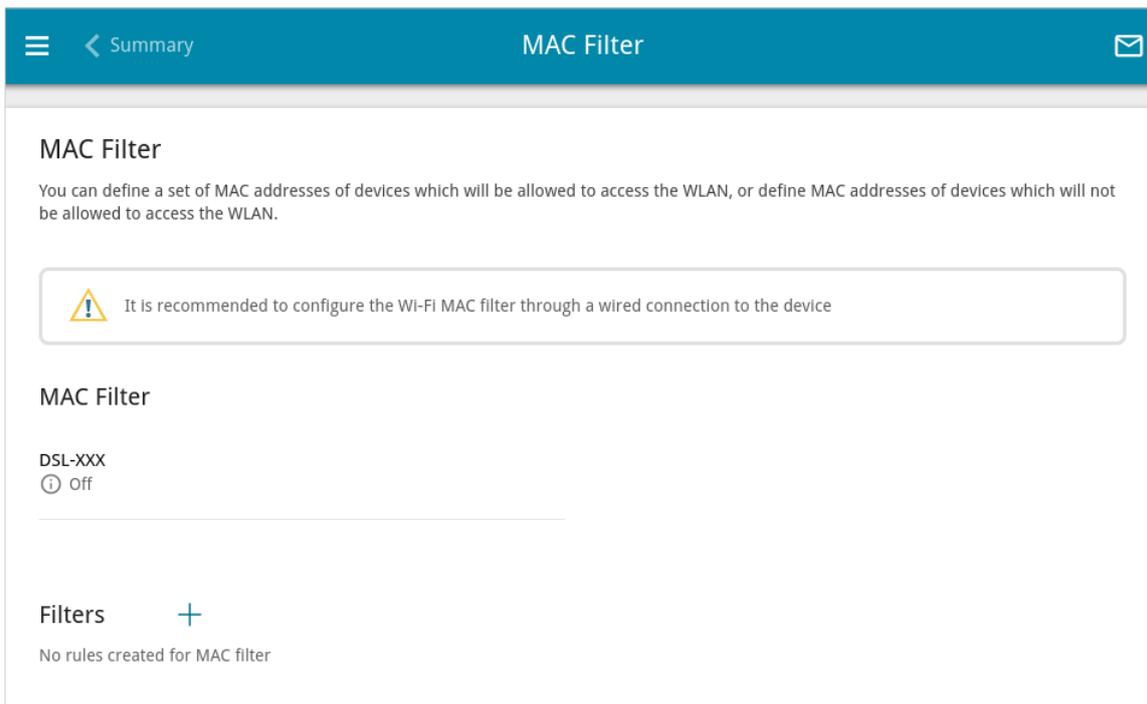


Figure 104. The page for configuring the MAC filter for the wireless network.

By default, the Wi-Fi MAC filter is disabled.

To configure the MAC filter, first you need to create rules (specify MAC addresses of devices for which the specified filtering modes will be applied). To do this, click the **ADD** button (**+**).

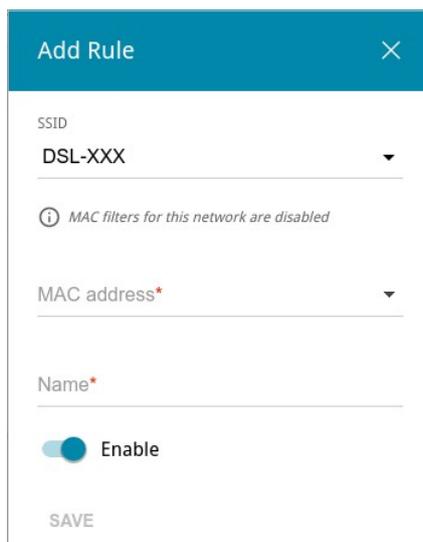


Figure 105. The window for adding a rule for the MAC filter.

You can specify the following parameters:

Parameter	Description
SSID	A wireless network to which the rule will be applied. Select the needed value from the drop-down list.
MAC address	In the field, enter the MAC address to which the selected filtering mode will be applied.
Name	The name of the device for easier identification. You can specify any name.
Enable	If the switch is moved to the right, the rule is active. Move the switch to the left to disable the rule.

When you have configured the parameters, click the **SAVE** button.

To edit the parameters of the existing rule, in the **Filters** section, left-click the needed rule. In the opened window, change the settings and click the **SAVE** button.

To remove the rule from the page, in the **Filters** section, select the checkbox located to the left of the relevant rule and click the **DELETE** button (🗑).

After creating the rules you need to configure the filtering modes.

To open the basic or additional wireless network for the devices which MAC addresses are specified on this page and to close the wireless network for all other devices, left-click the line of the wireless network. In the opened window, move the **Enable MAC filter** switch to the right. Upon that the **MAC filter restrict mode** drop-down list will be displayed. Select the **Allow** value from the drop-down list and click the **SAVE** button.

To close the wireless network for the devices which MAC addresses are specified on this page, select the **Deny** value from the **MAC filter restrict mode** drop-down list and click the **SAVE** button.

Roaming

On the **Wi-Fi / Roaming** page, you can enable the function of smart adjustment of Wi-Fi clients.

This function is designed for wireless networks based on several access points or routers. If the function is enabled for all access points (routers) which establish a wireless network, then wireless clients will always connect to the device with the highest signal level.

Smart Adjustment of Wi-Fi Clients

Smart adjustment of Wi-Fi clients is designed for wireless networks based on several access points or routers. If the function is enabled for all access points (routers) which establish a wireless network, then wireless clients will always connect to the device with the highest signal level. For proper operation of the function, it is recommended to specify the same parameters of the WLAN (SSID, authentication type, and password) for all devices.

DISABLE

Port*
7890

Maximum time of storing data (in seconds)*
60

Maximum time of storing data on adjacent clients

Minimum level of connection quality (in percent)*
50

Dead zone (from -50% to 50%)*
15

Threshold value of connection quality (in percent)*
40

Use multicast for service data exchange

Select the checkbox if APs are located in different subnets

Multicast TTL*
32

Multicast group address*
239.255.0.0

Enter the address from the range 239.255.x.x (239.255.0.1-239.255.255.255)

APPLY

Figure 106. The **Wi-Fi / Roaming** page.

To enable the function, click the **ENABLE** button. Upon that the following settings are available on the page.

Parameter	Description
Port	The number of the port used for data exchange between access points (routers).

Parameter	Description
Use multicast for service data exchange	<p>Move the switch to the right in order to use multicast traffic for service data exchange between access points (routers). This setting is needed if the devices which support the smart adjustment function are located in different subnets. If the switch is moved to the right, the Multicast TTL and Multicast group address fields are displayed on the page.</p> <p>If the switch is moved to the left, broadcast traffic is used for service data exchange.</p>
Multicast TTL	Specify the TTL (<i>Time to live</i>) parameter value.
Multicast group address	Specify the address of the multicast group (from the subnet 239.255.0.0/16).
Maximum time of storing data	The maximum time period (in seconds) during which the access point (router) stores data on the signal strength of the client located on its coverage area.
Minimum level of connection quality	The signal strength upon which the access point (router) starts scanning other devices in order to find a device with a higher signal level.
Dead zone	This parameter is used for calculation of the signal strength upon which the smart adjustment function goes off. If the signal strength provided by another device is less than the sum of the Minimum level of connection quality field value and the Dead zone field value, then the client disconnects from the access point (router). You can specify the values from -50% to +50% .
Threshold value of connection quality	The signal strength upon which the access point (router) disconnects the client from its wireless network regardless of the signal levels of other devices. This value should not be greater than the value specified in the field Minimum level of connection quality .

After specifying the needed parameters, click the **APPLY** button.

To disable the function of smart adjustment of Wi-Fi clients, click the **DISABLE** button.

Advanced

In this menu you can configure advanced settings of the router:

- define interface groups
- allow the router to connect to a private Ethernet line
- add name servers
- configure a DDNS service
- define static routes
- configure TR-069 client
- enable the UPnP function
- edit the VDSL/ADSL connection parameters
- allow the router to use IGMP
- enable the RTSP, SIP ALG mechanisms, and PPPoE/PPTP/L2TP/IPsec pass through functions.

Interface Grouping

On the **Advanced / Interface Grouping** page, you can create groups consisting of interfaces and ports of the router, for example, for distinguishing different types of traffic. Such a function is mostly used in Triple-play networks.

The **DEFAULT** group is created in the router's system. You cannot edit or delete this group.

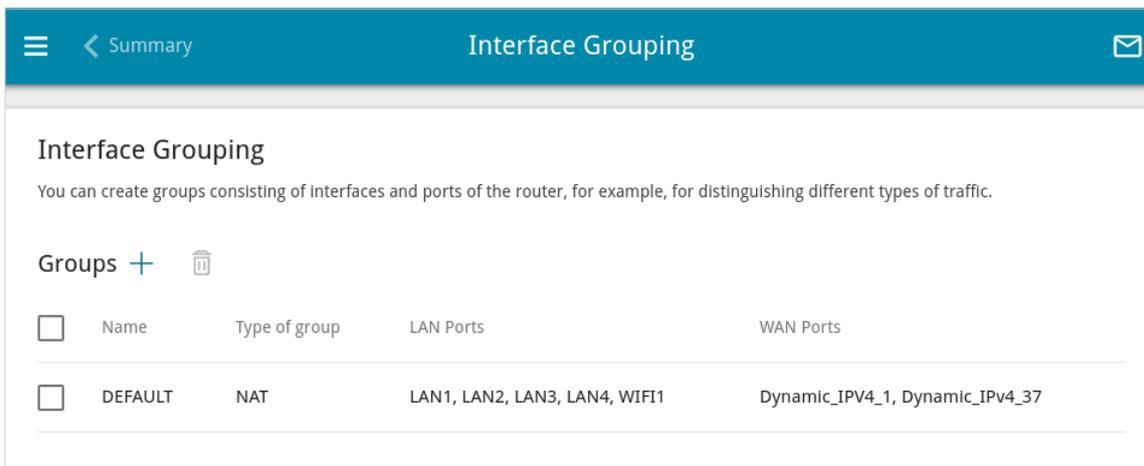


Figure 107. The **Advanced / Interface Grouping** page.

To create a new rule for interface grouping (a group of ports), click the **ADD** button (**+**).

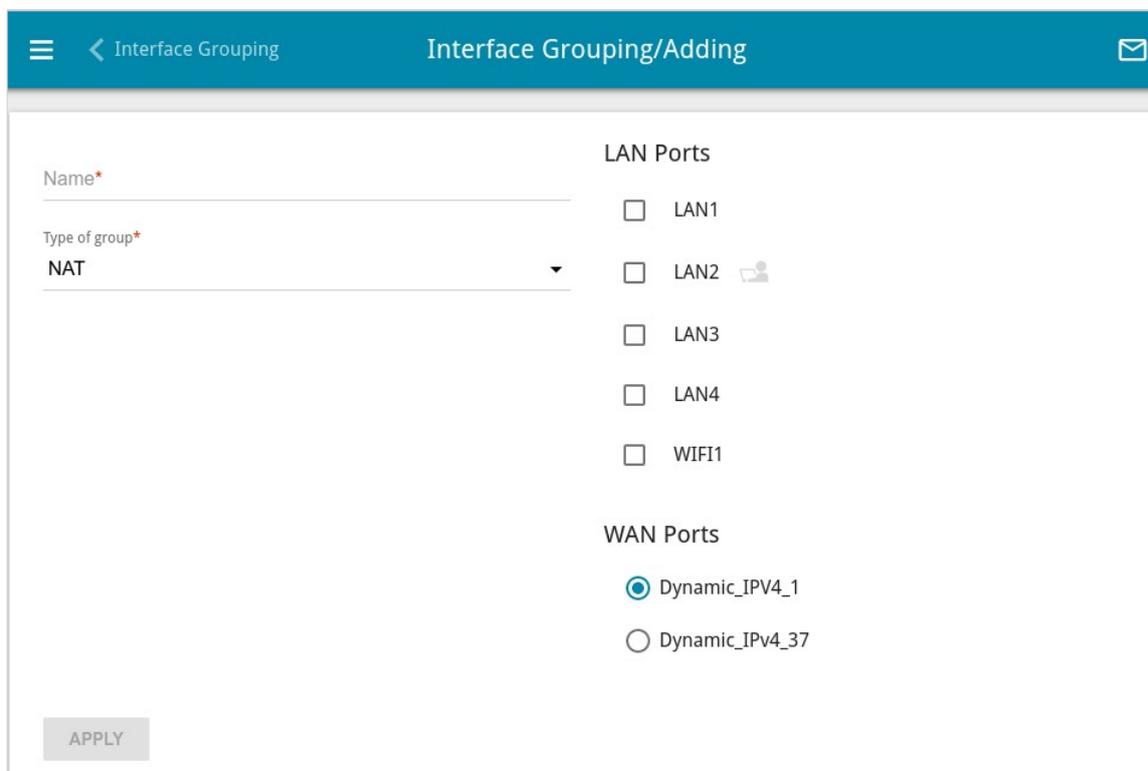


Figure 108. The page for adding a new group of ports.

On the opened page, you can specify the following parameters:

Parameter	Description
Name	A name for the group for easier identification. You can specify any name.
Type of group	The type of the group. <ul style="list-style-type: none"> • NAT: The group of this type is an external connection with address translation. It is mostly used to connect to the Internet. • Transparent bridge: The group of this type is a transparent connection between the router's port and an external connection. It is mostly used to connect IPTV set-top boxes. • Local: The group of this type is an internal connection of the router's ports. It is mostly used to join devices from the LAN to an isolated network with no access to the Internet.
LAN Ports	In this section the LAN ports and the WLAN interface of the router are displayed. To add an element to the group, select the relevant checkbox. To remove an element from the group, deselect the relevant checkbox.
WAN Ports	<i>Displayed for the NAT and Transparent bridge types only.</i> In this section WAN connections of the router are displayed. To add a connection to the group, select the choice of the radio button which corresponds to this connection.

Click the **APPLY** button.

To edit the parameters of a group you created, select the relevant line in the table. On the opened page, change the needed parameters and click the **APPLY** button.

To remove a group you created, select the checkbox located to the left of the relevant line of the table and click the **DELETE** button (). Also you can remove a group on the editing page. When you delete a group, ports and interfaces assigned to it are reassigned to the **DEFAULT** group.

WAN Remapping

On the **Advanced / WAN Remapping** page, you can configure the router to connect to a private Ethernet line.

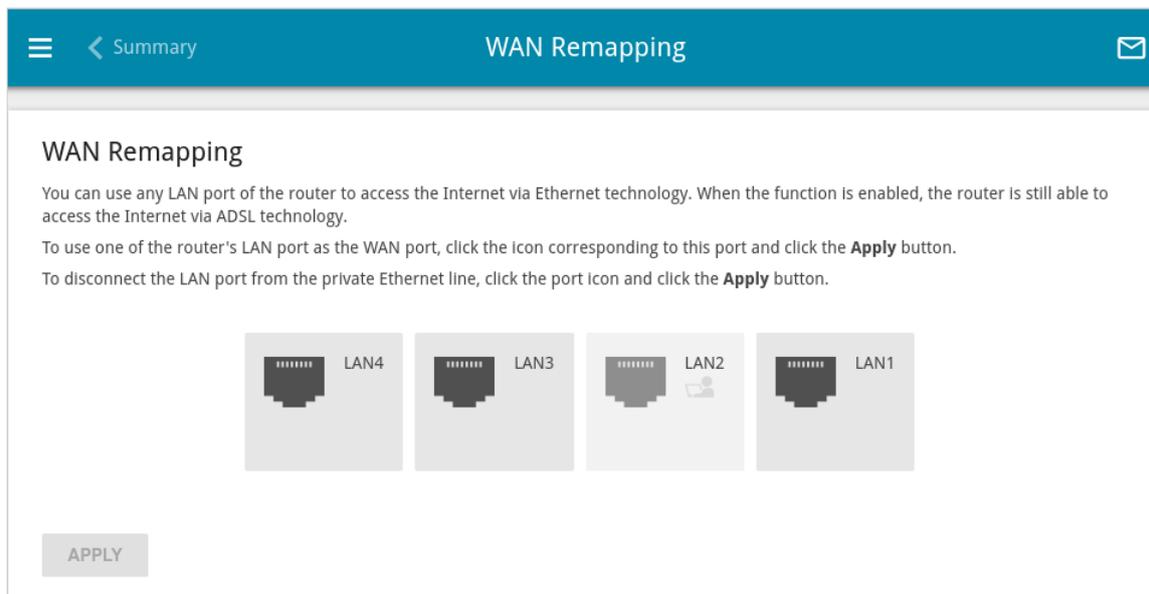


Figure 109. The **Advanced / WAN Remapping** page.

To use one of the router's LAN port as the WAN port, click the icon corresponding to this port and click the **APPLY** button. The port configured as the WAN port is highlighted in teal.

If in the future you need to disconnect the LAN port from the private Ethernet line, click the icon highlighted in teal and click the **APPLY** button.

DNS

On the **Advanced / DNS** page, you can add DNS servers to the system.

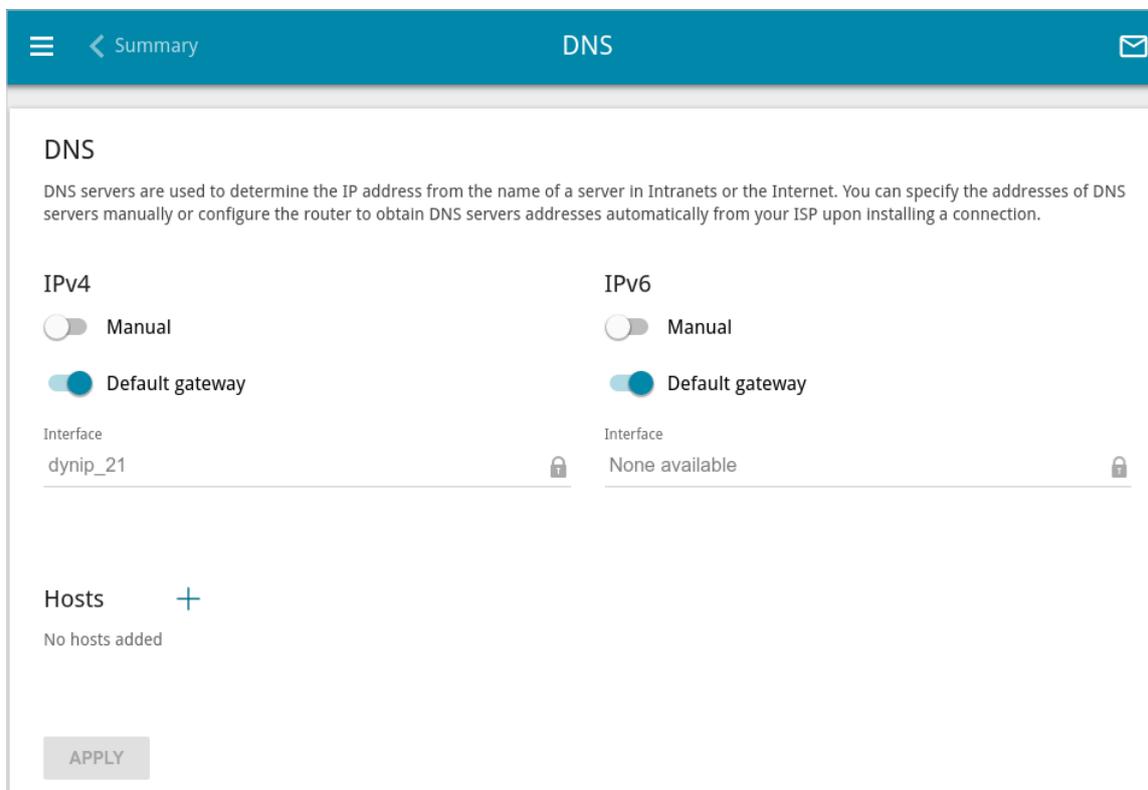


Figure 110. The **Advanced / DNS** page.

DNS servers are used to determine the IP address from the name of a server in Intranets or the Internet (as a rule, they are specified by an ISP or assigned by a network administrator).

You can specify the addresses of DNS servers manually on this page or configure the router to obtain DNS servers addresses automatically from your ISP upon installing a connection.



When you use the built-in DHCP server, the network parameters (including DNS servers) are distributed to clients automatically.

Specify needed settings for IPv4 in the **DNS IPv4** section and for IPv6 in the **DNS IPv6** section.

If you want to configure automatic obtainment of DNS servers addresses, move the **Manual** switch to the left. Then move the **Default gateway** switch to the left and from the **Interface** drop-down list select a WAN connection which will be used to obtain addresses of DNS servers automatically. If you want the router to use the default WAN connection to obtain addresses of DNS servers, move the **Default gateway** switch to the right. Then click the **APPLY** button.

To specify a DNS server manually, move the **Manual** switch to the right. In the **Name Servers** section of the relevant IP version, click the **ADD SERVER** button, and in the line displayed, enter an IP address of the DNS server. Then click the **APPLY** button.

To remove a DNS server from the page, click the **Delete** button () in the line of the address and then click the **APPLY** button.

If needed, you can add your own address resource record. To do this, click the **ADD** button () in the **Hosts** section.

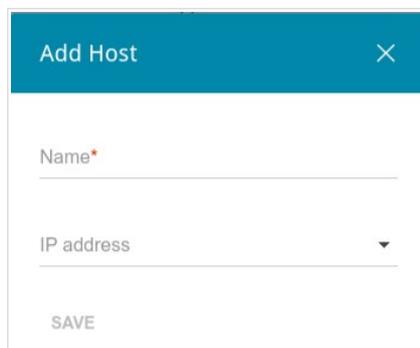


Figure 111. The window for adding a DNS record.

In the **IP address** field, specify a host from the internal or external network. You can choose a device connected to the router's LAN at the moment. To do this, select the relevant IP address from the drop-down list (the field will be filled in automatically). In the **Name** field, specify the domain name to which the specified IP address will correspond. Click the **SAVE** button.

To edit an existing record, select the relevant line in the table. In the opened window, change the needed parameters and click the **SAVE** button.

To remove a record, in the **Hosts** section, select the checkbox located to the left of the relevant line in the table and click the **DELETE** button ().

After completing the work with records, click the **APPLY** button.

DDNS

On the **Advanced / DDNS** page, you can define parameters of the DDNS service, which allows associating a domain name with dynamic IP addresses.

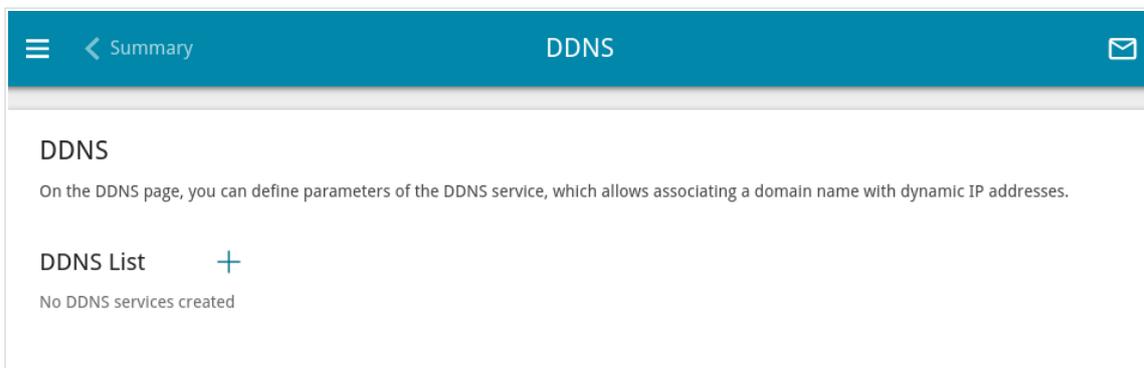


Figure 112. The **Advanced / DDNS** page.

To add a new DDNS service, click the **ADD** button (**+**).

Figure 113. The page for adding a DDNS service.

On the opened page, you can specify the following parameters:

Parameter	Description
Hostname	The full domain name registered at your DDNS provider.
DDNS service	Select a DDNS provider from the drop-down list.
Username	The username to authorize for your DDNS provider.
Password	The password to authorize for your DDNS provider. Click the Show icon () to display the entered password.
Update period	An interval (in minutes) between sending data on the router's external IP address to the relevant DDNS service.

After specifying the needed parameters, click the **SAVE** button.

To edit parameters of the existing DDNS service, select the relevant line in the table. On the opened page, change the needed parameters and click the **SAVE** button.

To remove an existing DDNS service, select the checkbox located to the left of the relevant line in the table and click the **DELETE** button ().

Routing

On the **Advanced / Routing** page, you can specify static (fixed) routes.

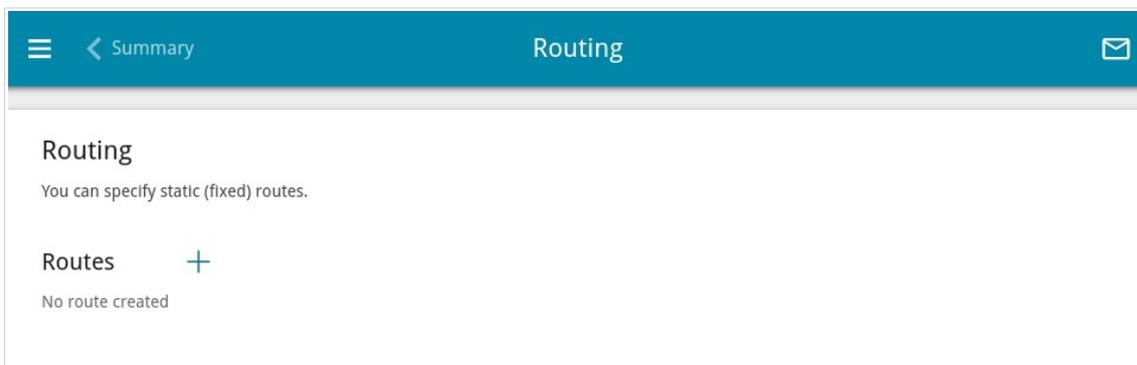


Figure 114. The **Advanced / Routing** page.

To specify a new route, click the **ADD** button (**+**).

The screenshot shows a modal dialog window titled 'Add Route' with a close button (X) in the top right corner. The dialog contains several input fields: 'Protocol' with a dropdown menu showing 'IPv4'; 'Interface' with a dropdown menu showing 'Auto'; 'Destination network*' (required field); 'Destination netmask*' (required field); 'Gateway*' (required field); and 'Metric'. At the bottom of the dialog is a 'SAVE' button.

Figure 115. The window for adding a new route.

In the opened window, you can specify the following parameters:

Parameter	Description
Protocol	An IP version.
Interface	From the drop-down list, select an interface (connection) through which the device will communicate with the remote network. If you have selected the Auto value, the router itself sets the interface according to the data on the existing dynamic routes.
Destination network	A remote network which can be accessed with help of this route. You can specify an IPv4 or IPv6 address. The format of a host IPv6 address is <code>2001:db8:1234::1</code> , the format of a subnet IPv6 address is <code>2001:db8:1234::/64</code> .
Destination netmask	<i>For IPv4 protocol only.</i> The remote network mask.
Gateway	An IP address through which the destination network can be accessed.
Metric	A metric for the route. The lower the value, the higher is the route priority. <i>Optional.</i>

After specifying the needed parameters, click the **SAVE** button.

To edit an existing route, select a relevant line of the table. In the opened window, change the needed parameters and click the **SAVE** button.

To remove an existing route, select the checkbox located to the left of the relevant line in the table and click the **DELETE** button ().

TR-069 Client

On the **Advanced / TR-069 Client** page, you can configure the router for communication with a remote Auto Configuration Server (ACS).

The TR-069 client is used for remote monitoring and management of the device.

Figure 116. The page for configuring the TR-069 client.

You can specify the following parameters:

Parameter	Description
TR-069 Client	
Enable TR-069 client	Move the switch to the right to enable the TR-069 client.
Interface	The interface which the router uses for communication with the ACS. Leave the Automatic value to let the device select the interface basing on the routing table or select another value if required by your ISP.

Parameter	Description
Inform Settings	
On	Move the switch to the right so the router may send reports (data on the device and network statistics) to the ACS.
Interval	Specify the time period (in seconds) between sending reports.
Auto Configuration Server Settings	
URL address	The URL address of the ACS provided by the ISP.
Username	The username to connect to the ACS.
Password	The password to connect to the ACS. Click the Show icon (👁) to display the entered password.
Connection Request Settings	
Username	The username used by the ACS to transfer a connection request to the router.
Password	The password used by the ACS. Click the Show icon (👁) to display the entered password.
Request port	The port used by the ACS. By default, the port 8999 is specified.
Request path	The path used by the ACS.

When you have configured the parameters, click the **APPLY** button.

UPnP IGD

On the **Advanced / UPnP IGD** page, you can enable the UPnP IGD protocol. The router uses the UPnP IGD protocol for automatic configuration of its parameters for network applications requiring an incoming connection to the router.

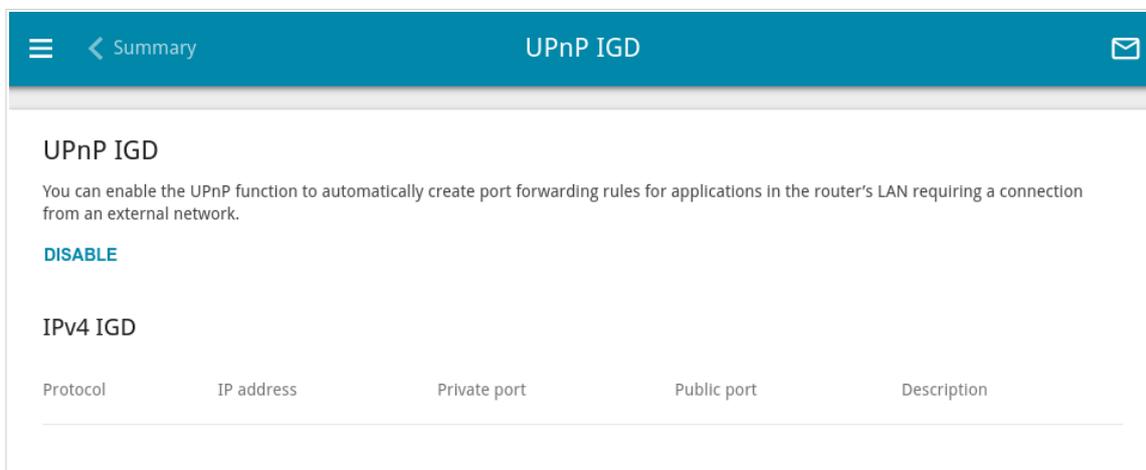


Figure 117. The **Advanced / UPnP IGD** page.

If you want to manually specify all parameters needed for network applications, click the **DISABLE** button. Then go to the **Firewall / Virtual Servers** page and specify needed settings.

If you want to enable the UPnP IGD protocol in the router, click the **ENABLE** button.

When the protocol is enabled, the router's parameters configured automatically are displayed on the page:

Parameter	Description
Protocol	A protocol for network packet transmission.
IP address	The IP address of a client from the local area network.
Private port	A port of a client's IP address to which traffic is directed from a public port of the router.
Public port	A public port of the router from which traffic is directed to a client's IP address.
Description	Information transmitted by a client's network application.

xDSL

The **Advanced / xDSL** page includes the set of ADSL and VDSL standards that should be defined by an ISP. Contact your ISP to set proper parameters. Select the relevant options and click the **APPLY** button.

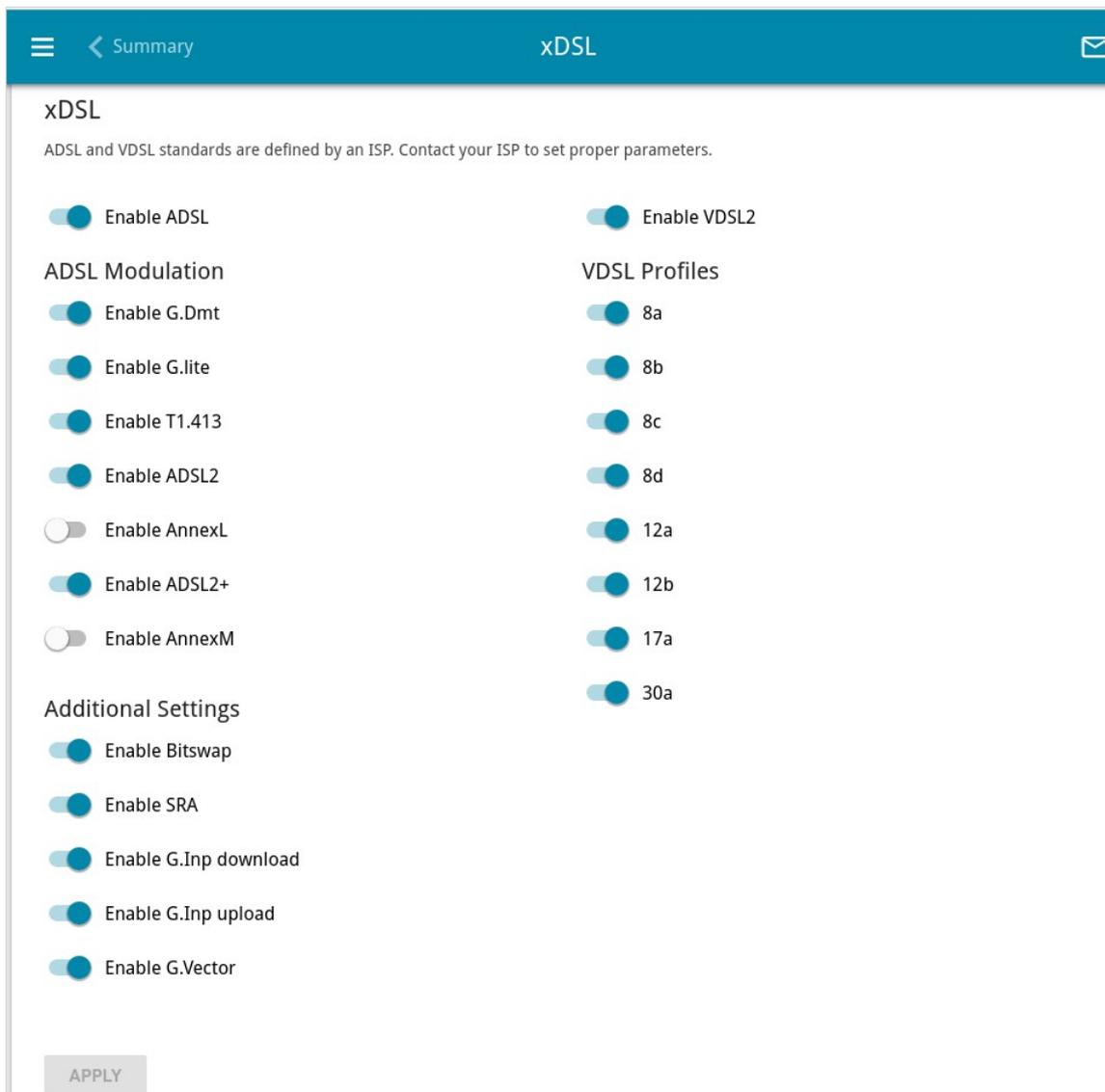


Figure 118. The **Advanced / xDSL** page.

IGMP

On the **Advanced / IGMP** page, you can allow the router to use IGMP and specify needed settings.

IGMP is used for managing multicast traffic (transferring data to a group of destinations). This protocol allows using network resources for some applications, e.g., for streaming video, more efficiently.

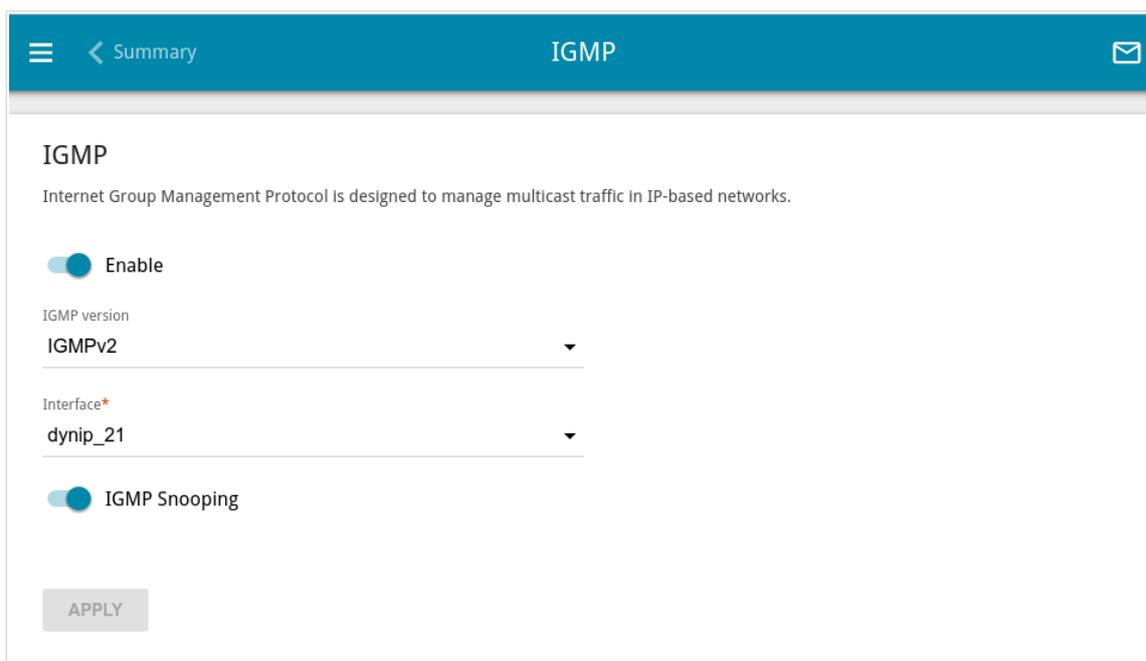


Figure 119. The **Advanced / IGMP** page.

The following elements are available on the page:

Parameter	Description
Enable	Move the switch to the right to enable IGMP.
IGMP version	Select a version of IGMP from the drop-down list.
Interface	From the drop-down list, select a connection of the Dynamic IPv4 or Static IPv4 type for which you need to allow multicast traffic (e.g. streaming video).
IGMP Snooping	The IGMP snooping function allows limiting multicast traffic for devices connected to the Ethernet ports of the router. If the switch is moved to the right, multicast traffic is forwarded only to the devices which require it. If the switch is moved to the left, multicast traffic is forwarded to all devices connected to the Ethernet ports of the router.

After specifying the needed parameters, click the **APPLY** button.

ALG/Passthrough

On the **Advanced / ALG/Passthrough** page, you can enable the RTSP, SIP ALG mechanisms, and PPPoE/PPTP/L2TP/IPsec pass through functions.

SIP is used for creating, modifying, and terminating communication sessions. This protocol allows telephone calls via the Internet.

RTSP is used for real-time streaming multimedia data delivery. This protocol allows some applications to receive streaming audio/video from the Internet.

The PPPoE pass through function allows PPPoE clients of computers from your LAN to connect to the Internet through connections of the router.

The PPTP pass through, L2TP pass through and IPsec pass through functions allow VPN PPTP, L2TP and IPsec traffic to pass through the router so that clients from your LAN can establish relevant connections with remote networks.

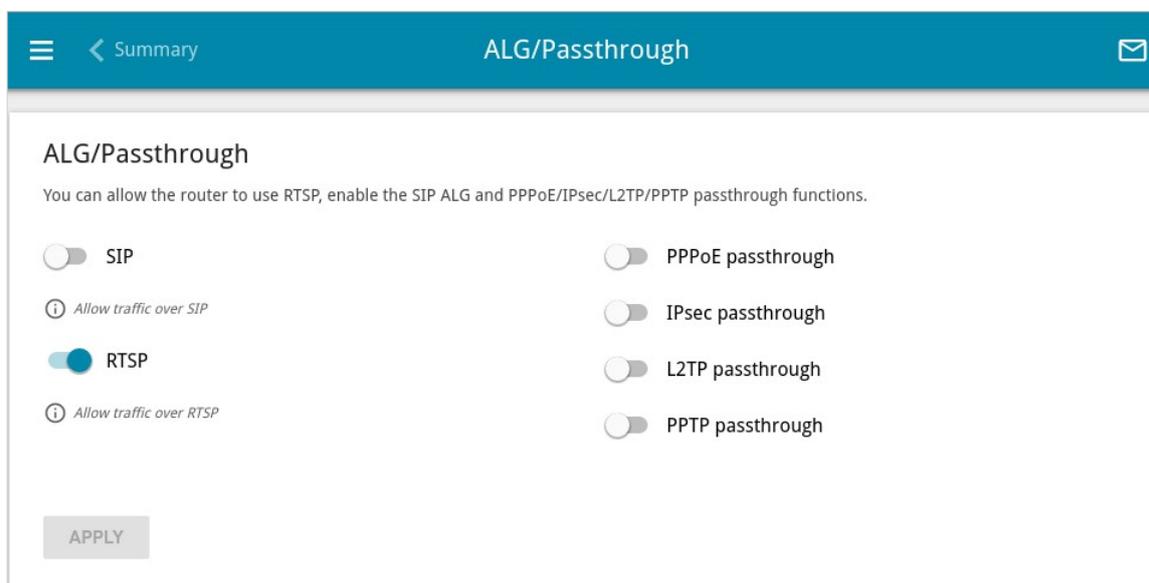


Figure 120. The **Advanced / ALG/Passthrough** page.

The following elements are available on the page:

Parameter	Description
SIP	Move the switch to the right to enable SIP. Such a setting allows using the SIP ALG function. This function allows VoIP traffic to pass through the NAT-enabled router. ³
RTSP	Move the switch to the right to enable RTSP. Such a setting allows managing media stream: fast forward streaming audio/video, pause and start it.
PPPoE pass through	Move the switch to the right to enable the PPPoE pass through function.
IPsec pass through	Move the switch to the right to enable the IPsec pass through function.
L2TP pass through	Move the switch to the right to enable the L2TP pass through function.
PPTP pass through	Move the switch to the right to enable the PPTP pass through function.

After specifying the needed parameters, click the **APPLY** button.

³ On the **Connections Setup / WAN** page, create a WAN connection, move the **SIP** switch to the right on the **Advanced / ALG/Passthrough** page, connect an Ethernet cable between a LAN port of the router and the IP phone. Specify SIP parameters on the IP phone and configure it to obtain an IP address automatically (as DHCP client).

Firewall

In this menu you can configure the firewall of the router:

- add rules for IP filtering
- create virtual servers
- define a DMZ
- configure the MAC filter
- specify restrictions on access to certain web sites
- create rules for remote access to the web-based interface.

IP Filter

On the **Firewall / IP Filter** page, you can create new rules for filtering IP packets and edit or remove existing rules.

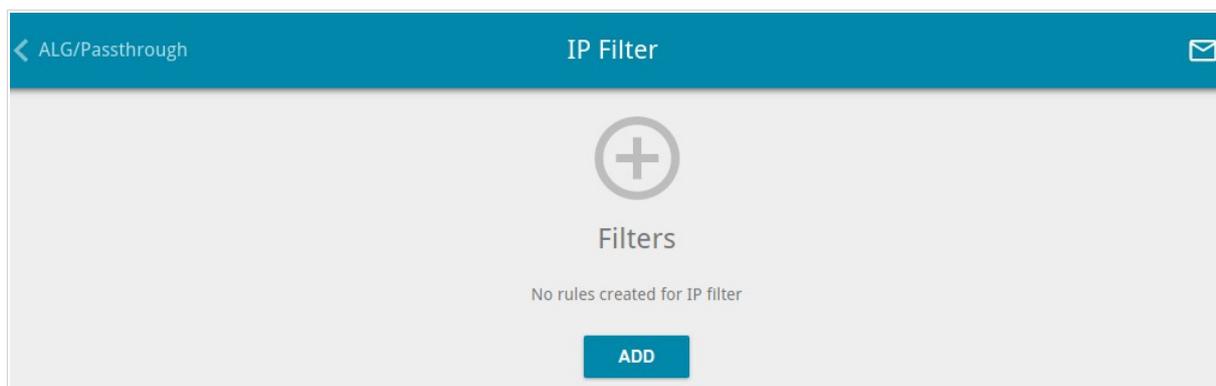


Figure 121. The **Firewall / IP Filter** page.

To create a new rule, click the **ADD** button (**+**).

Figure 122. The page for adding a rule for IP filtering.

You can specify the following parameters:

Parameter	Description
General Settings	
Enable rule	Move the switch to the right to enable the rule. Move the switch to the left to disable the rule.
Name	A name for the rule for easier identification. You can specify any name.
Action	Select an action for the rule. <ul style="list-style-type: none"> Allow: Allows packet transmission in accordance with the criteria specified by the rule. Deny: Denies packet transmission in accordance with the criteria specified by the rule.

Parameter	Description
Protocol	A protocol for network packet transmission. Select a value from the drop-down list.
IP version	An IP version to which the rule will be applied. Select the relevant value from the drop-down list.
Source IP Address	
Set as	Select the needed value from the drop-down list.
Start IPv4 address / Start IPv6 address	<p>The source host start IPv4 or IPv6 address.</p> <p>If it is necessary to specify a single address, leave the End IPv4 address / End IPv6 address field blank.</p> <p>You can choose a device connected to the router's LAN at the moment. To do this, select the relevant IPv4 or IPv6 address from the drop-down list (the field will be filled in automatically).</p>
End IPv4 address / End IPv6 address	The source host end IPv4 or IPv6 address.
Subnet IPv4 address / Subnet IPv6 address	The source subnet IPv4 or IPv6 address. The field is displayed when the Subnet value is selected from the Set as drop-down list.
Destination IP Address	
Set as	Select the needed value from the drop-down list.
Start IPv4 address / Start IPv6 address	<p>The destination host start IPv4 or IPv6 address.</p> <p>If it is necessary to specify a single address, leave the End IPv4 address / End IPv6 address field blank.</p> <p>You can choose a device connected to the router's LAN at the moment. To do this, select the relevant IPv4 or IPv6 address from the drop-down list (the field will be filled in automatically).</p>
End IPv4 address / End IPv6 address	The destination host end IPv4 or IPv6 address.
Subnet IPv4 address / Subnet IPv6 address	The destination subnet IPv4 or IPv6 address. The field is displayed when the Subnet value is selected from the Set as drop-down list.
Ports	
Destination port	A port of the destination IP address. You can specify one port, several ports separated by a comma, or a range of ports separated by a colon.

Parameter	Description
Set source port manually	Move the switch to the right to specify a port of the source IP address manually. Upon that the Source port field is displayed.
Source port	A port of the source IP address. You can specify one port, several ports separated by a comma, or a range of ports separated by a colon.

Click the **APPLY** button.

To edit a rule for IP filtering, select the relevant line in the table. On the opened page, change the needed parameters and click the **APPLY** button.

To remove a rule, select the checkbox located to the left of the relevant line of the table and click the **DELETE** button (). Also you can remove a rule on the editing page.

Virtual Servers

On the **Firewall / Virtual Servers** page, you can create virtual servers for redirecting incoming Internet traffic to a specified IP address in the local area network.

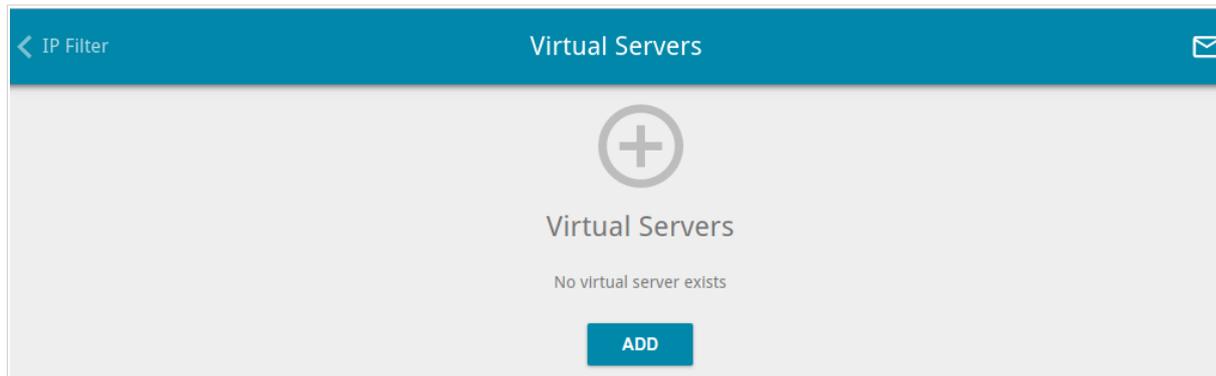


Figure 123. The **Firewall / Virtual Servers** page.

To create a new virtual server, click the **ADD** button ().

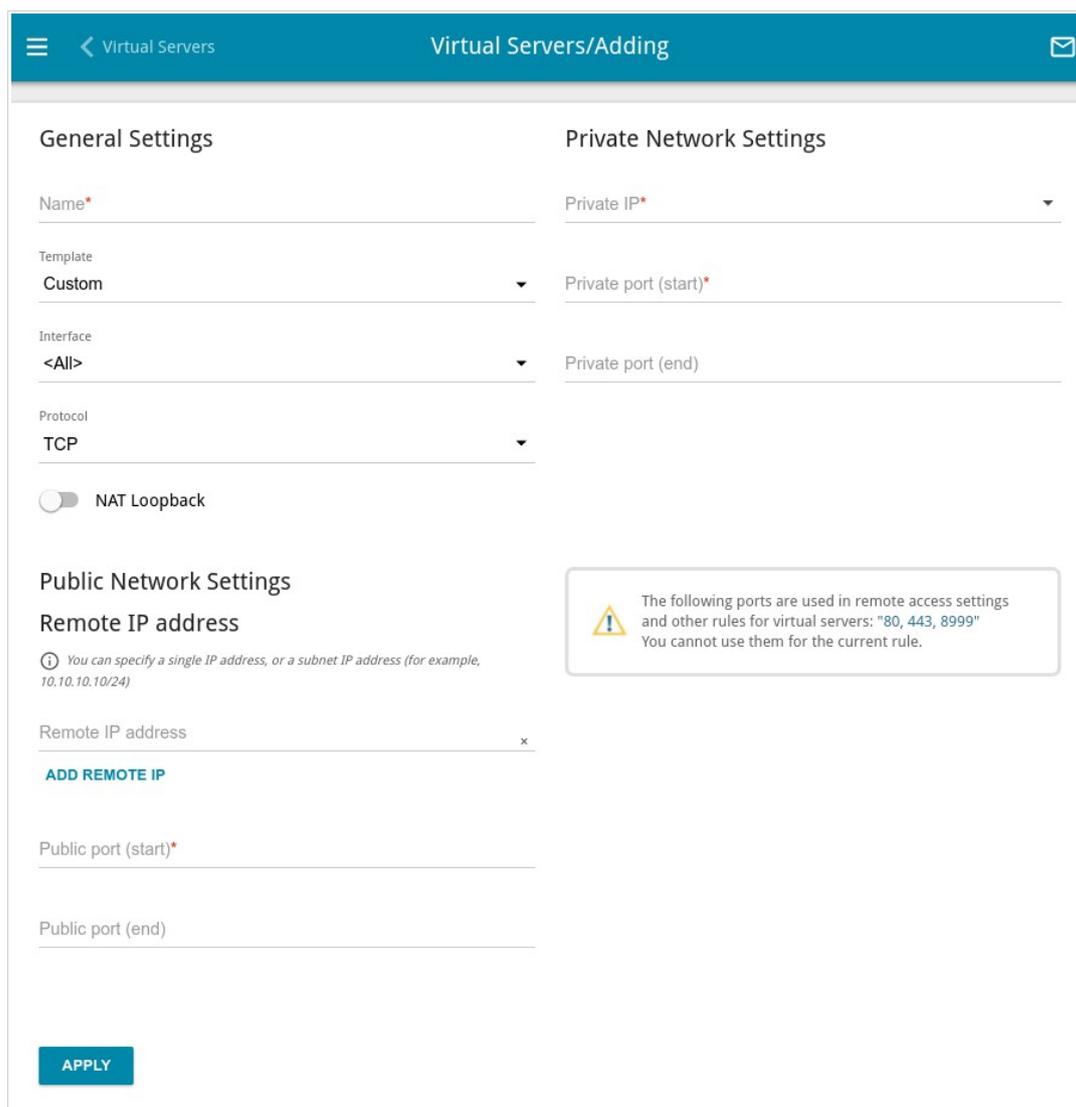
The screenshot shows the 'Virtual Servers/Adding' page. The header is blue with a menu icon, a back arrow, 'Virtual Servers', and 'Virtual Servers/Adding' in the center, with a mail icon on the right. The main content area is divided into three sections: 'General Settings', 'Private Network Settings', and 'Public Network Settings'.
- **General Settings:** Includes fields for 'Name*' (text input), 'Template' (dropdown menu with 'Custom' selected), 'Interface' (dropdown menu with '<All>' selected), and 'Protocol' (dropdown menu with 'TCP' selected). There is also a 'NAT Loopback' toggle switch which is currently off.
- **Private Network Settings:** Includes fields for 'Private IP*' (dropdown menu), 'Private port (start)*' (text input), and 'Private port (end)' (text input).
- **Public Network Settings:** Includes a 'Remote IP address' section with a warning icon and text: 'You can specify a single IP address, or a subnet IP address (for example, 10.10.10.10/24)'. Below this is a text input field for 'Remote IP address' with a close button 'x' and a blue button 'ADD REMOTE IP'. It also has fields for 'Public port (start)*' and 'Public port (end)'.
At the bottom left of the form is a blue button labeled 'APPLY'.
A warning box on the right side of the form contains a yellow warning triangle icon and the text: 'The following ports are used in remote access settings and other rules for virtual servers: "80, 443, 8999" You cannot use them for the current rule.'

Figure 124. The page for adding a virtual server.

You can specify the following parameters:

Parameter	Description
General Settings	
Name	A name for the virtual server for easier identification. You can specify any name.
Template	Select a virtual server template from the drop-down list, or select Custom to specify all parameters of the new virtual server manually.
Interface	A WAN connection to which this virtual server will be assigned.
Protocol	A protocol that will be used by the new virtual server. Select a value from the drop-down list.
NAT Loopback	Move the switch to the right in order to let the users of the router's LAN access the local server using the external IP address of the router or its DDNS name (if a DDNS service is configured). Users from the external network access the router using the same address (or DDNS name).
Public Network Settings	
Remote IP address	<p>The IP address of the host/subnet of the client that will connect to the virtual server.</p> <p>To add one more IP address, click the ADD REMOTE IP button and enter the address in the displayed line.</p> <p>To remove the IP address, click the Delete icon (✕) in the line of the address.</p>
Public port (start) / Public port (end)	A port of the router from which traffic is directed to the IP address specified in the Private IP field in the Private Network Settings section. Specify the start and the end value for the port range. If you need to specify one port, enter the needed value in the Public port (start) field and leave the Public port (end) field blank.
Private Network Settings	
Private IP	The IP address of the server from the local area network. To choose a device connected to the router's LAN at the moment, select the relevant value from the drop-down list (the field will be filled in automatically).

Parameter	Description
Private port (start) / Private port (end)	A port of the IP address specified in the Private IP field to which traffic is directed from the Public port . Specify the start and the end value for the port range. If you need to specify one port, enter the needed value in the Private port (start) field and leave the Private port (end) field blank.

Click the **APPLY** button.

To edit the parameters of an existing server, select the relevant line in the table. On the opened page, change the needed parameters and click the **APPLY** button.

To remove a server, select the checkbox located to the left of the relevant line of the table and click the **DELETE** button (). Also you can remove a server on the editing page.

DMZ

A DMZ is a host or network segment located “between” internal (local) and external (global) networks. In the router, the DMZ implements the capability to transfer a request coming to a port of the router from the external network to a specified host of the internal network.

On the **Firewall / DMZ** page, you can specify the IP address of the DMZ host.

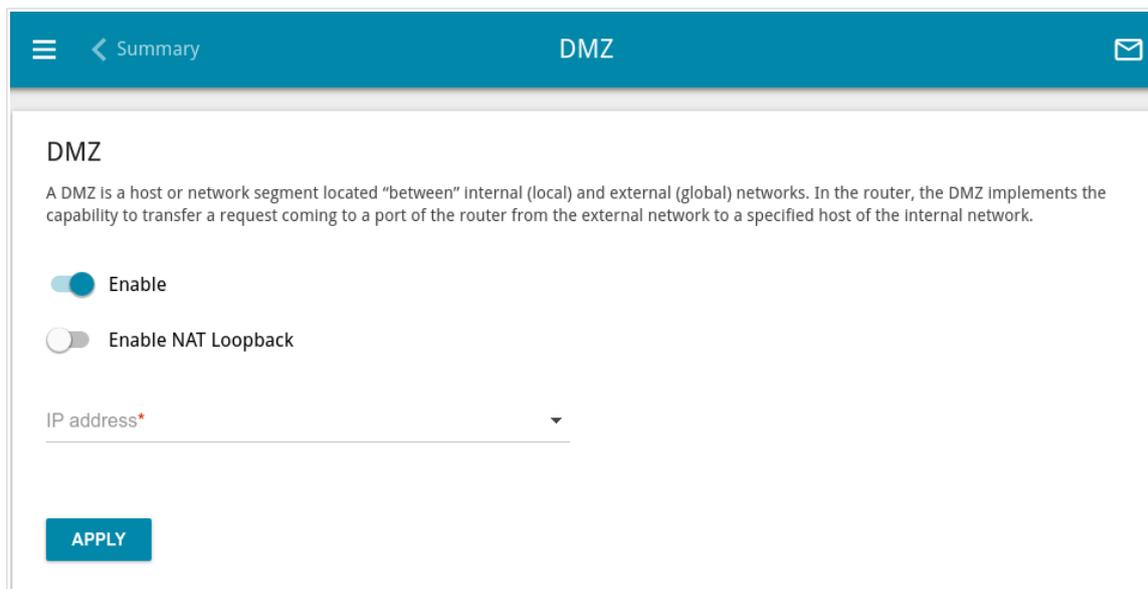


Figure 125. The **Firewall / DMZ** page.

To enable the DMZ, move the **Enable** switch to the right.

Enter the IP address of a host from your network in the **IP address** field. To choose a device connected to the router's LAN at the moment, select the relevant value from the drop-down list (the field will be filled in automatically).

Move the **Enable NAT Loopback** switch to the right in order to let the users of the router's LAN access the DMZ host using the external IP address of the router or its DDNS name (if a DDNS service is configured). Users from the external network access the router using the same address (or DDNS name).

Click the **APPLY** button.

Note that when the DMZ is enabled, all traffic coming to a port of the WAN interface of the router is directed to the same port of the specified IP address. Also note that virtual servers have higher priority than the DMZ host. In other words, if there has been created a virtual server that directs traffic from external port 80 to a port of the device from the router's local network, then entering **http://router_wan_ip** in the address bar, users of the external network are directed to the specified port and IP address configured for the virtual server, but not to port 80 of the device with the IP address specified on the **Firewall / DMZ** page.

To disable the DMZ, move the **Enable** switch to the left and click the **APPLY** button.

MAC Filter

On the **Firewall / MAC Filter** page, you can configure MAC-address-based filtering for computers of the router's LAN.

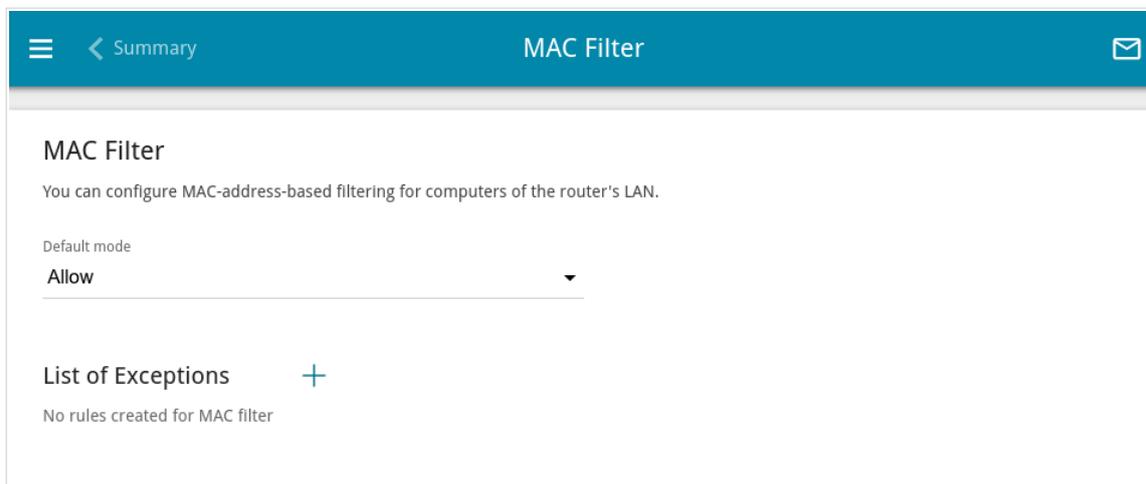


Figure 126. The **Firewall / MAC Filter** page.

Select the needed action from the drop-down list in the **Default mode** section to configure filtering for all devices of the router's network:

- **Allow:** Allows access to the router's network and to the Internet for devices (the value is specified by default);
- **Deny:** Blocks access to the router's network for devices.

! You can use the **Deny** mode only if an active rule which allows access to the device's network is created on the page.

To create a rule (specify a MAC address of a device for which the specified filtering mode will be applied), click the **ADD** button (**+**).

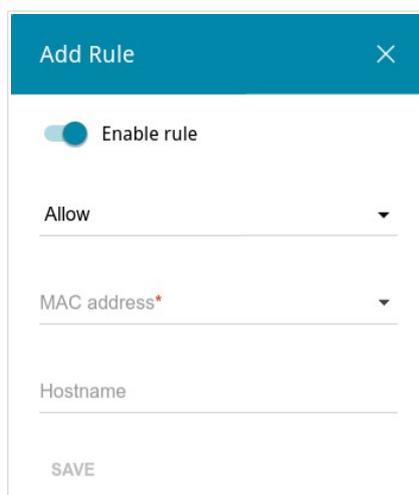


Figure 127. The window for adding a rule for the MAC filter.

In the opened window, you can specify the following parameters:

Parameter	Description
Enable rule	Move the switch to the right to enable the rule. Move the switch to the left to disable the rule.
Action	Select an action for the rule. <ul style="list-style-type: none"> • Deny: Blocks access to the Internet for the device with the specified MAC address even if the default mode allows access for all devices. • Allow: Allows access to the router's network and to the Internet for the device with the specified MAC address even if the default mode denies access for all devices.
MAC address	The MAC address of a device from the router's LAN. You can enter the MAC address of a device connected to the router's LAN at the moment. To do this, select the relevant device from the drop-down list (the field will be filled in automatically).
Hostname	The name of the device for easier identification. You can specify any name.

After specifying the needed parameters, click the **SAVE** button.

To edit a rule, select the relevant line in the table. In the opened window, change the needed parameters and click the **SAVE** button.

To remove a rule, select the checkbox located to the left of the relevant line of the table and click the **DELETE** button (). Also you can remove a rule in the editing window.

URL Filter

On the **Firewall / URL Filter** page, you can specify restrictions on access to certain web sites.

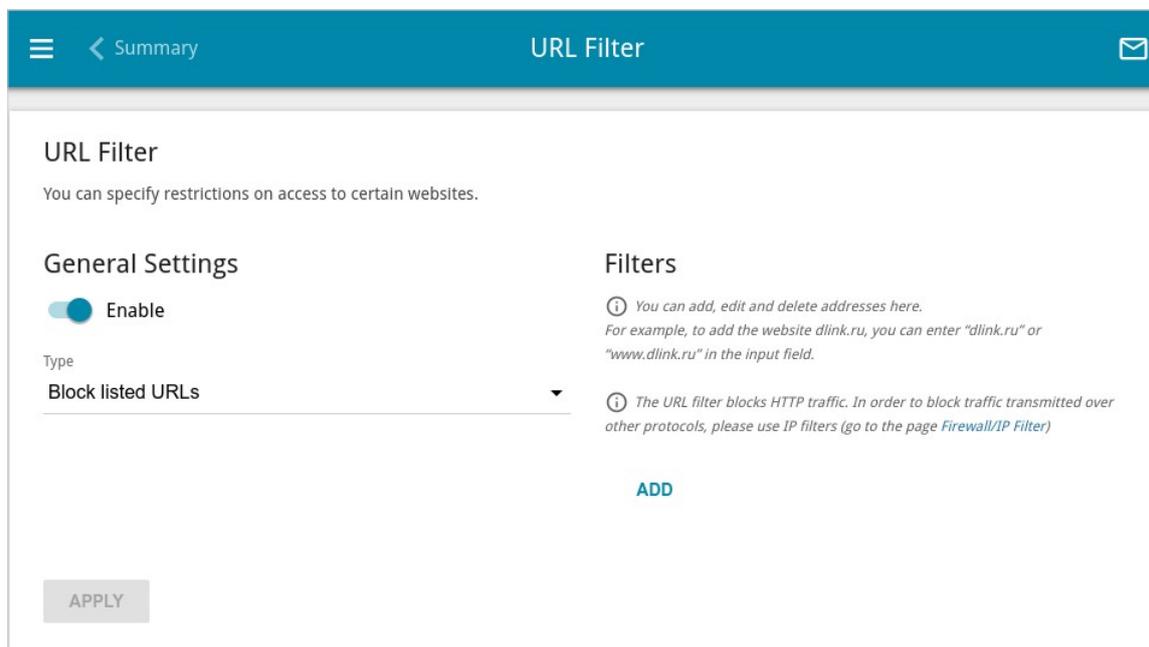


Figure 128. The **Firewall / URL Filter** page.

To enable the URL filter, in the **General Settings** section, move the **Enable** switch to the right, then select the needed mode from the **Type** drop-down list:

- **Block listed URLs:** When this value is selected, the router blocks access to all addresses specified in the **Filters** section;
- **Block all URLs except listed:** When this value is selected, the router allows access to addresses specified in the **Filters** section and blocks access to all other web sites.

Click the **APPLY** button.

To specify URL addresses to which the selected filtering mode will be applied, in the **Filters** section, click the **ADD** button and enter a relevant address in the displayed line. Then click the **APPLY** button.

To remove an address from the list of URL addresses, click the **Delete** icon (✕) in the line of the relevant URL address. Then click the **APPLY** button.

Remote Access

On the **Firewall / Remote Access** page, you can configure access to the web-based interface of the router. By default, the access from external networks to the router is closed. If you need to allow access to the router from the external network, create relevant rules.

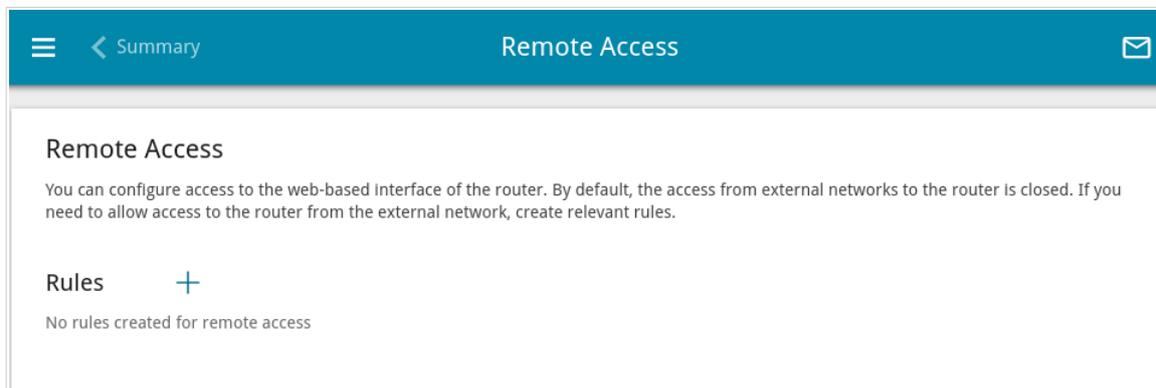


Figure 129. The **Firewall / Remote Access** page.

To create a new rule, click the **ADD** button ()

The screenshot shows a 'Add Rule' dialog box with a blue header bar containing the title 'Add Rule' and a close 'X' icon. The form contains several fields: 'Name*' (text input), 'Interface' (dropdown menu with 'Automatic' selected), 'IP version' (dropdown menu with 'IPv4' selected), a toggle switch for 'Open access from any external host' (currently off), 'IP address*' (text input), 'Mask*' (text input), 'Public port*' (text input with '80' entered), and 'Protocol' (dropdown menu with 'HTTP' selected). At the bottom of the dialog is a 'SAVE' button.

Figure 130. The window for adding a rule for remote management.

In the opened window, you can specify the following parameters:

Parameter	Description
Name	A name for the rule for easier identification. You can specify any name.
Interface	From the drop-down list, select an interface (WAN connection) through which remote access to the router will operate. Leave the Automatic value to allow remote access to operate through all created WAN connections.
IP version	An IP version to which the rule will be applied. Select the relevant value from the drop-down list.
Open access from any external host	Move the switch to the right to allow access to the router for any host. Upon that the IP address and Mask fields are not displayed.
IP address	A host or a subnet to which the rule is applied. You can specify an IPv4 or IPv6 address.
Mask	<i>For the IPv4-based network only.</i> The mask of the subnet.
Public port	<i>For the IPv4-based network only.</i> An external port of the router. You can specify only one port.
Protocol	The protocol available for remote management of the router.

After specifying the needed parameters, click the **SAVE** button.

To edit a rule for remote access, left-click the relevant rule. In the opened window, change the needed parameters and click the **SAVE** button.

To remove a rule for remote access, select the checkbox located to the left of the relevant line in the table and click the **DELETE** button ()

System

In this menu you can do the following:

- change the password used to access the router's settings
- restore the factory default settings
- create a backup of the router's configuration
- restore the router's configuration from a previously saved file
- save the current settings to the non-volatile memory
- reboot the router
- change the web-based interface language
- update the firmware of the router
- configure automatic notification on new firmware version
- view the system log; configure sending the system log to a remote host
- check availability of a host on the Internet through the web-based interface of the router
- trace the route to a host
- enable or disable access to the device settings via TELNET
- configure automatic synchronization of the system time or manually configure the date and time for the router.

Configuration

On the **System / Configuration** page, you can change the password for the administrator account used to access the web-based interface of the router and to access the device settings via TELNET, restore the factory defaults, backup the current configuration, restore the router's configuration from a previously created file, save the changed settings to the non-volatile memory, reboot the device, or change the web-based interface language.

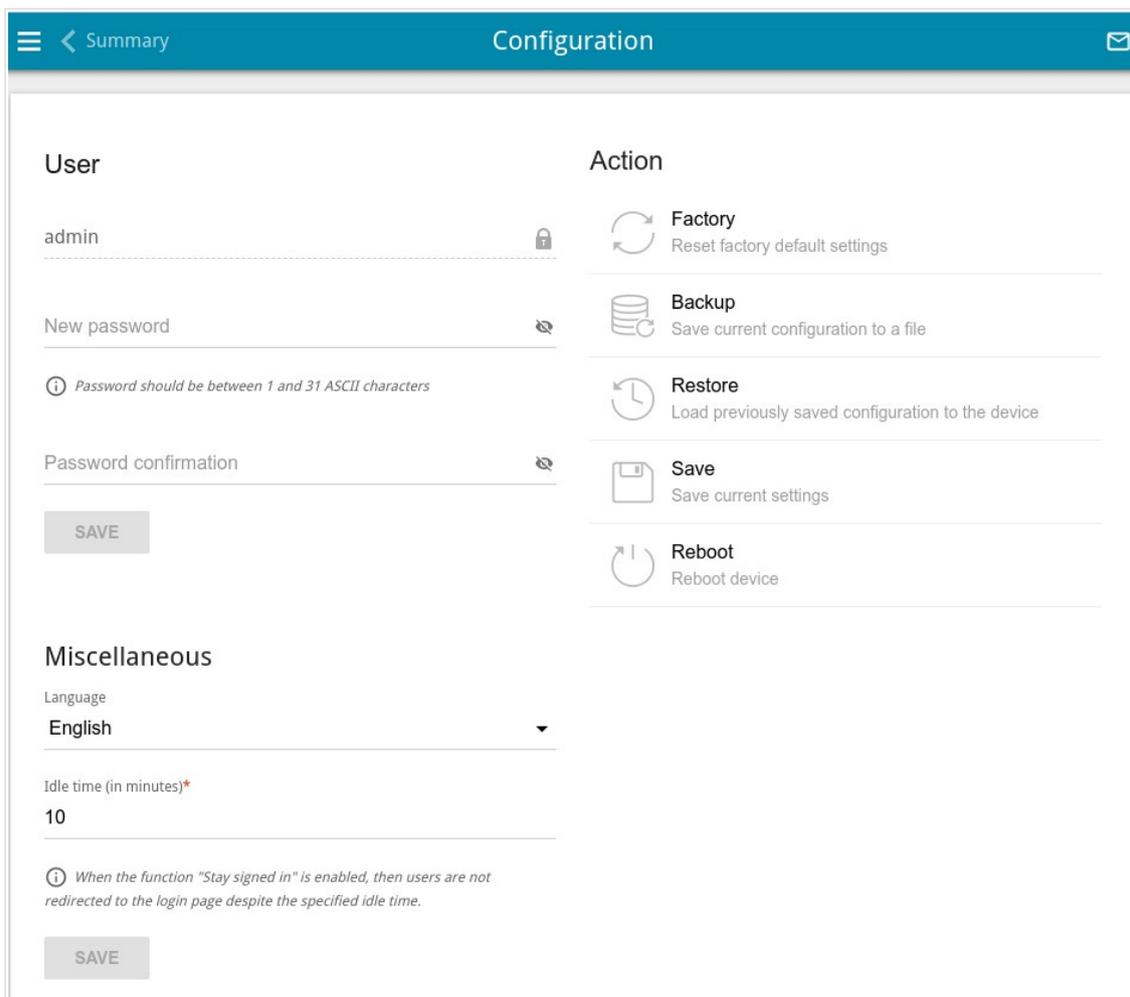


Figure 131. The **System / Configuration** page.

In order to change the password for the administrator account, in the **User** section, enter a new password in the **New password** and **Password confirmation** fields. Use digits, Latin letters (uppercase and/or lowercase), and other characters available in the US keyboard layout.⁴ Click the **Show** icon (👁) to display the entered values. Then click the **SAVE** button.



Remember or write down the new password for the administrator account. In case of losing the new password, you can access the settings of the router only after restoring the factory default settings via the hardware **RESET** button. This procedure wipes out all settings that you have configured for your router.

⁴ 0-9, A-Z, a-z, space, !"#\$%&'()*+,-./:;<=>?@[]^_`{|}~.

To change the web-based interface language, in the **Miscellaneous** section, select the needed value from the **Language** drop-down list.

To change a period of inactivity after which the router completes the session of the interface, in the **Miscellaneous** section, in the **Idle time** field, specify the needed value (in minutes). By default, the value **5** is specified. Then click the **SAVE** button.

In the **Action** section, the following buttons are available:

Control	Description
Factory	Click the button to restore the factory default settings. Also you can restore the factory defaults via the hardware RESET button (see the <i>Back and Bottom Panels</i> section, page 11).
Backup	Click the button to save the configuration (all settings of the router) to your PC. The configuration backup will be stored in the download location of your web browser.
Restore	Click the button and follow the dialog box appeared to select a previously saved configuration file (all settings of the router) located on your PC and upload it.
Save	Click the button to save settings to the non-volatile memory. The router saves changed settings automatically. If changed settings have not been saved automatically, a notification is displayed in the top right part of the page.
Reboot	Click the button to reboot the device. All unsaved changes will be lost after the device's reboot.

Firmware Update

On the **System / Firmware Update** page, you can update the firmware of the router and configure the automatic check for updates of the router's firmware.

! Update the firmware only when the router is connected to your PC via a wired connection.

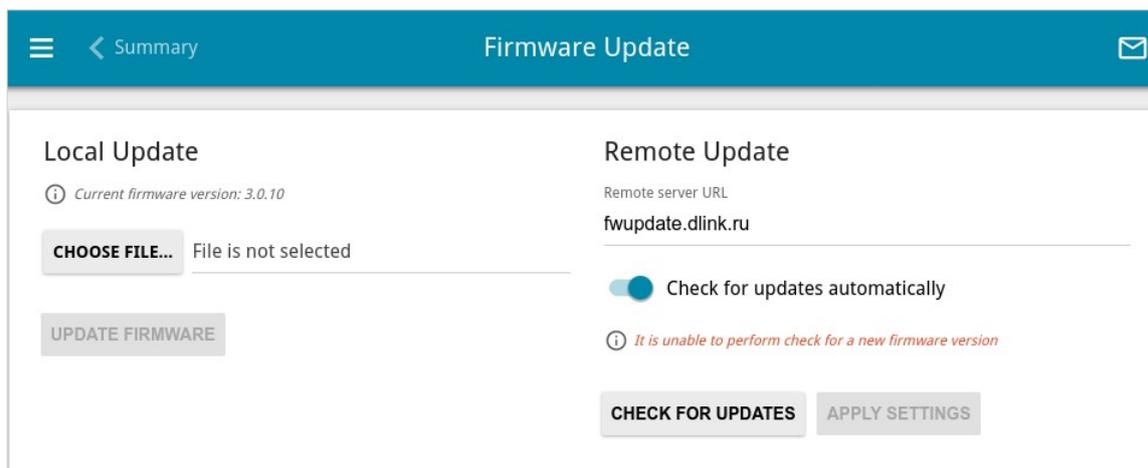


Figure 132. The **System / Firmware Update** page.

The current version of the router's firmware is displayed in the **Current firmware version** field.

By default, the automatic check for the router's firmware updates is enabled. If a firmware update is available, a notification will be displayed in the top right corner of the page.

To disable the automatic check for firmware updates, in the **Remote Update** section, move the **Check for updates automatically** switch to the left and click the **APPLY SETTINGS** button.

To enable the automatic check for firmware updates, in the **Remote Update** section, move the **Check for updates automatically** switch to the right and click the **APPLY SETTINGS** button. By default, in the **Remote server URL** field, the D-Link update server address (**fwupdate.dlink.ru**) is specified.

You can update the firmware of the router locally (from the hard drive of your PC) or remotely (from the update server).

Local Update



Attention! Do not turn off the router before the firmware update is completed. This may cause the device breakdown.

To update the firmware of the router locally, follow the next steps:

1. Download a new version of the firmware from www.dlink.ru.
2. Click the **CHOOSE FILE** button in the **Local Update** section on the **System / Firmware Update** page to locate the new firmware file.
3. Click the **UPDATE FIRMWARE** button.
4. Wait until the router is rebooted (about one and a half or two minutes).
5. Log into the web-based interface using the login (**admin**) and the current password.

If after updating the firmware the router doesn't work correctly, please restore the factory default settings. To do this, click the **Factory** button on the **System / Configuration** page. Wait until the router is rebooted.

Remote Update



Attention! Do not turn off the router before the firmware update is completed. This may cause the device breakdown.

To update the firmware of the router remotely, follow the next steps:

1. On the **System / Firmware Update** page, in the **Remote Update** section, click the **CHECK FOR UPDATES** button to check if a newer firmware version exists.
2. Click the **UPDATE FIRMWARE** button (the button is displayed if a newer version of the firmware is available).
3. Wait until the router is rebooted (about one and a half or two minutes).
4. Log into the web-based interface using the login (**admin**) and the current password.

If after updating the firmware the router doesn't work correctly, please restore the factory default settings. To do this, click the **Factory** button on the **System / Configuration** page. Wait until the router is rebooted.

Log

On the **System / Log** page, you can set the system log options and configure sending the system log to a remote host.

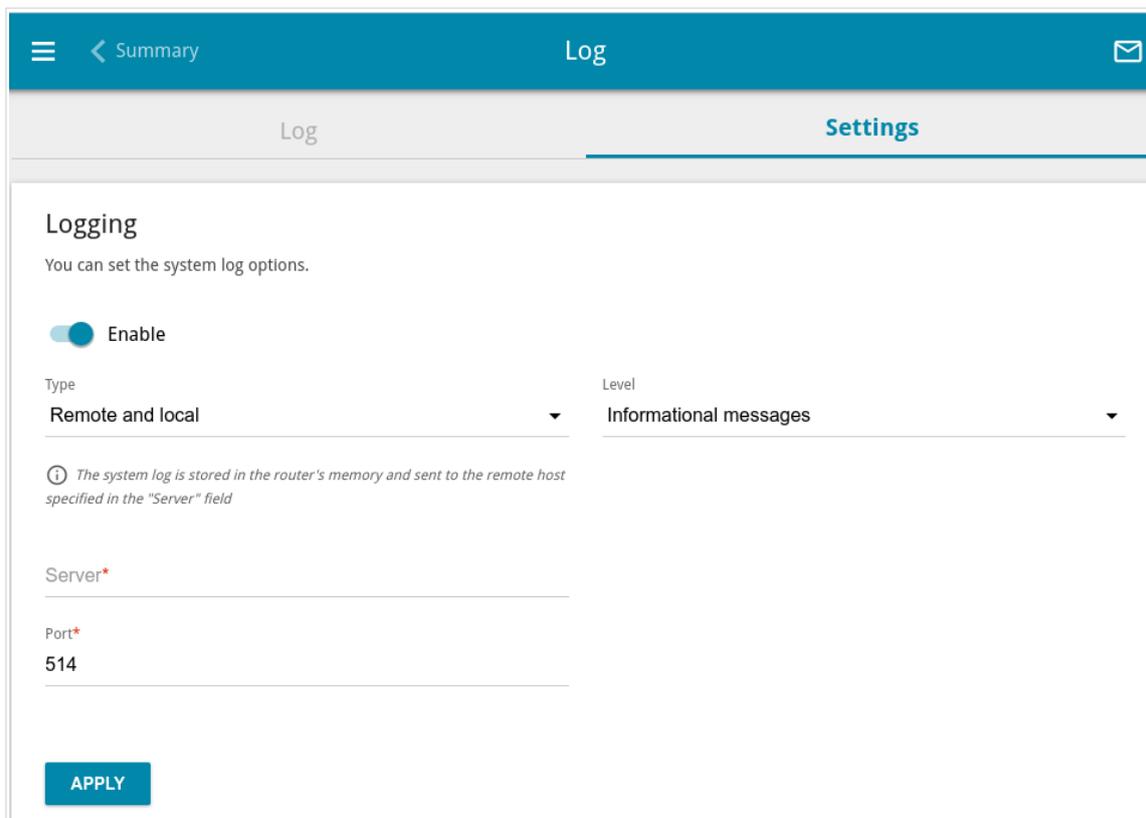


Figure 133. The **System / Log** page. The **Settings** tab.

To enable logging of the system events, go to the **Settings** tab and move the **Enable** switch to the right. Then specify the needed parameters.

Parameter	Description
Type	<p>Select a type of logging from the drop-down list.</p> <ul style="list-style-type: none"> • Local: The system log is stored in the router's memory. When this value is selected, the Server and Port fields are not displayed. • Remote: The system log is sent to the remote host specified in the Server field. • Remote and local: The system log is stored in the router's memory and sent to the remote host specified in the Server field.
Level	Select a type of messages and alerts/notifications to be logged.
Server	The IP or URL address of the host from the local or global network, to which the system log will be sent.

Parameter	Description
Port	A port of the host specified in the Server field. By default, the value 514 is specified.

After specifying the needed parameters, click the **APPLY** button.

To disable logging of the system events, move the **Enable** switch to the left and click the **APPLY** button.

To view the system log, go to the **Log** tab.

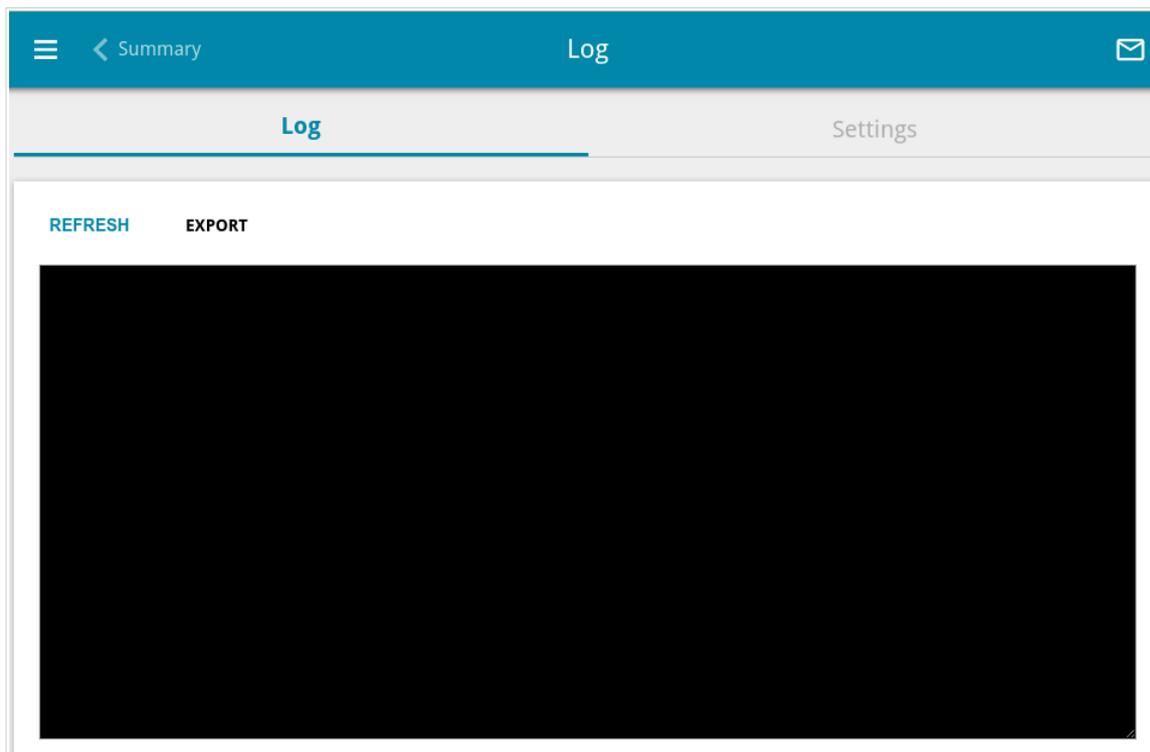


Figure 134. The **System / Log** page. The **Log** tab.

To view the latest system events, click the **REFRESH** button.

To save the system log to your PC, click the **EXPORT** button. The file will be stored in the download location of your web browser.

Ping

On the **System / Ping** page, you can check availability of a host from the local or global network via the Ping utility.

The Ping utility sends echo requests to a specified host and receives echo replies.

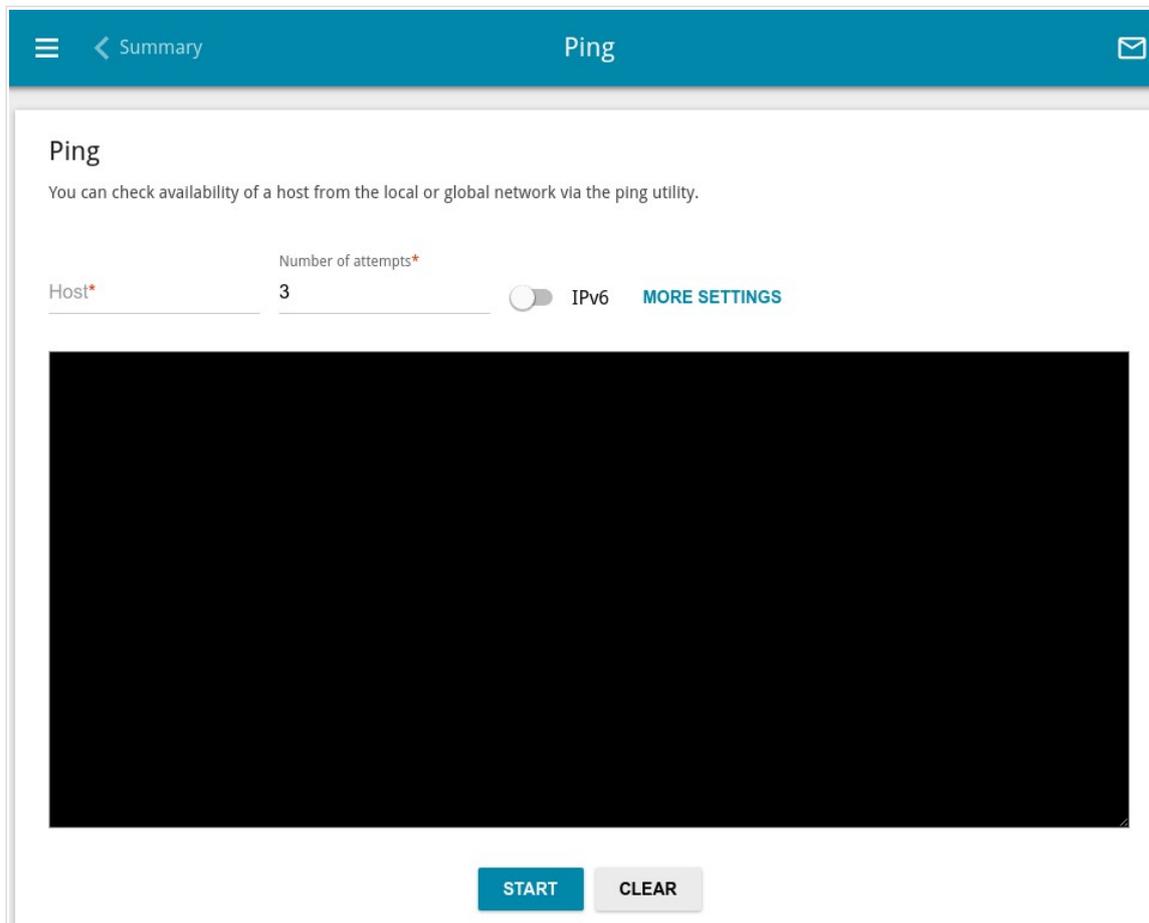
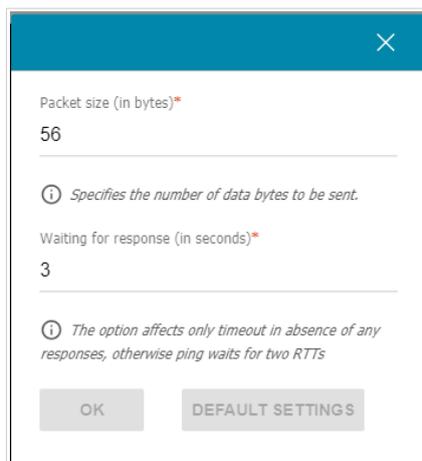


Figure 135. The **System / Ping** page.

To check availability of a host, enter the IP address or name of this host in the **Host** field and specify a number of requests that will be sent in order to check its availability in the **Number of attempts** field. If availability check should be performed with IPv6, move the **IPv6** switch to the right.

To specify additional settings, click the **MORE SETTINGS** button.



Packet size (in bytes)*
56

i Specifies the number of data bytes to be sent.

Waiting for response (in seconds)*
3

i The option affects only timeout in absence of any responses, otherwise ping waits for two RTTs

OK DEFAULT SETTINGS

Figure 136. The **System / Ping** page. The additional settings window.

In the opened window, in the **Packet size** field, specify the volume of data sent in a request. In the **Waiting for response** field, specify the response waiting period in seconds. To restore the default field values, click the **DEFAULT SETTINGS** button.

After specifying the additional parameters, click the **OK** button.

To run the check, click the **START** button. After a while, the results will be displayed on the page.

To remove the check result from the page, click the **CLEAR** button.

Traceroute

On the **System / Traceroute** page, you can trace the route of data transfer to a host via the traceroute utility.

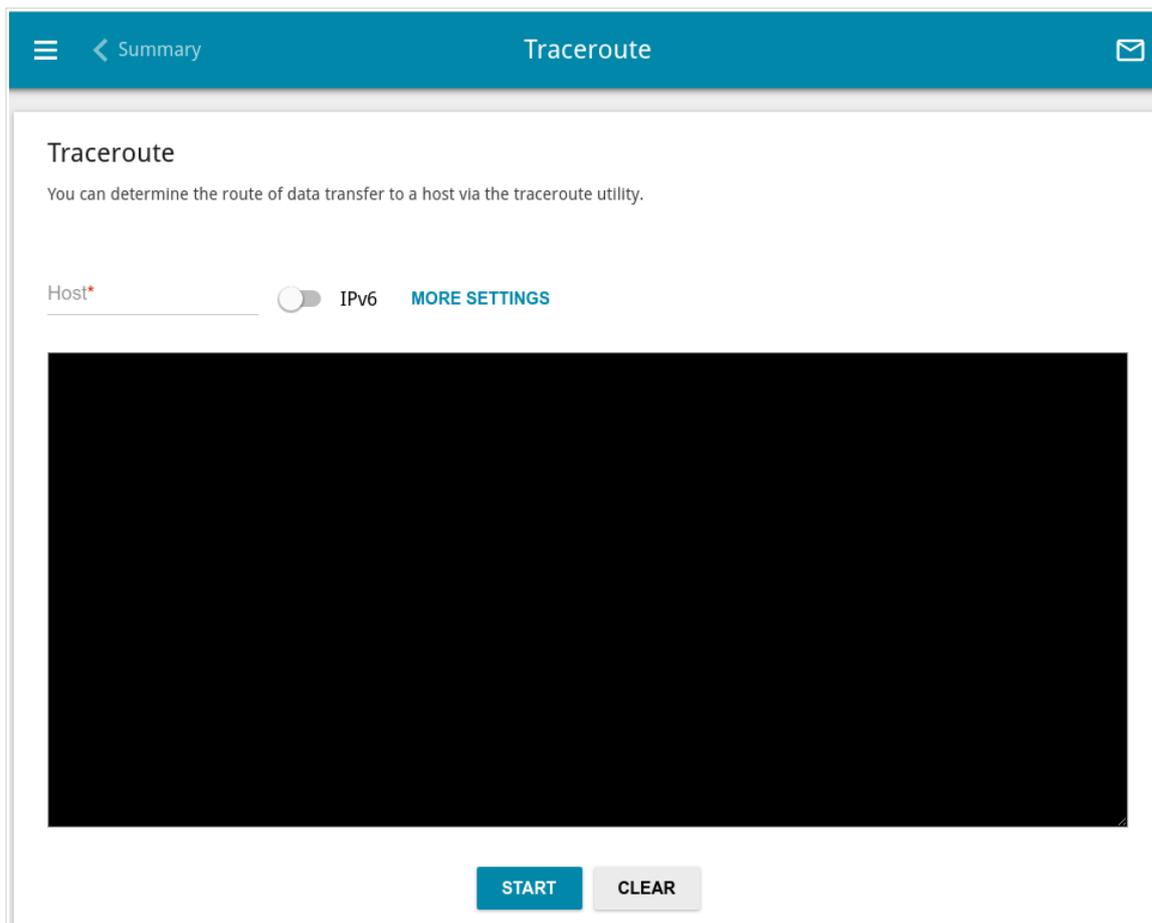


Figure 137. The **System / Traceroute** page.

To trace the route, enter the name or IP address of a host in the **Host** field. If the route should be traced using IPv6, move the **IPv6** switch to the right.

To specify additional settings, click the **MORE SETTINGS** button.

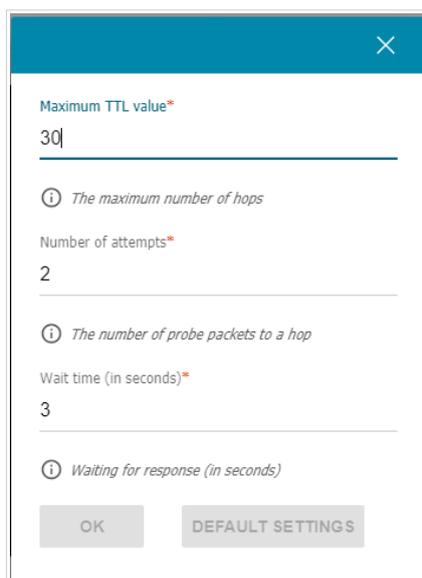


Figure 138. The **System / Traceroute** page. The additional settings window.

In the opened window, you can specify the following parameters:

Parameter	Description
Maximum TTL value	Specify the TTL (<i>Time to live</i>) parameter value. The default value is 30 .
Number of attempts	The number of attempts to hit an intermediate host.
Wait time	A period of waiting for an intermediate host response.

To restore the default field values, click the **DEFAULT SETTINGS** button.

After specifying the additional parameters, click the **OK** button.

To run the check, click the **START** button. After a while, the results will be displayed on the page.

To remove the check result from the page, click the **CLEAR** button.

Telnet

On the **System / Telnet** page, you can enable or disable access to the device settings via TELNET from your LAN. By default, access is disabled.

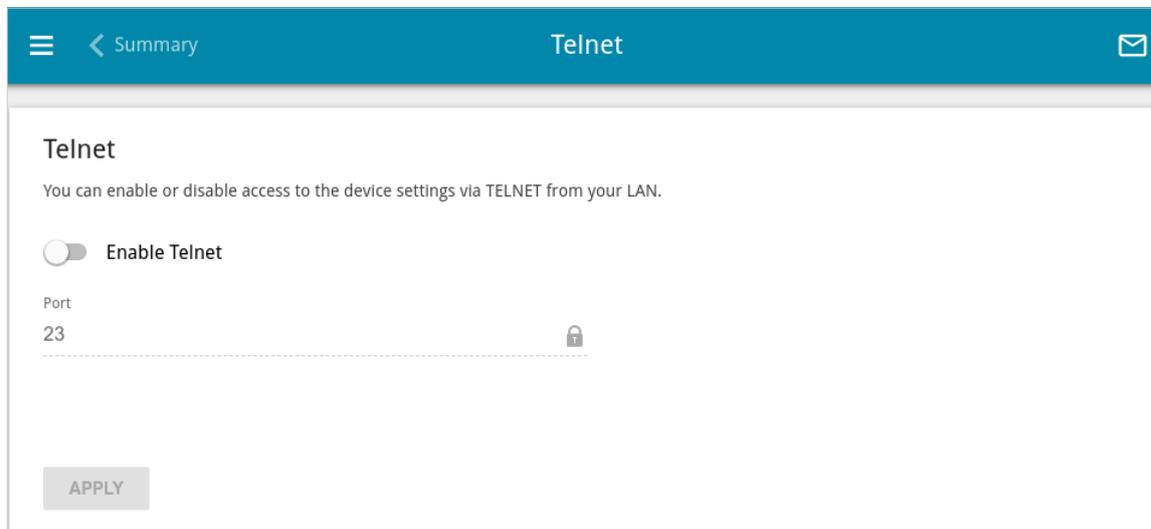


Figure 139. The **System / Telnet** page.

To enable access via TELNET, move the **Enable Telnet** switch to the right. In the **Port** field, enter the number of the router's port through which access will be allowed (by default, the port **23** is specified). Then click the **APPLY** button.

To disable access via TELNET again, move the **Enable Telnet** switch to the left and click the **APPLY** button.

System Time

On the **System / System Time** page, you can manually set the time and date of the router or configure automatic synchronization of the system time with a time server on the Internet.

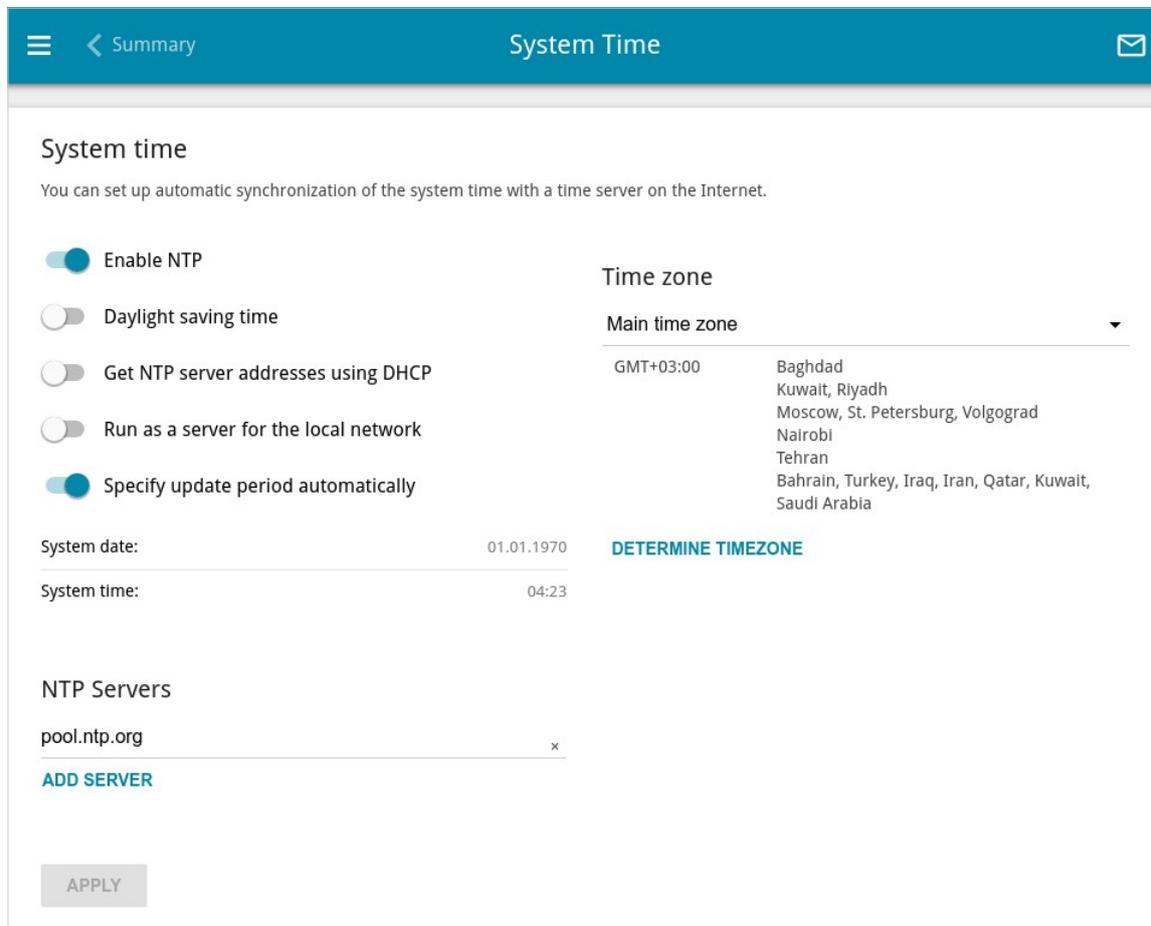


Figure 140. The **System / System Time** page.

To set the system time manually, follow the next steps:

1. Move the **Enable NTP** switch to the left.
2. In the **Time Settings** section, specify needed values. To specify the time set on your PC or portable device, click the **SET LOCAL TIME** button.
3. Click the **APPLY** button. The **System date** and **System time** fields will be filled in automatically.

To enable automatic synchronization with a time server, follow the next steps:

1. Move the **Enable NTP** switch to the right.
2. Specify the needed NTP server or leave the value specified by default in the **NTP Servers** section. If you need to specify several servers, click the **ADD SERVER** button.
3. Select your time zone from the **Main time zone** drop-down list. To set the time zone in accordance with the settings of your operating system or portable device, click the **DETERMINE TIMEZONE** button.

4. Click the **APPLY** button. The **System date** and **System time** fields will be filled in automatically.

To enable the router to automatically adjust to daylight saving time, move the **Daylight saving time** switch to the right. From the **Daylight saving time zone** drop-down list, select the time zone that will be used during summer time and specify the needed values in the **Beginning of daylight saving time** and **End of daylight saving time** sections. Click the **APPLY** button.

In some cases NTP servers addresses are provided by your ISP. In this case, you need to move the **Get NTP server addresses using DHCP** switch to the right and click the **APPLY** button. Contact your ISP to clarify if this setting needs to be enabled. If the **Get NTP server addresses using DHCP** switch is moved to the right, the **NTP Servers** section is not displayed.

To allow connected devices to use the IP address of the router in the local subnet as a time server, move the **Run as a server for the local network** switch to the right and click the **APPLY** button.

By default, the system is configured to automatically determine the system time synchronization interval. Upon that the **Specify update period automatically** switch is moved to the right. To configure the synchronization interval of the system time manually, move the **Specify update period automatically** switch to the left, and in the **Update period** field, specify the needed value (in minutes).

! When the router is powered off or rebooted, the system time is reset to the default value. If you have set automatic synchronization for the system time, the internal clock of the device will be configured after connecting to the Internet. If you have set the system time manually, you need to set the time and date again (see above).

CHAPTER 5. OPERATION GUIDELINES

Safety Rules and Conditions

Please carefully read this section before installation and connection of the device. Make sure that the power adapter and cables are not damaged. The device should be used only as intended in accordance with the documents.

The device is intended for use in dry, clean, dust-free, and well ventilated areas with normal humidity away from strong heat sources. Do not use the device outdoors or in the areas with high humidity. Do not place foreign objects on the device. Do not obstruct the ventilation openings of the device. The environmental temperature near the device and the temperature inside the device's cover should be within the range from 0 °C to +40 °C.

Only use the power adapter supplied with the device. Do not plug in the adapter, if its case or cable are damaged. Plug the adapter only into working electrical outlets with parameters indicated on the adapter.

Do not open the cover of the device! Unplug the device before dusting and cleaning. Use a damp cloth to clean the device. Do not use liquid/aerosol cleaners or magnetic/static cleaning devices. Prevent moisture getting into the device or the power adapter.

The service life of the device is 2 years.

Wireless Installation Considerations

The DSL-224 device lets you access your network using a wireless connection from virtually anywhere within the operating range of your wireless network. Keep in mind, however, that the number, thickness and location of walls, ceilings, or other objects that the wireless signals must pass through, may limit the range. Typical ranges vary depending on the types of materials and background RF noise in your home or office. To maximize your wireless range, follow the guidelines below.

1. Keep the number of walls and ceilings between the DSL-224 device and other network devices to a minimum – each wall or ceiling can reduce your wireless network range by 3-90 feet (1-30 meters).
2. Be aware of the direct line between network devices. Place your devices so that the signal travels straight through a wall or ceiling (instead of at an angle) for better reception.
3. Building materials make a difference. A solid metal door or aluminum studs may have a negative effect on your wireless range. Try to position your router, access points, and computers so that the signal passes through drywalls or open doorways. Materials and objects such as glass, steel, metal, walls with insulation, water (fish tanks), mirrors, file cabinets, brick, and concrete will degrade your wireless signal.
4. Keep your router away (at least 3-6 feet or 1-2 meters) from electrical devices or appliances that generate RF noise.
5. If you are using 2.4 GHz cordless phones or X-10 equipment (wireless devices such as ceiling fans, lights, and home security systems), your wireless connection may degrade dramatically or drop completely. Make sure your 2.4 GHz phone base is as far away from your wireless devices as possible. Note, that the base transmits a signal even if the phone is not in use.

CHAPTER 6. ABBREVIATIONS AND ACRONYMS

3G	Third Generation
AC	Access Category
AES	Advanced Encryption Standard
AP	Access Point
ARP	Address Resolution Protocol
BPSK	Binary Phase-shift Keying
BSSID	Basic Service Set Identifier
CCK	Complementary Code Keying
CHAP	Challenge Handshake Authentication Protocol
DBSK	Differential Binary Phase-shift Keying
DDNS	Dynamic Domain Name System
DDoS	Distributed Denial of Service
DES	Data Encryption Standard
DHCP	Dynamic Host Configuration Protocol
DMZ	DeMilitarized Zone
DNS	Domain Name System
DPD	Dead Peer Detection
DQPSK	Differential Quadrature Phase-shift Keying
DSL	Digital Subscriber Line
DSSS	Direct-sequence Spread Spectrum
DTIM	Delivery Traffic Indication Message
EoGRE	Ethernet over Generic Routing Encapsulation
GMT	Greenwich Mean Time
GRE	Generic Routing Encapsulation
GSM	Global System for Mobile Communications

HTTP	Hypertext Transfer Protocol
HTTPS	Hypertext Transfer Protocol Secure
ICMP	Internet Control Message Protocol
ID	Identifier
IGD	Internet Gateway Device
IGMP	Internet Group Management Protocol
IKE	Internet Key Exchange
IMEI	International Mobile Equipment Identity
IMSI	International Mobile Subscriber Identity
IP	Internet Protocol
IPTV	Internet Protocol Television
IPsec	Internet Protocol Security
ISP	Internet Service Provider
L2TP	Layer 2 Tunneling Protocol
LAN	Local Area Network
LCP	Link Control Protocol
LED	Light-emitting diode
LTE	Long Term Evolution
MAC	Media Access Control
MBSSID	Multiple Basic Service Set Identifier
MIB	Management Information Base
MIMO	Multiple Input Multiple Output
MPPE	Microsoft Point-to-Point Encryption
MS-CHAP	Microsoft Challenge Handshake Authentication Protocol
MTU	Maximum Transmission Unit
NAT	Network Address Translation

NIC	Network Interface Controller
NTP	Network Time Protocol
OFDM	Orthogonal Frequency Division Multiplexing
PAP	Password Authentication Protocol
PBC	Push Button Configuration
PFS	Perfect Forward Secrecy
PIN	Personal Identification Number
PoE	Power over Ethernet
PPP	Point-to-Point Protocol
pppd	Point-to-Point Protocol Daemon
PPPoE	Point-to-point protocol over Ethernet
PPTP	Point-to-point tunneling protocol
PSK	Pre-shared key
PUK	PIN Unlock Key
QAM	Quadrature Amplitude Modulation
QoS	Quality of Service
QPSK	Quadrature Phase-shift Keying
RADIUS	Remote Authentication in Dial-In User Service
RIP	Routing Information Protocol
RIPng	Next Generation Routing Information Protocol
RTS	Request To Send
RTSP	Real Time Streaming Protocol
SA	Security Association
SAE	Simultaneous Authentication of Equals
SIM	Subscriber Identification Module
SIP	Session Initiation Protocol

SMB	Server Message Block
SNMP	Simple Network Management Protocol
SSH	Secure Shell
SSID	Service Set Identifier
STBC	Space-time block coding
TCP	Transmission Control Protocol
TKIP	Temporal Key Integrity Protocol
UAM	Universal Access Method
UDP	User Datagram Protocol
UPnP	Universal Plug and Play
URL	Uniform Resource Locator
USB	Universal Serial Bus
VLAN	Virtual Local Area Network
VoIP	Voice Over Internet Protocol
VPN	Virtual Private Network
VRID	Virtual Router Identifier
VRRP	Virtual Router Redundancy Protocol
WAN	Wide Area Network
WEP	Wired Equivalent Privacy
Wi-Fi	Wireless Fidelity
WISP	Wireless Internet Service Provider
WLAN	Wireless Local Area Network
WMM	Wi-Fi Multimedia
WPA	Wi-Fi Protected Access
WPS	Wi-Fi Protected Setup