



FRITZ!Box

Fon WLAN 7390

Installation,
Configuration
and Operation



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FRITZ!Box Fon WLAN 7390

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We offer a manufacturer’s warranty for this original product. The warranty conditions are presented from page 129 of this manual.

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Symbols and Highlighting



This symbol indicates useful hints to assist you in working with the FRITZ!Box.



This symbol indicates important instructions that must be observed to avoid malfunctions.

The table below explains the highlighting used in this manual:

Highlighting	Function	Examples
Quotation marks	Keys	“F1” key
	Buttons	“Help”
	Settings pages	“Advanced”
	Menus	“Edit / Paste”
	Commands	“Copy”
	File paths	“C:/My Documents”
	File names	“Documentation”
Underlined text	Text input	fritz.box
Pointed brackets	Joker	<Ext.>
Bold	Emphasis	Do not click the button...

I CONNECTING AND OPERATION

1 Security and Handling

What to Watch Out For

Safety Instructions

When working with the FRITZ!Box Fon WLAN 7390, observe the following security instructions in order to protect yourself and the FRITZ!Box from harm.

- Do **not** install the FRITZ!Box during an electrical storm.
- Disconnect FRITZ!Box from the power supply during electrical storms.
- Never let liquids get inside the FRITZ!Box. Otherwise, electric shocks or short circuits may result.
- The FRITZ!Box is intended for indoor use only.
- Do not open the FRITZ!Box housing. The device contains hazardous components and should only be opened by authorized repair technicians.

Handling the FRITZ!Box

You can either place FRITZ!Box on a horizontal surface or mount it on a wall. Please note the following:

- Place or hang the FRITZ!Box in a dry location that is free of dust and protected from direct sunlight.

For ideal operating conditions, mount the FRITZ!Box on a wall with the cables connected on the bottom.

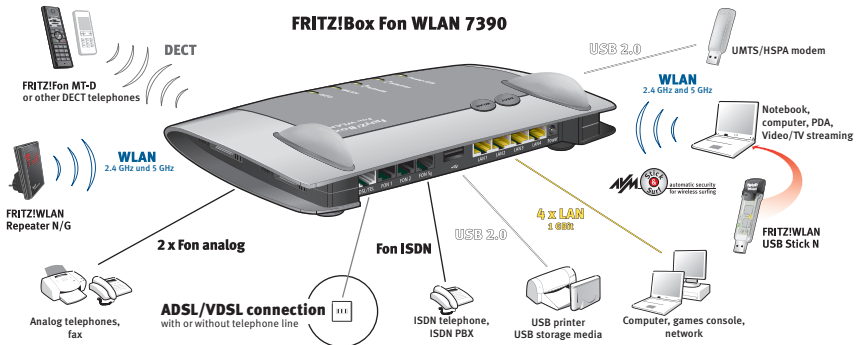
- Do not place FRITZ!Box on excessively heat-sensitive surfaces, as the base of the device can heat up during normal operation.
- Make sure that the ventilation slits are unobstructed. For this reason the FRITZ!Box should not be placed on a carpet or on upholstered furniture. The ventilation slits provide for air cooling of the FRITZ!Box.
- When connecting FRITZ!Box to your computer using the network, remember to take the length of the cable into account.

- If you would like to establish wireless connections between FRITZ!Box and the computer, position the device at a central location.
- Make sure to keep sufficient distance from potential sources of interference like microwave devices or electric devices with large metal housings.

2 FRITZ!Box Fon WLAN 7390 An Overview

The FRITZ!Box connects your computers directly with your DSL or VDSL line. Each connected computer can establish an Internet connection over the FRITZ!Box. As a WLAN access point, FRITZ!Box offers you the possibility of connecting your computer to the DSL or VDSL line wirelessly.

The FRITZ!Box is a Private Branch Exchange (PBX) for making telephone calls via the Internet and the fixed-line network (ISDN and analog).



PBX You can connect two analog telephones, fax machines or answering machines to the FRITZ!Box. Up to eight ISDN telephony devices can be connected to the integrated ISDN S₀ port.

Using Cordless Telephones Thanks to the DECT function, the FRITZ!Box can be used as a basis station for cordless telephones. Any cordless telephone that supports the DECT-GAP standard can be registered at the FRITZ!Box.

Connecting Computers Four computers can be connected directly to the FRITZ!Box using the LAN ports.

You can also connect a network hub or switch to the LAN ports so that even more computers can be connected to FRITZ!Box.

WLAN Access Point The FRITZ!Box is a WLAN access point. All computers equipped with a WLAN adapter can be wirelessly connected to the FRITZ!Box.

- Local Network** All of the computers connected with the FRITZ!Box constitute a network and can share access to any files released for file sharing.
- Internet** All of the computers connected to the FRITZ!Box can access the Internet.
- The FRITZ!Box works as a DSL router, making the Internet connection available to all connected computers. All connected computers can then use the Internet connection at the same time.
- Firewall** The FRITZ!Box is equipped with an integrated firewall. The integrated firewall protects your network from attacks from the Internet as long as the FRITZ!Box is operated as a router.
- USB Port** The FRITZ!Box is equipped with two ports for USB devices, to which you can connect USB storage devices (hard drive, stick), a printer, one of the AVM FRITZ!WLAN USB Sticks, a USB hub or other devices (see “USB Hubs” from page 63).
- The USB port supports the USB 2.0 and USB 1.1 standards.
- If you use one of the FRITZ!WLAN USB Sticks by AVM, the AVM Stick & Surf technology is at your disposal. Use Stick & Surf to adopt the WLAN security settings from the FRITZ!Box quickly and conveniently.
- For connecting a printer, FRITZ!Box has a printer server. Alternatively, the USB remote connection is available for the use of printers.
- Media Server** An integrated media server makes music, image and video files available in the local network. You can either save these files directly in the integrated memory of the FRITZ!Box or make them available via a USB memory stick connected to the FRITZ!Box. A suitable playback device linked to the local network can then play back these media contents. Any device compatible with the UPnP AV standard can be used.
- Network Devices** Other network devices can also be connected to the network ports of the FRITZ!Box, for instance game consoles.

2.1 Package Contents

The following is included in the FRITZ!Box Fon WLAN 7390 package:

- FRITZ!Box Fon WLAN 7390
- one power supply unit with a cable for connection to the power mains
- one network cable for connection to a computer or a network
- one DSL/telephone cable for connection to a DSL and a telephone line (ISDN or analog)
- one RJ45/RJ11 adapter (black) for connecting FRITZ!Box Fon WLAN 7390 to the analog telephone network
- one RJ45/RJ11 adapter (gray) for the DSL line (required in some countries)
- one quick guide

2.2 Operation Requirements

In order to operate the FRITZ!Box, you must have the following:

- a Web browser that supports Java script (for instance, Internet Explorer version 7.0 or higher, or Firefox version 2.0 or higher)
- an Internet connection
 - a VDSL2 line, standard ITU G.993.2 Annex A or B
 - or a DSL line in accordance with the standards ITU G.992.1 Annex A or B (G.dmt), ITU G.992.3 Annex A or B (ADSL2), ITU G.992.5 Annex A or B (ADSL2+), ITU G.994.1 (G.hs)
 - or an Internet cable access with cable modem
 - or a USB modem for mobile Internet access (UMTS /HSPA)
 - or another Internet connection

- for connection via WLAN:
computer with a WLAN adapter compliant with IEEE 802.11n, g, a or IEEE 802.11b, for example a FRITZ!WLAN USB Stick
- for connection via network cable:
computer with a network port (network adapter standard Ethernet 10/100/1000 Base-T)
- for fixed-line telephony:
an analog telephone line or ISDN point-to-multipoint line in accordance with the Euro ISDN protocol DSS1

3 Connecting Connecting FRITZ!Box

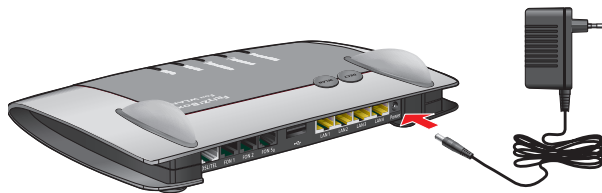
This chapter contains instructions on the following topics:

- connecting FRITZ!Box to electrical power
- connecting one or several computers to the FRITZ!Box
- connecting FRITZ!Box to DSL
- connecting FRITZ!Box to ISDN or the analog telephone line
- connecting analog terminal devices to the FRITZ!Box
- connecting ISDN terminal devices to the FRITZ!Box
- connecting an IP telephone



Please see the instructions about setting up the FRITZ!Box in section “Security and Handling” on page 8.

3.1 Connecting to Electrical Power



Connecting to the power supply

Connecting

Set aside the power supply unit from the FRITZ!Box package.

1. Connect the FRITZ!Box to the power supply unit. Insert the small plug in the power socket at the right edge of the socket strip on the FRITZ!Box.
2. Plug the other end into an AC power outlet.

The green “Power/DSL” LED will light up after a few seconds to indicate that the device is ready for operation.

3.2 Connecting the Computer(s)

If you would like to surf the web using the FRITZ!Box or to open the FRITZ!Box user interface, then you must connect a computer with the FRITZ!Box.

A computer can be connected with the FRITZ!Box in two different ways:

- via a LAN port
- wirelessly via WLAN

Connection Scenarios

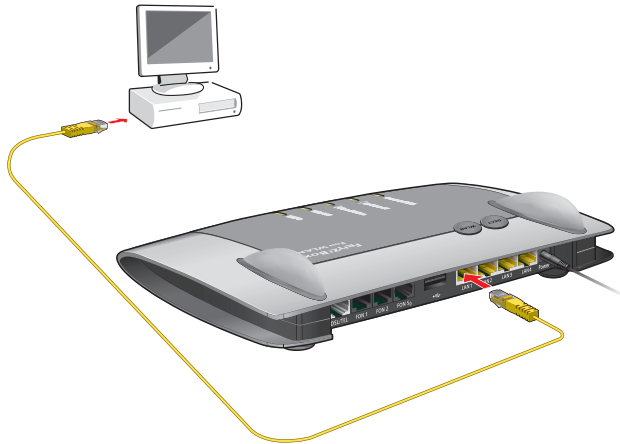
Note the following when connecting computers to the FRITZ!Box:

- **One** computer can be connected to the FRITZ!Box by only **one** of these means.
- At each of the network ports of the FRITZ!Box, a computer can be connected directly or via a hub/switch.
- Using WLAN you can connect multiple computers with the FRITZ!Box at the same time.
- The way a computer is connected to the FRITZ!Box is the same regardless of the operating system on the computer.
- All of the computers connected with the FRITZ!Box constitute a network.

3.3 Connecting Computers to the LAN Port



If you would like to connect a computer to the LAN port of the FRITZ!Box, make sure the computer is equipped with a LAN port (network adapter). A LAN port is usually designated by the icon at left or labeled “LAN”.



Connecting a computer to a LAN port on the FRITZ!Box

Connect

Set aside the network cable (yellow) from the FRITZ!Box package.

1. Switch on your computer.
2. If you work with a Linux operating system, configure your network adapter with the setting “DHCP”, if this setting is not already configured.
3. Insert one end of the LAN cable into the computer’s network adapter.
4. Connect the other end of the LAN cable to a socket on the FRITZ!Box labeled “LAN 1”, “LAN 2”, “LAN 3” or “LAN 4”.

Now the FRITZ!Box and computer are connected to each other.

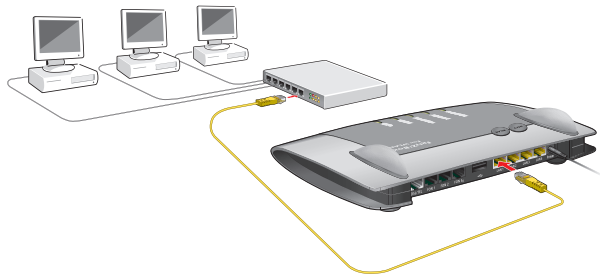
Connecting More Computers to the LAN Ports

Additional cables are required to connect further computers. In purchasing a LAN cable, note the instructions in the section “Network Cable” on page 123.

You can connect a computer to any of the four LAN ports of the FRITZ!Box at any time.

Connecting a Network Hub or Switch

You can connect a network hub or switch to one of the LAN ports on the FRITZ!Box if you would like to connect multiple computers via LAN.



Connecting FRITZ!Box to a network hub

Connecting

Set aside the network cable (yellow) from the FRITZ!Box package.

1. Connect one end of the LAN cable to the uplink port of the network hub or switch.
2. Connect the other end of the cable to one of the LAN sockets on the FRITZ!Box.

The FRITZ!Box and network hub are now connected with each other.

3.4 Connecting Computer(s) Wirelessly via WLAN

Using WLAN you can connect one or multiple computers with the FRITZ!Box wirelessly.

The wireless WLAN connection is independent of the operating system used. Each computer to be connected to the FRITZ!Box via WLAN must be equipped with a compatible WLAN adapter, for instance the FRITZ!WLAN USB Stick. Many modern computers and notebooks have an integrated WLAN adapter.



For more information on WLAN, see the section “More about WLAN” from page 131.

Connecting the FRITZ!WLAN USB Stick

AVM Stick & Surf

If you are using the FRITZ!WLAN USB Stick N, the FRITZ!WLAN USB Stick N 2.4 or the FRITZ!WLAN USB Stick by AVM as a WLAN adapter, you can establish a secure WLAN connection quickly and conveniently using the AVM Stick & Surf technology.

1. Switch on your computer.
2. Insert your FRITZ!WLAN USB Stick into one of the USB ports on the FRITZ!Box.

The WLAN security settings are transmitted automatically to the FRITZ!WLAN USB Stick. The “Info” LED on the FRITZ!Box begins flashing rapidly.

As soon as the “Info” LED stops flashing, transmission of the settings has been concluded.

3. Remove the FRITZ!WLAN USB Stick from the device.
4. Now insert the FRITZ!WLAN USB Stick into the USB port on your computer.

The security settings saved on the FRITZ!WLAN USB Stick are applied to the computer. Now the FRITZ!Box and FRITZ!WLAN USB Stick are connected with each other wirelessly.



For more information, see the manual on the AVM FRITZ!WLAN USB Stick N, the manual for the AVM FRITZ!WLAN USB Stick N 2.4, or the manual for the AVM FRITZ!WLAN USB Stick.

Establishing a WLAN Connection Using WPS

If you are using a WLAN adapter from another manufacturer and your WLAN adapter supports WPS (Wi-Fi Protected Setup), you can also use this mechanism to establish the WLAN connection between your computer and the FRITZ!Box. For detailed instructions about how to do so, see the section “WPS (Wi-Fi Protected Setup)” from page 148.

Establishing a WLAN Connection Manually

Installing a WLAN Adapter

If you are using a WLAN adapter from another manufacturer, you can also establish the WLAN connection manually. To do so, proceed as follows:

1. Switch on your computer.
2. Install the WLAN adapter in your computer along with the appropriate software. Please take note of the instructions in the documentation of the adapter.
3. In order to establish a WLAN connection to the FRITZ!Box, you can use the WLAN software for the WLAN adapter, or the WLAN software supplied with the operating system.

Establishing a Connection

The FRITZ!Box is delivered with preset values for WLAN security. You must enter these values during the configuration of the WLAN adapter.

If you would like to establish a WLAN connection using these preset values, then your WLAN adapter must support the WPA encryption procedure.

1. Start the WLAN software.
2. Enter the following values for the connection between the FRITZ!Box and the WLAN adapter:

SSID (name of the WLAN radio network)	FRITZ!Box Fon WLAN 7390
Encryption methods	WPA (TKIP) or WPA2 (AES-CCMP)
Encryption	WPA PSK or WPA2 PSK (AES)
WLAN key	The key is printed on the sticker on the base of the device.
Network mode	Infrastructure

3. Confirm your entries using the relevant button in the user interface (for instance, “OK” or “Connect”).

Now your WLAN adapter and the FRITZ!Box are connected with each other wirelessly.

Please see the instructions in the section “Opening the User Interface” on page 28. See also the information on WLAN security in the section “Security” from page 136.

WPA Not Supported

If your WLAN adapter does not support WPA encryption, you must convert the encryption set in the FRITZ!Box to WEP. For this you must change the WLAN settings in the FRITZ!Box. To do so, proceed as follows:

1. Connect the FRITZ!Box and the computer using the network cable (yellow) (see the section “Connecting Computers to the LAN Port” from page 16).
2. Start a web browser on your computer.
3. Enter fritz.box in the address field of the browser.
4. Select the “WLAN / Security” menu.
5. Then select WEP encryption and enter a network key.
6. Click the “Apply” button.

A window is displayed with the WLAN security settings.

7. Make a note of the settings or print out the page by clicking the printer icon in the toolbar.
8. Close the user interface and clear the connection between the FRITZ!Box and the computer. Remove the network cable (yellow).

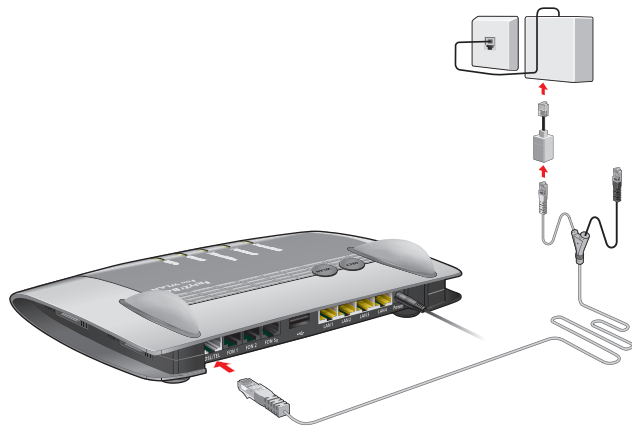
9. Configure your WLAN adapter with the security settings entered in the FRITZ!Box.

The WLAN connection between your WLAN adapter and the FRITZ!Box will be established.



We strongly recommend the use of a WLAN adapter that supports WPA or WPA2 (for instance, an AVM FRITZ!WLAN USB Stick, see also page 18). WEP is out of date and data encrypted with WEP can be deciphered within minutes.

3.5 Connecting to the DSL Line



FRITZ!Box on the DSL line: connecting to the telephone socket

Connecting

Connect the FRITZ!Box using the DSL/telephone cable (gray/black) with the DSL line.

1. Connect the longer, gray end of the DSL/telephone cable to the socket on the FRITZ!Box labeled “DSL/TEL”.
2. Then take the short, gray end of the cable and insert the plug (RJ45) into the socket of DSL line.

If the plug does not fit into the DSL socket, connect it to the black RJ11/RJ45 adapter included in the package. Then insert the adapter into the DSL socket of the DSL line.

As soon as the connection to the DSL line is ready for operation, the “Power/DSL” LED stops flashing and stays lit.

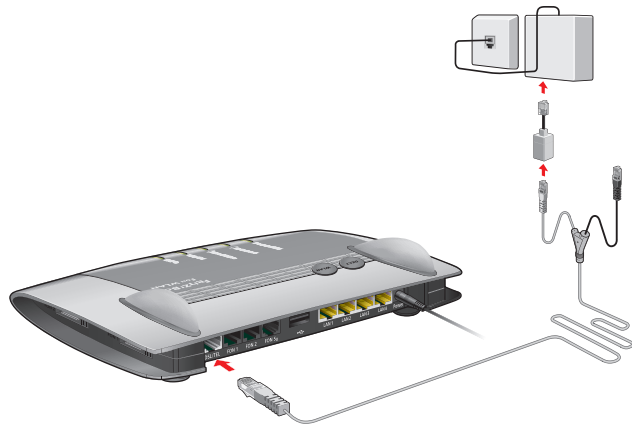


You can connect the FRITZ!Box to the Internet via DSL, or using alternative access technologies. For information about how to proceed, see the section “Internet Connections” from page 41.

3.6 Connecting to the Analog Telephone Line

Your telephone line is either an analog line or an ISDN line.

If you have an analog telephone line, then connect the FRITZ!Box as follows:



Connecting to the analog telephone line via the DSL splitter

Connecting

Connect the FRITZ!Box using the DSL/telephone cable (gray/black) with the analog line.

1. Connect the longer gray end of the cable to the socket on the FRITZ!Box labeled “DSL/TEL”.
2. Now insert the plug of the shorter, gray end of the cable into the appropriate socket of your DSL splitter.

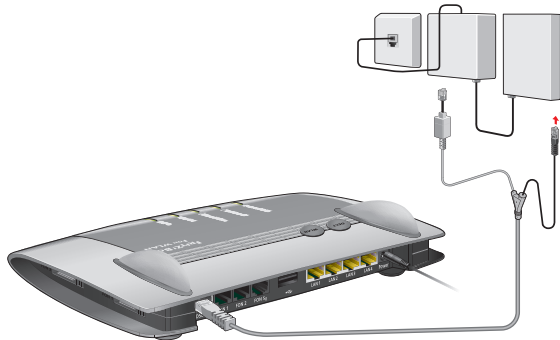
If the plug does not fit into the socket on the DSL splitter, connect it to the gray RJ11/RJ45 adapter included in the package. Then insert the adapter plug into the DSL splitter socket.

Now the FRITZ!Box is connected to the telephone line.

3.7 Connecting to the ISDN Line

Your telephone line is either an analog line or an ISDN line.

If you have an ISDN line, read here how to connect the FRITZ!Box with the ISDN line.



Connecting to the ISDN NT

Connecting

Set aside the Y-shaped cable (gray-black) delivered in the package. This cable is a combined DSL/telephone cable.

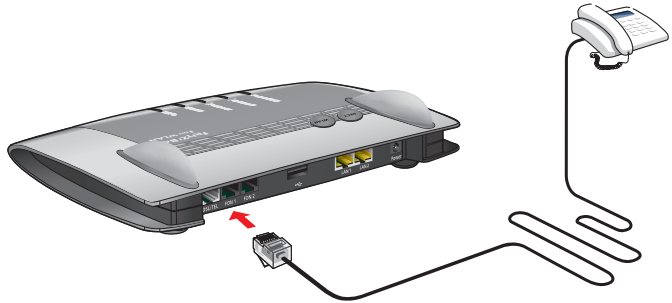
1. Connect the longer gray end of the cable to the socket on the FRITZ!Box labeled “DSL/TEL”.
2. Insert the black branch of the Y-shaped cable into the socket of your ISDN NT.

If the plug does not fit into the socket on the ISDN NT, connect it to the gray RJ11/RJ45 adapter included in the package. Then insert the adapter plug into the ISDN NT.

Now the FRITZ!Box and the ISDN line are connected.

3.8 Connecting Telephone, Fax, or Answering Machine

The FRITZ!Box provides Internet and/or fixed-line telephony for analog terminal devices.

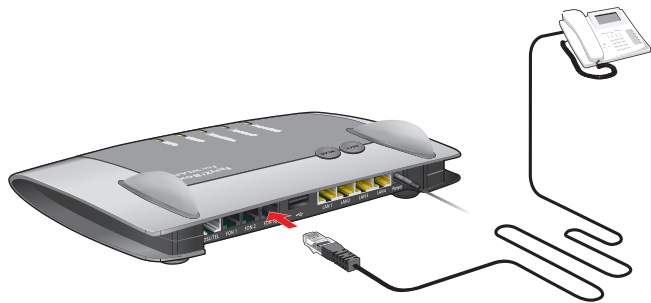


Connecting to an analog telephone

Analog telephones, fax machines and answering machines can be connected to the “FON 1” or “FON 2” socket on the FRITZ!Box.

3.9 Connecting ISDN Telephones

ISDN telephones can be connected to the FRITZ!Box. With appropriate cabling, up to eight ISDN telephones can be connected.



Connecting an ISDN telephone to the FRITZ!Box

Connect Use an ISDN cable to connect an ISDN telephone.

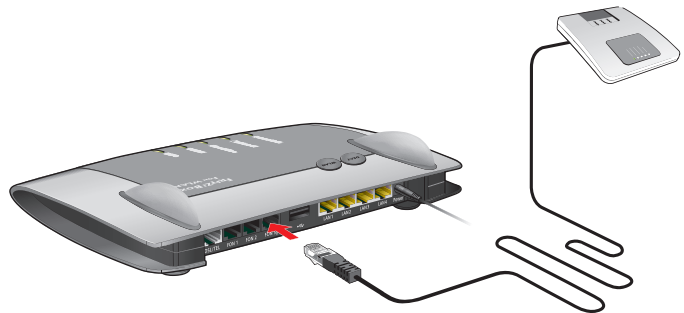
1. Connect one end of the ISDN cable with the ISDN telephone.
2. Connect the other end of the ISDN cable with the “FON S₀” port of the FRITZ!Box.

3.10 Connecting ISDN PBXs

If you have an ISDN PBX, you can connect this PBX to the FRITZ!Box. With the telephones connected to the PBX you can make calls in the usual fashion.



The ISDN PBX must support a point-to-multipoint line.



Connecting an ISDN telephone to the FRITZ!Box

Connect Use an ISDN cable to connect an ISDN telephone.

1. Connect one end of the ISDN cable with the ISDN telephone.
2. Connect the other end of the ISDN cable with the “FON S₀” port of the FRITZ!Box.



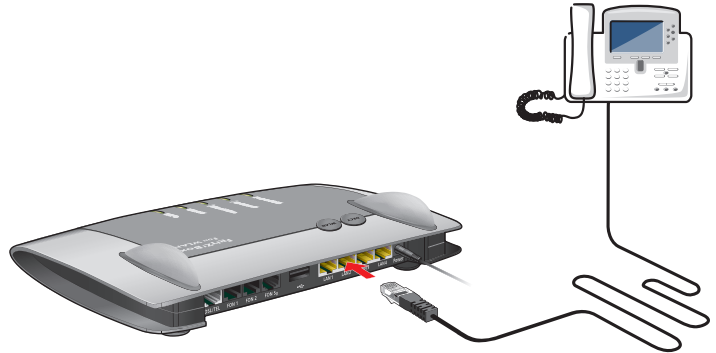
If you have no more than two analog devices connected to the PBX, you can connect them directly to the FRITZ!Box and do without the PBX.

3.11 Connecting IP Telephones

IP telephones can be connected to the FRITZ!Box Fon WLAN 7390 at the LAN ports or via WLAN.

Connecting to a LAN Port

At the LAN ports of the FRITZ!Box you can connect IP telephones using a LAN cable.



Connecting an IP telephone to the FRITZ!Box

1. Connect one end of the LAN cable with the IP telephone.
2. Connect the other end of the LAN cable to one of the LAN ports on the FRITZ!Box.

Now the IP telephone is connected to the FRITZ!Box. This phone must be configured before you can use it for telephone calls. Follow the instructions in the documentation of the device and in the section “Setting Up an IP Telephone in the FRITZ!Box” on page 35.

Connecting via WLAN

IP telephones that support WLAN, known as “smart phones”, can be connected wirelessly to the FRITZ!Box via WLAN.



Connecting a smart phone to the FRITZ!Box

1. Use your smart phone to search for WLAN devices at your location.
2. Select the FRITZ!Box Fon WLAN 7390 from the list of WLAN devices found.
3. To establish a connection, enter the WLAN key of the FRITZ!Box.

The smart phone is now connected to the FRITZ!Box. Before you can make telephone calls over the FRITZ!Box using software that takes advantage of the features of an IP telephone, this phone must be configured once. Follow the instructions in the documentation of the device and in the section “Setting Up an IP Telephone in the FRITZ!Box” on page 35.

4 Opening the User Interface fritz.box

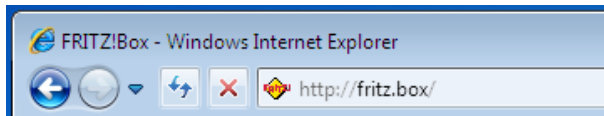
The FRITZ!Box has a user interface that can be used in a web browser.

The user interface presents information about the FRITZ!Box product, access and connections. This is where you configure all of the settings for operating the FRITZ!Box.

The user interface can be opened from any computer connected with the FRITZ!Box. The settings you configure are saved in the FRITZ!Box.

Starting

1. Start a web browser on your computer.
2. Enter “fritz.box” in the address field of the browser.



The “fritz.box” address entry in the address field of an Internet browser

The FRITZ!Box user interface opens.



If the user interface does **not** open, please see the instructions in the section “Errors Opening the User Interface” from page 101.

4.1 Password Protection

You can protect the FRITZ!Box user interface from unauthorized and unwelcome access by setting up a password. Only users who know the password can access the user interface. This protects all settings and all information in the FRITZ!Box.



We strongly recommend setting up and using password protection for the user interface.

Please note the following once you have enabled password protection:

- When the user interface is opened, the login screen will be displayed first. Enter the password here to log in to the user interface.
- If you do not click on the user interface for a period of longer than ten minutes, you will be logged off the user interface automatically.

The next time you click on the user interface you must log back in.

- There are some pages in the user interface from which the user is not logged off automatically. These are pages that show constantly changing information, which are refreshed automatically at regular intervals. The “Overview” page is one example.
- You can log yourself off the user interface by clicking the icon with the padlock at the top right.
- Be sure to use a password you can remember easily. If you forget the password, the only way to access the FRITZ!Box is to restore the factory settings. All settings made during operation will be overwritten. Then you can open the user interface again in order to re-configure your settings or restore the settings you saved during previous operation.

Setting Up Password Protection

There are several ways to set up password protection in the FRITZ!Box:

- On the login screen:

As long as password protection is not enabled and you have not switched off the prompt to use password protection, you will be prompted to set up password protection every time you open the user interface.

- In the “System / FRITZ!Box Password” menu:

In this menu you can set up password protection, or change a password that has already been set up.

4.2 Saving Your Settings

The settings you made in the FRITZ!Box can be saved as a file on your computer. This file contains all user-defined settings, including the account information for the Internet and telephony connections. This settings file can be loaded back to your FRITZ!Box at any time.

The FRITZ!Box features a Wizard to accompany you step by step through the process of saving and restoring your settings.

5 Telephone Connections

Configuring FRITZ!Box for Telephony

Using the FRITZ!Box you can make telephone calls via the Internet and the fixed-line network.

Once you have connected the FRITZ!Box as described in the chapter “Connecting” from page 14, you can configure the FRITZ!Box for making telephone calls.

The configuration is performed in two consecutive steps:

- entering your phone numbers
- configuring the connected telephony devices



In the FRITZ!Box user interface there are various Wizards for the configuration of your FRITZ!Box. We recommend using these step-by-step instructions.

5.1 Entering Your Phone Numbers

The “Managing Your Own Phone Numbers” Wizard supports you in performing the following tasks:

- entering Internet telephone numbers
- entering fixed-line numbers
- changing numbers already entered
- deleting entered numbers



If you used the Basic Configuration Wizard after connecting your FRITZ!Box and entered numbers then, these numbers are already entered in your FRITZ!Box. In this case you can start right away with the configuration of the connected telephony devices.

Entering New Internet Telephone Numbers

In order to be able to make calls via the Internet with the FRITZ!Box, you will need an Internet telephone number from an Internet telephony provider. Enter the Internet telephone number in the FRITZ!Box.

You can enter multiple Internet numbers in the FRITZ!Box. The Internet numbers can be from one or from multiple different Internet telephony providers.

Entering Fixed-line Numbers

With the FRITZ!Box you can make calls both via the analog fixed-line network and via the ISDN fixed-line network:

- In order to make calls via the analog fixed-line network, enter your telephone numbers in the FRITZ!Box.
- In order to make calls via the ISDN fixed-line network, enter your ISDN numbers in the FRITZ!Box.

5.2 Setting Up Telephony Devices

For the configuration of telephony devices, the “Manage Your Telephony Devices” Wizard is available in the FRITZ!Box.

Telephony Devices Supported

The following telephony devices are supported by the FRITZ!Box:

- telephones
 - analog telephones
 - ISDN telephones
 - telephones with an integrated answering machine
 - cordless (DECT) telephones
 - IP telephones

- answering machine

If you have connected an analog answering machine (to the “FON 1” or “FON 2” socket, for instance), configure it as an answering machine.

The FRITZ!Box is also equipped with integrated answering machines, which can be enabled and configured in the “Telephony / Telephony Devices” menu.

- ISDN Telephone Systems (PBXs)
 - ISDN PBXs for analog telephones
 - ISDN PBXs for ISDN telephones
- fax machines

The FRITZ!Box is equipped with an integrated fax machine for receiving faxes. This integrated device can be enabled and configured in the “Telephony / Telephony Devices” menu.

The FRITZ!Box also supports:

- analog fax machines
- analog fax-telephone combinations

Settings for Telephony Devices

Telephony devices like telephones, faxes and answering machines can be connected to the FRITZ!Box. The FRITZ!Box is also equipped with integrated answering machines and a fax machine for fax reception.

The “Managing Your Telephony Devices” Wizard can assist you in configuring the necessary settings for all telephony devices:

- telephone
 - kind of connection used to connect the telephone with the FRITZ!Box
 - internal name for the telephone

Devices Connected to
the FRITZ!Box

- Number used to conduct outgoing calls: With this entry you specify whether outgoing calls should be conducted via the Internet or the fixed-line network.
- Call acceptance: Specify here whether the telephone should react to all calls or only to calls for certain telephone numbers.
- fax machine
 - kind of connection used to connect the fax machine with the FRITZ!Box
 - internal name for the fax machine
 - Number used to send faxes: This entry defines whether outgoing faxes are sent via the Internet or the fixed-line network.
 - Call acceptance: Here you define the numbers to which the fax machine should react.
- answering machine
 - kind of connection used to connect the answering machine with the FRITZ!Box
 - internal name for the answering machine
 - Call acceptance: Enter here whether the answering machine should react to all calls or only to calls for certain numbers.
- ISDN PBX

The Wizard explains step by step how to prepare the ISDN telephone system for operation at the FRITZ!Box and what settings you can configure.
- fax reception
 - fax ID to be transmitted to the sender of the fax
 - e-mail address to which the incoming faxes are forwarded

Devices Integrated in
the FRITZ!Box

- USB memory on which the incoming faxes are stored. For this option a USB memory device must be connected to the USB port of the FRITZ!Box.
- Automatic fax detection for an analog fixed line, which detects whether an incoming call is a fax.
- Answering machine
 - specifications about how calls should be accepted, and whether the message should also be sent by e-mail
 - internal name for the answering machine
 - Call acceptance: Enter here whether the answering machine should react to all calls or only to calls for certain numbers.
 - Remote inquiry, which can be used to pick up messages from the answering machine from another telephone line.

Setting Up an IP Telephone in the FRITZ!Box

Before you can use an IP telephone with the FRITZ!Box, it must be set up. Follow the instructions below:

See also the manufacturer's documentation for information about how to set up your IP telephone.

1. Open the FRITZ!Box user interface (see the section "Opening the User Interface" on page 28).
2. Enable the "Expert Mode" settings in the "System" menu.
3. Click "Wizards / Managing Your Telephony Devices" and then click "Next".
4. Select the option "Telephone" and then click "Next".
5. Select "LAN/WLAN (IP telephone)", assign a name and then click "Next".
6. Assign a password.

7. Enter the password, the user name and the registrar in your IP telephone. Be sure to consult the documentation for your telephone on how to do this.
8. Confirm the Telephony Wizard of the FRITZ!Box by clicking “Next” and follow the instructions.

The IP telephone will be set up in the FRITZ!Box so that it can be used to make telephone calls.

5.3 Telephony Functions



More functions and settings options for telephony are available in the “Telephony” menu.

Call List

The “Call List” displays outgoing calls and sent faxes, incoming calls and faxes, as well as incoming calls during absence.

If the number of a caller or someone called is entered in the telephone book, the “Call List” will display the name from the telephone book.

The “Call List” can be saved as a file.

Menu The “Call List” is found in the “Telephony / Calls” menu.

Telephone Book

A telephone book is at your disposal in the FRITZ!Box.

Menu The “Telephone Book” is found in the “Telephony” menu.

Call Diversion

With this function you can divert incoming calls to another number. The following kinds of call diversion are available:

- diversion of all incoming calls to a certain telephone number
- diversion of calls for certain numbers
- diversion of calls to other telephones connected with the FRITZ!Box
- diversion of calls to other that come from a certain telephone number

Menu The “Call Diversion” menu is located in the “Telephony” menu.

Block Calls

The telephone number block of the FRITZ!Box offers you the following options:

- numbers and number ranges can be blocked for outgoing calls

From the FRITZ!Box no outgoing calls to a blocked number range are possible. In this manner you can block connections to certain mobile networks, for instance.

- blocking telephone numbers for incoming calls

For incoming calls you can block certain numbers to avoid receiving calls from unwanted callers.

Menu The command for blocking calls is located in the “Telephony / Calls” menu.

Alarm

With the alarm function you can use the telephones connected to the FRITZ!Box as alarm clocks.

- You can specify several different times for the alarm to go off.
- An individual telephone can be selected for the alarm function.

Menu The “Alarm” function is located in the “Telephony” menu.

Dialing Rules

Dialing rules specify when calls are conducted on the fixed-line network, and when they take place over the Internet.

All connections to number ranges for which a dialing rule has been defined are established using the specified connection type.

Menu The “Dialing Rules” menu is located in the “Telephony” menu.

Integrated Fax

The FRITZ!Box is equipped with an integrated fax function so that you can receive faxes without having to connect a fax machine. The integrated fax machine forwards incoming faxes to an e-mail address, or stores them on a USB memory device connected to the FRITZ!Box.

For operation the integrated fax machine must be set up using the Wizard for telephony devices in the FRITZ!Box user interface. Enter an e-mail address to which incoming faxes should be forwarded.

If the FRITZ!Box is connected to an analog fixed line with only one number, remember to enable automatic fax detection as well. The fax detection works passively, meaning that it does not detect an incoming fax until a call has been accepted. For this reason we recommend also using

the wizard for telephony devices to set up an answering machine, so that fax detection can also function when you do not accept a call.

The integrated fax machine of the FRITZ!Box supports only fax reception. To send faxes you can install the “FRITZ!fax for FRITZ!Box” software. This program can be downloaded from the AVM web site for the operating systems Windows 7, Windows Vista and Windows XP.

Integrated Answering Machine

The FRITZ!Box is equipped with several integrated answering machines, each of which can be enabled and configured individually.

By enabling the setting “Send messages by e-mail” you can have recorded messages sent to you by e-mail. The messages are sent as audio files.

To check an answering machine internally, enter the following keypad sequences:

Answering machine 1	* * 6 0 0
Answering machine 2	* * 6 0 1
Answering machine 3	* * 6 0 2
Answering machine 4	* * 6 0 3
etc.	etc.

An overview of the answering machine menu is presented in the section “Operating the Answering Machine via Telephone Keypad” on page 40.

Menu

The integrated answering machines can be enabled and configured in the “Telephony / Telephony Devices” menu.

5.4 Operating the Answering Machine via Telephone Keypad

Main menu

❶ Play back messages

If no messages have been recorded, you hear two short audio signals and return to the main menu.

- ❶ Play back messages
- ❸ Call back the caller of the message
- ❺ Delete message
- ❽ To previous message
- ❾ To next message
- ❿ Listen to “Play back messages” menu again
- Ⓝ Back to main menu

❷ Delete all messages

❸ Switch the answering machine on / off

❹ Record greetings

- ❶ Record greeting message
- ❷ Record announcement
- ❸ Record closing announcement

Record and select

- ❶ Listen to all greetings/announcements of the selected type > Select the desired recording by pressing 2
- ❺ Delete greeting/announcement
- ❸ Record greeting/announcement > End recording by pressing 1
- ❿ Listen to “Record and Select” menu again
- Ⓝ Back to main menu
- ❿ Listen to “Record greetings” menu again
- Ⓝ Back to main menu

❺ Switch recording and directions mode on / off

❿ Listen to main menu again

6 Internet Connections

Setting Up the Internet Connection

In order to allow Internet access with the FRITZ!Box, you must first configure the Internet connection in the FRITZ!Box user interface.

The FRITZ!Box can be operated directly at the DSL line. Alternatively, it can be connected to a cable modem, a DSL modem, or a DSL router, or integrated into an existing network.

If no DSL line is available, Internet connections can also be established over the mobile telephone network using a USB modem.

There are various ways to set up the Internet connection of your FRITZ!Box. In addition to the manual configuration variations, your Internet Service Provider may also offer automatic configuration of the Internet connection.

This chapter describes the various ways you can use the FRITZ!Box technology to set up an Internet connection. Nevertheless it is always advisable to follow the configuration instructions you received from your Internet Service Provider.

Also note the following for the setup of your FRITZ!Box's Internet connection:

- The Internet connection of the FRITZ!Box can be established using only **one** of the methods described below.
- Your Internet Service Provider transmitted you information about the configuration of your Internet connection. **Always perform the Internet connection setup as described by your provider!**
- If your Internet Service Provider supports an automatic setup routine (also known as “automatic configuration”, “autoconfiguration”, “remote configuration”

or “autoprovisioning”), we recommend always setting up the Internet connection of your FRITZ!Box in this way.

The FRITZ!Box then is set up automatically and securely, with the data necessary for Internet use and any other services ordered from your provider, like Internet telephony.

- If you would like to use not only DSL, but also UMTS/HSPA for Internet connections, note that the Internet connection can be used by only **one** of these access technologies. You will have to change the type of access in the FRITZ!Box as needed.

Remember that you can configure in the FRITZ!Box only those types of Internet access you have contracted with the appropriate providers.

6.1 Configuring an Internet Connection Automatically over DSL

Automatic configuration is a procedure in which the Internet Service Provider sets up the Internet connection of your FRITZ!Box completely automatically by “Plug & Play”.

Prerequisites

In order for you to be able to perform automatic configuration, the following requirements must be met:

- Your FRITZ!Box is brand new and starting operation for the first time
- or
- The factory settings were restored to your existing FRITZ!Box (see page 71) and the Internet connection has to be set up again.
- The provider you contracted your Internet connection from supports automatic configuration.



Follow all of the information you received from your provider on configuring your Internet connection!

If these prerequisites are not fulfilled, you can set up your FRITZ!Box using the Configuration Wizard (see page 44).

The Automatic
Configuration
Procedure

Proceed as follows to perform automatic configuration:



Your Internet Service Provider transmitted you information about the configuration of your Internet connection. Always perform the Internet connection setup as described by your provider!

1. Connect the FRITZ!Box to the DSL line.

The automatic configuration starts automatically.

2. Wait until the automatic configuration has concluded. This process can take around five to ten minutes.

During this time the FRITZ!Box receives all necessary settings directly from the autoconfiguration server of your Internet Service Provider.

After automatic configuration you can surf the web and use any other contracted services (like Internet telephony) right away.

3. To check that the automatic configuration was completed successfully, open a web browser and enter any Internet address.

Then you may want to try out the other services ordered from your Internet Service Provider, such as Internet telephony.



Further settings can be configured in the user interface of your FRITZ!Box. The “Wizards” area offers easy-to-use, step-by-step instructions on all important functions. Use these to set up the FRITZ!Box in accordance with your own needs.

6.2 Configuring the Internet Connection via DSL Using the Wizard

If the FRITZ!Box is connected directly to the DSL line, the account information from your Internet Service Provider is required to configure the Internet connection in the FRITZ!Box.

Use the Wizard to configure the Internet connection:

1. Open the FRITZ!Box user interface.
2. Select the “Wizards” menu.
3. Click the “Check Internet Connection” Wizard and follow the instructions.

6.3 Configuring the Internet Connection via DSL Manually

Changes to the Internet connection settings can be made in the FRITZ!Box user interface.

Proceed as follows:

1. Open the FRITZ!Box user interface.
2. Select “Internet / Account Information”.
3. Configure the desired settings. Take advantage of the Help available in the FRITZ!Box user interface for more information and instructions.
4. As a final step, click “Apply”.

If the FRITZ!Box is connected to a DSL modem or a DSL router, or integrated into an existing network, you must also configure your Internet connection as described above. To do so, enable the expert settings in the “System / Expert Mode” menu.

6.4 Internet Connection via Cable Modem

With an additional cable modem you can also use your FRITZ!Box Fon WLAN 7390 on a cable connection. Then the Internet connection is established and controlled by the FRITZ!Box itself, so that in this operating mode, too, all FRITZ!Box functions (like Internet telephony, firewall) are available without restriction.

1. Use a network cable to connect the cable modem with the “LAN 1” port on the FRITZ!Box.
2. Connect a computer with the FRITZ!Box either wirelessly via WLAN or using a network cable.
3. Open the FRITZ!Box user interface.
4. Enable the expert settings of the FRITZ!Box in the “System / Expert Mode” menu. Confirm by clicking “Apply”.
5. Open the “Internet / Account Information / Settings” menu.
6. Select the connection type “Internet connection via LAN 1” from the “Connection via” area.
7. In the “Operating Mode” section, enable the option “Establish own Internet connection (NAT router with PPPoE or IP)”.
8. In the “Account Information” section, select the option “No account information required (IP)”.
9. In the “Connection Settings” section, enable the option “Obtain the IP address automatically (DHCP)”.
10. In the input fields “Upstream” and “Downstream”, enter the relevant speeds of your Internet connection.
11. Save your settings by clicking “Apply”.
12. Then restart the cable modem, for instance, by unplugging it briefly from the electrical outlet.

Now the Internet connection of the FRITZ!Box will be established over the cable modem.

6.5 Internet Connection via the Mobile Telephone Network

In situations where DSL is not available, you can use your FRITZ!Box Fon WLAN 7390 to connect to the Internet via the mobile telephone network. A USB modem for mobile Internet access (UMTS/HSPA) is required for this.

The USB modem is simply inserted into the USB port of the FRITZ!Box.

The FRITZ!Box supports UMTS/HSPA modems from various manufacturers.

When the mobile telephone network function is used, the FRITZ!Box user interface presents information about network availability, connection status and transmission rate.

1. Insert the USB modem into the USB port on the FRITZ!Box.
2. Open the FRITZ!Box user interface.
3. Click the “Home Network / USB Devices” menu. On the “Overview of Devices” tab, the USB modem is displayed as a “Mobile telephone network modem”.
4. Click “Enable mobile telephone network modem now”.

The “Mobile Telephone Network” menu opens to let you set up the USB modem.



The “Mobile Telephone Network” menu is not available until the USB modem has been connected to the FRITZ!Box. From this point on the menu is always available, even when the USB modem has been disconnected.

5. Configure the settings for your Internet connection over the mobile telephone network. For more information, see the Online Help of the FRITZ!Box.



Due to technical limitations on the part of the mobile telephone network carriers, some limitations may arise for Internet telephone calls and for applications requiring an incoming connection. The same is true for using port forwarding, sharing USB storage memory, remote maintenance via HTTPS, dynamic DNS and VPN. Contact your network carrier for details on any restrictions that may apply.

6.6 Surfing the Net

Once you have set up the Internet connection in your FRITZ!Box, you can surf the Internet with any computer connected to the FRITZ!Box.

1. Start a web browser on your computer.
2. Enter in the address field the URL of the web page you would like to visit, for instance <http://www.avm.de/en>.

7 DECT Function

Cordless Telephony with FRITZ!Box

Thanks to the integrated DECT function, the FRITZ!Box Fon WLAN 7390 can be used as a base station for cordless telephones that support the DECT GAP or CAT-iq standard. A total of up to five cordless telephones can be registered on the FRITZ!Box.

7.1 Registering the FRITZ!Fon MT-F Cordless Telephone

The AVM FRITZ!Fon MT-F supports the DECT radio standard, making it an ideal handset for your FRITZ!Box Fon WLAN 7390.

Proceed as follows to register FRITZ!Fon MT-F at the FRITZ!Box:

1. Switch FRITZ!Fon MT-F on by pressing and holding down the hang-up button.
2. Press the DECT button on your FRITZ!Box until FRITZ!Fon MT-F indicates that registration has been successful.

The FRITZ!Fon MT-F is now connected with your FRITZ!Box and can be used to make telephone calls.

If registration is not successful, see the instructions for manual registration in the manual of your FRITZ!Fon MT-F.

FRITZ!Fon MT-F Scope of Service

FRITZ!Fon MT-F is optimized for connections with your FRITZ!Box to provide not only telephone connections, but a whole range of additional features.

- With FRITZ!Fon MT-F you can read the e-mail sent to your e-mail account with an e-mail provider. For this the POP3 protocol is used to retrieve your e-mail from your mailbox at the e-mail provider so that it can be displayed on the handset.
- You can set up multiple e-mail accounts on your FRITZ!Box, and, if you have more than one FRITZ!Fon MT-F, assign the display of each account to a certain FRITZ!Fon MT-F.

- With FRITZ!Fon MT-F you can use your FRITZ!Box telephone book. New numbers recorded in a call list on FRITZ!Fon MT-F can be transferred directly from the call list to the FRITZ!Box telephone book.

For detailed descriptions of this and other features, see the documentation for your FRITZ!Fon MT-F.

7.2 Registering Cordless Telephones

With FRITZ!Box Fon WLAN 7390 you can use all cordless telephones that support the DECT-GAP and CAT-iq radio standards. See the documentation of your cordless telephone to find out whether it supports either of these standards.

To register a cordless telephone from any manufacturer on the FRITZ!Box, please follow the corresponding instructions in your telephone manual.



Press and hold down the search key on the FRITZ!Box labeled “DECT” during the entire registration process. This facilitates telephone registration.

7.3 Making an Internal Call to a Cordless Telephone

All telephones connected to the FRITZ!Box can establish connections to each other free of charge.

Telephones from other manufacturers can establish internal connections using internal numbers, which are assigned to each telephone automatically upon registration.

The internal numbers of the telephones you have connected are listed in the FRITZ!Box user interface. Perform the following steps:

1. Start a web browser.
2. Open the FRITZ!Box user interface by entering fritz.box.
3. On the “Overview” page, select the “Telephone Book” entry.
4. Select the “Internal Numbers” tab.

The internal numbers of the telephones connected to the FRITZ!Box are displayed.

7.4 Searching for Cordless Telephones by Paging Call

Using the DECT button on the top of the device you can search for lost handsets by starting a paging call.

Press the DECT button briefly and all of the cordless telephones connected with the FRITZ!Box will ring. A paging call cannot work if a handset has dead batteries.

The DECT button and its use are described in the section “DECT Button” on page 126.

7.5 Logging a Cordless Telephone off of the FRITZ!Box

1. Start a web browser.
2. Open the FRITZ!Box user interface by entering fritz.box.
3. On the “Overview” page, click the on “DECT” entry in the “Interfaces ” area.
4. Select the cordless telephone you want to log off and click the “Delete” button.



Now the cordless telephone will be logged off.

7.6 Enabling and Disabling DECT

The DECT function is disabled upon delivery of the FRITZ!Box.

- Enabling the DECT function
The DECT function is switched on when the first cordless telephone is registered.
- Disabling the DECT function

When the last cordless telephone is logged off in the FRITZ!Box user interface, the DECT function is switched off automatically.

If you would like to use multiple devices at one USB port, you can also use a USB hub (see the section “USB Hubs” on page 63). Please read the “Tips for Using USB Devices” on page 66 first.

8.2 Accessing USB Devices

Network Sharing

As soon as a USB device is connected to the FRITZ!Box, all of its functions are available in the entire network:

- The files in the USB mass storage can be accessed from the network via FTP (File Transfer Protocol), or you can make the USB mass storage device available as a network storage device. The two kinds of access are explained in greater detail in the section “Accessing the Data on the USB Mass Storage” on page 54.
- USB printers are available as network printers.

USB Remote Connection

With the USB remote connection, a computer in the network can use USB devices just as if they were connected directly to the computer via the USB cable (virtual cable replacement). This can make sense for multifunctional printers, for instance, so that you can use the integrated card reader/scanner or the ink level display.

While a computer accesses a USB device via the USB remote connection, the USB device is not available for other computers in the network.

For more information on the USB remote connection, see the section “FRITZ!Box USB Remote Connection” from page 64.

8.3 FRITZ!WLAN USB Stick

The FRITZ!WLAN USB Stick N, the FRITZ!WLAN USB Stick N 2.4 and the FRITZ!WLAN USB Stick are WLAN adapters manufactured by AVM for connection to a computer. Using a WLAN adapter you can connect the computer wirelessly with the FRITZ!Box.

All FRITZ!WLAN USB Sticks from AVM master the Stick & Surf method, making it easy to establish a secure WLAN connection: The FRITZ!WLAN USB Stick is inserted

briefly into one of the USB ports on the FRITZ!Box, where it receives all of the security settings required for the WLAN connection to this FRITZ!Box.

For instructions on establishing a WLAN connection using Stick & Surf, see the section “Connecting the FRITZ!WLAN USB Stick” from page 18. For more information on the various FRITZ!WLAN USB Sticks by AVM and the WLAN standards each of them supports, see the FRITZ!WLAN USB Stick N manual, the FRITZ!WLAN USB Stick N 2.4 manual, or the manual for the FRITZ!WLAN USB Stick.

8.4 USB Mass Storage Devices

USB storage devices include hard drives, memory sticks, and card readers.

File Systems

Access to USB memory devices connected to the FRITZ!Box is possible via the File Transfer Protocol (FTP), network storage and USB remote connection functions. USB storage devices using the file systems FAT, FAT32 and NTFS are supported. Files in the FAT and FAT32 file systems are supported up to a size of 4 GB. This limit does not apply in the NTFS file system, where even larger files can be accessed.

Access Rights and Password Protection

You can define access rights and password protection for the USB storage devices. These settings are valid for all USB storage devices connected to the FRITZ!Box. It is not possible to assign specific read or write access or an individual password to each storage device.

Configuring

Proceed as follows to define access rights and password protection for the USB storage devices:

1. Start a web browser.
2. Enter fritz.box in the address field.
3. Select the “Home Network / Storage (NAS)” menu.
4. Select the “Security” tab.

5. Configure the access rights and password protection for the USB mass storage devices.



The access rights and password are not enabled if the USB remote connection is enabled for all USB storage devices.

Accessing the Data on the USB Mass Storage

USB storage devices connected to the FRITZ!Box directly or via a USB hub are displayed with their device name in the “Home Network / USB Devices” menu on the user interface.

FRITZ!NAS

All of the computers in the network can access the data in the USB mass storage simultaneously via FTP.

Click the “Start FRITZ!NAS” button in the “Home Network / Storage (NAS) / FRITZ!NAS” menu. The folder structure of the storage available via FRITZ!NAS is displayed in your web browser.

Now you can select the desired USB storage device and double click to view the data stored there. As soon as you set a checkmark in front of a file name, you can click any of the buttons at the top of the list to apply the associated function.

Files on the USB storage device cannot be run or opened until they have been copied to your computer or to your local network.

Media Server

With this option music, image and video files on the USB storage device can be played back by compatible devices (streaming). The USB storage device with the media collection is simply connected to the USB port on the FRITZ!Box and a suitable playback device is linked to the local network.

The devices automatically communicate via Universal Plug & Play (UPnP). This technology allows the devices connected to each other by cable or radio network to perform automatic detection, recognize events, and exchange data with each other accordingly. With UPnP AV this technology has been expanded to audio and video contents.

With the media server, media files of all kinds of formats can be made available from the connected USB storage device via UPnP.



The USB network storage, media server and FTP functions can be used only if the USB remote connection is not enabled for USB storage devices.

8.5 USB Printer

To connect a USB printer to one of the USB ports of the FRITZ!Box, you can either enable the USB remote connection or use the USB printer as a network printer.

USB Printer at the USB Remote Connection

If you enable the USB remote connection for USB printers, then you can use the printer on another computer just as if it were connected directly to your computer (virtual cable replacement).

- If you want to use the printer with the USB remote connection enabled, then the program for the USB remote connection (see page 64) and the suitable printer drivers must be installed on any computer that is supposed to use the printer.
- When the USB remote connection is enabled, all-in-one printers (printers with supplementary fax or scanner functions) can also be used for faxing and scanning.
- If your printer is equipped with a status monitor, you can use this feature when the USB remote connection is enabled.
- Host-based printers, like those that expect printer status message responses from the system (bidirectional communication as in the GDI system, for instance), can only be used via the USB remote connection. These printers usually can be used only with an operating system for which the printer manufac-

turer has provided driver software. Such printers connected to the FRITZ!Box are not supported as network printers.

USB Printer as a Network Printer

When you connect a USB printer to the FRITZ!Box and set it up without using the “USB Remote Connection” software, the FRITZ!Box manages the printer itself and makes it available as a network printer to all computers connected to the FRITZ!Box. Please note the following for the printer setup:

- If you want to use the printer as a network printer, the printer connection must be configured, and the suitable printer drivers installed, on every computer. Print jobs are forwarded to the IP address of the printer server in the local network via the printer port.
- Only printers that can be addressed with the device class “Printer” are supported as network printers. This is generally not the case for multi-function devices, for instance combined fax-scanner-printers.
- If your printer is equipped with a status monitor, it may not be possible to use the status monitor if the printer is operated as a network printer.
- For multi-function devices (printers with additional functions like fax or scanning), only the printing function is supported for network printers.

Configuring the Windows Printer Port for a Network Printer

If the “FRITZ!Box” entry is already listed in the “Programs” group of the start menu of the computer, this means that the printer port is already configured on this computer.

Otherwise, work through the instructions below to configure the printer port.



Note that this manual describes only how to configure and install the printer port in the 32-bit versions of the Windows operating systems.

If you use a 64-bit Windows operating system on your computer, please proceed according to the corresponding [instructions on the AVM web site](#).

Complete the steps below to set up the printer port in a 32-bit Windows operating system:

1. Insert the FRITZ!Box CD in the computer’s CD_ROM drive.
The Installation Help opens.
2. Click the “View CD Contents” button.
3. Click the “Create Start Menu Entry” button.
The printer port designated “AVM: (FRITZ!Box USB Printer Port)” will be configured.

Now you can install the printer drivers of the printer connected to FRITZ!Box for this printer port.

Installing Printer Drivers in Windows 7

1. Click the “Start” button in the task bar and select “Devices and Printers”.
2. Click “Add a printer”.
3. Select “Add a local printer”.

You must make this selection because the printer port on the computer functions as a local port.

4. Select the “Use an existing port:” setting and then choose the entry “AVM: (FRITZ!Box USB Printer Port)” from the list. Click “Next”.
5. Select the manufacturer for the USB printer connected to the FRITZ!Box from the “Manufacturers” list and then select the exact model from the “Printers” list. Click “Next”.

If the manufacturer or the model is not included in the lists, use an installation disk or CD with the required files and click “Have Disk...”.
6. You can enter a name for the printer in the “Printer name” field. The operating system will use this name to administer the printer.
7. Click “Next”. Installation will be concluded.

Installing Printer Drivers in Windows Vista

1. Click the “Start” button in the task bar and select the “Control Panel”.
2. Select “Printers”.
3. Click “Add Printer”.
4. Select “Add a local printer”.

You must make this selection because the printer port on the computer functions as a local port.
5. Select the “Use an existing port” setting and then choose the entry “AVM: (FRITZ!Box USB Printer Port)” from the list. Click “Next”.
6. Select the manufacturer for the USB printer connected to the FRITZ!Box from the “Manufacturers” list and then select the exact model from the “Printers” list.

If the manufacturer or the model is not included in the lists, use an installation disk or CD with the required files and click “Have Disk...”.
7. You can enter a name for the printer in the “Printer Name” field. The operating system will use this name to administer the printer.

8. Conclude the installation by clicking “Finish”.

Installing Printer Drivers in Windows XP/2000

1. Open the start menu of the computer and click the “Printers and Faxes” entry (Windows XP) or click “Start / Settings / Printer” (Windows 2000).

2. In the “Printers and Faxes” window, click “Add a printer”.

The “Add Printer” Wizard will be started.

3. Click “Next”.
4. Select the option “Local printer attached to this computer” (Windows XP) or “Local Printer” (Windows 2000) and make sure that the setting “Automatically detect and install my Plug and Play printer” is disabled.

You must make this selection because the printer port on the computer functions as a local port.

5. Click “Next”.
6. In the “Select a Printer Port” window, select the option “Use the following port” and select “AVM: (FRITZ!Box USB Printer Port)” from the list field. Click “Next”.
7. Select the manufacturer for the USB printer connected to the FRITZ!Box from the “Manufacturers” list and then select the exact model from the “Printers” list.

If the manufacturer or the model is not included in the lists, use an installation disk or CD with the required files and click “Have Disk...”.

8. In the “Name Your Printer” window, answer the question “Do you want to use this printer as the default printer?” (Windows XP) or “Do you want your Windows-based programs to use this printer as the default printer?” (Windows 2000) with “No”.

Setting Up Printers in SUSE Linux Systems

A USB printer can be connected to the FRITZ!Box for use as a network printer. The printer is then available to all computers connected with the FRITZ!Box.

You install the printer as “root” or “superuser”.

1. Open a console and enter the following command:

```
lpadmin -p <printer_name> -E -v socket://<IP_
address_of_the_FRITZ!Box>:<port> -m <printer_
description_file.ppd>
```

2. For more information and instructions, go to the following web site:

<http://www.cups.org/documentation.php/man-lpadmin.html>



The printer must be supported by CUPS (Common UNIX Printing System) software and be detected correctly at the USB port of the FRITZ!Box.

Example

For a laser jet printer with the example name of “LaserJet4” and the PPD file “laserjet.ppd” at a FRITZ!Box with the default address 192.168.178.1, on the console you must enter:

```
lpadmin -p LaserJet4 -E -v socket://192.168.178.1:9100 -
m laserjet.ppd
```

You can view the PPD files installed in the system with the following command:

```
lpinfo -m
```

For More Information

Please direct any questions about PPD files to the manufacturer of the printer or system used. More detailed information on the CUPS printing software is included in the following documentation:

<http://www.cups.org/documentation.php>

More detailed questions on the setup should also be directed to the manufacturer of the distribution or to an Internet-based or usenet forum that deals with CUPS or the distribution used.

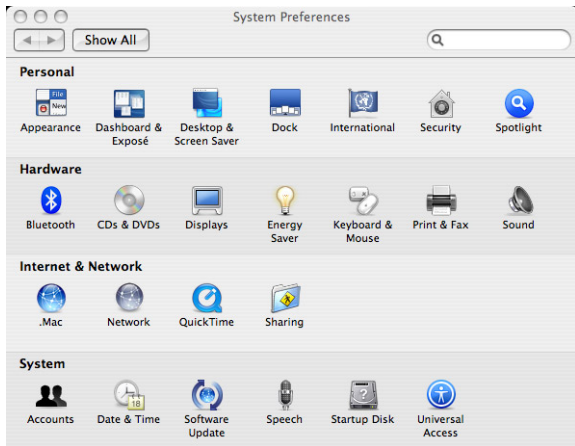
Setting Up USB Printers on Apple Computers

A USB printer can be connected to the FRITZ!Box for use as a network printer. The printer is then available to all computers connected with the FRITZ!Box.

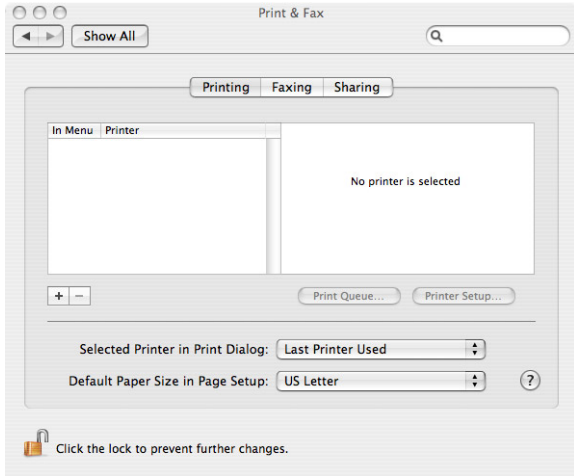


The only printers that can be used are the ones whose drivers can be selected in the Printer utility or for which a compatible driver is available there.

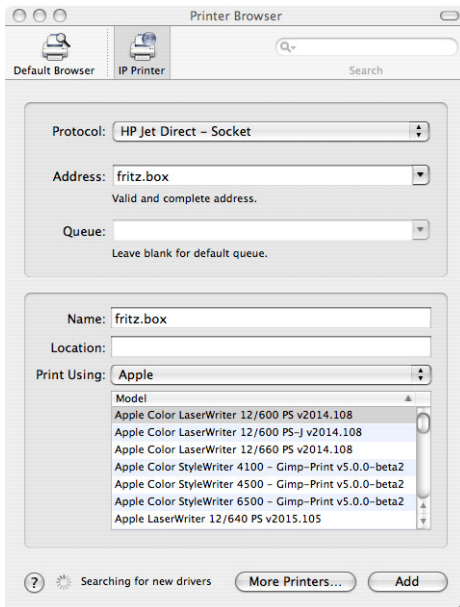
1. Open “Programs / System Preferences / Print & Fax”.



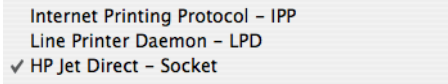
2. Click the “+” symbol at the left of the bottom half of the screen.



3. Click “IP Printer”.



4. In the “Protocol:” field, select the entry “HP Jet Direct – Socket”.



5. Enter in the “Address:” field the IP address of the FRITZ!Box:
192.168.178.1
6. Leave the “Queue:” field empty.
7. Enter the desired values in the “Name:” and “Location:” fields.
8. Enter a driver compatible with your printer in the “Print Using:” field.



If the printer cannot be selected, it may be possible to select a compatible printer or printer driver.

9. Click the “Add” button to save your settings.

The printer is then available to all computers connected with the FRITZ!Box.

Information about compatible printers or printer drivers is available in the Internet, for instance on the following page:

<http://gimp-print.sourceforge.net/MacOSX.php>

8.6 USB Hubs

One or two USB hubs can be connected to the USB ports of the FRITZ!Box. A USB hub is a device to extend existing USB ports.



If you use USB hubs, note that a maximum of four USB devices can be operated on the FRITZ!Box. We strongly recommend using USB hubs with their own power supply.

In total you can connect either four USB storage devices (hard drives, memory sticks), or three USB storage devices and a USB printer, directly to the FRITZ!Box or via a USB hub.

8.7 FRITZ!Box USB Remote Connection

With the FRITZ!Box USB remote connection you can control connections between your computer and USB devices. The computer and the USB devices are all connected with the FRITZ!Box.

A USB device connected to the FRITZ!Box is handed over to a computer via the USB remote connection function (virtual cable replacement). The USB device is detected as new hardware by the operating system on this computer, so that device software can be installed as if it were connected directly to the computer.



The USB remote connection can be utilized in 32-bit Windows 7, in Windows Vista and Windows XP with Service Pack 2 or higher.

Using

Enable the FRITZ!Box USB remote connection whenever you would like to use one of the following devices on the FRITZ!Box:

- USB storage device with the NTFS file format
- printer with the Graphics Device Interface (GDI printer) that requires the driver software for the given operating system
- multi-function printer whose scanner, fax or card reader features are to be used
- printer with ink level monitor (requiring bidirectional communication)
- USB scanner

Note that isochronous USB devices with time-critical transmission (isochronous USB devices like sound cards, web cams, video converters or TV adapters) are not supported.

Do not use the FRITZ!Box USB remote connection if multiple computers are to be able to access a single USB device connected to the FRITZ!Box at the same time (network printing function).

Functions like FTP, USB network storage and the media server, which are provided by the FRITZ!Box, are not available as long as the USB remote connection is active for USB storage devices.

Enabling the USB Remote Connection

Work through the following steps in order to enable the USB remote connection on your computer:

1. Start a web browser on your computer.
2. Enter fritz.box in the address field of the browser.
3. Enable the expert settings of the FRITZ!Box by clicking the tool bar entry “System / Expert Mode” or in the “System / Expert Mode” menu. Confirm by clicking “Apply”.
4. Open the “USB Remote Connection” page in the “Home Network / USB Devices” menu.
5. Select the setting “USB remote connection enabled” and click “Apply”.
6. Now install the program for the USB remote connection on the computer from which you want to use the USB devices.
7. The next step is to specify for which kind of USB devices the USB remote connection should be enabled. Enable the desired options.
8. As a final step, click “Apply”. All USB devices connected to the FRITZ!Box will be detected again.

The result of the changed USB settings can be viewed in the “Overview of Devices”.

Disabling the USB Remote Connection

Perform the following steps to disable the USB remote connection:

1. Open a web browser on the computer for which the USB remote connection is to be disabled.
2. Enter fritz.box in the address field of the browser.
3. Enable the expert setting of the FRITZ!Box in the “System / Expert Mode” menu. Confirm by clicking “Apply”.
4. Open the “Home Network / USB Devices” menu.
5. Select the “USB Remote Connection” page.
6. Disable all types of USB devices.
7. As a final step, click “Apply”.

The result of the changed USB settings can be viewed in the “Overview of Devices”.

8.8 Tips for Using USB Devices

When using USB devices at the USB ports of the FRITZ!Box, please keep in mind the following:

- If more than one USB device without its own power supply is connected to the FRITZ!Box, please note that, in accordance with the USB specification, the total current consumption may not exceed a value of 500 mA. Otherwise unspecified malfunctions with the USB devices or even damage to the FRITZ!Box may occur.
- AVM expressly advises against performing firmware updates for USB devices connected to the computer via the USB remote connection on the FRITZ!Box.
- Before removing a USB storage device, select the “Remove safely” option in the FRITZ!Box user interface to prevent losses of data.

- To avoid damage to the FRITZ!Box, only operate USB storage devices that require more than one USB port for operation (for instance hard drives with a Y cable) if they have their own power supply or a USB hub with its own power supply.
- The FRITZ!Box can not defend the USB memory from external influences. Thus such phenomena as voltage spikes during storms may occur, and writing to older USB memory devices may corrupt the data structure due to a high number of defective structures. In such cases a complete loss of data may occur.

Therefore we recommend always making a security copy of the USB memory content so that your data are not irretrievably lost just because losses may occur on the USB storage device.

9 Configuration and Operation on the Telephone

FRITZ!Box Keypad Sequences

Many of the FRITZ!Box functions and features can be configured and used over a telephone connected to a FRITZ!Box extension. Only tone-dialing (dual-tone multi-frequency = DTMF) telephones can be used in configuration and operation. Pulse dialing telephones are **not** suitable.



The telephone network features can be used only if they are supported by your telephone network carrier and enabled on your telephone line.








Acknowledgment Tone

Entries input on the telephone are confirmed with acknowledgement tones (see also “Audio Signals” on page 70):

- Entries made correctly are confirmed with a positive acknowledgement tone (a single tone of one second in length).
- If the entry was not successful, because of an incorrect key sequence, for instance, you hear a negative acknowledgment tone (an intermittent tone broken into intervals of about 0.25 seconds).

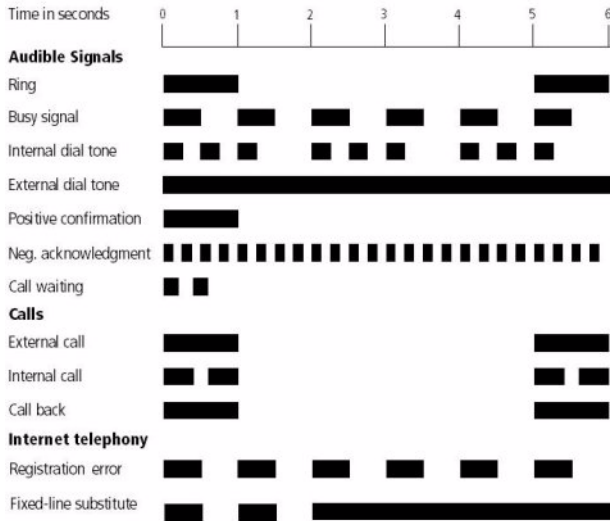
9.1 Instructions for Operation at the Telephone

The table explains the icons used in this chapter:

Icon	Action
	Dial a number.
	Pick up the handset.
	Hang up the handset.
	Talk.
	Three-party conference call
	Wait for the acknowledgement tone.
	You hear the ring tone.
<Ext.>	Enter the number of an analog extension of the FRITZ!Box. In place of <Ext.>, enter the number of an analog extension (for instance, 1 for extension “FON 1” or 2 for extension “FON 2”).
<MSN>	Enter an ISDN number (MSN). In place of the abbreviation <MSN> used here, enter the complete MSN desired, without any dialing prefix.
<DNo>	Enter an external telephone number (destination number). In the place of <DNo>, enter the complete number of the external line.
<DNo./Ext.>	Enter the external telephone number (destination number) or extension number (Ext.) to which your calls are to be diverted.

9.2 Audio Signals

The following diagram illustrates the duration and intervals of the various audio signals and ring tones of the telephones connected to the FRITZ!Box Fon WLAN 7390.



Audio signals and ring tones of the connected telephones

9.3 Configuring on the Telephone



Saving New Settings

In this section, saving refers to all current settings made in the FRITZ!Box. It is not necessary to save the configuration immediately after every change. You may first configure all of your settings as desired, and then save them permanently.



Permanent saving cannot be reversed. However, you can change the settings by using new commands or restore the FRITZ!Box to its factory settings.

Saving Permanently

	Pick up the handset.
#91**	Save all settings permanently by dialing the sequence shown at left.
	Hang up the handset.

Restoring Factory Settings

All of the settings in the FRITZ!Box can be reset to their condition upon delivery by restoring the factory settings.



All settings you made in the FRITZ!Box—including the configured Internet connection—are deleted when the factory settings are restored.

Restoring Factory Settings

#991*159 01590*	Restores all settings in the FRITZ!Box to their original condition.
----------------------------	---

After factory settings are restored, the FRITZ!Box is restarted.

Enabling and Disabling WLAN

The WLAN function can be switched on and off using the telephone keypad. This is especially convenient when the WLAN function has been switched off. Simply use your telephone to turn it back on. This means that the WLAN function can be enabled without having use a wired connection to open the user interface.

Enabling and Disabling WLAN

#96*1*	Enables the WLAN function.
#96*0*	Disables the WLAN function.

Do Not Disturb

For every analog extension of the FRITZ!Box, the Do Not Disturb option can be enabled by telephone. When Do Not Disturb is set, the telephone connected to the extension will not ring. In configuring this function you can choose between enabling the function immediately or selecting a specific time period.

Immediately

When Do Not Disturb is enabled immediately, no incoming calls will be signaled at the specified extension. The Do Not Disturb setting will remain enabled until it is disabled.

Enabling Do Not Disturb Effective Immediately

#81<Ext.>*0*	Immediately enables Do Not Disturb for the extension entered as <Ext.>.
#91**	Saves the settings.

Period

Alternatively, you can enter a Do Not Disturb period during which the telephone will not ring. At the extension for which a Do Not Disturb period is to be configured, define the period during which the telephone should not ring and save your entries. Then enable Do Not Disturb. Do Not Disturb then automatically will be switched on daily at the time entered in the “Start” field and switched off again at the time defined in the “End” field.

Example: Do Not Disturb should be configured from 8:00 p.m. until 7:00 a.m. daily. Enter the value “2000” for <Start> and “0700” for <End>.

Enabling Do Not Disturb for a Prescribed Period

#80<Ext.>* <Start>*<End>*	Defines the period for Do Not Disturb at extension <Ext.>.
#91**	Saves the settings.
#81<Ext.>*6*	Enables Do Not Disturb for the defined period.
#91**	Saves the settings.

Disabling

Both kinds of Do Not Disturb settings can be disabled by means of a keypad sequence.

Disabling Do Not Disturb

#81<Ext.>*1*	Disables Do Not Disturb for extension <Ext.>.
#91**	Saves the settings.

Alarm

The telephones connected to the FRITZ!Box can be used for an alarm call. The alarm can be configured individually for each connected telephone.

First enter on the telephone the time at which you would like to be awakened and save this entry. Then enable the alarm function.

Example: The telephone should ring at 07:00 a.m. Enter the value “0700” as the <Time> and save this setting.

Configuring the Alarm for a Telephone

#881* <time> * <Ext.> *	Defines for the given extension the time at which the telephone should ring.
#91**	Saves the settings.

Enabling/Disabling the Alarm

#881**	Enables the alarm for all extensions on which a time was configured.
#881#	Disables the alarm for all extensions.

Call Forwarding on the ISDN Line

Call forwarding is performed by the ISDN operator’s switching station. To use call forwarding, FRITZ!Box must be connected to an ISDN line. Then this feature can be used to forward calls to an external line. Call forwarding is subject to charges by the carrier and cannot be used to forward calls to Internet numbers.

In addition to call forwarding, there is also call diversion via the FRITZ!Box. Use call diversion to divert calls to internal and external lines. See the section “Call Diversion” on page 78 for more information.



Do not activate both call forwarding and call diversion at the same time.

For call forwarding you may specify whether you want incoming calls to be forwarded unconditionally, after the fifth ring, or when busy. Different settings may be configured separately for each number.

Call Forwarding Immediately

Incoming calls for the given MSN are always diverted immediately to the specified number. Call forwarding is subject to charges by the carrier and cannot be used to forward calls to Internet numbers.




Call Forwarding Immediately for Your Outgoing Caller ID

	Pick up the handset.
21 <DNo> #	Dial the sequence shown at left.
	Wait for the acknowledgement tone.
	Hang up the handset.




Call Forwarding Immediately for Any MSN

	Pick up the handset.
21 <DNo> * <MSN> #	Dial the sequence shown at left.
	Wait for the acknowledgement tone.
	Hang up the handset.




Call Forwarding Immediately for All MSNs

	Pick up the handset.
21 <DNo> *#	Dial the sequence shown at left.
	Wait for the acknowledgement tone.
	Hang up the handset.




Disabling Call Forwarding Immediately for Your Outgoing Caller ID

	Pick up the handset.
21#	Dial the sequence shown at left.
	Wait for the acknowledgement tone.
	Hang up the handset.

Disabling Call Forwarding Immediately for Any MSN

	Pick up the handset.
21 * <MSN> #	Dial the sequence shown at left.
	Wait for the acknowledgement tone.
	Hang up the handset.




Disabling Call Forwarding Immediately for All MSNs

	Pick up the handset.
*21**#	Dial the sequence shown at left.
	Wait for the acknowledgement tone.
	Hang up the handset.




Call Forwarding When Busy

Incoming calls are forwarded to the specified number only if a call is already being conducted using the number dialed. You can define call diversion for the local outgoing call number. The local outgoing call number is the first number you assigned to an extension. You can also define call diversion for any other number, e.g. a telephone at another extension, or for all numbers. All settings can be disabled at any time.




Call Forwarding When Busy for Your Outgoing Caller ID

	Pick up the handset.
67 <DNo> #	Dial the sequence shown at left.
	Wait for the acknowledgement tone.
	Hang up the handset.




Call Forwarding When Busy for Any MSN

	Pick up the handset.
67 <DNo> * <MSN> #	Dial the sequence shown at left.
	Wait for the acknowledgement tone.
	Hang up the handset.




Call Forwarding When Busy for All MSNs

	Pick up the handset.
67 <DNo> * #	Dial the sequence shown at left.
	Wait for the acknowledgement tone.
	Hang up the handset.




Disabling Call Forwarding When Busy for Your Outgoing Caller ID

	Pick up the handset.
67 #	Dial the sequence shown at left.
	Wait for the acknowledgement tone.
	Hang up the handset.




Disabling Call Forwarding When Busy for Any MSN




	Pick up the handset.
67 * <MSN> #	Dial the sequence shown at left.
	Wait for the acknowledgement tone.
	Hang up the handset.




Call Forwarding
Delayed

Disabling Call Forwarding When Busy for All MSNs	
	Pick up the handset.
*67**#	Dial the sequence shown at left.
	Wait for the acknowledgement tone.
	Hang up the handset.




Incoming calls are forwarded to the specified number if not answered at the number originally dialed within 20 seconds (about five rings). Call forwarding can be configured for your extension's outgoing caller ID (the first number assigned to an extension), for any number (for instance, a telephone at the other FRITZ!Box extension), or for all numbers. All settings can be disabled at any time.

Call Forwarding Delayed for Your Outgoing Caller ID	
	Pick up the handset.
61 <DNo> #	Dial the sequence shown at left.
	Wait for the acknowledgement tone.
	Hang up the handset.




Call Forwarding Delayed for Any MSN	
	Pick up the handset.
61 <DNo> * <MSN> #	Dial the sequence shown at left.
	Wait for the acknowledgement tone.
	Hang up the handset.

Call Forwarding Delayed for All MSNs	
	Pick up the handset.
61 <DNo> * #	Dial the sequence shown at left.
	Wait for the acknowledgement tone.
	Hang up the handset.




Disabling Call Forwarding Delayed for Your Outgoing Caller ID

	Pick up the handset.
61#	Dial the sequence shown at left.
	Wait for the acknowledgement tone.
	Hang up the handset.

Disabling Call Forwarding Delayed for Any MSN

	Pick up the handset.
61#<MSN>#	Dial the sequence shown at left.
	Wait for the acknowledgement tone.
	Hang up the handset.

Disabling Call Forwarding Delayed for All MSNs

	Pick up the handset.
*61**#	Dial the sequence shown at left.
	Wait for the acknowledgement tone.
	Hang up the handset.

Call Diversion

Incoming calls to the FRITZ!Box telephones can be diverted to a different extension or to an external number. Call diversion takes place directly in the FRITZ!Box. This is the difference between call diversion and call forwarding, where the calls are diverted via the central exchange. How to use call forwarding by telephone is described in the section “Call Forwarding on the ISDN Line” on page 74.



Do **not** activate both call forwarding and call diversion at the same time.

Call diversion allows you to forward calls to an external line or to another extension. This kind of diversion is organized inside FRITZ!Box so that diversions to another extension are free of charge. Calls are diverted to an external

number over your ISDN line's second B channel and are subject to normal transmission charges. If the FRITZ!Box is operated on an analog telephone line, incoming calls can only be diverted to a different extension or to Internet numbers.



Do **not** activate both call forwarding and call diversion at the same time.



Note that only numerical Internet telephone numbers can be entered for diversion to an Internet telephone number. This means that you can enter only numerals, no letters or other characters.

You can specify the conditions under which an incoming call will be diverted. You can select one of five different options. Different settings may be saved for each extension.

Call Diversion Immediately (without Ringing)

	Pick up the handset.
#41<Ext.>* <DN>/<Ext.>*	Dial the sequence shown at left.
#91**	Save your settings if desired by dialing the sequence shown at left.
	Hang up the handset.

Call Diversion After the Third Ring

	Pick up the handset.
#42<Ext.>* <DN>/<Ext.>*	Dial the sequence shown at left.
#91**	Save your settings if desired by dialing the sequence shown at left.
	Hang up the handset.

Call Diversion When Busy

☎	Pick up the handset.
#43<Ext.>* <DN>/<Ext.>*	Dial the sequence shown at left.
#91**	Save your settings if desired by dialing the sequence shown at left.
☎	Hang up the handset.

Call Diversion After the Third Ring or When Busy

☎	Pick up the handset.
#44<Ext.>* <DN>/<Ext.>*	Dial the sequence shown at left.
#91**	Save your settings if desired by dialing the sequence shown at left.
☎	Hang up the handset.

Call Diversion Immediately with Ringing

☎	Pick up the handset.
#45<Ext.>* <DN>/<Ext.>*	Dial the sequence shown at left.
#91**	Save your settings if desired by dialing the sequence shown at left.
☎	Hang up the handset.

Disabling Call Diversion

☎	Pick up the handset.
#40<Ext.>**	Dial the sequence shown at left.
#91**	Save your settings if desired by dialing the sequence shown at left.
☎	Hang up the handset.

Call Waiting

Call waiting can be switched on or off for each extension. Some older terminal equipment connected to extensions may misinterpret the call waiting signal. This is especially true of fax machines and modems. If communication errors occur, you should disable call waiting for fax and modem extensions.

See the section “Waiting Calls” on page 89 for information about how to accept a call while another connection is active.



When call waiting is enabled, modem and fax connections may be interrupted.

Enabling Call Waiting

Ⓜ	Pick up the handset.
#2<Ext.>*0*	Dial the sequence shown at left.
#91**	Save your settings if desired by dialing the sequence shown at left.
Ⓜ	Hang up the handset.

Disabling Call Waiting

Ⓜ	Pick up the handset.
#2<Ext.>*1*	Dial the sequence shown at left.
#91**	Save your settings if desired by dialing the sequence shown at left.
Ⓜ	Hang up the handset.



Suppressing Caller ID for Outgoing Calls (CLIR)

The CLIR (Calling Line Identification Restriction) function prevents your telephone number being displayed on the other party's telephone during outgoing calls.



The CLIR function is disabled in the factory settings. You have the option of enabling this function permanently and then disabling it again. CLIR can also be used for individual connections. When CLIR is permanently enabled, this setting is saved for the extension and always enabled for outgoing connections.

If you would like to conduct only certain calls with the Caller ID suppressed, prefix the number dialed with a keypad sequence. This enables CLIR only for the current connection.



Enabling CLIR Permanently

	Pick up the handset.
#5<Ext.>*1*	Dial the sequence shown at left.
#91**	Save your settings if desired by dialing the sequence shown at left.
	Hang up the handset.

Disabling CLIR Permanently

	Pick up the handset.
#51<Ext.>*0*	Dial the sequence shown at left.
#91**	Save your settings if desired by dialing the sequence shown at left.
	Hang up the handset.

CLIR on a Case-by-Case Basis

	Pick up the handset.
*31#	Dial the sequence shown at left. Now you hear the external dial tone.
	Dial the number you want to call.

Displaying the Incoming Caller ID (CLIP)

The CLIP (Calling Line Identification Presentation) function makes the number of callers—external and internal—visible on your telephone display.



This feature is only effective if your telephone supports CLIP.

The CLIP function is enabled in the factory settings. This function can be permanently disabled and enabled again.

Enabling Display of Incoming Caller ID (CLIP)

	Pick up the handset.
#50<Ext.>*1*	Dial the sequence shown at left.
#91**	Save your settings if desired by dialing the sequence shown at left.
	Hang up the handset.

Disabling Display of Incoming Caller ID (CLIP)

	Pick up the handset.
#50<Ext.>*0*	Dial the sequence shown at left.
#91**	Save your settings if desired by dialing the sequence shown at left.
	Hang up the handset.

Connected ISDN Line Identification Restriction and Presentation (COLR/COLP)

By default, a caller's display always shows the Multiple Subscriber Number (MSN) of the extension she or he dialed. Yet if you take the call at another extension, the MSN of this extension will be displayed. If you want this number to remain concealed so that the caller does not know that the call has been picked up at another extension, you have the option of suppressing transmission of the connected line's number. The caller's display will continue to show the number dialed.

Transmission of the connected line’s number can be switched on and off for each extension individually. Transmission of the connected line’s number is permanently enabled in the factory settings.

Enabling Connected Line Identification Restriction (COLR) Permanently

ⓘ	Pick up the handset.
#53<Ext.>*1*	Dial the sequence shown at left.
#91**	Save your settings if desired by dialing the sequence shown at left.
ⓘ	Hang up the handset.



Enabling Connected Line Identification Presentation (COLP) Permanently

ⓘ	Pick up the handset.
#53<Ext.>*0*	Dial the sequence shown at left.
#91**	Save your settings if desired by dialing the sequence shown at left.
ⓘ	Hang up the handset.



Disabling Automatic Outside Dialing

The FRITZ!Box offers the possibility of disabling automatic outside dialing. This means that you will receive an internal dialing tone when you lift the handset at the corresponding extension. This makes sense at any extension which is used to make many internal calls, for instance, between the extensions of the FRITZ!Box. When automatic outside dialing is disabled, for an external call the “0” must be dialed before the telephone number.

Disabling Automatic Outside Dialing

	Pick up the handset.
#1<Ext.>*0*	Dial the sequence shown at left.
#91**	Save your settings if desired by dialing the sequence shown at left.
	Hang up the handset.



Enabling Automatic Outside Dialing

	Pick up the handset.
#1<Ext.>*1*	Dial the sequence shown at left.
#91**	Save your settings if desired by dialing the sequence shown at left.
	Hang up the handset.



Call Rejection on Busy (Busy on Busy)

Calls for an extension can be rejected using the “busy on busy” feature. This means that the user receives a busy signal whenever the extension is busy.

Enabling Busy on Busy

	Pick up the handset.
#52<Ext.>*1*	Dial the sequence shown at left.
#91**	Save your settings if desired by dialing the sequence shown at left.
	Hang up the handset.

Disabling Busy on Busy

	Pick up the handset.
#52<Ext.>*0*	Dial the sequence shown at left.
#91**	Save your settings if desired by dialing the sequence shown at left.
	Hang up the handset.

9.4 Operation at the Telephone

This section describes how you can use the FRITZ!Box features via your telephone keypad.

Shortening the Dialing Procedure

The FRITZ!Box automatically recognizes when a number has been entered, but not until a few seconds after the final digits are entered.

You have the possibility of shortening the dialing procedure by closing your entry with the **#** key.

Shortening the Dialing Procedure

<number>**#**

Indicates that a number has been dialed to shorten the dialing procedure.

Selecting the Outgoing Number and the Type of Connection

For outgoing connections you can specify the kind of connection to be used for the next dialing procedure. For this entry you can use settings already made, or circumvent the settings currently configured. In this case the dialing rules are suspended for the given dialing procedure.

By entering precisely which Internet telephony account should be used it is possible to have the dialing procedure conducted via a certain Internet telephone number, even though this number was never previously configured for the extension used.

Selecting the Outgoing Number and the Type of Connection

*111# <telephone number>	Dials up this connection using the fixed line.
*12# <telephone number>	Establishes a connection for this dialing procedure using the first Internet telephone number.
*12<P>#	Establishes an Internet telephony connection via the specified Internet telephone number. For <P> enter the position of the Internet telephone number in the list of Internet telephone numbers.

Making Internal Calls

All calls conducted between telephones connected to the FRITZ!Box, be they analog or ISDN/DECT phones, are internal telephone calls.

Dialing Internal Calls with Automatic Outside Dialing

Ⓡ	Pick up the handset. You can hear the external dial tone immediately, since the extension is set for automatic outside dialing.
**<Ext.>	If you would like to make an internal call to one of the extensions, dial **, followed by the number of the extension, for instance 1 or 2 .
**50	If you would like to call all ISDN terminal devices for which no number has been configured, then dial **50.
**<ISDN ID>	If you would like to call an ISDN terminal device for which you have defined an internal phone number, dial ** followed by the internal number of the device (for instance, 51).
**5<MSN>	If you would like to call an ISDN device that does not have an internal phone number, dial **5, followed by the MSN that was saved in the ISDN terminal device.

Dialing Internal Calls without Automatic Outside Dialing

☎	Pick up the handset. You hear the internal dial tone.
<Ext.>	Dial the desired extension number. for instance 1 or 2 . For instance, enter * * 1 , to call the telephone at the analog extension “FON 1”.
<ISDN ID>	If you would like to call an ISDN terminal device for which you defined an internal phone number, dial the internal phone number of the device (for instance, 5 1).
* * <MSN>	If you would like to call an ISDN terminal device that does not have an internal phone number, dial 5 , followed by the configured for the ISDN terminal device.

Group Call

Place a group call to call all other extensions at the same time. Your call is connected with whichever extension answers first.

Group Call

☎	Pick up the handset.
* * 9	Dial the keypad sequences listed here to call all free extensions.

Picking up a Call from the Answering Machine

Use this function to pick up incoming calls on your telephone that already have been taken by the answering machine.

Picking up a Call

☎	Pick up the handset.
* 0 9	Dial the sequence shown at left.
☎	The call is now connected to your extension. You are now connected to the caller.

Waiting Calls

When the “Call Waiting” feature is enabled and you are conducting a call, you will be notified as soon as an external call arrives on your your line. This call will be signaled by an acoustic signal in the handset. You can accept the connection with the new caller within 30 seconds. If you ignore the signal, the waiting call is rejected after 30 seconds.

For instructions on how to enable and disable the function, see the section “Call Waiting” on page 81.

Accepting or Rejecting Waiting Calls

R2	To accept a waiting call, dial the sequence shown at left. Your original call is now on hold.
R1	To return to your original connection, dial the sequence shown at left. You can also accept the waiting call by hanging up your existing connection, i.e., by hanging up the handset. In this case the telephone rings as soon as you have hung up. Pick up the handset again to accept the waiting call.
R0	To reject a waiting call, dial the sequence shown at left.




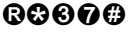




Call-back on Busy (CCBS) on the ISDN Line

When you dial a number and it is busy, you can enable the “call-back on busy” feature. As soon as the line is free, your telephone rings for 20 seconds, as it would for an external call. When you pick up your handset, the number of desired party will be dialed automatically.

“Call-back on busy” can be used for both external and internal connections.

A maximum of five call-back requests can be enabled for each extension at any given time.

Call-Back on Busy (CCBS)

	You have just dialed a number and now you hear the busy signal.
	If the call is not answered, within 20 seconds, dial either the number 
	or
	the sequence shown at left.
	Wait for the acknowledgement tone.
	Hang up the handset.
	As soon as the subscriber you dialed hangs up, your telephone will ring.
	Pick up the handset. The subscriber's number is dialed again automatically.

Call-Back on No Response (CCNR) on the ISDN Line

The “call-back on no response” function can be used when you dial a number and the party does not respond. Once the party can be reached again and conducts a call from her or his telephone, this function recognizes when this conversation is ended. Your telephone then rings. When you pick up your handset, the number of the desired party is automatically dialed again.

“Call-back on no response” can be used both for external and internal connections.

This command can be activated five times for each line.

Enabling Call-Back on No Response (CCNR)

Ⓜ	You have just dialed a number and hear a ring tone.
⑤	If the call is not answered, within 20 seconds, dial either the number ⑤
or	
Ⓜ * 3 7 #	the sequence shown at left.
Ⓜ	Wait for the acknowledgement tone.
Ⓜ	Hang up the handset. As soon as the party you dialed completes the conversation being conducted from her or his telephone, your telephone rings.
Ⓜ	Pick up the handset. The number is dialed again automatically.

Call-back requests can also be deleted manually, with the oldest call-back request being deleted first.

Deleting Call-Back Requests Manually

Ⓜ	Pick up the handset.
# 3 7 #	Dial the sequence shown at left.
Ⓜ	Hang up the handset.

Alternating Between Calls









Whenever you have one active connection and one caller on hold, you can switch from one call to the other as often as you want using the Hold button.

Alternating Between Calls	
Call 1 📞	You are talking to caller 1.
R	Press the Hold button. Caller 1 is now on hold.
☎	To establish a second call, simply dial * * plus the desired extension number for an internal call, or the desired external number.
Call 2 📞	If the call is answered, you can consult on this line. The original caller is still on hold.
R 2	To switch back from caller 2 to caller 1, dial the sequence shown at left.
Call 1 📞	Caller 1 is now active again and caller 2 is on hold.
R 2	To switch back again from caller 2 to caller 1, dial the same sequence. In this way you can alternate between the two connections.

Ending Hold	
⏏	The caller on hold hangs up. You can continue talking on the active connection.
R 1	You end the active connection by dialing the sequence shown at left. The call that was on hold is now active again, and there is no call left at hold.
⏏ 📞 Call 📞	You can also return to the call on hold by hanging up the handset: this ends the currently active connection. In this case the telephone rings as soon as you hang up. Pick up the handset again to return to the last call that was on hold.







Three-Party Conference Call

FRITZ!Box allows you to hold telephone conferences with two other people at once. Two external and one internal party, or two internal and one external party can conduct a conference call with each other.

Conducting a Three-Party Conference Call	
	Pick up the handset.
	Dial the external number of the first party. Talk.
	Press the Hold button.
	To establish a second call, simply dial ** plus the desired extension number for an internal call, or the desired external number. You can now conduct a second conversation while your first call is on hold.
	Dial the sequence shown at left to begin a three-party conference call.
	Now all three participants can confer together. If either of the other two parties hangs up, your connection with the remaining participant remains active.
	You can end the three-party call by hanging up the handset.
	You can also switch from the three-party call back to the original two-party connection. Dial the sequence shown at left. This ends the three-party conference. The connection that was active last before you initiated the three-party conference is now active again. The other call is on hold. You can alternate between the two connections by dialing the same sequence again.



Consultation / Hold

The consultation/hold feature allows you to place an existing call on hold. You then may consult with someone else at your workplace or dial a second call. The party on hold does not hear the second conversation. Once you have finished the consultation, you can return to the original connection.

Consultation / Hold	
Call 1	You are talking to caller 1.
	
	Press the Hold button. Caller 1 is now on hold and you can consult someone else.
	To establish a second call, simply dial ** plus the desired extension number for an internal call, or the desired external number.
Call 2	If the call is answered, you can consult on this line. The original caller is still on hold.
	
	If the number you dialed is busy or the call is not answered, press the Hold button again to return to caller 1.
	To switch back to caller 1 after talking on the second connection, dial the sequence shown at left. Call 1 is now active again.








If you return to caller 1 by pressing the Hold button, the connection to caller 2 is not cleared down until caller 2 hangs up.

Ending Consultation	
Call 1	You can also return to caller 1 by hanging up the handset: this ends the connection to caller 2. In this case, your phone rings as soon as you hang up. Pick up the handset to return to caller 1 again.
	
	Hang up the handset to end the connection.







Transferring Calls

The “call transfer” function allows you to transfer a connection from one of FRITZ!Box’s extension to another.

Transferring Calls	
Call 1	You are talking to caller 1.
	
	Press the Hold button. Caller 1 is now on hold.
 * * <Ext.>	To establish a connection to caller 2, dial the star key twice and then her or his extension number.
Call 2	You can now talk with caller 2.
	
	To transfer the caller 1 to caller 2, simply hang up the handset.

Explicit Call Transfer (ECT)












Use the “explicit call transfer” function to connect two external parties with each other while one connection is active and the other is on hold. Then you can end your own connection while the other two parties continue their conversation.

Explicit Transfer of One Active and One Held Connection	
	Pick up the handset.
	Dial the external number of the first party. Talk.
	Press the Hold button.
	Dial the number for your second external call. You can now conduct a second conversation while your first call is on hold.
	To clear your connection while allowing the external parties to continue the call, connect the parties with each other.
 4	Dial the sequence shown at left. The connection on hold and the active connection are connected with each other. The external parties continue the call while you clear the connection.
	Hang up the handset.

Explicit Call Transfer from a Three-Party Conference Call	
Ⓜ	Pick up the handset.
☎	Dial the external number of the first party. Talk.
Ⓜ	Press the Hold button.
☎	Dial the number for your second external call. You can now conduct a second conversation while your first call is on hold.
Ⓜ☎	Dial the sequence shown at left to begin a three-party conference call.
Ⓜ☎	Now all three participants can confer together. If either of the other two parties hangs up, your connection with the remaining participant remains active.
	To clear your connections while allowing the external parties to continue the call, connect the parties with each other.
Ⓜ☎	You can also switch from the three-party call back to the original two-party connection. Dial the sequence shown at left. This ends the three-party conference. The connection that was active last before you initiated the three-party conference is now active again. The second external call is on hold. You can alternate between the two connections by dialing the same sequence again.
Ⓜ☎	Dial the sequence shown at left. The connection on hold and the active connection are connected with each other. The external parties continue the call while you clear the connection.
Ⓜ	Hang up the handset.

One-Time Explicit Transfer on the ISDN Line

Explicit Call Transfer (ECT) is an ISDN feature that must be enabled by your ISDN provider and thus usually is subject to extra charges. If ECT has not been enabled on your line, you can program the telephone system to initiate a one-time explicit call transfer before connecting to two parties. When you end the connection, the other two parties will be connected to each other.

One-Time Explicit Transfer	
	Pick up the handset.
   	Dial the sequence shown at left. You hear the external dial tone.
	Dial the external number of the first party. Talk.
	Press the Hold button.
	Dial the number for your second external call. You can now conduct a second conversation while your first call is on hold.
	To clear your connections while allowing the external parties to continue the call, connect the parties with each other.
 	Dial the sequence shown at left. The connection on hold and the active connection are connected with each other. The external parties continue the call while you clear the connection.
	Hang up the handset.



With this type of external transfer, both parties are connected to each other over your PBX. This means that both B channels on your ISDN line remain busy with this connection as long as the parties are connected to each other.










Suspending/Resuming a Call on the ISDN Line

The “suspend/resume” feature, also technically known as “terminal portability”, allows you to suspend an existing connection and resume it at another point on the S₀ bus. The connection can be resumed at a different ISDN terminal device (such as an ISDN telephone) that is connected to your BRI line along with the FRITZ!Box.

You will hear an acknowledgement tone to indicate that the call has been successfully suspended. If you hear the failure tone, this may indicate that you made a mistake, or that the “suspend/resume” feature is not enabled on your line. It is also possible that the parked-call ID you chose is already in use.

You can resume the suspended call using another ISDN device on the S₀ bus.





Suspending/Resuming a Call

	You are talking to a caller.
	Press the Hold button. Call 1 is now suspended.
  <PC> 	Dial the sequence shown at left. Type in a code for the suspended call as <PC> (parked-call code). The code can be any number between  and  . You will need to enter this code again when you resume the call.
 	After the acknowledgement tone, the connection is suspended. You can hang up the handset. The call remains suspended at the ISDN provider’s local switch for two minutes.

Call Tracing on the ISDN Line

You can use this function during a call or after the caller hangs up. For more information about this feature, contact your ISDN provider.

Call Tracing (MCID)

   	Dial the sequence shown at left.
---	----------------------------------

Room Monitoring (Baby Monitor)

The following keypad sequence enables the function for monitoring the sound level in a room. First enter the volume level (a value between 1 and 8). Enter a telephone number. Do not hang up the handset! When the volume in the room reaches the specified level, the number you entered will be dialed. When the telephone rings and you pick up the handset, you will be connected with the telephone on which you enabled the room monitoring function.



When using this feature, it is advisable to activate the speaker phone function.

Enabling Room Monitoring

	Pick up the handset or activate the speaker phone function of your telephone.
4 <level> <number> 	Dial the sequence shown at left. For <level>, enter a number between the most sensitive sound level) and . For <number>, enter the number to be called. This may be the number of another internal extension, a for an internal group call, or any external number desired.
	Wait for the acknowledgement tone. The baby monitoring phone function is now enabled.
	Do not hang up the handset!

Dial the number of the extension to listen in at an extension with room monitoring activated.

After initiating a room monitoring phone call, the PBX cannot generate a new call until at least one minute has lapsed.

You can disable the function by simply hanging up the handset of the telephone at which you enabled it.

Using Keypad Shortcuts

The Keypad function allows you to control services and features on the telephone line by entering characters and strings on the telephone keypad.

These keyboard entries are called keypad messages. Ask your telephone carrier for the specific keypad messages to access ISDN features.

Entering Keypad Messages on an Extension with Automatic Outside Dialing

Ⓡ	Pick up the handset.
*#<Seq>	Dial the sequence shown at left. Seq stands for the keypad sequence you received from your telephone carrier.

Entering Keypad Sequences on an Extension without Automatic Outside Dialing

Ⓡ	Pick up the handset.
0*#<Seq>	Dial the sequence shown at left. Seq stands for the keypad sequence you received from your telephone carrier.

10 Troubleshooting

Help for Errors

This chapter provides assistance if you are not able to open the user interface of your FRITZ!Box, if you are having problems with the WLAN connection, or if you want to change the IP settings on your computer.

10.1 Errors Opening the User Interface

If an error message is returned when you open the user interface, this can have various causes. Check the possible causes and attempt to resolve the error.

Restarting the FRITZ!Box

The user interface cannot be opened or does not react.

Possible Cause

Inconsistencies within the FRITZ!Box.

Remedy

1. Restart the FRITZ!Box.
Remove the power cable from the socket.
2. Wait about five seconds before reconnecting to the power supply.
3. To make sure that the FRITZ!Box has finished restarting, wait until the “Power / DSL” LED lights up and stops flashing and, if you have switched on WLAN, the “WLAN” LED stays lit as well. This ensures that the FRITZ!Box restart has been completed.
4. Try again to open the FRITZ!Box user interface by entering fritz.box in the address field.

Checking the Cable Connections

The user interface of the FRITZ!Box does not appear in the window of your web browser.

Possible Cause

The cable connections are not secure.

Remedy

Make sure that all cable connections are plugged in securely.

Checking the Name Resolution

The user interface of the FRITZ!Box cannot be opened by entering [fritz.box](#).

Possible Cause

The name resolution of the FRITZ!Box does not work.

Remedy

1. In the web browser, enter the following IP address in place of [fritz.box](#):
[192.168.178.1](#)
 2. If the user interface cannot be reached via this address, check the settings configured for your network adapter as described in the section “Obtaining an IP Address Automatically” from page 115.
-

Checking the IP Address

The user interface of the FRITZ!Box can be reached neither at the address fritz.box nor at 192.168.178.1.

Possible Cause

The IP address set on the connected computer is inapplicable.

Remedy

Set the network adapter to DHCP so that the IP address can be obtained via the DHCP server of the FRITZ!Box. Adjust the settings to those described in the section “Obtaining an IP Address Automatically” from page 115.

If it is still not possible to open the FRITZ!Box user interface by entering fritz.box or 192.168.178.1, use the fixed IP address of the FRITZ!Box as described on page 106.

Disabling Dial-Up Connections

The user interface is not opened; a window for a dial-up connection appears instead.

Possible Cause

The browser must use the network connection between the computer and FRITZ!Box when the user interface is opened. For this the automatic establishment of a Dial-Up Networking connection must be disabled.

Remedy

You can disable the automatic attempt to establish a Dial-Up Networking connection. The following example explains how to check the settings of Internet Explorer 8:

1. Select the “Connections” settings page under “Tools/ Internet Options...”.
2. In the “Dial-up and Virtual Private Network settings” section, enable the option “Never dial a connection”.
3. As a final step, click “OK”.

Disabling Online Operation

The user interface does not appear in the window of your web browser.

Possible Cause

The web browser is set for offline operation.

Remedy

Configure the web browser for online operation. Using the example of Internet Explorer 8:

1. Open the “Tools” menu.
2. If a checkmark is displayed in front of “Work Offline”, click this line.

The checkmark will be removed and Internet Explorer will switch to online operation.

Checking the Proxy Settings

The user interface does not appear in the window of your web browser.

Possible Cause

The proxy settings of the web browser prevent the user interface from being opened.

Remedy

Enter the DNS name and the IP address of the FRITZ!Box as an exception in the proxy settings of the web browser, as described here for the example of the Internet Explorer 8.

1. Select the “Connections” settings page under “Tools / Internet Options...”.
2. Click the “LAN Settings...” button in the “Local Area Network (LAN)” settings area.
3. In the “Proxy server” area of the next window, check the “Use proxy Server for LAN” option and then click “Advanced”.

4. Enter as “Exceptions”:
fritz.box; 192.168.178.1; 169.254.1.1
and click “OK”.
-

Checking the CGI Settings

The user interface does not appear in the window of your web browser.

Possible Cause

The execution of CGI scripts is disabled in the web browser.

Remedy

Configure the web browser so that the execution of scripts is allowed in the user interface. Using the example of the Internet Explorer 8:

1. Select the “Security” settings page under “Tools / Internet Options...”.
 2. If the “Default Level” button is not available for selection, the “Medium” security level is already configured, which means that CGI scripts can be executed in the Internet browser.
 3. Proceed as follows if the “Default Level” button is available for selection:
 4. Select the “Local Intranet” icon and click the “Sites...” button.
 5. In the next window, click the “Advanced...” button and enter in the “Add this Web site to the zone:” field:
fritz.box
Click “Add”.
 6. Disable the “Require server verification (https:) for all sites in this zone” option and click “Close”.
-

Checking the Security Software

The user interface cannot be displayed in the web browser.

Possible Cause

Security software is blocking access to the user interface.

Remedy

Security software like firewalls can prevent access to the user interface of the FRITZ!Box. Configure exceptions for the FRITZ!Box in all of the enabled security software.



If you would like to exit security software to test access to the FRITZ!Box, remove the DSL cable first. After testing, first start the security software before reinserting the DSL cable and connecting to the Internet!

Opening the User Interface of the FRITZ!Box

The FRITZ!Box is equipped with a fixed IP address that cannot be changed. FRITZ!Box always can be reached at this IP address. This fixed IP address is:

Fixed IP address	169.254.1.1
------------------	-------------

Proceed as follows to open the FRITZ!Box user interface using this IP address:

1. Connect the FRITZ!Box to the computer using the network cable (yellow). For more information, see the section “Connecting Computers to the LAN Port” from page 16.
2. Make sure that the computer obtains its IP address automatically. You can check this setting in the computer’s IP settings (see section “Obtaining an IP Address Automatically” from page 115).
3. Restart your computer.

4. Start your Internet browser and enter FRITZ!Box's fixed IP address:

169.254.1.1

The FRITZ!Box user interface opens



Once you have reached the FRITZ!Box user interface again, you should check the FRITZ!Box settings and correct them if necessary.

10.2 The WLAN Adapter Cannot Find FRITZ!Box

If the “FRITZ!Box Fon WLAN 7390” radio network is not found by the WLAN adapter of a computer, work through the following steps to find the source of the error and resolve it.

Enabling the WLAN Adapter

The WLAN adapter cannot find a wireless network.

Possible Cause

The WLAN adapter is not ready for operation.

Remedy

Make sure that the WLAN adapter is ready for operation. Some of the WLAN adapters installed in notebooks must be activated by flipping a switch on the notebook.



For questions on the WLAN adapter of your computer, please contact the manufacturer.

Enabling WLAN

The wireless network of the FRITZ!Box is not found by the WLAN adapter.

Possible Cause

WLAN is not enabled in the FRITZ!Box. If the “WLAN” LED on the FRITZ!Box is not lit up or is flashing, this means that WLAN is not enabled.

Remedy

Press the WLAN button on the FRITZ!Box. The “WLAN” LED begins flashing and then lights constantly. This means that the WLAN function is enabled.

Announcing the Name of the Radio Network

The WLAN Adapter cannot find the wireless network of the FRITZ!Box.

Possible Cause

The name of the wireless network of the FRITZ!Box is concealed.

Remedy

Enable the option “Name of the WLAN radio network visible” in the WLAN settings of the FRITZ!Box.

1. Connect the FRITZ!Box to a computer using a network cable, as described in the section “Connecting Computers to the LAN Port” on page 16.
2. Start a web browser.
3. Enter fritz.box in the address field.
4. Select the “WLAN / Radio Network” menu and select the “Name of the WLAN radio network visible” option.
5. Click the “Apply” button.
6. Remove the network cable and try again to establish a connection via WLAN.

Assigning Different Names to Wireless Networks in Parallel Operation

Although the FRITZ!Box you are using provides two wireless radio networks in different frequency bands (2.4 and 5 GHz) at the same time, only one FRITZ!Box wireless network is displayed in your WLAN control software (for instance, in Microsoft WLAN Service WZC).

Possible Cause

Your WLAN control software differentiates between wireless radio networks on the basis of the radio network name (SSID), not the frequency bands they occupy. But upon delivery your FRITZ!Box has the same SSID configured for both wireless networks.

Remedy

If you would like to select a frequency band directly (for IP-TV, for instance), you must assign different names (SSIDs) for the two available WLAN radio networks in the WLAN settings of the FRITZ!Box.

To set the radio network name in the user interface, your computer must be connected with the FRITZ!Box by network cable or wirelessly. If your computer is connected via WLAN, continue with Step 2 of the instructions below. In this case, note that the existing WLAN connection must be interrupted and then established again if you change the name of the wireless network in the frequency band currently in use.

1. Connect the FRITZ!Box to a computer using a network cable, as described in the section “Connecting Computers to the LAN Port” on page 16.
2. Start a web browser.
3. Enter fritz.box in the address field.
4. Open the “WLAN / Radio Network” menu and change the name of the wireless network in either the “2.4-GHz frequency band” or the “5-GHz frequency band” section, for instance to “FRITZ!Box Fon WLAN 7390_5GHz”.

5. Click the “Apply” button.
 6. Remove the network cable and try again to establish a wireless connection in the desired frequency band.
-

10.3 WLAN Connection Is Not Established

Comparing the Security Settings for WLAN

Make sure that the WLAN security settings registered in the FRITZ!Box agree with the security settings of the WLAN adapter.

Here is how to view the WLAN security settings of the FRITZ!Box and print them out.

1. Connect the FRITZ!Box to a computer using a network cable. Proceed as described in the section “Connecting Computers to the LAN Port” from page 16.
2. Start a web browser.
3. Enter fritz.box in the address field.
4. Select the “WLAN / Security” menu.
5. Click the “Apply” button.

A window is displayed with the WLAN security settings. Print out the page by clicking the “Print Page” button.

6. Remove the network cable and check the configuration of the WLAN adapter in the printout. Try again to establish a connection.

Testing the WLAN Connection without Security Settings

Disable the WLAN security settings to test whether a WLAN connection between the FRITZ!Box and the WLAN adapter is possible at all.

1. Connect the FRITZ!Box to a computer using a network cable. Proceed as described in the section “Connecting Computers to the LAN Port” from page 16.

2. Open the user interface in a web browser. Proceed as described in the section “Opening the User Interface” on page 28.
3. Go to the “WLAN / Security” menu and select “non-encrypted”. As a final step, click “Apply”.
4. Remove the network cable and try again to establish a connection.



This non-secured condition should be used only for testing, to find out whether a WLAN connection is possible at all.

If the attempt to connect to the WLAN using the non-encrypted connection is not successful either, check the installation of the WLAN adapter and contact the manufacturer of the WLAN adapter if necessary.

Enable WLAN encryption again after completing the tests. Follow the steps listed above and then enable the kind of encryption that was previously configured.

Installing the Current Service Pack

The WLAN connection to the FRITZ!Box cannot be established using the Microsoft WLAN Service (WZC) in Windows XP with Service Pack 2.

Possible Cause

The required Microsoft patch for WPA2 (IEEE 802.11i) may not be not installed.

Remedy

Install Service Pack 3 (SP3) for Windows XP, available as a free download from Microsoft. Then Microsoft WLAN Service will support WPA2, so that a WLAN connection can be established to the FRITZ!Box.

Changing the WLAN Connection of a FRITZ!WLAN USB Stick in FRITZ!WLAN


Using a FRITZ!WLAN USB Stick and AVM Stick & Surf technology, a computer was connected with a FRITZ!Box that can manage two wireless networks (2.4 and 5 GHz) at the same time. However, the wireless connection was not established in the desired frequency range (5 GHz, for instance), but in the alternative frequency range (2.4 GHz, for instance).

Possible Cause

Upon delivery the FRITZ!Box Fon WLAN 7390 is preset to use the same wireless network name (SSID) and network key for both wireless networks. The FRITZ!WLAN USB Stick then always connects with the first wireless network that matches the security settings. If you have assigned different SSIDs to the two wireless networks in your FRITZ!Box, WLAN connections will be always be established via Stick & Surf in the 2.4-GHz frequency range.

Remedy

Proceed as follows to set the desired wireless network manually:

1. Open the control software of your FRITZ!WLAN USB Stick by double-clicking the program icon  in the notification area of the taskbar.
2. Click the “Find” button, select the desired wireless network from the list of accessible remote sites and then click “Apply”.
3. In the “Remote Site” window, enter the settings of the wireless network and confirm your entries with “OK”.

The desired WLAN connection will be established.

Ruling Out Interference Caused by Other Wireless Networks

If there are other devices in the immediate vicinity of your FRITZ!Box that use the same frequency band, simultaneous use of frequencies can result in mutual interference (for example, fluctuations or interrupted connections). Disruptions can be caused by other WLAN access points, but also by devices like baby monitors, game consoles, garage door openers, Bluetooth devices, or wireless AV bridges, which also use the 2.4-GHz frequency band. In this case, please test a different radio channel for your FRITZ!Box.

Alternatively, you can set the radio channel to “Auto”. This enables the Autochannel function, so that the FRITZ!Box searches for the best WLAN channel itself.

For applications that rely on a steady, high throughput rate (“streaming”), you should use the 5-GHz frequency band. This radio band provides more channels and is subject to significantly less external interference.

To set the radio channel in the user interface, your computer must be connected with the FRITZ!Box by network cable or wirelessly. If your computer is connected via WLAN, continue with Step 2 of the instructions below. In this case, note that the existing WLAN connection must be interrupted and then established again if you change the radio channel in the frequency band currently in use. If your WLAN adapter can also work in both the 2.4-GHz and 5-GHz frequency bands, you can skip this step by establishing a wireless network between the computer and the FRITZ!Box in the other frequency band before changing this setting.

1. Connect the FRITZ!Box to a computer using a network cable. Proceed as described in the section “Connecting Computers to the LAN Port” on page 16.
2. Start a web browser.
3. Enter fritz.box in the address field.

4. Enable the expert settings of the FRITZ!Box in the “System / Expert Mode” menu. Confirm by clicking “Apply”.
5. Select the “WLAN / Radio Channel” menu and then choose the frequency band whose channel settings you would like to change.
6. Select a different radio channel from the “Adjust radio channel settings” list.
7. Click the “Apply” button.
8. Remove the network cable and check whether interference continues to occur.

Avoiding WLAN Channels with DFS

The FRITZ!Box loses the WLAN connection in the 5-GHz frequency band for no apparent reason.

Possible Cause

In the 5-GHz frequency area the access point is programmed to change the channel whenever a radar source transmits on the same channel (Dynamic Frequency Selection, DFS).

Remedy

A forced channel change can be avoided by selecting in the FRITZ!Box a channel for the 5-GHz frequency band that does not use DFS (channels 36, 40, 44, 48).

10.4 Obtaining an IP Address Automatically

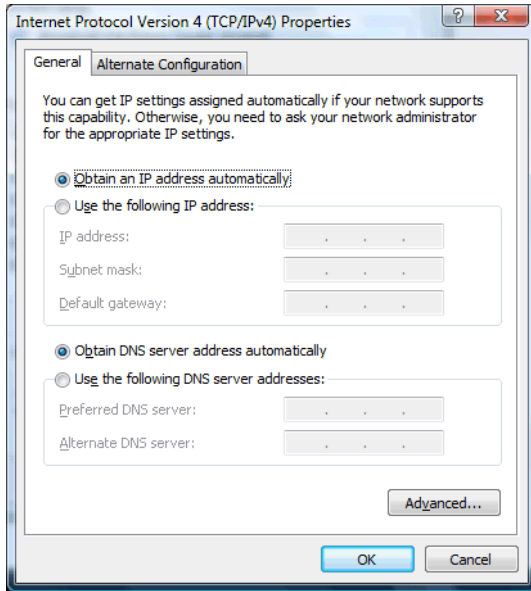
The FRITZ!Box has its own DHCP server, which assigns IP addresses to the connected computers. The connected computers must be configured such that they can receive their IP addresses automatically. The steps for checking and adjusting this option differ among the operating systems. See the relevant section for your operating system.



If FRITZ!Box is operated in a network, no other DHCP server may be activated in this network.

Obtaining an IP Address Automatically in Windows 7

1. Click the “Start” button in the task bar and select the “Control Panel / Network and Internet”.
2. Under “Network and Sharing Center”, click on “View network status and tasks”.
3. From the left column, select the “Change adapter settings” command.
4. Select the LAN connection between your computer and the FRITZ!Box. Click the right mouse button and select “Properties”.
5. Under “This connection uses the following items”, select the “Internet Protocol Version 4 (TCP/IPv4)” entry and click “Properties”.
6. On the “General” tab, enable the options “Obtain an IP address automatically” and “Obtain DNS server address automatically”.



Properties of the Internet protocol (TCP/IP)

7. Confirm your selection by clicking “OK”.

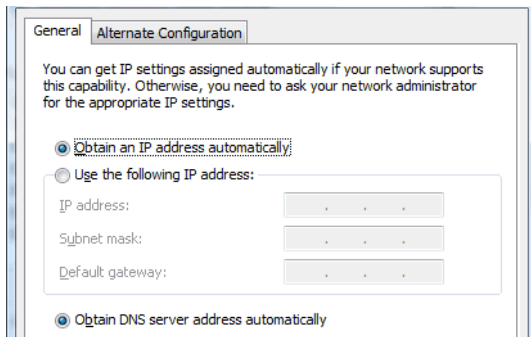
Repeat steps 5 through 7 for the “Internet Protocol Version 6 (TCP/IPv6)” as well.

The computer now receives an IP address from the FRITZ!Box.

Obtaining an IP Address Automatically in Windows Vista

1. Click the “Start” button in the task bar and select the “Control Panel / Network and Sharing Center”.
2. From the “Tasks”, select “Manage network connections”.
3. In the “LAN or High-Speed Internet” area, select the LAN connection between your computer and the FRITZ!Box. Click the right mouse button and select “Properties”.

4. If the “User Account Control” window is displayed, click “Continue” in this window.
5. Under “This connection uses the following items”, select the “Internet Protocol Version 4 (TCP/IPv4)” entry and click “Properties”.
6. On the “General” tab, enable the options “Obtain an IP address automatically” and “Obtain DNS server address automatically”.



Properties of the Internet protocol (TCP/IP)

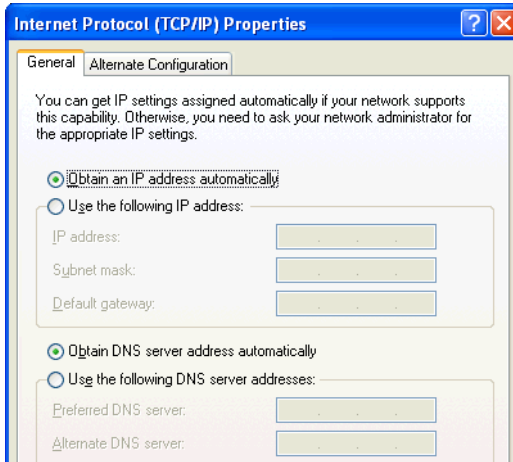
7. Confirm your selection by clicking “OK”.
If necessary, repeat steps 5 through 7 for the “Internet Protocol Version 6 (TCP/IPv6)” as well.

The computer now receives an IP address from the FRITZ!Box.

Obtaining an IP Address Automatically in Windows XP

1. Go to “start / Control Panel / Network and Internet Connections / Network Connections” and double-click the LAN connection icon of the network adapter connected to the FRITZ!Box.
2. Click the “Properties” button.
3. Select “Internet Protocol (TCP/IP)” in the list of items used in this network connection and click “Properties”.

4. On the “General” tab, enable the options “Obtain an IP address automatically” and “Obtain DNS server address automatically”.



Properties of the Internet protocol (TCP/IP)

5. Confirm your selection by clicking “OK”.

The computer now receives an IP address from the FRITZ!Box.

Obtaining an IP Address Automatically in Mac OS X

1. Select the “System Preferences” in the Apple menu.
2. In the “System Preferences” window, click the “Network” icon.
3. In the “Network” window, select the “Built-in Ethernet” entry from the “Show:” drop-down menu.
4. Switch to the “TCP/IP” settings page and select the “Using DHCP:” option from the “Configure IPv4” drop-down menu.
5. Click “Apply Now”.

The computer now receives an IP address from the FRITZ!Box.

Obtaining an IP Address Automatically in Linux

For comprehensive information and tips on the topic of network settings in Linux, see, for example:

<http://www.tldp.org/HOWTO/NET3-4-HOWTO-5.html>

11 Removing Removing Software and Program Entries

This chapter describes how to remove the FRITZ!Box from the computer and uninstall the corresponding software.

11.1 Disconnecting the FRITZ!Box from the Computer

LAN Port If the computer is connected to one of the LAN ports on the FRITZ!Box, simply remove the network cable.

If the computer is connected to the FRITZ!Box via a network hub or switch, remove the network cable between the FRITZ!Box and the network hub or switch.

WLAN If the computer is connected to the FRITZ!Box wirelessly via WLAN, deactivate the WLAN connection to the FRITZ!Box in the software of the WLAN adapter or the WLAN module.

11.2 Removing the Printer Port

The AVM FRITZ!Box USB printer port is removed using the Control Panel of the Windows operating system.

Removing the Printer Port in Windows 7

1. Open “Start / Control Panel / Programs”.
2. Under “Programs and Features”, click “Uninstall a program”.
3. Select the “AVM FRITZ!Box Printer Port” entry from the list.
4. Click the “Uninstall/Change” button above the list.

The printer port is uninstalled.

Removing the Printer Port in Windows Vista

1. Open “Start / Settings / Control Panel / Programs and Functions”.
2. Select the “AVM FRITZ!Box USB Printer Port” entry from the list.

3. Click the “Uninstall/Change” button.
 4. Confirm the next query by clicking “Continue”.
- This concludes the uninstallation of the printer port.

Removing the Printer Port in Windows XP

1. Open “start / Control Panel / Add or Remove Programs”. Make sure that the “Change or Remove Programs” button is selected in the column at left.
2. Select the “AVM FRITZ!Box USB Printer Port“ entry from the list of “Currently installed programs”.
3. Click the “Change/Remove” button.

This concludes the uninstallation of the printer port.

This concludes the uninstallation of the program group.

II PRODUCT DETAILS AND USEFUL INFORMATION

1 Product Details

FRITZ!Box Fon WLAN 7390

This chapter provides you with product details on FRITZ!Box Fon WLAN 7390. You receive information on cables and adapters, technical data and further details.

1.1 Cable

See the information in the following section on the individual cables and adapters on the FRITZ!Box Fon WLAN 7390.

DSL/Telephone Cable



Your FRITZ!Box Fon WLAN 7390 package may include only the DSL cable (see page 122). For a description of the exact contents of your FRITZ!Box package, see the cardboard box in which the FRITZ!Box was delivered.

The DSL/telephone cable is a special combined cable developed by AVM to connect the FRITZ!Box Fon WLAN 7390 to the DSL splitter and the ISDN NT or analog telephone line.

If you need a longer cable, you can extend one or multiple ends of the combined cable using RJ45 double couplings. Which ends of the cable you extend depends on the spatial conditions at your location.

You will need the following components to extend the length of one or more ends of your DSL/telephone cable:

- 1 standard network cable
- 1 standard RJ45 CAT5 double coupling

Both components are available from specialized vendors.

AVM recommends that the standard DSL/telephone cable be extended to no more than 10 meters.



Remember that the quality of the line may decrease as the distance from the central switching station increases.

Network Cable



Additional network cable is required if you would like to use all of the FRITZ!Box Fon WLAN 7390 network ports.



The FRITZ!Box Fon WLAN 7390 network cable (yellow) is a standard category 5 (Cat5) Ethernet cable. If you need a replacement cable, a longer cable or an extension, please use a standard STP-type (Shielded Twisted Pair) Ethernet cable of category 5 or 5e (Cat5 or Cat5e). To extend the cable you will need a shielded RJ45 double coupling (Cat5 or Cat5e) with a 1:1 pin assignment. You can use both straight cables and crosslink cables. All components are available from specialized vendors.

When components of a smaller category are used, reduced transmission rates may result.

AVM recommends using a network cable no more than 100 meters long.

1.2 LEDs

Five LEDs are built into the top of the FRITZ!Box Fon WLAN 7390, which flash or light up to display various connection statuses.

LED	Condition	Meaning
Power/DSL	on	<ul style="list-style-type: none"> FRITZ!Box on standby the device has electrical power and the DSL line is ready for operation
	flashing	<ul style="list-style-type: none"> the device has electrical power the connection to DSL is being established or has been interrupted
 Internet	on	a telephone connection to the Internet is active
	flashing	there are messages in your mailbox (this function must be supported by your telephony carrier)
 Fixed Line	on	a telephone connection via the telephone line (ISDN/analog) is active
	flashing	there are messages in your mailbox (this function must be supported by your telephony carrier)
WLAN	on	WLAN function is enabled.
	flashing	<ul style="list-style-type: none"> enabling or disabling WLAN function adopting the WLAN settings performing WPS WPS procedure aborted: More than two WLAN devices are performing WPS at the same time. Repeat the connection routine.
Info	on	<ul style="list-style-type: none"> a telephone connection between two Internet telephony subscribers is active; the call is free of charge (this function must be supported by your Internet telephony provider) signals an event specified by the user Stick & Surf procedure concluded
	flashing	<ul style="list-style-type: none"> updating the firmware specified value for online meter reached signals an event specified by the user Stick & Surf procedure in progress
	flashes red	Error: Open the FRITZ!Box user interface and follow the instructions on the “Overview” page

- “Info” LED Here you can define what additional information should be displayed on the “Info” LED. For details, see the “System / “Info” Display” section of the user interface of your FRITZ!Box.

1.3 WLAN Button

The FRITZ!Box is equipped with a WLAN button.

The button has two functions:

- enabling/disabling WLAN
- establishing a WLAN Connection with the WPS method (see “WPS (Wi-Fi Protected Setup)” from page 148)

If you hold the button down longer than six seconds, this function will be executed. For this to work, your WLAN adapter must support the WPS method.

1.4 DECT Button

The FRITZ!Box is equipped with a DECT button. The DECT switch has two functions:

- Ring to search for misplaced handsets (paging call)

If you press the DECT button once briefly, the handset will ring.

- Start the login procedure to register handsets

How to register a DECT handset is explained in the section “DECT Function” from page 48.

1.5 Technical Specifications

Ports and Interfaces

- VDSL2/telephone port
 - VDSL modem in accordance with ITU standard G.993.2 Annex A and B
 - Telephone port for connecting to the analog network or ISDN
- DSL/telephone port
 - DSL modem in accordance with standard ITU G.992.1 Annex A and B (ADSL), ITU G.992.3 Annex A and B (ADSL2), ITU G.992.5 Annex A and B (ADSL2+)
 - Telephone port for connecting to the analog network or ISDN
- two a/b ports for connecting two extensions via RJ11 sockets
- DECT base station
- two LAN ports via RJ45 sockets (standard Ethernet, 10/100/1000 base-T)
- two USB host controllers (USB version 2.0)

- WLAN Access Point with support for wireless networks
 - IEEE 802.11a – 54 Mbit/s
 - IEEE 802.11b – 11 Mbit/s
 - IEEE 802.11g – 54 Mbit/s
 - IEEE 802.11n – 300 Mbit/s

Router Function

- VDSL/ADSL router
- DHCP server
- Firewall with IP masquerading/NAT

User Interface and Display

- Settings and status messages via a web browser on a connected computer
- Five LEDs indicate the condition of the device

Physical Specifications

- Dimensions (w x h x d) approx. 226 x 160 x 47 mm
- Supply voltage: 230 V / 50 Hz
- Maximum power consumption: 22 W
- Average power consumption: 8 W – 11 W
- Firmware can be updated
- Conform to CE standards
- Ambient conditions
 - Operating temperature: 0°C – +40°C
 - Storage temperature: -20°C – +70°C
 - Relative humidity (operation): 10 % – 90 %
 - Relative humidity (idle): 5 % – 95 %

1.6 Declaration of CE Conformity

AVM declares herewith that the device is compliant with the basic requirements and the relevant rules in directives 2014/53/EU, 2009/125/EC and 2011/65/EU.

The declaration of CE conformity is available at <http://en.avm.de/ce>.

1.7 Manufacturer's Warranty

We offer a manufacturer's warranty of 2 years for this original product. The warranty period begins with the purchase date from the first end user. Compliance with the warranty period can be proven by submission of the original invoice or comparable documents. This warranty does not restrict your warranty rights based on the contract of sale or other statutory rights.

We will remove defects to the product which are demonstrably due to faults in materials or manufacturing. Our warranty does not cover defects which occur due to incorrect installation, improper use, non-observance of instructions in the user manual, normal wear and tear or defects in the environment of the system (third-party hardware or software). We may, at our discretion, repair or replace the defective product. Claims other than the right to the removal of defects which is mentioned in these terms of warranty are not constituted.

We guarantee that the software conforms with general specifications, not, however, that the software meets your individual requirements. Delivery costs will not be reimbursed. Products which have been replaced revert to our ownership. Claims recognized under warranty entail neither an extension or recommencement of the warranty period. If we reject a warranty claim, this claim lapses no later than six months after being rejected by us.

This warranty shall be governed by German substantive law, to the exclusion of the United Nations Convention on Contracts for the International Sale of Goods (CISG).

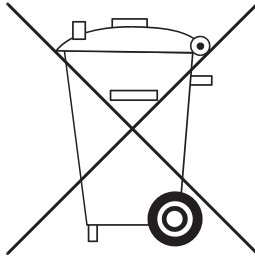
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AVM Computersysteme
Vertriebs GmbH
Alt-Moabit 95
D 10559 Berlin
Germany

AVM in the Internet: www.avm.de/en

1.8 Disposal

Electrical and electronic equipment must be disposed of separately from household waste.



Labeling of electrical and electronic scrap

In accordance with European regulations and the Electrical and Electronic Equipment Act (ElektroG), the FRITZ!Box Fon WLAN 7390, as well as all devices and electronic components contained in the FRITZ!Box Fon WLAN 7390 package, may not be disposed with household waste. Please bring these to your local collection points for disposal.

2 More about WLAN

WLAN (Wireless Local Area Network) is a radio technology that allows networks and access to the Internet to be provided without cable connections. This allows multiple users to share one wireless Internet connection.

2.1 Standards

The WLAN standards IEEE 802.11a, IEEE 802.11b, IEEE 802.11g, IEEE 802.11n and IEEE 802.11i were developed by the Institute of Electrical and Electronic Engineers (IEEE).

The standards IEEE 802.11a, IEEE 802.11b, IEEE 802.11g and IEEE 802.11n define the transmission rate within a wireless LAN. The IEEE 802.11i standard is a security standard.

Standards for the Throughput Rate

Data Throughput

The FRITZ!Box supports your choice of the standards IEEE 802.11a, IEEE 802.11b, IEEE 802.11g and IEEE 802.11n. WLAN adapters based on one or more of the standards listed can be used for WLAN connections with the FRITZ!Box.

The standards are intended for different frequency bands.

Standard	Frequency Band	Gross Data Throughput up to	Net Data Throughput up to
802.11a	5 GHz	54 Mbit/s	25 Mbit/s
802.11b	2.4 GHz	11 Mbit/s	5 Mbit/s
802.11g	2.4 GHz	54 Mbit/s	25 Mbit/s
802.11n	2.4 / 5 GHz	300 Mbit/s	100 Mbit/s

The throughputs listed differentiate between gross and net transmission rates. The net speed describes the transmission rate of the user data.

- Range** The range within a WLAN is highly dependent on the following factors:
- the WLAN adapter used
 - the structural conditions
 - the amount of radio traffic on the same frequency band. Other wireless networks may be active, but also microwave ovens, baby monitors, game consoles, garage door openers, audio-video bridges, or Bluetooth transmitters (for instance, in mobile telephones).

**FRITZ!WLAN
Repeater N/G**

To increase the WLAN range, especially under difficult or strongly-shielding structural conditions, the FRITZ!WLAN Repeater N/G, available as an accessory from AVM, can be used in combination with the FRITZ!Box. It is especially easy to install and can be operated at any 230-V power outlet.

Everything you need to know about the FRITZ!WLAN Repeater N/G can be found at the web address:

www.avm.de/en/Produkte/FRITZ_WLAN/FRITZ_WLAN_Repeater_N_G

IEEE 802.11a

Because this standard works exclusively in the seldom used 5-GHz range, it offers the opportunity to transmit data relatively free of interference from external influences. WLAN adapters that support 802.11a are much less common than devices that work in accordance with the 802.11b/g standard.

IEEE 802.11b

With a maximum throughput rate of 11 Mbit/s, this is the oldest standard for radio networks. Older WLAN adapters of the first generation can communicate with the FRITZ!Box using 802.11b. However, if the WLAN adapter supports newer standards such as 802.11g, the latest standard should be used.

IEEE 802.11g

This is currently the most common WLAN standard. It communicates with a maximum of 54 Mbit/s gross in the 2.4-GHz frequency range (ISM) and guarantees broad compatibility with many WLAN devices.

However, due to heavy use of the 2.4-GHz range, interference is more common than in the less-used 5-GHz range.

IEEE 802.11n

This standard allows for high throughput rates and ranges. The FRITZ!Box supports 802.11n in the 2.4-GHz frequency band, or, if desired, also in the 5-GHz frequency band. Modulation processes and antenna techniques like MIMO (Multiple Input, Multiple Output) use the entire frequency band available more effectively than the older standards.



The use of the 802.11n standard—and thus the availability of higher throughput rates—is possible only if the WLAN connection is secured using the WPA2 security mechanism (AES-CCMP).

Thanks to compatibility with the 802.11g standard, you can also continue to use older WLAN adapters.

Setting the Right Standard in the FRITZ!Box

The throughput rate that can be achieved in your WLAN radio network depends on the WLAN standards used by the integrated WLAN adapters. These WLAN standards must also be set in the FRITZ!Box. Proceed as follows to check which WLAN standards are set and change them if needed:

1. Start a web browser.
2. Open the FRITZ!Box user interface by entering fritz.box.
3. Make sure that the expert mode is enabled in the “System / Expert Mode” menu.
4. Open “WLAN / Radio Channel”.
5. Enable the “Adjust radio channel settings” option.
6. Select the desired standard in the “WLAN Standard” list.



Note the following for the configuration of this setting:

- Your FRITZ!Box Fon WLAN 7390 can make two WLAN networks available simultaneously for data transmission. One of the WLAN radio networks works in the 2.4-GHz frequency band, and the other in the 5-GHz frequency band. This means the FRITZ!Box can be implemented as an especially flexible access point for the various WLAN adapters and applications in your network.
- Set the standards of the two WLAN radio networks in the FRITZ!Box such that they are compatible with all of the WLAN adapters used in the wireless network.

Make a note of which standards the WLAN adapters in your network are compatible with and then adjust the FRITZ!Box settings according to the following information:

- Your radio network integrates only WLAN adapters that are compatible with one or both of the following standards:
 - 802.11n
 - 802.11g

In this case set the WLAN standard for the 2.4-GHz frequency band to:

“802.11n+g”.

If the 5-GHz frequency band is not used, in order to reduce energy consumption you can disable it in the FRITZ!Box without losing WLAN connections.

- Your radio network integrates only WLAN adapters that are compatible with one or both of the following standards:
 - 802.11b

- 802.11g

In this case set the WLAN standard for the 2.4-GHz frequency band to:

“802.11b+g”.

If the 5-GHz frequency band is not used, in order to reduce energy consumption you can disable it in the FRITZ!Box without losing WLAN connections.

- Your radio network integrates only WLAN adapters that are compatible with one or both of the following standards:
 - 802.11n
 - 802.11g
 - 802.11b

In this case set the WLAN standard for the 2.4-GHz frequency band to:

“802.11n+g+b”.

If the 5-GHz frequency band is not used, in order to reduce energy consumption you can disable it in the FRITZ!Box without losing WLAN connections.

- Your radio network integrates only WLAN adapters that are compatible with one or both of the following standards:
 - 802.11n
 - 802.11a

As long as your WLAN adapters support the full N standard, to reduce energy consumption you can disable the 2.4-GHz frequency band in the FRITZ!Box without losing any WLAN connections. Then you will work only in the 5-GHz frequency band, for which no additional settings have to be configured in the FRITZ!Box.

The Standard for Security

IEEE 802.11i

The WPA2 security mechanism is defined in the IEEE 802.11i standard. WPA2 is an extension of the familiar security mechanism WPA (Wi-Fi Protected Access).

The main feature of the extension of WPA to WPA2 is the AES-CCMP encryption process.

Mechanism	Encryption
WPA	TKIP (Temporary Key Integrity Protocol)
WPA2	TKIP AES-CCMP based on the extremely secure AES (Advanced Encryption Standard) procedure. CCM (Counter with CBC-MAC) defines how the AES procedure is applied to WLAN packets.

FRITZ!Box supports the AES encryption procedure as part of the WPA2 mechanism, and the TKIP encryption procedure as part of the WPA mechanism. This means that the FRITZ!Box can be used in combination with any WLAN adapters that also support WPA2 with AES or WPA with TKIP.

2.2 Security

Security is of utmost importance within radio networks.



Radio signals can also be received outside of office or residential spaces and abused for criminal purposes.

Therefore it is important that no unauthorized users can register in a WLAN to use its Internet access or shared network resources.

FRITZ!Box includes settings on various levels that contribute to the security of your WLAN and thus to the security of your computers.

Encryption

The most important security setting is encryption. FRITZ!Box supports the security mechanisms WEP (Wired Equivalent Privacy), WPA (Wi-Fi Protected Access) and WPA2 as follows:

- As part of the WEP mechanism a static key is determined to serve for the encryption of the user data.

Enter the key in the WLAN Security settings of the FRITZ!Box. All of the WLAN adapters in your wireless network must also use this key.
- The WPA and WPA2 mechanisms provide for authentication while the connection is being established. For this a WPA password must be defined.

When WPA is selected, the TKIP encryption method is used to encrypt the user data. In WPA2 the AES-CCMP encryption method is used.

The encryption method you configure here must also be supported by your WLAN adapter.

The user data are encrypted using an automatically generated key. This key is regenerated at regular intervals.

The WPA password used may be 8 to 63 characters in length. For increased security, however, the password should be at least 20 characters long. Use numerals, letters and special characters and combine capitals and lower-case letters.

Default Setting

In the FRITZ!Box a method combining WPA + WPA2 encryption with the TKIP/AES-CCMP encryption method is pre-configured. This setting allows you to use WLAN adapters that support WPA (TKIP) or WPA2 (AES-CCMP) or both methods.



It is advisable to change the preconfigured WLAN key as soon as possible. Changes to the settings can be configured on the FRITZ!Box user interface.

Recommendation If your WLAN adapter supports an encryption method that is more secure than the one preconfigured in the FRITZ!Box, you should select the more secure encryption method in your FRITZ!Box.

To configure the best security settings possible with FRITZ!Box and your WLAN adapter, please note the following recommendations:

- If your WLAN adapter supports WPA2 in accordance with the 802.11i standard:
 - Enable WPA encryption.
 - Select the WPA mode “WPA2 (CCMP)” or “WPA+WPA2”.
 - Replace the WPA network key with a new, unique value.
- If your WLAN adapter supports the WPA mechanism, but not the WPA2 mechanism:
 - Enable WPA encryption.
 - Select the WPA mode “WPA (TKIP)” or “WPA+WPA2”.
 - Replace the WPA network key with a new, unique value.
- If your WLAN adapter supports neither the WPA nor the WPA2 mechanism:
 - Enable WEP encryption.
 - Replace the WLAN key with a new, unique value.



We strongly recommend the use of a WLAN adapter that supports WPA or WPA2 (for instance, the FRITZ!WLAN USB Stick N). WEP is out of date and data encrypted with WEP can be deciphered within minutes.

Wireless Network Name (SSID)

Your FRITZ!Box provides two wireless networks in different frequency bands (2.4 and 5 GHz) at the same time. Upon delivery, the name of both wireless networks (SSIDs) are set to “FRITZ!Box Fon WLAN 7390”.



Because some WLAN control software, like that provided by Microsoft for Windows, cannot differentiate between the frequency band used, it will show only one of the wireless networks with this SSID as an available remote partner. If you run into difficulties establishing WLAN connections, you should assign unique names to the two wireless networks.

2.3 Frequency Ranges

WLAN uses the frequency ranges at 2.4 GHz and 5 GHz as its transmission range.

With the FRITZ!Box you can establish WLAN connections in either the 2.4-GHz or the 5-GHz frequency range.

2.4-GHz Frequency Band

In the 2.4-GHz frequency band WLAN works in the same range as Bluetooth, microwave devices and various other devices like radio-controlled toys, garage-door openers and video bridges. This means that interference may occur within WLANs operated in the vicinity of such devices. Generally this has adverse effects on the transmission rate, including aborted connections.

In the 2.4-GHz frequency range the European regulation authorities have designated 13 channels for WLAN. A channel can have a bandwidth of 20 MHz (throughput up to 130 Mbit/s) or 40 MHz (throughput of up to 300 Mbit/s).

Channels located directly next to each other in the 2.4-GHz band may overlap and result in mutual interference. For instance, if several WLANs are operated close to each other in the 2.4-GHz frequency range with a bandwidth of 20 MHz, a distance of at least five channels should be left empty between each two channels used. This means that

if channel 1 is selected for one WLAN, the channels 6 through 13 can be selected for a second WLAN. This maintains the minimum distance between channels.

WLAN Autochannel

With the WLAN Autochannel function, the FRITZ!Box automatically searches for the channel subject to the least interference. This process takes into consideration interference from radio networks in the vicinity (WLAN access points) and potential sources of interference (for instance video bridges, baby monitors, microwave ovens). Should problems with interference persist despite this function, try to identify the source of interference and switch it off manually.

Additional tips on interference in the WLAN radio network are presented in the section “Ruling Out Interference Caused by Other Wireless Networks” from page 113.

5-GHz Frequency Band

The FRITZ!Box can operate in the 5-GHz frequency band as an alternative. This frequency range is used much less frequently than the most common 2.4-GHz frequency range.

In the 5-GHz frequency band, your FRITZ!Box occasionally may change channels automatically due to DFS (Dynamic Frequency Selection) if a “higher-privileged user” simultaneously claims the channel selected by the FRITZ!Box. This can happen especially when military or civilian radar is used in the immediate vicinity. For more information, see the section “Ruling Out Interference Caused by Other Wireless Networks” on page 113.

A prerequisite for use of the 5-GHz frequency band is that all WLAN devices in the network support this frequency range in accordance with the IEEE 802.11a or IEEE 802.11n standard.

2.4 GHz or 5 GHz

The FRITZ!Box works in the wireless network either in the 2.4-GHz range or in the 5-GHz range. Both frequency ranges can be used simultaneously for WLAN connections. This means you always have the optimum data connection at your disposal:

For applications that rely on a steady, high throughput rate (“streaming”), you should use the 5-GHz frequency band. This radio band provides more channels, and these channels do not overlap, as well as experiencing significantly less external interference.

For applications that require a low to normal throughput rate (for instance, reading and writing e-mail), use the 2.4-GHz frequency band.

Bandwidth

In both frequency ranges you can select between channel bandwidths of 20 MHz or 40 MHz (exception: channel 140 in the 5-GHz frequency band). The FRITZ!Box initially attempts to select a channel with 40 MHz bandwidth (throughput up to 300 Mbit/s). If this is not possible due to interference or channels already being used by other WLANs in the vicinity, the FRITZ!Box automatically switches temporarily to a channel with 20 MHz bandwidth. Greater bandwidth provides for higher data throughput:

Bandwidth (MHz)	Maximum Data Throughput (Mbit/s)
20	130
40	300

Increasing bandwidths also increases the probability of interference by wireless networks in the vicinity. Large bandwidths reduce the frequency range available to other wireless networks in the vicinity.

Allocation of the WLAN Channels in the 2.4-GHz Range

Channel	Frequency (GHz)	Channel	Frequency (GHz)
1	2.412	8	2.447
2	2.417	9	2.452
3	2.422	10	2.457
4	2.427	11	2.462
5	2.432	12	2.467
6	2.437	13	2.472
7	2.442		

Allocation of the WLAN Channels in the 5-GHz Range

Channel	Frequency (GHz)	Channel	Frequency (GHz)
36	5.18	108	5.54
40	5.20	112	5.56
44	5.22	116	5.58
48	5.24	120	5.60
52	5.26	124	5.62
56	5.28	128	5.64
60	5.30	132	5.66
64	5.32	136	5.68
100	5.50	140	5.70 (20 MHz band-width only)
104	5.52		

2.4 Increasing the WLAN Range

The range of a WLAN radio network also always depends on external influences. The following factors have an especially strong influence on the distance over which your FRITZ!Box can establish a stable, high-throughput wireless connection:

- the WLAN adapter used
- structural conditions at your location
- the number of devices operating near the access point in the same frequency range.

You can extend the range in your wireless network yourself as needed. To do so you will need supplementary equipment not included in your FRITZ!Box package: You can either use a WLAN repeater, for instance the FRITZ!WLAN Repeater by AVM, or use an additional WLAN access point working in repeater mode to set up a wireless distribution system. Both options are described in greater detail below.

Using the FRITZ!WLAN Repeater N/G

To increase the WLAN range, especially under difficult or strongly-shielding structural conditions, the FRITZ!WLAN Repeater N/G, available as an accessory from AVM, can be used in combination with the FRITZ!Box. It supports all common WLAN standards, is especially easy to install and can be operated at any 230-V power outlet.

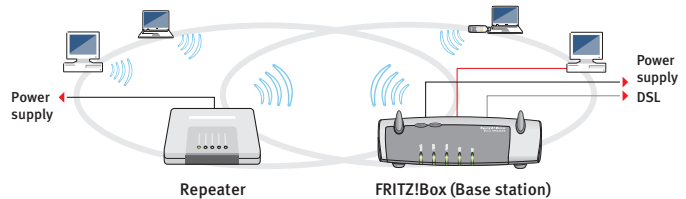
For more information on the FRITZ!WLAN Repeater N/G, go to the following web address:

www.avm.de/en/Produkte/FRITZ_WLAN/FRITZ_WLAN_Repeater_N_G

Setting up a WDS

To extend the range in your wireless network using WDS (Wireless Distribution System), you will need a WLAN access point in addition to the FRITZ!Box. One of the two WLAN access points works as the WDS base station, the

other as a WDS repeater. The WDS base station and WDS repeater are connected to each other via WLAN. The WDS base station then can use the WDS repeater to reach even computers that would be located beyond its range without the WDS repeater.



WDS: Expanding the WLAN range using a repeater

Note the following for WDS configuration:

- In order to expand the range of your wireless network, you need at least one additional WLAN access point. The wireless network of your FRITZ!Box can be expanded to a WDS (Wireless Distribution System) with up to three WLAN access points.
- All WLAN access points implemented in the WDS must support WDS and be configured for this technology.
- All WLAN access points implemented as repeaters in the WDS must be located within the radio range of the WDS base station.
- The FRITZ!Box can function as a WDS base station to establish the Internet connection for other WDS repeaters, or as a WDS repeater to expand the range of a WDS base station.
- Make sure that the WDS connections between the WDS base station and the WDS repeaters are secured using the same encryption (for instance, WPA/WPA2). Note that the WPA2 encryption method is available only when your network consists of AVM devices, since only WEP encryption has been specified for WDS connections among all manufacturers.

- Make sure that all WLAN access points in the WDS use the same radio channel.
- Every access point participating in the WDS fulfills the tasks of a WLAN access point for its given WLAN clients. This means that the WLAN clients see each WLAN access point with an individual name (SSID) and individual encryption settings.

If you use the WLAN control software provided in Windows 7, Windows Vista or by the Windows XP Service Pack 2 on your WLAN clients, you can assign the same SSID and the same encryption settings to different WLAN access points. Each client can then automatically register at the WLAN access point with the best availability.

- Make sure that each IP address is assigned only once in the wireless network.

Configuring FRITZ!Box as a Base Station

WDS Base Station

As a **WDS base station**, the FRITZ!Box establishes Internet connections for other WLAN repeaters and WLAN clients.

For instructions on how to set up the FRITZ!Box as a WDS repeater, start reading from page 146.

To set up the FRITZ!Box as a WDS base station, proceed according to the following directions:

1. Start a web browser.
2. Enter fritz.box in the address field.
The FRITZ!Box user interface opens.
3. Make sure that the expert mode is enabled in the “System / Expert Mode” menu and click “Apply”.
4. Open “WLAN / WDS” and make sure the “Autochannel!” function is not selected by following the instructions on the screen.
5. Check the checkbox in front of the “WDS enabled” option.
6. Select “Base station” as the operating mode.

7. Select from the list of “WLAN Devices” the devices that are to be used as WDS repeaters.
8. In the “Security” area, define how the WDS repeater connection should be encrypted.



Please note that the WPA2 encryption method is only available for AVM AVM devices.

9. Enter a network key.
10. Click “Apply”.

The “Repeater Settings” you require to set up the WDS repeaters are displayed.

11. We recommend printing out these settings.

This concludes the configuration of the FRITZ!Box as a WDS base station.



Register the FRITZ!Box settings you printed out in each WDS repeater operating in your wireless network.

Configuring FRITZ!Box as a Repeater

WDS Repeater

As a **WDS repeater**, the FRITZ!Box extends the range of a WDS base station in the wireless network.

For instructions on how to set up the FRITZ!Box as a WDS base station, start reading from page 145.

To set up the FRITZ!Box as a WDS repeater, proceed as directed below:

1. Start a web browser.
2. Enter fritz.box in the address field.
The FRITZ!Box user interface opens.
3. Enable the expert mode by clicking the “View: Expert Mode” tool bar entry or in the “System / Expert Mode” menu and click “Apply”.

4. Check under “WLAN / Radio Network” to make sure that the same frequency band is set as in the WDS base station. Click “Apply”.
5. Open “WLAN / WDS” and check the checkbox in front of the “WDS enabled” option.
6. Select the “Repeater” option as the operating mode.
7. Select from the “WLAN Devices” list the WLAN device that should be used as the WDS base station.
8. If the FRITZ!Box is to be operated as a repeater, you must change the settings in the area “IP Settings for Repeater Operation”.
 - **IP address:** Enter here an IP address for this FRITZ!Box that fulfills the following criteria: The IP address must be different from the IP address of the WDS base station, and must come from the IP network of the WDS base station. Keep in mind that the IP address may not come from the address range of the DHCP server of the WDS base station.
 - **Subnet mask:** Enter, for instance, the value “255.255.255.0” in this field. For more information, see the “subnet mask” entry in the glossary.
 - **Default gateway:** Enter the IP address of the WDS base station here.
 - **Primary DNS server:** Enter the IP address of the WDS base station here.
 - **Secondary DNS server:** Enter the IP address of a second DNS server here.
9. In the “Security” area define how the WDS repeater connection should be encrypted.



Please note that the WPA2 encryption method is only available for AVM devices.

10. Enter a WLAN key.

11. Click “Apply”.

The “Repeater Settings” window now displays all of the settings you need to set up the WDS base station.

Also displayed is the current IP address of the FRITZ!Box you just set up as a WDS repeater. You must enter this IP address in the web browser to open the FRITZ!Box user interface.

12. We recommend printing out these settings.

This concludes the configuration of the FRITZ!Box as a WDS repeater.



Then register the FRITZ!Box settings you printed out in the WDS base station operating in your wireless network.

2.5 WPS (Wi-Fi Protected Setup)

The FRITZ!Box supports WPS (Wi-Fi Protected Setup). With WPS you can create secure links between WLAN adapters and your FRITZ!Box. All of the necessary WLAN security settings are transferred in the process. You can use either the push-button or the PIN method.

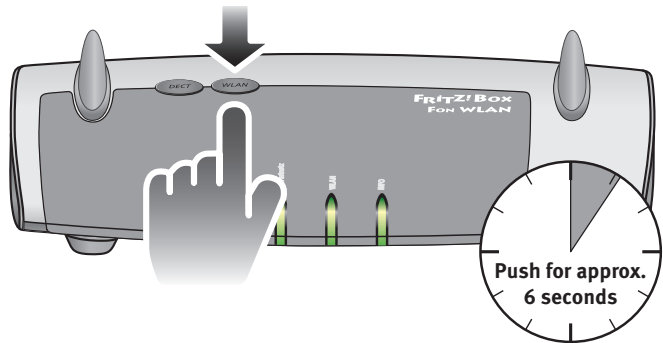


WPS can be used only in combination with WLAN adapters that also support WPS. Consult the documentation of your WLAN adapter to find out whether it supports WPS.

WPS with the Push Button Method

The push-button method (WPS PBC) can be used if your WLAN adapter is also equipped with a WPS button, or if WPS can be enabled via the control software of the WLAN adapter.

1. Press the “WLAN” button on the FRITZ!Box and hold it down for at least six seconds.



2. As soon as the “WLAN” LED begins flashing, enable the WPS function, either by pressing a WLAN button or in the device’s user interface (depending on the device). Activation must be started within two minutes.

The FRITZ!Box and the WLAN device now connect with each other automatically. The WLAN device adopts the security settings of the FRITZ!Box.

WPS with the PIN Method

If your WLAN adapter supports WPS, but does not have a button to start the push method nor any possibility to enable it in its control software, use the PIN method to establish the WLAN connection.

You can choose between two methods:

1. Start a web browser.
2. Enter fritz.box in the address field.

The FRITZ!Box user interface opens.

FRITZ!Box Specifies
the PIN

3. Open “WLAN / Security”.
4. Open the “WPS Quick Connection” settings page.
5. Select the option “PIN method (WPS-PIN), FRITZ!Box specifies the PIN”.
6. The PIN will be displayed. Enter this PIN in the control software of the WLAN adapter.
7. Click “Start WPS”.

The “WLAN” LED on the FRITZ!Box flashes slowly, indicating that the WPS procedure has begun. Now a secure WLAN connection is being established between the FRITZ!Box and the WLAN adapter.

WLAN Device
Specifies the PIN

1. Start a web browser.
2. Enter fritz.box in the address field.
The FRITZ!Box user interface opens.
3. Open “WLAN / Security”.
4. Open the “WPS Quick Connection” settings page.
5. Select the option “PIN method (WPS-PIN), the WLAN device specifies the PIN”.
6. Now start the control software of the WLAN device. The program outputs a PIN for establishing a connection.
7. Enter this PIN in the FRITZ!Box user interface.
8. Click “Start WPS”.

The WLAN LED on the FRITZ!Box flashes slowly, indicating that the WPS procedure has begun. Now a secure WLAN connection is being established between the FRITZ!Box and the WLAN adapter.

3 More about Networks

The FRITZ!Box is delivered with preconfigured network settings. According to these settings, all network devices connected with the FRITZ!Box are located in a single network.

The network settings can be changed and adapted to your conditions and needs. But you should do so only if you are well versed in networking technology.



- The Glossary explains concepts and terminology having to do with IP networks.
- The section “Network Overview” from page 151 introduces the network overview of the FRITZ!Box.
- The sections “IP Address” from page 154 and “DHCP Server” from page 155 explain when it may make sense to change the preconfigured network settings, what the effects of these changes are, and how to make the changes.
- Section “The Prioritization of Network Applications and Network Devices” from page 164 explains how you can assign priorities to network applications and network devices for accessing the Internet connection.

3.1 Network Overview

The FRITZ!Box user interface shows an overview with all of the devices and users connected with the FRITZ!Box.

The “Devices and Users” network overview is found in the menu: “Home Network / Network”.

There is an entry in the network overview for each user and each network device. The columns have the following meanings:

Symbols	The symbol in front of each name indicates whether the entry is a user or a network device. In the case of network devices the symbol also indicates whether the device is connected via a network (LAN) cable or wirelessly (via WLAN),
Name	This column displays the name under which the user or the network device is known to the FRITZ!Box. The names of network devices can be changed by clicking the button to edit the entry.
IP Address	For network devices, also displayed is the IP address with which the device is integrated into the FRITZ!Box network.
Properties	This column indicates whether port forwarding or child protection is enabled for the respective user or network device.
	<p>Button for editing the entry</p> <p>The button opens the detailed view of the entry. This view displays information about the network device, for instance on child protection or port forwarding settings. The name of the device in the FRITZ!Box can be changed here.</p>
	<p>Button for deleting the entry</p> <p>Users or network devices that do not have an active connection to the FRITZ!Box can be deleted from the network overview by clicking this button.</p>

Always assign the same IP address

The detailed view for network devices includes the setting “Always assign this network device the same IP address”.

When this setting is enabled for a network device, the DHCP server of the FRITZ!Box will always assign the same IP address to this device each time the connection is established.

Start Computer: Wake on LAN

The detailed view for network devices that are connected with the FRITZ!Box via a network (LAN) port includes the “Start Computer” button. Use this button to start computers that support Wake On LAN.

With the Wake on LAN function you can start computers in your FRITZ!Box via the Internet. For instance, you can access a computer at any time using remote maintenance software, without wasting electricity by keeping the computer switched on permanently.

3.2 IP Settings

The IP settings of the FRITZ!Box are preset upon delivery with the following values:

Factory Settings	
All computers are located in the same IP network	enabled
IP address	192.168.178.1
Subnet mask	255.255.255.0
DHCP server	enabled

The IP address and the corresponding subnet mask yield the following values:

Network address of the subnet	192.168.178.0
Entire IP address range for the computers	192.168.178.2 - 192.168.178.254

The following addresses cannot be assigned because they are reserved for certain purposes:

192.168.178.1	is used by the FRITZ!Box itself
192.168.178.254	reserved for internal use
192.168.178.255	broadcast address used to send messages into the network

3.3 UPnP Settings

The Universal Plug-and-Play (UPnP) service included in your FRITZ!Box provides status information about the FRITZ!Box to all connected computers. Programs with UPnP support on these computers can receive this information and use them to display the status of the FRITZ!Box (e.g., DSL synchronization, connection status, data transmission). UPnP service thus allows you to monitor your FRITZ!Box from a connected computer.

3.4 IP Address

Upon delivery the FRITZ!Box is assigned the following IP address:

192.168.178.1

If you would like to change the IP address, please read through the following sections. Also note the additional information in the section “Reserved IP Addresses” on page 155.

When Does It Make Sense to Change the IP Address?

You should change the IP address of the FRITZ!Box if the following apply to your network:

- You have an existing local IP network, one subnet with several computers.
- Fixed IP addresses are registered in the network settings of the computer, and you do not want to or are not permitted to change these addresses.

- You want to connect the FRITZ!Box to the local IP network in order to make the FRITZ!Box features available to all of the computers in the IP network.

Reserved IP Addresses

The entire IP network 192.168.180.0 in the FRITZ!Box is reserved for internal purposes.

IP addresses from this network may not be assigned to the FRITZ!Box.

3.5 DHCP Server

The FRITZ!Box is equipped with its own DHCP server. The DHCP server is enabled by default in the factory settings. The following range of IP addresses is reserved for the DHCP server in the factory settings:

192.168.178.20 - 192.168.178.200

This IP address can be changed as needed.

Every time the operating system on a computer connected with FRITZ!Box is started, the DHCP server assigns it an IP address from the IP address range of the DHCP server.



Only one DHCP server may be active within any network.

Assigning the IP addresses via the DHCP server ensures that all of the computers connected with the FRITZ!Box are located in the same IP network.



The computers can receive their IP addresses from the DHCP server only if the setting “Obtain an IP address automatically” is enabled in their IP settings. For more information, see the section “Obtaining an IP Address Automatically” from page 115.

Fixed IP Addresses When the DHCP Server Is Enabled

If you would like to configure fixed IP addresses on individual computers connected with the FRITZ!Box despite the enabled DHCP server, please note the following:

- The IP addresses must be from the IP network of the FRITZ!Box.
- The IP addresses may not come from the address range of the DHCP server.
- Each IP address can be assigned only once.

Disabling the DHCP Server

You can disable the DHCP server.

To make sure that all computers remain in the same IP network as the FRITZ!Box, you must enter the IP addresses manually in the computers' network settings. First disable the option “Obtain an IP address automatically” and then enter the IP address manually in the appropriate field.

In the case of the preset IP address of the FRITZ!Box, the following IP addresses are available for assignment to the computers:

192.168.178.2 - 192.168.178.254

Each IP address can be assigned only once.

3.6 Subnetwork

By default the option “All computers are located in the same IP network” is enabled in the FRITZ!Box.

If the factory settings were not changed, this setting has the following effect:

The DHCP server of the FRITZ!Box assigns all of the computers connected with the FRITZ!Box an IP address from the address range of the DHCP server.

This means that all of the computers connected with the FRITZ!Box are located in the same IP network.

Disabling “All computers are located in the same IP network”

If you switch off the setting “All computers are located in the same IP network”, the interfaces of the FRITZ!Box will receive their own IP addresses.

Factory Settings

Upon delivery the interfaces of the FRITZ!Box are configured as follows:

Interface	IP Address	Subnet Mask	DHCP Server
LAN 1	192.168.178.1	255.255.255.0	enabled
LAN 2	like LAN 1	255.255.255.0	enabled
LAN 3	like LAN 1	255.255.255.0	enabled
LAN 4	like LAN 1	255.255.255.0	enabled
WLAN	192.168.182.1	255.255.255.0	enabled

Thus the following address pools are available to the DHCP server:

Interface	Address Pool of the DHCP Server at the Interface
LAN 1	192.168.178.20 - 192.168.178.200
LAN 2	like LAN 1
LAN 3	like LAN 1
LAN 4	like LAN 1
WLAN	192.168.182.20 - 192.168.182.200

Computers connected with the FRITZ!Box via different interfaces are located in different IP networks.

Interface	Network Address of the IP Network
LAN 1	192.168.178.0
LAN 2	like LAN 1
LAN 3	like LAN 1
LAN 4	like LAN 1
WLAN	192.168.182.0

3.7 Changing the Network Settings

In order to change the network settings of the FRITZ!Box, the expert mode must be enabled in the user interface:

1. Start a web browser on your computer and enter fritz.box in the address field of the browser.
2. Click “Expert Mode” in the “System” menu, enable the setting “Show expert settings” and confirm this setting by clicking “Apply”.

Here is how to change the network settings:

1. Select the “Home Network / Network” menu.
2. Select the “Network Settings” tab.
3. Click the “IP Addresses” button.

The “IP Settings” page is opened.

4. Once all desired changes to the settings have been configured, confirm by clicking “OK” to apply them.



Please note that changes to the network settings in the FRITZ!Box may make it necessary to adjust the network settings of your computers so that you can continue to access the FRITZ!Box user interface.

4 More about Internet Telephony Voice over IP (VoIP)

Internet telephony has already been in use for years, but today it allows even private customers the convenience familiar from conventional telephony, usually at significantly lower prices.

Internet telephony has also made it considerably more convenient to use applications like conference calls and answering machines in networks. Further advantages include global availability at a single telephone number, and the development of new standards for security and voice quality.

Data Transfer

All kinds of data transmission in the Internet use the Internet Protocol (IP). IP is packet-oriented. This means that the data are broken down into data packets for transmission and IP takes care of the transport of the individual data packets through the Internet. Language is also transmitted in the Internet in this manner.

In opposition to this, fixed-line telephony transmits data in a line-oriented manner. In this case data are transmitted in a coherent data stream.

4.1 Telephony Scenarios

If you have configured both a fixed-line number and an Internet telephone number in FRITZ!Box, you can make calls in all directions:

- from the fixed-line network into the fixed-line network
- from the Internet into the fixed-line network
- from the Internet into the Internet

and receive calls from all directions as well.

5 More about: Virtual Private Network (VPN)

Via VPN a secure remote access to the network of the FRITZ!Box can be established.

- The VPN solution for the FRITZ!Box is based on the IPSec standard.
- Computer-LAN coupling and LAN-LAN coupling: VPN connections can be set up for individual remote computers or even for remote networks.
- Eight simultaneous active VPN connections are supported.
- The configuration files for the VPN connections are created using a separate program. The program is provided free of charge and can be downloaded from the AVM web site.
- A free VPN client for individual computers can also be downloaded from the AVM web site.

The chapter is a short introduction to the topic of VPN. The AVM web site offers an English-language Service Portal which presents comprehensive information on VPN in general and in connection with the FRITZ!Box. Visit this portal to obtain more detailed information.

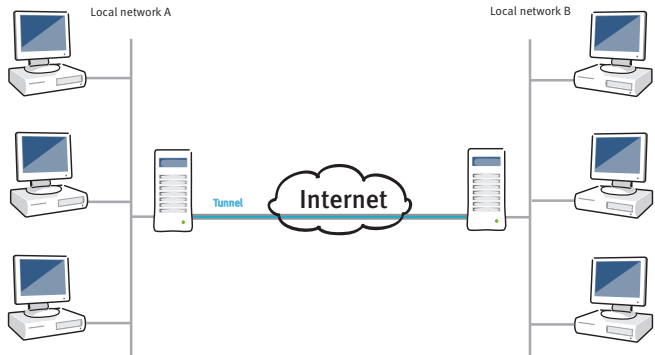
www.avm.de/en/vpn

5.1 What Is VPN?

VPN stands for Virtual Private Network. A VPN is a virtual, private network that uses the Internet as its physical base. The VPN provides for secure data transmission.

All computers registered in the network are connected with each other over the Internet so that they can exchange data. Data transmission takes place over IP, as in the local network. In a pure transmission over IP the data are not protected and thus exposed to unauthorized access by third parties.

Security in a VPN is ensured by transmitting the data encrypted via what is known as a tunnel. This excludes the possibility of unauthorized access to the data. The tunnel is the logical, virtual connection.



The terminals of the tunnels can be individual computers or entire networks. For instance, telecommuters or field staff can connect to the company network via VPN. The local network at a branch office can also be connected to the local network of company headquarters via VPN. Both of the locations securely connected over VPN must have an Internet connection at their disposal.

5.2 Security through a VPN

A VPN fulfills the following security requirements for data transmission:

- Authenticity
- Confidentiality
- Integrity

Authenticity Authenticity ensures that no unauthorized users can access the local network via VPN.

It also makes sure that incoming data actually come from the registered party and not from another source.

Confidentiality Confidentiality requires the nondisclosure of data. Confidentiality can be guaranteed by encrypting the data. Encryption means that unauthorized third parties cannot obtain any knowledge about the transmitted data.

Integrity Integrity ensures that the data are not changed, recorded or diverted during transmission.

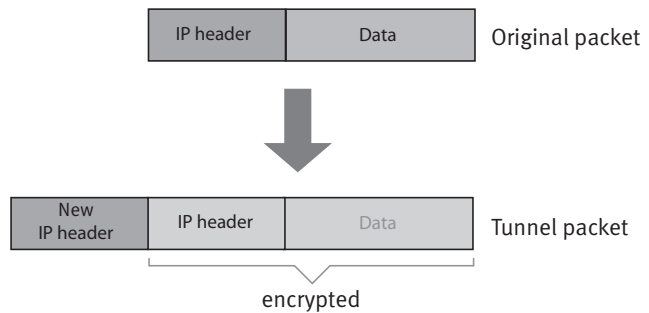
The VPN tunnel fulfills these security requirements. The VPN tunnel is implemented using a tunnel protocol.

5.3 Tunnel Technology

A tunnel is created by placing an IP packet to be transmitted inside of an additional, new IP packet.

An IP packet is composed of the IP header and the user data. The IP header contains the IP address of the destination and the IP address of the sender.

The original packet is encrypted and authenticated before repacking.



- The IP addresses of the destination and the sender in the new IP header are the public IP addresses of the two VPN parties in the Internet. Only the new IP header can be read in the Internet in clear text.
- Thanks to the encryption and authentication, the original packet remains concealed in the inside of the tunnel. The IP addresses of the destination and sender in the IP header of the original packet are private IP addresses in the local network.

The tunnel is what makes it possible to connect networks with private IP addresses via the Internet. Moreover, the tunnel secures the connection.

The VPN solution used with the FRITZ!Box uses the IPSec tunnel protocol.

IPSec is a tunnel protocol that offers state-of-the-art encryption procedures and can be integrated seamlessly into existing IP networks. The AES encryption algorithm is used in the FRITZ!Box VPN solution. AES is the most modern encryption algorithm.

5.4 Supplementary Software for VPN

All of the information required for a VPN is saved in a configuration file. The terminals involved in any VPN must receive this file.

If an individual computer is integrated into a network via a VPN, the computer must have a VPN client installed.

- The “FRITZ!Box VPN” Configuration Wizard
AVM provides the “Configure FRITZ!Box VPN” software in English to set up configuration files. This program is a Wizard that takes you step by step through the VPN configuration. All of the necessary VPN settings, like the encryption method and access rules, are set automatically. The resulting configuration files must be imported to the respective terminals of the VPN tunnel. At the terminal with the FRITZ!Box the configuration file is then imported to the FRITZ!Box. The VPN parameters in these files can be adjusted manually to connect to products by other manufacturers.
- The “FRITZ!VPN” VPN Client
AVM offers the “FRITZ!VPN” software in English as a VPN client.

Both the Wizard and the client can be downloaded free of charge from the VPN Service Portal on the AVM web site:

www.avm.de/en/vpn

6 More about: Bandwidth Management and Prioritization

Integrated bandwidth management ensures high speech quality for telephone calls over the Internet with the FRITZ!Box.

The FRITZ!Box also offers a prioritization function that can be used to divide network applications and network devices into three different categories. The category assigned determines whether an application or device is treated with higher or lower priority when it accesses the Internet.

6.1 Bandwidth Management

The FRITZ!Box is equipped with integrated bandwidth management. This function ensures that the speech quality during telephone calls over the Internet is not reduced by surfing activity. To do this, the FRITZ!Box adjusts all uploads and downloads to the currently available bandwidth. Because the FRITZ!Box also places a higher priority on Internet telephony connections over Internet data connections, unwelcome interference is largely avoided. Just as for any other analog call, once Internet telephony transmission capacity has been reached, remote partners receive a busy signal.

6.2 The Prioritization of Network Applications and Network Devices

Prioritization is a function you can use to specify that network applications and network devices be treated with higher or lower priority when they access the Internet connection. For example, you may wish to ensure that applications like Internet telephony, IPTV and video on demand are always treated with higher priority than other applications. You can also specify that file-sharing applications like eMule and BitTorrent always have to wait behind online games.

The following algorithm is used in the FRITZ!Box to send data packets according to their prioritization:

- Change in the order in which packets are sent to the Internet (upstream direction)

The order of the packets the FRITZ!Box receives from the Internet (downstream direction) cannot be changed.

- Discard low-priority packets in order to ensure the transmission of higher-priority packets. This algorithm is used whenever more packets are supposed to be sent to the Internet than the upstream transmission rate of the Internet connection allows.
- As long as no packets are being sent from higher-priority applications, the full transmission rate of the Internet connection is available for low-priority packets.

Categories for Prioritization

There are three categories for prioritization: “Real-time applications”, “Prioritized applications” and “Background applications”. The categories are explained below.

- Real-time applications

This category is suitable for applications with high demands on transmission speed and reaction times (for example, Internet telephony, IPTV, video on demand).

- Network applications of this category always have priority over other applications accessing the Internet at the same time.
- When the Internet connection is working at full capacity, the network packets of the applications of this category will always be sent first. In this case data from network applications assigned to other categories, like “Prioritized applications”, will be transmitted later.
- If multiple network applications are assigned to this category, then they must share the available capacity.

- Whenever Internet telephony is included in this category, this application always has the highest priority, even over other real-time applications.
- Prioritized applications

This category is suitable for applications that require a fast reaction time (for example, company access, terminal applications, games).

 - For network applications prioritized in this category, 90% of the FRITZ!Box's upload bandwidth is available, as long as no application from the “Real-time applications” category requires bandwidth. The remaining 10% of the upload bandwidth is available for applications that are prioritized in lower categories or not prioritized at all.
 - If multiple network applications are assigned to the “Prioritized applications” category, then they must share the available capacity.
- Background applications

This category is suitable for applications that do not require any high transmission speed and which are not time-critical (for example, peer-to-peer services or automatic updates).

 - Network applications assigned to this category are always treated with the lowest priority when the Internet connection is working at full capacity. So whenever an application from a different category or a non-prioritized application requires the entire bandwidth, all background applications must wait until bandwidth capacity becomes available again.
 - If no other network applications are active, then the background applications receive the entire bandwidth.

Network applications and network devices are assigned to the categories using rules.

In order to use prioritization, the Expert Mode must be enabled in the user interface of the FRITZ!Box.

1. Start a web browser on your computer and enter fritz.box in the address field of the browser.
2. Click “Expert Mode” in the System menu, enable the setting “Show expert settings” and confirm this setting by clicking “Apply”.

The “Prioritization” menu is located under “Internet”.

7 More Functions

This chapter introduces additional useful functions and features of the FRITZ!Box.

7.1 Child Protection

The child protection feature in the FRITZ!Box allows you to specify when and for how long individual computers or Windows users may use the Internet. For instance, you can define that your children are allowed to use the Internet connection only on weekdays between 4:00 p.m. and 8:00 p.m., and then only for one hour.

Child protection is set in the “Internet / Child Protection” menu of the FRITZ!Box.



The “Child Protection” menu is available only if you have set up the Internet connection in the FRITZ!Box and established an Internet connection. The menu is not available if you have configured the FRITZ!Box as a DSL modem or IP client.

- Child protection can be set up for any computer, regardless of the operating system used.
- In the Windows 7, Windows Vista and Windows XP operating systems, child protection can be configured for each user individually.

See the Online Help of the FRITZ!Box to set up child protection. The Online Help contains further comprehensive information on the child protection feature.

7.2 Energy Monitor

The FRITZ!Box is extremely efficient in its energy use.

The individual modules of the FRITZ!Box adapt their energy consumption to the amount needed at any given time. Modules that are not in use or being used far below their capacity reduce their energy consumption accordingly.

For an overview of energy consumption open the “System / Energy Monitor” menu.

The energy consumption is shown as a percentage. The maximum power consumption value of the FRITZ!Box is the amount of energy used when all functions are in operation.

The “Energy Monitor” page shows the following:

- FRITZ!Box System Overall

This graph shows how much energy all of the FRITZ!Box functions are using at the moment, and how much they use in total on an average day. When all functions and modules are working at capacity, this value equals 100%. When the load is less, the value is correspondingly lower.

- FRITZ!Box Central Processor

The energy consumption of the CPU is displayed, both the current value and the daily average. When all functions and modules are working at capacity, this value equals 100%. When the load is less, the value is correspondingly lower.

- The individual FRITZ!Box modules

For each module, this page displays the amount of energy being consumed at the moment and the daily average. When all functions and modules are working at capacity, this value equals 100%. When the load is less, the value is correspondingly lower.

- Statistics

Here three diagrams show how certain device parameters of the FRITZ!Box change depending on the actions performed with the FRITZ!Box. Interested users can watch the how these changes are related over time and observe how the FRITZ!Box is affected by simultaneously making telephone calls, surfing and streaming data.

On the “Settings” tab, in the “System / Energy Monitor” menu, you can disable individual, unneeded LAN ports manually.

7.3 Push Service E-mail

With push service you can specify that the FRITZ!Box sends you e-mail messages with status and consumption data at regular intervals.

The e-mail contains a table with the overview of your FRITZ!Box connections.

The call list is also sent as a file in csv format. The file can then be opened and evaluated statistically with appropriate software like a spreadsheet program.

The push service mail is set up in the “System / Push Service” menu.

7.4 Night Service

In the FRITZ!Box you can set up night service for WLAN and for the telephones connected to the FRITZ!Box.

Configure night service using the menu command “System / Night Service”.

First define the period of time for which the night service of the FRITZ!Box should be active. For instance, from 10:00 p.m. to 6:00 a.m.

The function must be enabled after you specify the settings.

- Configure the night service for wireless network

On the “WLAN” page you may turn off the wireless network during the same period of time each day or define individual schedules for each weekday

- **Do Not Disturb**

When this setting is selected, the telephones connected with the FRITZ!Box will not ring.

This setting does not apply to the IP telephones. They are connected with the FRITZ!Box either by means of a network cable or via WLAN. The Do Not Disturb setting is not applied to IP telephones.

If you connected a fax machine to the FRITZ!Box, this device is disabled during night service.

The Do Not Disturb setting has no effect on the fax function integrated in the FRITZ!Box.

If you connected an answering machine to the FRITZ!Box, this device is not active during night service.

The Do Not Disturb setting has no effect on the answering machine integrated in the FRITZ!Box.

Individual settings can be made for different devices; for instance, different times for the Do Not Disturb setting can be set for individual telephones. Or, you can except individual devices entirely from the Do Not Disturb setting. The individual settings can be configured in the “Telephony / Telephony Devices” menu.

8 Customer Service Guide

Help on All Important Service Topics

AVM is here to help should any questions or problems arise. Here you will find the important information you need, in the form of frequently asked questions (FAQs), manuals, updates and support.

Microsoft Updates In many cases problems that arise during operation can be resolved by installing the current Microsoft Service Pack or other Microsoft updates.

The current service packs and updates can be obtained free of charge from Microsoft at the address:

www.microsoft.com

8.1 Documentation

To take advantage of all commands and features of your FRITZ!Box Fon WLAN 7390, consult the following documentation:

Help In the FRITZ!Box user interface you can open the detailed Help by clicking the “Help” buttons.

Manual The FRITZ!Box Fon WLAN 7390 manual is available on the Internet in PDF format, and can be downloaded at:

www.avm.de/en/service/manuals



The current Adobe Acrobat Reader for reading PDF documents can be downloaded from the Internet free of charge at www.adobe.com.

8.2 Frequently Asked Questions (FAQs)

We would like to make our products as easy to use as possible. If you still have problems, sometimes a little tip is all you need to resolve them. That is why we present you with a selection of frequently asked questions.

The English-language FAQs can be viewed at the following address:

www.avm.de/en/service/FAQs

8.3 Updates and Software

FRITZ!Box provides firmware updates and additional software you can use with your FRITZ!Box free of charge.

Firmware Use the “Update Firmware” wizard on the FRITZ!Box user interface to perform an update of your firmware.

Programs The latest software is also available for download at the following address:

www.avm.de/en/download

FTP Experienced users can also download updates from the AVM FTP server. Click the “FTP Server” link in the download area, or enter the following address:

ftp.avm.de

8.4 Support from the AVM Service Team

Should problems with your FRITZ!Box arise, we recommend taking the following steps:

1. If you have questions about starting operation of your FRITZ!Box, please consult the chapter “Connecting” from page 14.

Please see the information in the section “Product Details” from page 122.

2. If you have any problems, seek first aid by consulting the chapter “Troubleshooting” from page 101.

This chapter also presents useful tips on problems with establishing connections.

3. The next step is to consult the English-language FAQs in the Internet:

www.avm.de/en/service/FAQs

This site contains answers to questions our customers have frequently asked our Support team.

4. If you do not find the answer you need in the FAQs, AVM Support will assist you. The support desk can be reached by e-mail or by fax.



Please take advantage of the information sources described above before contacting AVM support.

Support by E-mail

You can send us an English-language e-mail request at any time using the “Service” area of our web site. The “Service” area can be reached at:

www.avm.de/en/service

Select the product for which you need support from the “Support” area. Click the “Mail Form” link to open the e-mail form. Fill out the form in English and send it to AVM by clicking the “Send” button. Our Support team will respond by e-mail as quickly as possible.

Glossary

ADSL abbreviation for Asymmetric Digital Subscriber Line
ADSL (G.992.1/G992.2) was developed on the basis of DSL technology in order to satisfy the increasing demand for higher throughput rates during uploading and downloading.

designates a fast kind of data transmission that works with standard copper cables and transports signals in both directions at different speeds (upstream at 640 Kbit/s and downstream at up to 9 Mbit/s).

ADSL2 abbreviation for Asymmetric Digital Subscriber Line 2
ADSL 2 (G.992.3) is a further development of the ADSL standard.

ADSL2 offers range much greater than did the first ADSL generation, and is significantly more robust than ADSL, as it can simply disable single carrier frequencies when they produce interference. This feature allows ADSL2 to prevent synchronization losses.

With a throughput rate of up to 12 Mbit/s downstream, ADSL2 offers considerably greater bandwidth than ADSL.

ADSL2 is completely downward compatible, meaning that terminal equipment compliant with ADSL can also be operated on ADSL2 lines, although they cannot exploit the advantages of ADSL2.

In practice ADSL2 has become less important since the ADSL2+ standard has made higher throughput rates possible.

ADSL2+ abbreviation for Asymmetric Digital Subscriber Line 2 with extended bandwidth

ADSL 2+ (G.992.5) is a further development of the ADSL standard.

ADSL2+ offers a doubled frequency range used for downstream transmission, and thus double the maximum bandwidth achievable for downstream to 24 Mbit/s.

ADSL2+ is completely downward compatible, meaning that terminal equipment compliant with ADSL and ADSL2 can also be operated on ADSL2+ lines, although they cannot exploit the advantages of ADSL2+.

ADSL-Controller An ADSL-Controller is an electronic hardware module that allows a computer to access an ADSL line. ADSL-Controllers are stationary equipment, included on internal ADSL cards (for the PCI bus) or in external ADSL modems (with USB or Ethernet ports).

DECT abbreviation for Digital Enhanced Cordless Telecommunications

DECT is a European standard for cordless telephony which was drafted by the European Telecommunications Standards Institute in 1992 and officially adopted in 1992. DECT defines the air interface between a mobile handset and its base station, and supports both voice transmission and data transmission with flexible transfer speeds.

Default gateway see gateway

DHCP abbreviation for Dynamic Host Configuration Protocol

DHCP is a protocol for the dynamic negotiation of the operating parameters for the TCP/IP protocol (TCP is a transport protocol based on the Internet protocol). The computers in a local IP network (DHCP clients) access the DHCP server as part of their operating systems' start procedure.

The central administration of the TCP/IP operation parameters makes it possible to avoid address conflicts caused by IP addresses accidentally assigned more than once.

DHCP server The DHCP server assigns each client an IP address that is has not yet been assigned at the present time. The DHCP server also informs the client of the IP addresses of the

DNS server to be used and of the default gateway. In assigning the IP addresses the DHCP server selects from a prescribed range of IP addresses.

DNS abbreviation for Domain Name System

Domain Name Service takes care of determining the IP address for a given domain name. This Domain Name Service runs on every computer. It accepts the domain name entered by a user and inquires about the corresponding IP address at a DNS server known to the service. If a DNS server cannot answer the inquiry itself, it can inquire about the IP address (DNS resolution) at other DNS servers.

If the Domain Name Service receives negative information from the DNS server (domain name not known), it can send inquiries to other DNS servers it knows or return a corresponding error message to the user. If it receives the desired IP address instead, the application can use the IP address to retrieve the destination desired by the user.

This hierarchical system of DNS servers is known as the Domain Name System. The addresses of the DNS servers at which the Domain Name Service is to inquire by default generally are handed over to the computer by the Internet Service Provider automatically whenever a connection to the Internet is established. In local networks addresses can also be assigned via DHCP. Otherwise they must be entered manually in the TCP/IP settings of the computer by the user or the system administrator.

Download Download designates the transfer of files from the Internet to a computer.

DSL modem A DSL modem connects a computer to the Internet via the DSL line. In contrast to the analog modem, a connection via the DSL modem does not mean that the telephone line is busy.

DSL router A combination of a DSL modem and a router is called a DSL router.

DDNS abbreviation for Dynamic Domain Name System

DDNS is a service which allows a computer always to be reached under the same domain name despite constantly changing public IP addresses. This means the home network can always be reached from the Internet, regardless of the user's location. Even private users have an economical way of placing their own Internet offers on their computer at home.

Every time the Internet connection is established, the Internet provider assigns a new public IP address.

Each time the IP address changes, the current IP address is transmitted to a special DDNS server. Except for the few seconds between the cancellation of the old IP address and the notification of the new IP address, the computer can always be reached at the selected domain name.

Dynamic IP address

A dynamic IP address is an IP address valid only for the duration of one Internet or network session.

Every computer participating in the Internet must have a uniquely assigned public IP address. Since only a limited number of such IP addresses is available, they must be used sparingly. That is why most of the Internet participants who dial in to the Internet receive a dynamic IP address. They are called dynamic because every participant receives a new public address that has not been assigned yet each time he or she dials in to the Internet.

By contrast, dynamic addresses are usually used in local IP networks because they are easy to handle, and because using them avoids incorrect IP address entries or unintentional double assignments. The DHCP service is responsible for assigning unique dynamic IP addresses.

Fixed IP address

Fixed IP addresses are IP addresses which are permanently assigned to a computer or another device like a network printer.

Assigning fixed IP addresses makes sense in cases where a local network has a sufficiently large pool of IP addresses available, or when a computer is always supposed to be accessible at a certain address (such as a web server or e-mail server).

Firewall

A firewall protects a computer or local network against attacks from the Internet.

Most firewalls work with packet filters, which merely check the IP addresses and port numbers of incoming and outgoing data packets and filter the packets according to prescribed rules.

Some firewalls also integrate additional concepts like IP masquerading and NAT to decouple data traffic by distinguishing strictly between the internal and external network.

Especially effective firewalls go even further, analyzing and evaluating the contents of the packets and filtering them according to prescribed rules. Such techniques may also include a Stateful Packet Inspection Firewall, for instance.

Firmware

Firmware designates software that is embedded in electronic devices. Firmware is saved in programmable components within a device. Through the possibility of updating the firmware by computer at any time, manufacturers enjoy great flexibility in reacting to the demands of the operational environment, integrating new functions requested by customers, and eliminating errors discovered after production.

FTP

abbreviation for File Transfer Protocol

The File Transfer Protocol allows files to be exchanged between two computers operating in the Internet. Data exchange takes place via an FTP server and what is known as an FTP client. The more convenient FTP clients are available as stand-alone software or are components of some ISDN data transfer software; simple FTP clients are now included in many web browsers.

Gateway Gateway is a general term designating an interface between two networks. Such a network interface can be realized using a router or a bridge, for instance.

If a computer wants to transfer data packets to a computer in another network, it must first transmit the packet to the gateway. To do this, the computer must know the address of the gateway.

If all packets that cannot be delivered in a local network always are to be transmitted to their given recipients via the same gateway, for this purpose the address of the gateway must be saved as the default gateway in the network settings of the computer.

Such a default gateway for the computer is negotiated automatically by the operating system or the dialing software whenever an ISDN-Controller or ADSL-Controller establishes a connection to the Internet. If a router is used for the shared Internet access in a local network, the IP address of the router must be entered as the default gateway in the TCP/IP settings of each computer that wishes to use the Internet connection. If the TCP/IP setting is configured by means of a DHCP server, there is no need to enter the gateway address manually.

HSPA abbreviation for High Speed Packet Access

HSPA is a third-generation mobile radio standard further developed from the the UMTS mobile radio standard. HSPA provides for throughput rates in the mobile radio network that are comparable with DSL (3.6 to 13.98 Mbit/s).

IP abbreviation for Internet Protocol

The IP Internet Protocol is the most important basic protocol for the control of data exchange in local networks and in the Internet. The Internet protocol works without a connection; in other words, data packets are transmitted from the sender to the recipient without previous consultation. The addresses of the recipient and the sender in the data packets are given as IP addresses.

IP address In IP-based networks, for instance in the Internet and local networks, all connected devices are addressed via their IP addresses. So that data packets are sure to be delivered to the right address, each IP address may be assigned only once within the Internet or a local IP network.

The IP address consists of four three-digit groups of numbers (for instance, 192.168.178.247). Each group of numbers can assume values between 000 and 255.

Every IP address contains two components: the network address and the host address. These two components can be read out of an IP address only if the subnet mask is also specified.

IP addresses can be public or private, and also fixed or assigned dynamically. See the corresponding entries in the Glossary for more information.

IP addressing Addressing is one of the main functions of the Internet Protocol (IP). Internet addresses can be written in decimal, octal or hexadecimal notation. The FRITZ!Box uses “dotted-decimal” notation: The four bytes of an address are represented by decimal numbers separated by dots. The total volume of Internet addresses, the address space, is separated into classes (A, B, C, D, and E). The full set of IP addresses, called the address space, is grouped into address classes designated as A, B, C, D and E. Only the first three of these five address classes are actually used. These classes can be described as follows:

Classes	Properties	Network Address Decimal Value
Class A address	few networks, many hubs	0-127
Class B address	intermediate distribution of networks and hubs	128-191
Class C address	many networks, few hubs	192-223

Properties of IP Address Classes

Every IP address consists of two parts: the network address and the host address. The sizes of the network address and the host address are variable, and determined by the first four bits (of the first byte) of the IP address.

IP masquerading

By means of IP masquerading a computer or LAN can be protected from unauthorized connection requests from the Internet. Masquerading works by converting the IP addresses used in a network to one public IP address. From the outside it appears that all requests are sent from a single computer.

IP network

A network in which data exchange takes place on the basis of the Internet Protocol is called an IP network.

NAS functionality

NAS is the abbreviation for Network Attached Storage

NAS designates one or more devices that are integrated into a network to provide storage space.

In connection with the FRITZ!Box, NAS functionality means that various services for connected USB memory are available in the FRITZ!Box so that it is easier for you to use your data and make them available in the local network. It is easy to exchange documents in the local network via the storage medium on the FRITZ!Box. The Media Server makes music, pictures and videos in the network available to compatible playback devices. Files can also be released for sharing in the Internet, and local memory expanded by adding online storage.

NAT

abbreviation for Network Address Translation

NAT is a process used in routers to replace the address information in data packets with new address information. A typical application for NAT is routers that connect local networks with the Internet. In local networks, every network device has a private IP address, while generally there is only one public IP address available for the Internet. To grant the network devices access to the Internet, the router replaces the private IP address of the sender with its

own public IP address in all outgoing data packets. The router saves all necessary information in a table so that incoming data packets can then be assigned to the correct network device.

Outside dialing prefix

The outside dialing prefix is the digit dialed at an extension line to obtain an outside line. Generally this is “0”.

Public IP address

A public IP address is an IP address valid in the Internet. Every computer or router participating in the Internet must have a uniquely assigned public IP address. This address is usually negotiated dynamically with the Internet Service Provider when a connection to the Internet is dialed. The Internet Service Provider assigns the negotiated IP address to the computer or router for the duration of an Internet session.

Port

So that a single network connection on a computer can be used by multiple applications to exchange data with remote sites at the same time, a computer administers what are known as ports for the IP-based protocols TCP and UDP. Ports substantiate the point of access for the data packets delivered via the IP Internet protocol. While the IP address determines the destination computer quite generally, the port addresses the communication interface provided by an application for a certain communication procedure.

The Internet protocol allots 16 bits for the specification of the port number. Thus a total of 65,535 different port numbers can be specified. Ports up to port number 1,024 are reserved for special system applications and typical Internet applications. These include, for instance, the port numbers 21 for FTP (File Transfer Protocol), 25 for SMTP (Simple Mail Transfer Protocol), 53 for DNS (Domain Name Service) and 80 for HTTP (Hypertext Transfer Protocol).

Ports are primarily of interest to users for their role in protecting an Internet connection from external attacks. Most firewalls offer the possibility of preventing data traffic on certain ports. This means that certain port numbers can be blocked to prevent data from being delivered to system

services. This is also a way of preventing any Trojans that may have infected your computer from receiving data on ports it created as means of accessing your computer for potentially damaging activities. A firewall blocks most of the atypical port numbers not required for normal operation of an application and offers specialized users the opportunity to forward specified ports.

Port forwarding

With port forwarding it is possible to specify ports that will allow all incoming or outgoing data packets to pass through a router or firewall.

If a computer from the local network offers server services, for instance, the settings of a router using NAT or IP masquerading must enable or forward the port used by the server service for access to incoming data packets and thus keep it open permanently. The private IP address of the given computer must be saved as the destination address for all of the packets arriving at the port.

Typical server applications that require port forwarding are FTP and Web servers. To allow access to a computer via remote management software like Symantec pcAnywhere or Microsoft's Remote Desktop, or even use of a file-sharing program like eMule, the required ports must be released for port forwarding. Port forwarding settings for the most important application cases are quite simple as long as the settings of the router or the firewall already contain rules with a corresponding preconfiguration.

Private IP address

Private IP addresses are used for computers and other network devices within local IP networks.

Since many local IP networks are not connected to the Internet except via single computers or routers (gateway), certain address ranges are excluded from the publicly available IP addresses so that they are available for assignment in local IP networks. An IP address may only be assigned once within the local network. A private IP address may exist in any number of other local networks.

Stick & Surf Stick & Surf is a technique developed by AVM for the fast, simple, error-free and secure configuration of radio networks. This technique allows for the straightforward transmission of all important parameters of a radio network from the access point to any computer that is to be added to the radio cell.

In this process the radio parameters used, including the WLAN channel, SSID and WLAN standard used, as well as security parameters like the encryption method and network key, are transferred almost fully automatically from the WLAN access point to the computer with the WLAN client that is to be connected.

Subnetwork A local IP network can consist of one subnetwork or be divided into multiple subnetworks. The division into subnetworks is performed when the local IP network is configured. The subnetworks of a local IP network are also IP networks.

Subnet mask The subnet mask indicates which part of an IP address is the network address and which the address of the computer. The network address defines what is called the subnet.

Example 1

IP address	192.168.178.247
Subnet mask:	255.255.255.0

The assignment of the first three groups of numerals in the subnet mask indicates that the first three groups of numerals in the IP address define the network. The following addresses result:

Example 1

Network address of the subnet:	192.168.178.0
Address of the computer in the subnet:	192.168.178.247
IP address pool in the subnet:	<p>192.168.178.0 - 192.168.178.255</p> <p>The IP addresses 192.168.178.0 and 192.168.178.255 are reserved. This means that the addresses from 192.168.178.1 to 192.168.178.254 are available for assignment to the computers. Therefore a maximum of 254 computers can be included in the subnetwork.</p>

Example 2

IP address:	192.168.178.247
Subnet mask:	255.255.0.0
<p>The assignment of the first two groups of numerals in the subnet mask indicates that the first two groups of numerals in the IP address define the network. The following addresses result:</p>	
Network address of the subnet:	192.168.0.0
Address of the computer in the subnet:	192.168.178.247
IP address pool in the subnet:	<p>192.168.0.0 - 192.168.255.255</p> <p>That's 65,536 IP addresses. The IP addresses 192.168.0.0 and 192.168.255.255 are reserved. This means that the addresses from 192.168.0.1 to 192.168.255.254 are available for assignment to the computers.</p>

TCP/IP abbreviation for Transmission Control Protocol / Internet Protocol

TCP/IP is the “language” of the Internet. TCP/IP is used to refer to a suite of protocols used for data communication over the Internet. TCP and IP are the network and transport protocols underlying most Internet services, including file transfer (FTP) and e-mail communication (SMTP). TCP/IP is available for practically all computer systems. TCP/IP thus offers the advantage of trouble-free communication between otherwise incompatible networks and systems.

TR-069 T-069 is an HTTP-based protocol for communication between CPE (Customer Premises Equipment) and an Auto Configuration Server (ACS) belonging to the Internet Service Provider. The TR-069 protocol is also known under the alternative name CPE WAN Management Protocol (CWMP). It offers the possibility of setting up the terminal device securely and automatically and thus, most importantly, facilitates simple initial configuration of the ADSL terminal equipment by the end customer (autoprovisioning).

The TR-069 protocol can be used for automatic configuration only if it is actively supported by the given terminal device. For this an Auto Configuration Client (ACC) must be integrated in the device. The specifications for automatic configuration of the ADSL terminal device are stored on the Auto Configuration Server by the given Internet Service Provider. As soon as the ADSL terminal device initiates the autoconfiguration process, the settings are retrieved from the Auto Configuration Server and implemented in the ADSL terminal device without any further interaction with the user. During this process all of the communication between the ADSL terminal device and the Auto Configuration Server takes place in encrypted form.

UMTS abbreviation for Universal Mobile Telecommunications System

UMTS is a third-generation (3G) mobile radio standard with throughput rates of 384 Kbit/s to 7.2 Mbit/s.

The high throughput rates make it possible to support multimedia services. With special cards or USB sticks the Internet connection can also be provided for laptops or computers via UMTS.

Update A more recent version of software or firmware is called an update. Updates are often free of charge, resolve minor programming errors, and sometimes also offer new functions.

Upload This term designates the procedure of transmitting files from one's own computer to another computer in the Internet.

UPnP abbreviation for Universal Plug and Play (UPnP)

UPnP is an extension of the Microsoft Plug & Play standard that allows devices to network globally and to exchange services—without a central server or computer.

UPnP allows devices from all kinds of manufacturers (stereo systems, routers, printers, house controls) to be controlled via an IP-based network, with or without central control through a gateway. It is based on a number of standardized network protocols and data formats. Expressed simplistically, devices can communicate with each other automatically using UPnP to exchange information.

Today the UPnP forum specifies the UPnP standard and certifies devices that are compliant with this standard.

UPnP AV abbreviation for Universal Plug and Play Audio/Video

UPnP AV is a UPnP specification for the interaction between the media server, playback devices and devices controlling the streaming of audio and video data within networks. Media servers are devices that make audio and video data available upon request. Playback devices render the audio and video data (television, stereo system, streaming clients). Control devices are remote controls.

VDSL abbreviation for Very High Speed Digital Subscriber Line

In Germany, the DSL technology VDSL is increasingly becoming available in the VDSL2 (G993.2) version. VDSL2 is a further development of the ADSL2+ standard, to which it is fully downward compatible. The standard provides for throughput rates of up to 100 Mbit/s for uploading and downloading, but requires a distribution network with a more closely meshed infrastructure—a demand that is hardly economical outside of major urban areas.

VPN abbreviation for Virtual Private Network.

VPN serves to integrate devices from a neighboring network into your own network, without the networks having to be compatible with each other.

A VPN is generally an independent company network distributed over several locations, which uses the infrastructure of a public communications network to link its partial networks or to link individual computers to the rest of the network. A VPN uses tunneling technologies and typically builds on the infrastructure of the Internet.

Using a Virtual Private Network it is possible to use all network applications of the company network even from distant locations. This means it is possible to use the advantages of the network even over large geographical distances.

VPN facilitates optimum information flow without delay throughout the entire company, even to offices in other locations. E-mail servers, file sharing and other central applications of the company network can thus be made available via VPN even to distant branch offices, subsidiaries and home offices. With VPN, field representatives of a company can also be granted secure access to the company network.

VoIP abbreviation for Voice over IP, also known as Internet telephony

Voice over IP makes telephone calls possible via the Internet. The technology has already been in use for years, but today it allows even private customers the convenience familiar from conventional telephony, usually at significantly lower prices. VoIP has also made it considerably more convenient to use applications like conference calls and answering machines in networks. Added to this are global accessibility under a single telephone number and new VoIP features like the Buddy List known from chat rooms.

Internet telephony used to be possible only with a headset connected to the computers of the callers and their conversation partners. Today voice connections via the Internet, even to fixed-line and mobile networks, can be conducted conveniently using VoIP telephone systems that allow already existing analog telephones to be used even when the computer is switched off. Various Internet Service Providers and telephony carriers provide SIP-fixed-line gateways for this purpose. Such a gateway is used to produce voice connections between the Internet and conventional telephone networks. In principle VoIP conversations are possible via every DSL access point, but for convenient use with existing terminal equipment, and for conversations with the fixed-line and mobile networks, it is important that the DSL provider support what is known as the SIP standard. SIP is the current standard defined for VoIP by the IETF (Internet Engineering Task Force).

WLAN abbreviation for Wireless Local Area Network

The term WLAN designates the industry standard for wireless local networks passed by the Institute of Electrical and Electronics Engineers (IEEE) in 1997 under the title IEEE 802.11.

By means of WLAN technology, individual computers or network devices like printers or DSL access points can be linked wirelessly to an existing cable-connected local network (LAN), or LANs can be converted completely to a

wireless structure. A further useful purpose for WLAN technology is to link segments of existing cable-connected networks.

Although WLAN was actually developed only for short-range connections, by cascading WLAN access points or implementing transmission networks with high-power point-to-point radio transmission, even network segments located further from each other can be linked or network participants in relatively remote locations can be economically and easily integrated into an existing network.

WLAN access points often also serve as access points to the Internet in private or public institutions. Many airports, hotels and cafes, for instance, make WLAN hotspots available to their customers, either free or subject to a charge. Ultimately this has maneuvered WLAN into serious competition with mobile UMTS technology.

The application possibilities for wireless network communication also overlap with Bluetooth technology. For mobile devices with limited energy capacity Bluetooth is the more useful solution, however, as Bluetooth uses considerably less power than wireless LAN. What is more, Bluetooth technology is more flexible and thus can offer a greater bandwidth of potential applications.

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