



# FRITZ!Box 6840 LTE

Configuration  
and Operation



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## Symbols and Highlighting

Symbols and emphasized text are used to mark certain information in this manual.

### Symbols



This symbol designates hints and tips that are useful in operating your product.



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

### Highlighting

Highlighting	Function	Examples
Quotation marks	Keys Buttons Menus File paths Folder and file names	“F1” key “Help” “Home Network” “C:\My Documents” “Documentation”
Pointed brackets	Joker	<Telephone number>
Blue and underlined	Address to be entered in the web browser	<a href="#">fritz.box</a>
Blue text	links and references within this manual	For more information on customer service, see the section from <a href="#">page 132</a> .
Bold	Emphasis	<b>Do not</b> click the button ...

# 1 Getting to Know FRITZ!Box

This chapter gives you an overview of the features and functions of your FRITZ!Box 6840 LTE and describes ports, buttons and LEDs.

## 1.1 FRITZ!Box at a Glance

### Access to the Internet

The FRITZ!Box connects multiple computers fast and safely with the Internet. Other network-compatible devices like smartphones and game consoles can use the FRITZ!Box for their Internet connection.

For fast Internet connections via the LTE radio standard, an LTE modem is integrated into the FRITZ!Box. A preconfigured firewall protects your network from attacks from the Internet.

The FRITZ!Box also offers a variety of functions to control access to the Internet as well as access from the Internet. The “Internet filter” feature allows you to restrict access to the Internet for individual Windows users or computers, for instance for you children’s computers. With the integrated VPN server you can link remote computers securely with the home network of the FRITZ!Box over the Internet.

### WLAN Base Station for Wireless Connections

Computers and other network devices that support WLAN can be connected wirelessly with the FRITZ!Box. If no WLAN device is integrated in your computer, you can install an external WLAN adapter like a FRITZ!WLAN USB Stick by AVM (see also [AVM Products for the FRITZ!Box from page 135](#)).

The FRITZ!Box supports the fast WLAN N standard, which provides for data throughput of up to 300 Mbit/s (gross).

You can use the FRITZ!Box in either the 2.4-GHz frequency band or the 5-GHz frequency band (dual band). Because the 5-GHz frequency band is used less frequently, connections in this band are subject to less interference.

With the “guest access” feature you can grant friends and visitors fast, secure access to the Internet over your wireless network.



## Telephone System (PBX)

The FRITZ!Box is a telephone system (or PBX: private branch exchange) for the Internet telephone line.

The PBX is also equipped with up to five integrated answering machines and one integrated fax machine for fax reception. You do not need any more additional devices for these functions. For up to five different telephone numbers in the FRITZ!Box you can configure a separate answering machine. The FRITZ!Box can be configured to forward new messages on an answering machine and new faxes automatically by e-mail.

The FRITZ!Box telephone book is easy to manage in the web browser. If you use multiple FRITZ!Box cordless telephones on the FRITZ!Fon, you can use a shared telephone book or set up a separate telephone book for each FRITZ!Fon in the FRITZ!Box.

In addition, the FRITZ!Box telephone functions offer convenience features like a call list, call diversion and do not DisturbDo Not Disturb.

## DECT Base Station for Cordless Telephones

A DECT base station is integrated in your FRITZ!Box. Up to six cordless telephones can be connected with the FRITZ!Box: you do not need an additional base station.

You can use the FRITZ!Box as a DECT base station or as a repeater. When used as a repeater, the FRITZ!Box increases the range of another FRITZ!Box's DECT radio network.

## Switchboard in the Home Network

The FRITZ!Box connects your computers and other network devices not only with the Internet, but also with each other. The connected network devices constitute the home network of the FRITZ!Box and can exchange data among each other.

You connect computers and other network devices with the FRITZ!Box either wirelessly via WLAN or using a network cable.

The FRITZ!Box can manage various storage media and make them available to all participants in the home network. These include connected USB flash drives, USB hard drives and on-line storage.

### USB 2.0 Port

The FRITZ!Box has a USB port which can be used to integrate USB devices into your home network, for instance a printer or a storage medium. The connected USB devices can then be used simultaneously by all network devices in the home network of the FRITZ!Box.

### Media Server for Music, Images, and Video in the Home Network

As a media server the FRITZ!Box makes music, video and image files available throughout the entire home network. With suitable playback devices in the home network of the FRITZ!Box you can even play back the media files when the computer is turned off.

Your music, video and image files can be stored on a USB storage medium connected to the FRITZ!Box.

The playback devices or programs, for instance computers or television sets, must support the UPnP AV or DLNA standard.

## 1.2 LTE: Radio Standard for Connecting to the Internet

LTE (Long Term Evolution) is a radio standard specified according to the 3GPP standard, Release 8 . Within this standard the FRITZ!Box belongs to category 3 UE (user equipment).

### Frequency Ranges

LTE supports two frequency bands:

- 791 - 862 MHz: the LTE band 20 is located in this range. This band is called the “digital dividend” spectrum.
- 2500 - 2690 MHz: the LTE band 7 is located in this range.

### Channel Bandwidth

Within these two frequency bands the FRITZ!Box supports the channel bandwidths 5, 10 and 20 MHz.

The smaller the channel bandwidth, the lower the throughput:

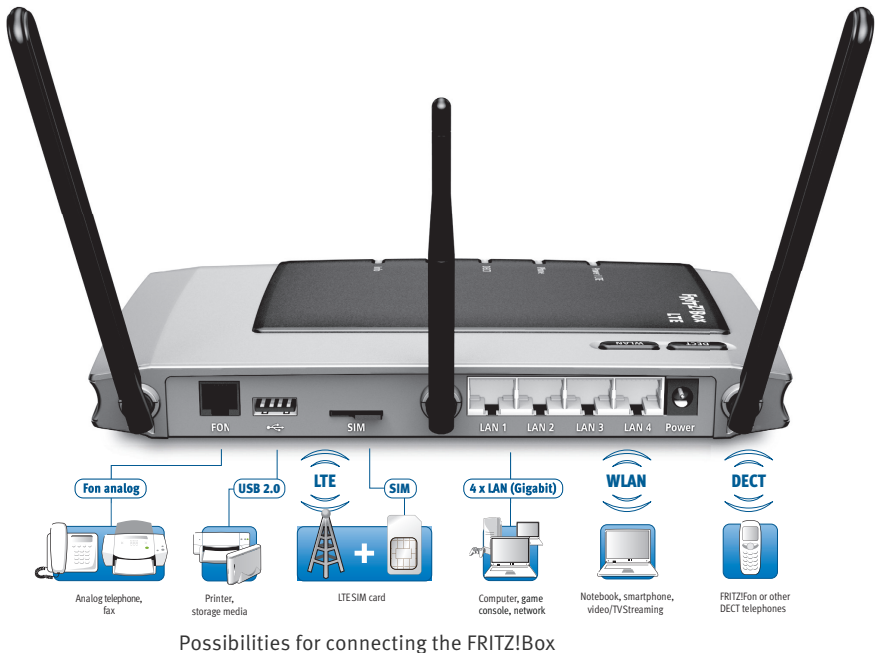
20 MHz	up to 100 Mbit/s download up to 50 Mbit/s upload
10 MHz	up to 60 Mbit/s download up to 38 Mbit/s upload


All devices located in the same radio cell share the bandwidth and thus the throughput.

### Antenna Technology

The FRITZ!Box supports Multiple-In-Multiple-Out (MIMO) antenna technology.

## 1.3 Ports and Interfaces



- **FON**  
One RJ11 socket for one analog telephone or another analog terminal device
- **LAN 1 – LAN 4**  
4 gigabit Ethernet ports (10/100/1000 Base-T) for connecting computers and other network devices like game consoles and network hubs
- **USB**   
USB 2.0 port for connecting USB devices like printers or storage media
- **WLAN base station**  
Integrated WLAN base station for connecting to WLAN devices that use the radio standard IEEE 802.11a, IEEE 802.11b, IEEE 802.11g or IEEE 802.11n (in the 2.4- or 5-GHz frequency band)
- **DECT base station**  
Integrated DECT base station for connecting up to 6 cordless telephones that use the DECT standard

## 1.4 Buttons

The FRITZ!Box has two buttons on the upper side of the housing.



FRITZ!Box buttons

### WLAN Button

With the WLAN button you can turn the WLAN function on and off and connect wireless devices with the FRITZ!Box by WPS. WPS is an easy way to establish secure wireless connections (see [page 25](#)).

### DECT Button

With the DECT button you can register cordless telephones on the FRITZ!Box (see [page 34](#)) and page misplaced cordless handsets (see [page 83](#)).

## 1.5 LEDs

LED	Condition	Meaning
Power / LTE	on	<ul style="list-style-type: none"> <li>FRITZ!Box on standby</li> <li>Device has electrical power and the LTE connection has been established</li> </ul>
	flashing	<ul style="list-style-type: none"> <li>Device has electrical power</li> <li>LTE connection is being established or has been interrupted</li> </ul>
Phone	on	Telephone connection to the Internet active
	flashing	Messages in your voicemail/e-mail inbox (this function must be supported by your telephony provider)
DECT	on	DECT function enabled
	flashing	Registration procedure for a DECT handset in progress
WLAN	on	WLAN function enabled
	flashing	<ul style="list-style-type: none"> <li>Enabling or disabling WLAN function</li> <li>Adopting the WLAN settings</li> </ul>

LED	Condition	Meaning
Info	on	<ul style="list-style-type: none"><li>• 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)</li><li>• Signals an event specified by the user</li></ul>
	flashing	<ul style="list-style-type: none"><li>• Updating the firmware</li><li>• Specified value for online meter reached</li><li>• Signals an event specified by the user</li></ul>
	flashing 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 6840 LTE.

## 2 Before You Connect the FRITZ!Box

- Check the contents of your FRITZ!Box package. See the section [Contents of the FRITZ!Box Package on page 15](#) for more information.
- Make sure that the requirements for connecting and operating the FRITZ!Box have been met. See the section [Requirements for Operation on page 15](#) for more information.
- Please see the security and handling instructions in the section [Security and Handling on page 16](#).

### 2.1 Contents of the FRITZ!Box Package

- FRITZ!Box 6840 LTE
- two LTE antennae
- one power supply unit
- one network cable
- a FRITZ!Box CD with the FRITZ!Box manual as a PDF file
- printed product information

### 2.2 Requirements for Operation

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

- a web browser that supports Java script (for instance, Internet Explorer version 8.0 or higher, or Firefox version 7 or higher)
- an LTE SIM card for the Internet connection
- for connecting computers via WLAN:

computer with WLAN support (compliant with IEEE 802.11n, IEEE 802.11g, IEEE 802.11a or IEEE 802.11b). Computers that do not have integrated WLAN can be equipped with WLAN support by installing a WLAN device like a FRITZ!WLAN USB Stick N, for instance.

- for connecting computers using network cable:  
computer with a network port (network adapter standard Ethernet 10/100/1000 Base-T)

## 2.3 Security and Handling

Before installing and using the FRITZ!Box, please read the following security and handling instructions.

### Safety Instructions



When working with the FRITZ!Box 6840 LTE, be sure to observe the following security instructions in order to protect yourself and the FRITZ!Box from harm.

- Before mounting the FRITZ!Box on the wall, make sure that there are **no** electrical lines, gas or water pipes located where you need to drill the holes.  
If necessary, check the site it with a pipe detector or consult with qualified experts.
- 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 on the FRITZ!Box housing are always unobstructed. The ventilation slits provide for air cooling.
  - The FRITZ!Box should not be placed on a carpet or on upholstered furniture.
  - Do not cover the FRITZ!Box.
- Do **not** install the FRITZ!Box during an electrical storm.
- Disconnect the 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. For a drilling template to mount the FRITZ!Box on a wall, see [page 144](#).
- 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.
- When connecting FRITZ!Box to your computer using a network cable, keep in mind that the cable can be no longer than 100 m.
- If you would like to establish wireless connections between the FRITZ!Box and the computer, position the FRITZ!Box 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.

### 3 Connecting FRITZ!Box

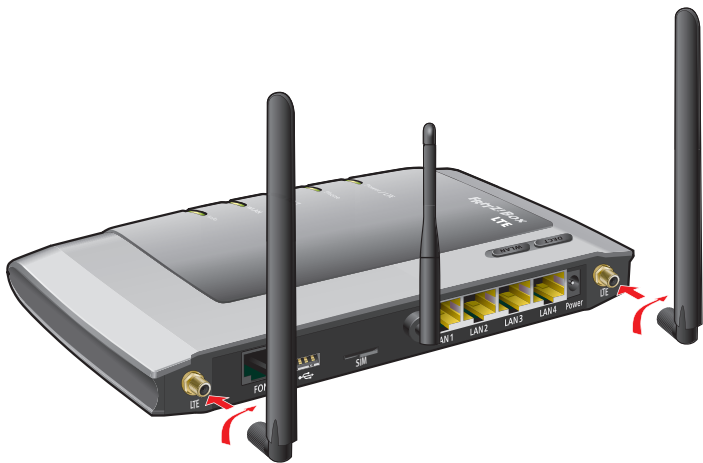
- Screw the LTE antennae onto the FRITZ!Box and insert the SIM card.
- Connect the FRITZ!Box to the power supply.

This chapter tells you how.



Before you connect the FRITZ!Box, note the additional instructions in the section [Security and Handling on page 16](#).

#### 3.1 Screwing On the LTE Antennae



##### Screwing On the LTE Antennae

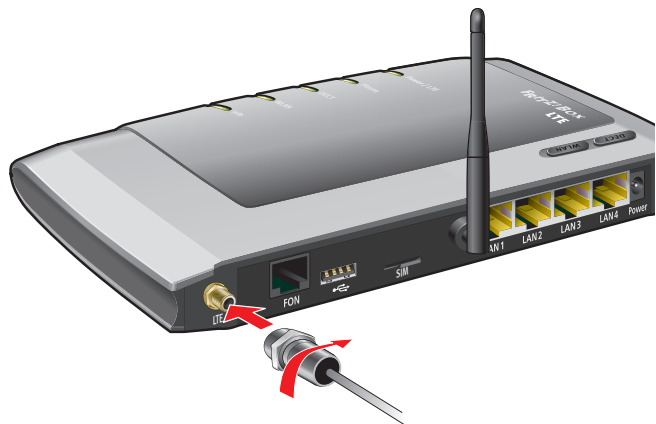
1. Pick up the two LTE antennae included in the package.
2. Screw the antennae onto the sockets labeled “LTE”.

##### Connecting Exterior Antenna

You can also connect the FRITZ!Box 6840 LTE with an exterior antenna rather than using the LTE antennae included with delivery. If areas located on the edge of LTE radio coverage, the two LTE included in the package may not be sufficient for successful radio traffic. If this is the case, you can use a stronger antenna, for instance, one mounted on your roof.

Please note the following if you would like to use an exterior antenna:

- The antenna has to fit into an SMA socket. The antenna sockets on the FRITZ!Box 6840 LTE are SMA connectors.
- The plugs on the antenna cable used to connect the FRITZ!Box 6840 LTE and the antenna must be SMA plugs.
- The FRITZ!Box 6840 LTE receives on both antenna sockets and transmits on only one. The antenna socket on the left of the FRITZ!Box 6840 LTE socket panel is the one for transmission:

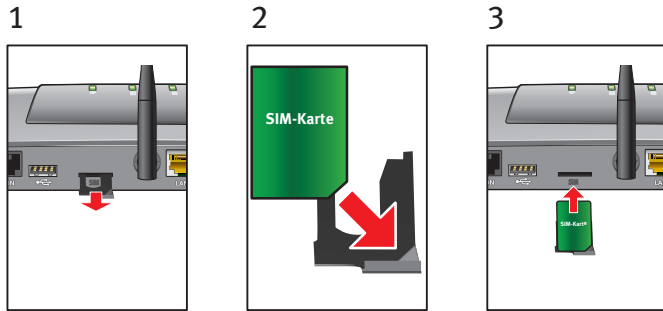


If your exterior antenna has only one connector, connect the antenna to this antenna socket and screw one of the LTE antennae included with delivery into the other antenna socket.

If the exterior antenna has two connectors, connect the antenna to both antenna sockets on the FRITZ!Box 6840 LTE.

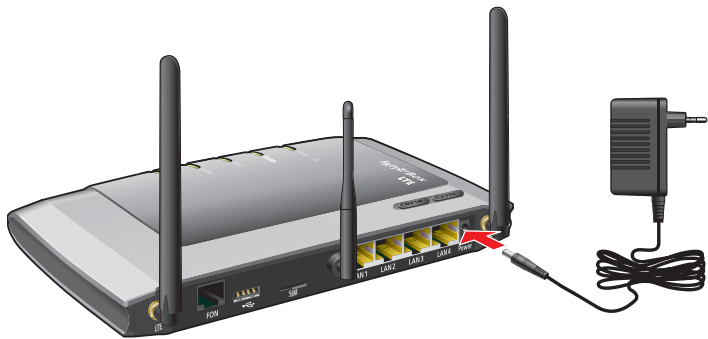
### 3.2 Inserting the SIM Card

You received a SIM card from your LTE provider. This card must be inserted into the card holder in the FRITZ!Box SIM card slot.



1. Pull the card holder completely out of the SIM card slot.
2. Place the SIM card with the slanted edge in the bottom right corner with the contacts facing downwards.
3. Insert the card holder with the SIM card back into the SIM card slot.

### 3.3 Connecting to Electrical Power



Connecting to the power supply

1. Pick up the power supply unit included in the FRITZ!Box package.



Use only this power supply unit for connecting to electrical power.

2. Connect the power supply unit to the socket on the FRITZ!Box labeled “Power”.

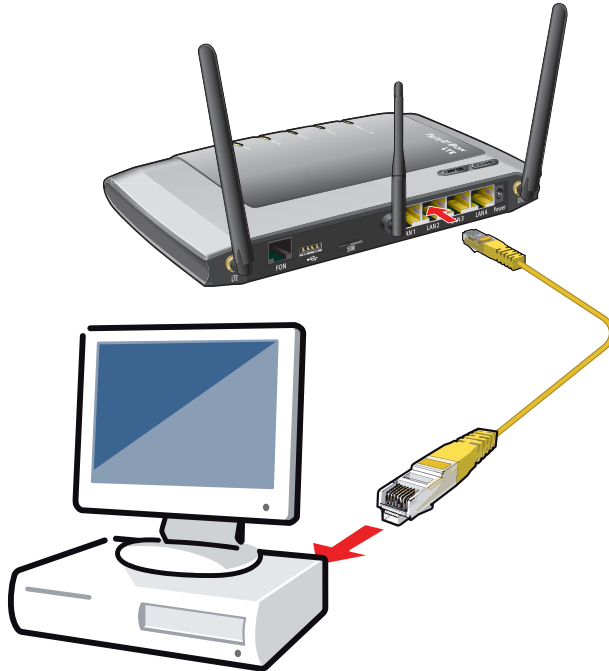
3. Plug the other end into an AC power outlet.

The “Power / LTE” LED begins flashing after a few seconds to indicate that the LTE connection is being established.

## 4 Connecting the Computer to the FRITZ!Box

Connect one or several computers to the FRITZ!Box.

### 4.1 Connecting Computers to the LAN Port



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

1. Set aside the network cable (yellow) from the FRITZ!Box package.
2. If you work with a Linux operating system: Configure the network adapter of the computer with the setting “DHCP”.
3. Connect one end of the network cable to the network port (network card) of the computer.
4. Connect the other end to the “LAN 1”, “LAN 2”, “LAN 3” or “LAN 4” socket on the FRITZ!Box.

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

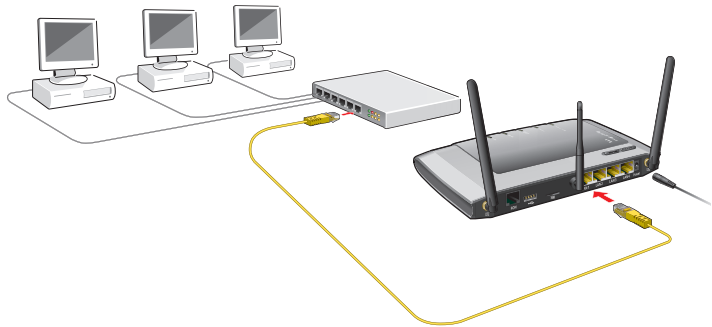
### Connecting More Computers to the LAN Ports

Additional cables are required to connect further computers. In purchasing a LAN cable, note the instructions in the section [Network Cable on page 131](#).

One computer can be connected to each network port of the FRITZ!Box.

### Connecting a Network Hub or Switch

You can also connect a network hub or switch to the LAN ports on the FRITZ!Box.



Connecting FRITZ!Box to a network hub

1. Set aside the network cable (yellow) from the FRITZ!Box package.
2. Connect one end of the LAN cable to the uplink port ([see glossary](#)) of the network hub or network switch.
3. Connect the other end of the cable to one of the LAN ports on the FRITZ!Box.

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

## 4.2 Connecting Computers Wirelessly over WLAN

Using WLAN radio technology you can connect multiple computers with the FRITZ!Box wirelessly.

Please note the following before establishing a wireless connection between the computer and the FRITZ!Box:

- WLAN device

A computer to be connected to the FRITZ!Box via WLAN must be equipped with a WLAN device for it to support WLAN. A WLAN device can be an external WLAN adapter—like a USB stick, for example—or a device integrated in the computer. Many modern computers and notebooks come with a WLAN device integrated.

- WLAN security settings

In the FRITZ!Box, WLAN security settings are enabled upon delivery. Before a computer can establish a wireless connection to the FRITZ!Box, the WLAN security settings of the FRITZ!Box must be transferred to the WLAN device.

For this procedure the FRITZ!Box supports the two automatic methods AVM Stick & Surf and WPS (Wi-Fi Protected Setup). The security settings can also be transferred manually.



For more information on WLAN, see the section [FRITZ!Box as a WLAN Base Station from page 52](#).



### Establishing a WLAN Connection with AVM Stick & Surf

If you use a FRITZ!WLAN USB Stick from AVM as the WLAN device, you can use AVM Stick & Surf to establish a secure WLAN connection quickly and conveniently.

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

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

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

3. Remove the FRITZ!WLAN USB Stick.
4. Now insert the FRITZ!WLAN USB Stick into the USB port of the computer.

The security settings will be adopted and the WLAN connection between the FRITZ!Box and the FRITZ!WLAN USB Stick will be established. As soon as the WLAN connection has been established the computer is connected to the FRITZ!Box.



See the AVM FRITZ!WLAN USB Stick manual for details.

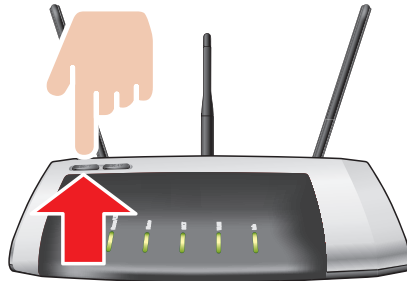
### Establishing a WLAN Connection Using WPS

The FRITZ!Box supports WPS (Wi-Fi Protected Setup). WLAN devices that also support WPS can be connected with your FRITZ!Box securely using this method. All of the necessary WLAN security settings are transferred in the process. There are two kinds of WPS: the push-button method and the PIN method.

### WPS with the Push-button Method

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

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 on the other WLAN device, either by pressing a 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.

As soon as the WLAN connection has been established the computer is connected to the FRITZ!Box.

### WPS with the PIN Method

If your WLAN device 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:

- the FRITZ!Box specifies the PIN
- the WLAN device specifies the PIN.

#### The FRITZ!Box Specifies the PIN

1. Open the FRITZ!Box user interface.
2. Select the “WLAN / Security” menu.
3. Go to the “WPS / Quick Connection” page.
4. Enable the setting “WPS enabled”.
5. Select the option “PIN method (WPS-PIN), the FRITZ!Box specifies the PIN”.
6. The PIN will be displayed. Enter this PIN in the control software of the WLAN device.
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 device.

#### The WLAN Device Specifies the PIN

1. Open the FRITZ!Box user interface.
2. Select the “WLAN / Security” menu.
3. Go to the “WPS / Quick Connection” page.
4. Enable the setting “WPS enabled”.
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 device.

### Transferring the WLAN Security Settings Manually

The WLAN security settings for WLAN devices can also be transferred manually. Manual transfer is unavoidable if a WLAN device does not support any methods for transferring the security settings automatically.

For manual transfer the WLAN security settings have to be entered in the WLAN software.

WLAN devices are generally delivered with their own WLAN software, which is installed in the computer along with the WLAN device. By now many operating systems have WLAN software included. Integrated WLAN devices sometimes use the operating system’s WLAN software.

### Installing a WLAN Device

If you need to use a separate WLAN device because you do not have one integrated, then install the WLAN device in the computer along with the corresponding WLAN software. Please take note of the instructions in the documentation of the device.

### Transferring WLAN Security Settings

The values for WLAN security preconfigured in the FRITZ!Box have to be transferred to the WLAN device.



If you would like to establish a WLAN connection using the values preset in the FRITZ!Box, then your WLAN device 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 device:

SSID (name of the WLAN radio network)	FRITZ!Box 6840 LTE
Encryption method	WPA (TKIP) or WPA2 (AES-CCMP)
Encryption	WPA PSK or WPA2 PSK (AES)
WLAN key	The key is printed on the sticker on the bottom of the housing and on the cover of the FRITZ!Box CD.
Network mode	Infrastructure

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

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

## 5 The FRITZ!Box User Interface

The FRITZ!Box has a user interface you can open in a web browser on your computer.

In the user interface you can set up the FRITZ!Box, enable or disable functions and receive information on the FRITZ!Box and on your connections.

### 5.1 Opening the User Interface

The FRITZ!Box user interface can be opened on every computer connected with the FRITZ!Box.

1. Start a web browser on your computer.
2. Enter [fritz.box](http://fritz.box) in the address line of the browser.

The FRITZ!Box user interface opens.



Entering the address [fritz.box](http://fritz.box) in the browser



If the user interface does **not** open, see the instructions on resolving errors in the section from [page 108](#).

#### The Wizard: Opening the User Interface for the First Time

When you open the user interface for the first time, a wizard starts to assist you in configuring the FRITZ!Box.

If you cancel the wizard, you can configure your FRITZ!Box without this wizard. You can change the settings configured with this wizard at any time.

For comprehensive information on configuring the many diverse functions of your FRITZ!Box, see the following chapters in this manual.

## 5.2 Protecting the User Interface with a Password

You can protect the user interface of the FRITZ!Box with a password. The password will be requested every time the user interface is opened. This protects the settings of your FRITZ!Box from unauthorized access.



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

### Setting Up Password Protection

As long as no password protection has been set up, every time you open the user interface you will be prompted to enter a password. If you disabled this message, here is how to set password protection:


1. Open the FRITZ!Box user interface (see [page 30](#)).
2. Go to the “System / FRITZ!Box Password” menu.
3. Enter a password and save the password by clicking “Apply”.

Password protection is now enabled.



Be sure to remember the password! If you forget the password, the factory settings will have to be restored to your FRITZ!Box (see [page 128](#)). All of the settings you configured will be discarded.

### Logging Off the User Interface

When password protection is enabled, you can log off the user interface at any time. To do so, click  **Log off** .

If you do not click on the user interface for a period of longer than ten minutes, you will be logged off automatically. The only pages excepted from this are those which are constantly updated, like the “Overview” page. No automatic logout will take place on these pages.

### 5.3 Saving the FRITZ!Box Settings

All of the settings you configure in your FRITZ!Box can be saved in a backup file on your computer. With this backup file you can restore your settings to the FRITZ!Box at any time or load your settings to another FRITZ!Box.

#### Saving and Restoring Settings

To save and restore your FRITZ!Box settings, use the “System / Save Settings” menu in the user interface. Here you can

- save your FRITZ!Box settings on the “Save” tab.
- restore all of your saved settings to **the same FRITZ!Box** on the “Restore” tab.
- load all of your saved settings to **another FRITZ!Box of the same model** on the “Restore” tab.
- load your saved settings to **another FRITZ!Box model** on the “Apply” tab. In this case you can select which settings are to be applied to the FRITZ!Box.



To load your saved settings to **another FRITZ!Box of the same model**, or to apply your FRITZ!Box settings to **another FRITZ!Box model**, the backup file must always be password protected.

Instructions for saving, restoring and applying FRITZ!Box files are presented in the user interface’s Online Help.



## 6 Configuring an Internet Connection into the LTE Network

The Internet connection for the mobile telephone network has to be set up once in the FRITZ!Box, then it is always available.

Along with the SIM card you received a PIN (Personal Identification Number) and a corresponding PUK (Personal Unlock Key) from your mobile telephone network provider. Keep both numbers handy.

The first time you open the FRITZ!Box user interface, you will automatically be prompted to configure the Internet connection.

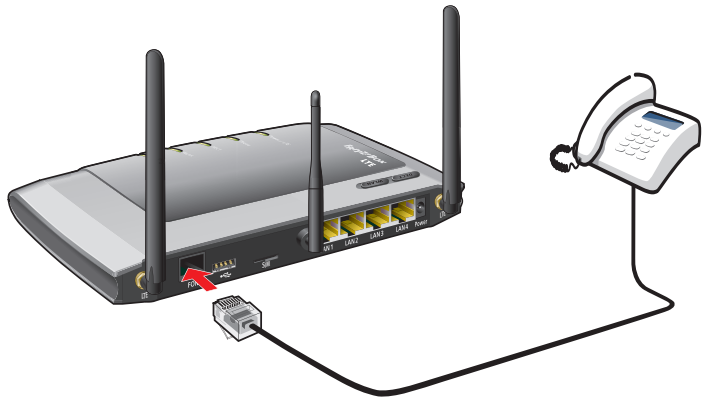
1. Start a web browser on your computer.
2. Enter [fritz.box](http://fritz.box) in the address field of the web browser.
3. The Wizard for configuring the Internet connection starts automatically.
4. Follow the instructions displayed on the screen.
5. As soon as you are prompted to do so, enter the PIN. If you enter the PIN incorrectly during login three times in a row, the device is blocked for further entries. With the PUK you can release this block.

## 7 Connecting Telephony Devices to the FRITZ!Box

This chapter describes how to connect telephones, fax machines, answering machines and telephone systems to the FRITZ!Box.

### 7.1 Connecting an Analog Telephony Device

You can connect an analog telephone, an analog fax machine or an analog answering machine to the FRITZ!Box.



Connecting an analog telephone with an RJ11 plug

Connect the telephone device to the “FON” port of the FRITZ!Box.



For instructions on how to set up the FRITZ!Box for making telephone calls, start reading from [page 39](#).

### 7.2 Registering Cordless (DECT) Telephones

Up to six cordless telephones that support the DECT standard can be registered on the FRITZ!Box.

#### Registering FRITZ!Fon Cordless Telephones

The cordless telephones FRITZ!Fon by AVM are the ideal complement to your FRITZ!Box 6840 LTE (see also [AVM Products for the FRITZ!Box from page 135](#)).



Connecting a cordless telephone

Here is how to register your FRITZ!Fon on the FRITZ!Box:

1. Switch your FRITZ!Fon on by pressing and holding down the hang-up button.
2. Press and hold down the “DECT” button on the FRITZ!Box. Hold the button down until the “DECT” LED on the FRITZ!Box begins flashing.

Your FRITZ!Fon will be registered at the FRITZ!Box.

If registration fails, register the FRITZ!Fon on the FRITZ!Box manually as described in the following section.

### Registering Any DECT Cordless Telephone

1. Start the process of registering your cordless telephone at a base station and follow the instructions.
2. As soon as you are prompted to press the registration button on the base station, press the “DECT” button on the FRITZ!Box and hold it down until the “DECT” LED on the FRITZ!Box begins flashing.



Upon delivery of the FRITZ!Box, the PIN for the integrated DECT base station is set to “0000”.

### 7.3 Registering Smartphones with FRITZ!App Fon

The FRITZ!App Fon software connects your smartphone with the FRITZ!Box via WLAN. Calls you make from home then use not the mobile telephone network, but the telephone numbers set up in the FRITZ!Box.

The free FRITZ!App Fon software can be installed on an iPhone, iPod or iPad with iOS4 or higher, and on Android smartphones with Google Android 2.1 or higher.

FRITZ!App Fon for Android smartphones is available at the [Android Market](#). FRITZ!App Fon for iOS is offered in the [Apple App Store](#).

#### Registering a Smartphone on FRITZ!Box

1. Install FRITZ!App Fon on your smartphone.
2. Connect your smartphone with the FRITZ!Box via WLAN.  
To establish the connection you need the WLAN key of the FRITZ!Box. The preconfigured WLAN key is printed on the sticker on the underside of the FRITZ!Box and on the FRITZ!Box CD jewel case.
3. Start the FRITZ!App Fon. If you protected the user interface of the FRITZ!Box with a password, enter the password to log in.

Once FRITZ!App Fon has been started, use your smartphone to make calls from home over the FRITZ!Box.

#### Defining Telephone Numbers for the Smartphone

A new telephone device for FRITZ!App Fon is entered automatically in the FRITZ!Box. The name of the telephone device is listed in the FRITZ!App Fon under “More / FRITZ!Box”.

You can assign telephone numbers to this telephone to determine which telephone numbers are used to make calls with your smartphone from home. See the section [Configuring Connected Telephones and Terminal Devices on page 40](#) for instructions.

## 7.4 Connecting an IP Telephone

Connect an IP telephone by plugging it into a network port on the FRITZ!Box or wirelessly via WLAN.

### Connecting an IP Telephone to the LAN Port of the FRITZ!Box

IP telephones with a LAN port can be connected to the FRITZ!Box with a network cable.



Connecting an IP telephone to the network port of the FRITZ!Box

1. Connect a network cable to the IP telephone.
2. Connect the free end of the network cable to a LAN port on the FRITZ!Box.

The IP telephone is now connected with the FRITZ!Box.



You cannot make calls with the IP telephone yet. The IP telephone still has to be configured in the FRITZ!Box (see [page 40](#)).

### Connecting an IP Telephone with the FRITZ!Box over WLAN

IP telephones that support WLAN can be connected wirelessly to the FRITZ!Box via WLAN.



Connecting an IP telephone with the FRITZ!Box over WLAN

1. Use your IP telephone to search for WLAN devices at your location.
2. Select your FRITZ!Box 6840 LTE from the list of WLAN devices found.
3. Enter the WLAN key of the FRITZ!Box.

The preconfigured WLAN key is printed on the sticker on the underside of the FRITZ!Box and on the FRITZ!Box CD jewel case.

Now the IP telephone will be connected with the FRITZ!Box.



You cannot make calls with the IP telephone yet. The IP telephone still has to be configured in the FRITZ!Box (see [page 40](#)).

## 8 Setting Up the FRITZ!Box for Telephone Calls

This chapter describes how to set up your FRITZ!Box for making telephone calls.

### 8.1 Entering Internet Telephone Numbers

Enter all telephone numbers you would like to use to make calls over the Internet in the FRITZ!Box.

#### Automatic Configuration of Telephone Numbers

Various Internet telephony providers offer automatic configuration of the Internet telephone numbers. They then automatically configure your Internet telephone numbers in the FRITZ!Box once the FRITZ!Box has been connected. To start automatic configuration, some providers require that you enter a start code.

The FRITZ!Box receives the data for automatic configuration (also called “remote configuration”) from an “Auto Configuration Server” (ACS), which is made available in the Internet by the Internet telephony provider.

After automatic configuration, your Internet telephone numbers will be listed in the “Telephony / Internet Telephony” menu in the FRITZ!Box user interface.

#### Entering Internet Telephone Numbers with the Wizard

Internet telephone numbers that are not configured automatically can be entered using the “Manage Your Own Phone Numbers” Wizard in the FRITZ!Box. You can even enter multiple Internet numbers from different Internet telephony providers.



The account information for your Internet telephone numbers, like the user name and the password, are obtained from your Internet telephony provider.

1. Open the FRITZ!Box user interface (see [page 30](#)).
2. Click “Wizards”.

3. Click “Manage Your Own Phone Numbers”.

The next page presents an overview of all telephone numbers that have already been entered.

4. Click “Enter New Telephone Number” to enter a new Internet telephone number. Follow the wizard’s instructions.

The Internet telephone number is entered in the FRITZ!Box. An overview of your Internet telephone numbers is presented in the FRITZ!Box user interface in the “Telephony / Internet Telephony” menu. Here you can edit or delete Internet telephone numbers as needed.

## 8.2 Configuring Connected Telephones and Terminal Devices

Once you have entered your telephone numbers in the FRITZ!Box, set up the connected telephones, telephone systems (PBXs), fax machines and answering machines in the FRITZ!Box. During configuration you must define the following, depending on the type of device:

- The telephone number the terminal device uses to place outgoing calls to the public telephone network.
- Telephone numbers for accepting calls. A telephone can be set to ring for all incoming calls or only for calls to certain telephone numbers.
- Internal name for the terminal device. This name will be displayed, for instance, in the call list of the FRITZ!Box.

The “Manage Your Telephony Devices” Wizard assists you in setting up the telephones and other terminal devices:


1. Open the FRITZ!Box user interface (see [page 30](#)).
2. Click “Wizards” in the menu.
3. Click “Manage Your Telephony Devices”.

You are presented with an overview of all telephones and terminal devices that have already been set up.



4. Now you can set up a new terminal device or open the settings of a terminal device:

To set up a new terminal device, click “Configure New Device” and follow the Wizard’s instructions.

Click the “Edit”  button to open the settings of a terminal device.

All configured telephones and other terminal devices are displayed in an overview in the FRITZ!Box user interface. This overview is found in the “Telephony / Telephony Devices” menu. Here you can edit the settings of terminal devices and delete terminal devices.

### 8.3 Making Telephone Calls

Once you have set up your telephones, you can make outgoing telephone calls to the public network and accept incoming calls.

A telephone places outgoing calls using the telephone number you defined for outgoing calls while setting up the telephone (see [page 40](#)).

For incoming calls a telephone reacts only to calls to those telephone numbers you assigned to the telephone during set-up (see [page 40](#)).

## 9 Firmware Update: Updating the FRITZ!Box Software

AVM provides free updates of the firmware for the FRITZ!Box. The firmware is the software stored in the FRITZ!Box that controls all of the FRITZ!Box functions.

Firmware updates contain further developments of existing FRITZ!Box functions and often also introduce new functions for your FRITZ!Box.

### Finding New Firmware and Transferring It to the FRITZ!Box

1. Open the FRITZ!Box user interface (see [page 30](#)).
2. Click “Wizards” in the menu and start the “Update Firmware” Wizard.

The Wizard checks whether new firmware is available for your FRITZ!Box.

If the Wizard finds new firmware, it displays the version number of the firmware. Click the link under the firmware version to view information about further developments and new functions contained in the firmware update. Read this information before starting the firmware update.

3. To transfer new firmware to the FRITZ!Box, click “Start Firmware Update Now”.

The firmware update begins and the “Info” LED on the FRITZ!Box starts flashing.



Do not interrupt the power supply to the FRITZ!Box during the firmware update!

The firmware update is complete when the “Info” LED stops flashing.

## 10 FRITZ!Box as an Internet Router

The FRITZ!Box connects computers in your home network with the Internet. This chapter explains the possibilities offered by using the FRITZ!Box as an Internet router and how to take advantage of them.

### 10.1 Child Protection: Restricting Internet Access

The child protection feature allows you to define access rules to the Internet for individual computers or Windows users. These access rules may include restrictions of Internet access time, filter lists and a list with blocked network applications:

- **Restrict Internet access time:** Using the time restriction you can restrict the amount of time the user can surf the web. You can define on which days of the week, at what times of day, and for how long a computer or Windows user is allowed to use the Internet connection.
- **Block or permit web sites:** you can use filter lists to define which Internet pages are allowed to be accessed and to which access is blocked. For instance, you can block all Internet pages the government has defined as offensive or harmful to minors.

You can create both filter lists, the whitelist and the blacklist. A whitelist contains all Internet pages to which access is allowed. A blacklist contains all Internet pages to which access is blocked.

- **Block network applications:** You can list network applications for which Internet access should be blocked. For instance, you can block Internet access for file-sharing software.

Child protection can be enabled for each computer individually, regardless of the computer's operating system.

You can also enable child protection individually in all Windows operating systems (Windows 7, Windows Vista and Windows XP). This option is very beneficial if a computer is used by multiple users.

### Setting Up Child Protection in the FRITZ!Box

1. Open the FRITZ!Box user interface (see [page 30](#)).
2. Select the “Internet / Filters” menu.
3. Set up the child protection feature, making use of the Online Help in the FRITZ!Box user interface.

## 10.2 Port Forwarding: Making Computers Accessible from the Internet

With default settings in the FRITZ!Box, programs on your computer and LAN cannot be accessed from the Internet. For a number of applications like online games and file sharing software, you have to make your computer accessible for other Internet users. In order to grant controlled access to your computer to other Internet users, you release certain ports for incoming connections. The ports serve to distinguish between running applications on a computer that has only one IP address.

### Setting Up Port Forwarding in the FRITZ!Box

- Port Forwarding is set up in the “Internet / Permit Access” menu.
- Port Forwarding for IPv6 is also set up in the “Internet / Permit Access” menu, on the “IPv6” page. To see this page, make sure you enabled the expert mode in the “System / Expert Mode” menu.

### Address for Accessing the FRITZ!Box

If you have enabled the ports for forwarding in the FRITZ!Box, other users can access your computer at the IP address assigned to your FRITZ!Box by the Internet Service Provider. This is a public IP address.

Here is how to determine the public IP address of the FRITZ!Box:

1. Open the FRITZ!Box user interface (see [page 30](#)).
2. Enable the expert settings in the “System / Expert Mode” menu.

3. Open any Internet page in order to establish an Internet connection.
4. The FRITZ!Box's public IP address is displayed on the "Overview" page in the "Connections" area.



Every time the Internet connection is interrupted the Internet Service Provider re-assigns the IP address. The IP address may change in the process. Therefore it is a good idea to use dynamic DNS so that the IP address can always be reached under the same name. For more information, see the section [Dynamic DNS: Name Instead of IP Address on page 45](#).

### 10.3 Dynamic DNS: Name Instead of IP Address

Dynamic DNS is an Internet service that makes it possible for the FRITZ!Box to remain accessible from the Internet at all times under a fixed name, even though the public IP address changes.

You must register with a dynamic DNS provider to use this service. When you register, you agree on the fixed name (domain name) at which your FRITZ!Box should be accessible from the Internet. You also define a user name and password.

Every time the IP address changes, the FRITZ!Box transmits the new IP address to the dynamic DNS provider in the form of an update request. Then the domain name is assigned to the current IP address by the dynamic DNS provider.

#### Setting Up Dynamic DNS in the FRITZ!Box

1. Open the FRITZ!Box user interface (see [page 30](#)).
2. Make sure that the expert mode is enabled in the "System / Expert Mode" menu.
3. Select the "Internet / Permit Access" menu.
4. Select the "Dynamic DNS" page and set up dynamic DNS. Consult the Online Help available in the FRITZ!Box user interface for more information.

## 10.4 Remote Access over HTTPS

With this function it is possible to access the user interface of the FRITZ!Box from another location. With this feature you can configure settings in the FRITZ!Box or perform a firmware update using a computer that is not in your own network (LAN or WLAN).

### Setting Up Remote Access over HTTPS in the FRITZ!Box

1. Open the FRITZ!Box user interface (see [page 30](#)).
2. Make sure that the expert mode is enabled in the “System / Expert Mode” menu.
3. Select the “Internet / Permit Access” menu.
4. Select the “Remote Access” page and set up dynamic DNS. For more information, see the Online Help.

## 10.5 Prioritization: Right of Way for Internet Access

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.

Network applications and network devices are assigned to the categories using rules.

### 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.

### Prioritization Method in the FRITZ!Box

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.

### Setting Up Prioritization in the FRITZ!Box

In order to use prioritization, the expert mode must be enabled in the user interface of the FRITZ!Box.

1. Make sure that the expert mode is enabled in the “System / Expert Mode” menu.
2. Prioritization is set up in the “Internet / Filters / Prioritization” menu.



## 10.6 VPN: Remote Access to the Home Network

Via VPN (see [glossary](#)) a secure remote access to the network of the FRITZ!Box can be established. The VPN solution for the FRITZ!Box features the following:

- 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.
- A maximum of eight simultaneous active VPN connections is 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 AVM web site offers a 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](http://www.avm.de/en/vpn)

### Setting Up VPN in the FRITZ!Box

1. Open the FRITZ!Box user interface.
2. Enable the expert settings in the “System / Expert Mode” menu.
3. Select the “Internet / Permit Access” menu.
4. Select the “VPN” page.

See the Online Help of the FRITZ!Box to set up VPN.

## 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.

- “Configure FRITZ!Box VPN Connection” Wizard

AVM provides the “Configure FRITZ!Box VPN” software for creating 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 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](http://www.avm.de/en/vpn)

## 10.7 DNSSEC: Security for DNS Queries

DNSSEC is short for Domain Name System Security Extensions. As the name says, this is an extension of DNS, the domain name system.

DNSSEC ensures that both the DNS server and the information returned by the DNS server are authentic, or genuine.

### Support with the FRITZ!Box

The FRITZ!Box supports DNSSEC queries over UDP.

The FRITZ!Box has a DNS proxy. The computers in the home network use the FRITZ!Box as a DNS server. The FRITZ!Box forwards DNSSEC queries from the home network to the Internet. The FRITZ!Box forwards DNSSEC responses from the Internet to the home network. The DNSSEC information must be validated on the computer in the home network. For this DNSSEC must be supported in the operating system.

### Security with DNSSEC

When a home user surfs the web, she or he sends queries to the Internet by entering URLs in the address line of his browser. A URL is the name of a web site that is easy to remember, such as [avm.de/en](http://avm.de/en). Every query is sent to the DNS server first. The DNS server resolves the URL into the corresponding IP address. There is one unambiguous IP address for every URL.

The home user relies on the authenticity of the IP address returned by the DNS server. Authentic means that the response is the IP address of the desired web site, and not a faked IP address that leads to a fake web site. DNSSEC can ensure that the returned addresses are authentic.

## 11 FRITZ!Box as a WLAN Base Station

The FRITZ!Box supports WLAN (Wireless Local Area Network) technology. In this chapter you will learn how you can use WLAN with the FRITZ!Box.

### 11.1 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.

#### Wireless Network Name (SSID)

In the factory settings of the FRITZ!Box, the name of the wireless network (SSID) is set to “FRITZ!Box 6840 LTE”.



It may occur that an additional device with the same FRITZ!Box network name is located in the vicinity of your FRITZ!Box. Therefore we recommend changing the preset radio network name.

### 11.2 Guest Access: WLAN Connection for Guests

You can connect computers with the FRITZ!Box via WLAN so that they can access the Internet without being integrated in the home network of the FRITZ!Box. This function is called “guest access”.

Your guests can use the guest access, for instance, to surf the web with a notebook and to receive e-mail.

### Guest Access Properties

- The guest radio network is a separate radio network with its own name (SSID). It is independent of the wireless network of the FRITZ!Box that integrates computers in the home network.
- Computers connected via guest access are not part of the home network.
- The guest network is secured with its own network key. This network key can be changed as desired without affecting the computers in your home network.

### Setting Up Guest Access in the FRITZ!Box

1. Open the FRITZ!Box user interface.
2. Make sure that the expert mode is enabled in the “System / Expert Mode” menu.
3. Make sure that the wireless radio network (WLAN) is enabled in the “WLAN / Radio Network” menu.
4. Select the menu “WLAN / Guest Access” and configure the guest radio network. For more information, see the Online Help of the FRITZ!Box.

## 11.3 Setting Up Night Service for WLAN

In the FRITZ!Box you can set up night service for the WLAN radio network. Then the FRITZ!Box switches to hibernation at specified times and turns off the radio network. This has the following advantages:

- reduced power consumption when idle
- time-controlled Internet access: with night service you can ensure that your children are only allowed to surf the web until a certain time of day

### Switching Night Service for WLAN On and Off

1. Open the FRITZ!Box user interface (see [page 30](#)).
2. Select the “System / Night Service” menu.

3. Enable the “Use schedule for WLAN radio network” option.
4. Enable or disable the option “The radio network cannot be switched off until no more WLAN devices are active”.

Option enabled: The radio network remains switched on until all wireless connections between the FRITZ!Box and other WLAN devices have been ended.

Option is disabled: The radio network is switched off immediately at the start of the specified period.

5. Define the days and times at which the FRITZ!Box WLAN radio network should be switched off.
6. Save your settings by clicking “Apply”.

Night service for WLAN is now enabled. To disable night service, remove the checkmark in front of “Use schedule for WLAN radio network” and click “Apply”.

### Switching On WLAN during Night Service

The WLAN radio network of the FRITZ!Box can be switched back on at any time during night service:

Press the WLAN button on the FRITZ!Box or enable the WLAN radio network using a connected telephone (see [page 120](#)).

## 11.4 Increasing the Range of the WLAN Connection

The range of a WLAN radio network is influenced by various external circumstances. 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 device used
- structural conditions
- the number of devices operating near the access point in the same frequency range.

If needed, you can extend the range of your WLAN radio network with a WLAN repeater, for instance with the FRITZ!WLAN Repeater N/G or FRITZ!WLAN Repeater 300E from AVM. A WLAN repeater is a supplementary device that is not included in the FRITZ!Box package.

Instead of using a WLAN repeater, you can set up a Wireless Distribution System. For this you need, in addition to the FRITZ!Box, another WLAN access point that is configured as a WDS repeater (see [page 55](#)).

### Using the FRITZ!WLAN Repeater

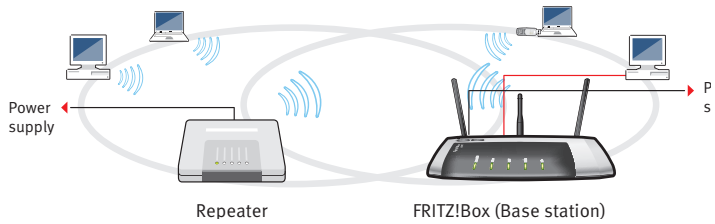
With the FRITZ!WLAN Repeater N/G from AVM you can extend the range of your WLAN radio network quickly and easily, for instance to overcome structural conditions that are characterized by thick materials and heavy shielding. The FRITZ!WLAN Repeater N/G supports all common WLAN standards, is especially easy to install and can be operated at any 230-V power outlet. For more information on the FRITZ!WLAN Repeater N/G, see the web site at:

[www.avm.de/en/Produkte/FRITZ\\_WLAN/FRITZ\\_WLAN\\_Repeater\\_N\\_G](http://www.avm.de/en/Produkte/FRITZ_WLAN/FRITZ_WLAN_Repeater_N_G)

### Setting Up a WDS

To use WDS (Wireless Distribution System) to increase the range of your WLAN radio network, you need another WLAN base station in addition to the FRITZ!Box. This can be a second FRITZ!Box or any other WLAN base station that supports WDS. The first WLAN base station then works as a WDS base station and the second 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 are outside its own range, but within the range of the WDS repeater.



WDS: Expanding the WLAN range using a WDS repeater

Note the following for WDS configuration:

- To expand the range of your wireless network, you need at least one additional WLAN base station. The wireless network of your FRITZ!Box can be expanded to a WDS (Wireless Distribution System) with up to three WLAN base stations.
- All WLAN base stations implemented in the WDS must support WDS and be configured for this technology.
- All WLAN base stations 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.
- All WDS connections between the WDS base station and the WDS repeaters must be secured using the same encryption (e.g. WPA/WPA2). **Note that the WPA2 encryption method is available only when your network consists of AVM devices, since in the WLAN standard only WEP encryption has been specified for WDS connections.**
- All WLAN base stations in the WDS must use the same radio channel.



- Every WLAN base station participating in the WDS fulfills the tasks of a WLAN access point for its WLAN clients. This means that the WLAN clients see each WLAN base station 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 base stations. Each client can then automatically register at the WLAN base station with the best availability.

- Each IP address may be assigned only once in the wireless network.

## 11.5 WLAN 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 IEEE 802.11a, IEEE 802.11b, IEEE 802.11g and IEEE 802.11n standards define the throughput within a wireless radio network. IEEE 802.11i is a security standard.

### Standards for the Throughput Rate

#### Data Throughput

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

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

Standard	Frequency Band	Gross Data Throughput up to	Net Data Throughput up to
802.11b	2.4 GHz	11 Mbit/s	5 Mbit/s
802.11g	2.4 GHz	54 Mbit/s	25 Mbit/s
802.11a	5 GHz	54 Mbit/s	25 Mbit/s
802.11n	2.4 / 5 GHz	300 Mbit/s	150 Mbit/s

The standards are intended for different frequency bands.

### 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 devices 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 WLAN standard. Older WLAN devices of the first generation can communicate with the FRITZ!Box using 802.11b. However, if the WLAN device 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 whichever frequency band is 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 devices.

### 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 devices. 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. Open the FRITZ!Box user interface.
2. Make sure that the expert mode is enabled in the “System / Expert Mode” menu.
3. Open the “WLAN / Radio Channel” menu and select “Adjust radio channel settings” to make the desired changes.



Note the following for the configuration of this setting:

- In order to communicate with each other, the FRITZ!Box and all WLAN devices must work in the same frequency band.
- The standard you configure in the FRITZ!Box must be compatible with the standards of all WLAN devices used in the WLAN.

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

- Your radio network integrates only WLAN devices that are compatible with one or both of the following standards:  
802.11n  
802.11g  
Set the following mode in the FRITZ!Box:  
Mode: 802.11n+g  
The 2.4-GHz frequency band will be used.
- Your radio network integrates only WLAN devices that are compatible with one or both of the following standards:  
802.11b  
802.11g  
Set the following mode in the FRITZ!Box:  
Mode: 802.11b+g  
The 2.4-GHz frequency band will be used.
- Your radio network integrates only WLAN devices that are compatible with one or several of the following standards:  
802.11n  
802.11g  
802.11b  
Set the following mode in the FRITZ!Box:  
Mode: 802.11n+g+b  
The 2.4-GHz frequency band will be used.

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

802.11n

802.11a

Set the following mode in the FRITZ!Box:

Mode: 802.11n+a

The 5-GHz frequency band will be used.

## 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. CCMP (Counter Mode with CBC-MAC Protocol) 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 devices that also support WPA2 with AES or WPA with TKIP.

## 11.6 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.

Should interference in a WLAN persist, the first step should be to select a different channel.

### 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 base stations) 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 118](#).

### 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 often than the most common 2.4-GHz frequency range.

In the 5-GHz frequency band the FRITZ!Box supports automatic channel switching by DFS (Dynamic Frequency Selection). DFS ensures that the channels from 52 to 140 are kept free for higher priority users, like weather radar systems. If you are operating your FRITZ!Box in one of these channels, it monitors the selected channel periodically for higher priority users, and, if necessary, switches to a different channel. Note that the FRITZ!Box waits up to ten minutes, as legally required, before occupying a free channel. During this period you cannot register any WLAN devices. The WLAN connection is then established automatically. For more information, see the section [Avoiding WLAN Channels with DFS on page 117](#).

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, but not parallel in both frequency ranges at the same time.

### 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 bandwidth only)
104	5.52		



## 12 FRITZ!Box as a Telephone System

The FRITZ!Box is a telephone system (or PBX: Private Branch Exchange) for Internet telephony. This chapter describes convenience functions for the telephone system that can be configured in the FRITZ!Box user interface, for instance telephone books, answering machines and call diversion.

You will also find out which convenience functions can be used to make calls, for instance internal calling, alternating between calls, forwarding calls and three-party conferences.

### 12.1 Using the Telephone Book and Call List

#### Telephone Book

A telephone book is at your disposal in the FRITZ!Box. In the user interface the FRITZ!Box telephone book is found in the “Telephony” menu.

If a cordless telephone from AVM (for instance FRITZ!Fon MT-F) is registered on the FRITZ!Box, you can use the telephone book directly on the cordless telephone. If multiple AVM cordless telephones are registered, you can set up an individual telephone book for each cordless telephone in the FRITZ!Box.

#### Call List

In the call list the FRITZ!Box saves outgoing and incoming calls, missed calls, and sent and received faxes.

In the FRITZ!Box user interface the call list is found in the “Telephony” menu.

If the number of a caller or someone called is entered in the FRITZ!Box telephone book, the call list will display the name from the telephone book.

Numbers that are not saved in the telephone book can be added to the telephone book from the call list.

The call list can be stored as a CSV file. CSV files can be opened in programs like spreadsheet software.

## 12.2 Setting Up the FRITZ!Box Answering Machine

You can configure up to five different answering machines in the FRITZ!Box.

### Enable an Answering Machine

1. Open the FRITZ!Box user interface (see [page 30](#)).
2. Select “Telephony / Telephony Devices”.
3. Click “Configure New Device”.
4. Under “Integrated in the FRITZ!Box”, select the “Answering machine” option and confirm by clicking “Next”.
5. Specify the mode, greeting delay and greeting length. (In the “Greeting only” mode, callers will hear a recording, but cannot leave any message for you.)
6. Enter a name for the answering machine and confirm by clicking “Next”.
7. Specify which calls the answering machine should accept. Select one or multiple telephone numbers and confirm by clicking “Next”.
8. Check the settings of the answering machine and then click “Apply”.

Now the answering machine is enabled.







### Switching the Answering Machine On or Off

All configured answering machines are displayed in the FRITZ!Box user interface under “Telephony / Telephony Devices”. Here you can disable or delete answering machines and enable additional functions.

For instance, you can enable the “Send messages via e-mail” setting for each answering machine. Messages callers leave on the answering machine then will be sent to you by e-mail. You can select any e-mail address you want. The messages are sent as audio files.


























## Picking Up a Call from the Answering Machine

With this function, calls that have already been answered by an answering machine can be transferred to your telephone:

Picking Up a Call	
	Pick up the handset.
   	Dial the sequence shown at left.
	The call is now connected to your extension, and you can talk with the caller.

## Operating the Answering Machine Using the Voice Menu

The answering machines of the FRITZ!Box can be operated using a voice menu. You can listen to new messages, for instance, or switch the answering machine on and off.

Operating the Answering Machine Using the Voice Menu	
	Pick up the handset.
	Select:
   	Answering machine 1
    	Answering machine 2
    	Answering machine 3
    	Answering machine 4
    	Answering machine 5
	You will enter the voice menu of the answering machine.
	Follow the voice menu.
	If you do not want to wait for the voice menu instructions, you can press a telephone key right away.

## The Answering Machine Menu

### Main menu

**1** Play back messages

If no messages are available, you will hear two short audio signals and return to the main menu.

- 1** Play back messages
- 3** Call back the caller of the message
- 5** Delete message
- 7** To previous message
- 9** To next message
- 0** Listen to “Play back messages” menu again
- #** Back to main menu

**2** Delete all messages

**3** Switch answering machine on/off

**4** Record greetings

- 1** Record greeting message
- 2** Record announcement
- 3** Record closing announcement

Record and select

- 1** Listen to all greetings/announcements of the selected type › Select the desired recording by pressing 2
- 5** Delete greeting/announcement
- 8** Record greeting/announcement › End recording by pressing 1
- 0** Listen to “Record and Select” menu again
- #** Back to main menu
- 0** Listen to “Record greetings” menu again
- #** Back to main menu

**5** Switch recording and directions mode on/off

**0** Listen to main menu again

## 12.3 Setting Up FRITZ!Box Fax Reception

With the FRITZ!Box you can receive faxes without having to connect a fax machine. The FRITZ!Box automatically forwards incoming faxes by e-mail or saves the faxes on a connected USB storage medium.

1. Open the FRITZ!Box user interface (see [page 30](#)).
2. Select the “Telephony / Telephony Devices” menu.
3. Click “Configure New Device”.
4. Select the “Fax reception” option and confirm by clicking “Next”.
5. Enter a fax ID. This could be your fax number or name, for instance.
6. Define whether the FRITZ!Box forwards incoming faxes by e-mail or saves them.

If you would like to enter multiple e-mail addresses, separate the addresses with commas.

7. Confirm with “Next”.
8. Select one or multiple telephone numbers you would like to use exclusively for fax reception.
9. Confirm by clicking “Next” and “Apply”.

### **Sending Faxes with FRITZ!fax for FRITZ!Box**

To **send** faxes you can install the free “FRITZ!fax for FRITZ!Box” software. This program is available at [www.avm.de/en](http://www.avm.de/en) (for Windows 7, Vista and XP).

## 12.4 Setting Up Call Diversion

You can configure call diversion settings in the FRITZ!Box. Call diversion forwards incoming telephone calls, for instance, to an external telephone number.

## Call Diversion Settings

You can configure multiple call diversion modes with different settings.

Depending on the setting, a call diversion forwards all calls or only certain calls. For instance, you may want to divert calls for a certain telephone number, or calls from a certain person in the FRITZ!Box telephone book.

As the destination of a call diversion you can specify an external telephone number, a connected telephone, the integrated answering machine of the FRITZ!Box or a connected answering machine.

Examples of call diversion settings:

- All incoming calls will be diverted to another telephone line.
- Calls that come from a certain telephone number will be diverted to your mobile telephone number.
- Anonymous calls in which the caller does not transmit a telephone number will be diverted to an answering machine.

## Setting Up a New Call Diversion Setting

1. Open the FRITZ!Box user interface (see [page 30](#)).
2. Select the “Telephony / Call Diversion” menu.
3. Click “New Call Diversion”.
4. Define which calls should be diverted.
5. Define the destination and the type of call diversion.
6. Save the settings by clicking “OK”.

This concludes the configuration of call diversion.

All configured call diversion settings can be viewed in the user interface of the FRITZ!Box in the “Telephony / Call Diversion” menu. All call diversion settings can be disabled or deleted here.

## 12.5 Saving Costs with Dialing Rules

In the FRITZ!Box you can set up dialing rules. A dialing rule determines which telephone number the FRITZ!Box uses for outgoing calls in a certain number range. A number range may cover, for instance, all mobile telephone numbers or international numbers.

If you have multiple telephone numbers you can have each outgoing call automatically placed using the most economical telephone rate.

### Setting Up New Dialing Rules

1. Open the FRITZ!Box user interface (see [page 30](#)).
2. Select the “Telephony / Dialing Rules” menu.
3. Click the “New Dialing Rule” button.
4. Define the range of telephone numbers or the telephone number to which the dialing rule should apply.
5. Select a telephone number from the “Connect via” drop-down list.
6. Save the settings by clicking “OK”.

This concludes the configuration of the dialing rule.

## 12.6 Blocking Telephone Numbers and Callers

The FRITZ!Box offers you the following possibilities for blocking calls:

- Block numbers and ranges of numbers for outgoing calls:

Blocked numbers and number ranges can no longer be called from the FRITZ!Box. In this manner you can block calls to certain mobile networks, for instance.

- Block telephone numbers for incoming calls:

If you block a number for incoming calls, the FRITZ!Box will no longer accept any calls from this telephone number—provided that the caller did not suppress her or his number. In this way you can block connections from unwanted callers.

You can also set up a call block for all callers who do not transmit their telephone numbers (anonymous callers).

### Setting Up a New Call Block

1. Open the FRITZ!Box user interface (see [page 30](#)).
2. Select the “Telephony / Call Blocks” menu.
3. Click the “New Blocking Rule” button.
4. Select whether the call block is to apply to incoming or outgoing calls.
5. Enter a range of numbers or a number.
6. Save the settings by clicking “OK”.

This concludes the configuration of the call block.

## 12.7 Setting Up Do Not Disturb

In the FRITZ!Box night service you can set up a Do Not Disturb function so that none of the connected telephones and other terminal devices signal calls. At a time freely defined by the user (for instance 11:00 p.m. – 6:00 a.m.) the terminal devices then will be set as follows:

- Connected telephones will not ring.

This is not the case for IP telephones. It is not possible to set up Do Not Disturb for IP telephones in the FRITZ!Box.

- Connected fax and answering machines are disabled.

The Do Not Disturb setting has no effect on fax reception or the answering machines integrated in the FRITZ!Box.



### Turning Do Not Disturb On/Off

1. Open the FRITZ!Box user interface (see [page 30](#)).
2. Select the “System / Night Service / Do Not Disturb” menu.
3. Enable the “Do Not Disturb active” option and define the time period during which the telephones should not be able to ring every day.
4. Save your settings by clicking “Apply”.

Do Not Disturb is now enabled.

To have the telephones ring again, disable the “Do Not Disturb enabled” option and then click “Apply”.

Instead of setting the Do Not Disturb setting for all telephones, in the FRITZ!Box you can also set the Do Not Disturb feature for individual telephones. The Do Not Disturb function for an individual telephone is set up in the telephone settings. In the user interface of the FRITZ!Box, these settings can be opened for editing in the “Telephony / Telephony Devices” menu.

## 12.8 Setting Up the Alarm

In the FRITZ!Box you can set an alarm. When an alarm is set and enabled, a telephone connected to the FRITZ!Box will ring at the specified time.









### Setting the Alarm in FRITZ!Box

1. Open the FRITZ!Box user interface (see [page 30](#)).
2. Select the “Telephony / Alarm” menu.
3. Enable the alarm and enter a time.
4. Select which telephone should ring at the specified time.
5. Define here whether the alarm should be repeated.
6. Save the settings by clicking “Apply”.

Now the alarm is set up and enabled.

## 12.9 Enabling the Baby Monitor

When the baby monitor is enabled for a telephone, the telephone automatically calls a previously specified telephone number whenever the volume in the room reaches a defined level. If the telephone is in the same room as your child, you can use this function to monitor its sleep.

Enabling Baby Monitor	
	<p>Pick up the handset or activate the speaker phone function of your telephone.</p> <p>We recommend using a device with a speaker phone function.</p>
<p> 4</p> <p>&lt;level&gt;</p> <p></p> <p>&lt;number&gt;</p> <p></p>	<p>Enables the baby monitor.</p> <p>&lt;Level&gt;: Sound level at which a call is triggered. Enter a numeral between  (the most sensitive setting) and .</p> <p>&lt;Number&gt;: The telephone number to be called. Enter an internal telephone number (see <a href="#">page 75</a>), the number  for an internal group call, or any external telephone number desired.</p>
	<p>Wait for the second-long acknowledgement tone.</p>
	<p>Do <b>not</b> hang up the handset!</p>
	<p>The baby monitoring function is now enabled.</p> <p>As soon as the volume in the room reaches the specified level, the telephone will dial the telephone number you entered. If you accept the call, you are connected with the telephone where the baby monitor is enabled.</p> <p>A new call is initiated no less than one minute after the previous call.</p> <p>You can disable the baby monitor at any time by hanging up the headset.</p>








Telephones on which baby monitoring is enabled can be called internally (see [page 75](#)) so that you can listen in on the room directly.

## 12.10 Making Telephone Calls with Convenience Functions

This chapter describes convenience functions you can use when placing and making telephone calls, for instance internal calling, forwarding calls, alternating between calls and three-party conferences.





### Making Internal Calls

All calls conducted between telephones connected to the FRITZ!Box are internal telephone calls. Internal calls are free of charge.

Dialing Internal Calls	
	Pick up the handset.
  <internal telephone number>	Select   and the internal telephone number of a telephone.  <b>Internal numbers:</b> Socket “FON” of the FRITZ!Box: 1 Cordless DECT telephones: 610 – 615 IP telephones: 620 – 629

### Group Call

A group call is placed to all other telephones connected to the FRITZ!Box. You conduct the call with the party who picks up first.

Group Call	
	Pick up the handset.
  	Dial the sequence shown at left.

## Transferring: Forwarding Calls Internally

You can transfer a call to another telephone connected with the FRITZ!Box.

Transferring Calls	
Call 1 ⓵	You are talking to caller 1.
Ⓜ	Press the Hold button. Caller 1 is now on hold.
* * <internal telephone number>	<p>Call caller 2: Select * * and the internal telephone number of a telephone.</p> <p><b>Internal numbers:</b></p> <p>Socket “FON” of the FRITZ!Box: 1</p> <p>Cordless DECT telephones: 610 – 615</p> <p>IP telephones: 620 – 629</p>
Call 2 ⓵	You can now talk with caller 2.
Ⓣ	<p>To transfer call 1 to caller 2, simply hang up the receiver.</p> <p>Caller 1 and caller 2 will be connected to each other.</p>




## Shortening the Dialing Procedure

The FRITZ!Box automatically detects when the entry of a telephone number is complete. However, the FRITZ!Box needs a few seconds after entering the last numeral to detect this. You can shorten this delay:

Shortening the Dialing Procedure	
<Number> #	After entering the telephone number, press the # key. This signals to the FRITZ!Box that the entry of the telephone number is complete.







## CLIR for One Call on an Analog Extension (Case by Case)

On the analog extension of the FRITZ!Box, when you make a call you can define that during this call your telephone number will not be transmitted to the other caller.

Enabling CLIR (Case by Case)	
	Pick up the handset.
	Dial the sequence shown at left. You hear the external dial tone.
	Dial an external telephone number. For this call your telephone number will not be transmitted to the other caller.

## Three-Party Conference Call

A three-party conference call can involve one other internal participant and one external participant, or two external participants.

Conducting a Three-party Conference Call	
	Pick up the handset.
	Establish the call with party 1: Dial  and an internal telephone number (see <a href="#">page 75</a> ) or dial an external telephone number. Talk.
	Press the Hold button. Call 1 is on hold.
	Call party 2. You can now conduct the second call while call 1 is on hold.
	Dial the sequence shown at left.

---

### Conducting a Three-party Conference Call

---

Ⓜ	Now all parties can confer together. If either of the other two parties hangs up, your connection with the remaining participant remains active.
Ⓜ	To end the three-party conference call, hang up the handset.
Ⓜ②	This keyboard shortcut ends the conference and re-connects you with the party you called before the conference began. The second call is on hold. You can alternate between the two parties by dialing the keypad sequence again.

---

### Accepting or Rejecting Waiting Calls on an Analog Extension of the FRITZ!Box

When the “call waiting” function is switched on, you hear a signal whenever you receive an external call during an active telephone conversation. You can then accept the call within 30 seconds. If you do not accept the call, it will be rejected.

You can enable and disable the “call waiting” function in the FRITZ!Box user interface in the menu “Telephony / Telephony Devices”.

---

### Accepting or Rejecting Waiting Calls on an Analog Extension

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Ⓜ②	Use this keypad sequence to accept a waiting call. The first call is on hold.  If you would like to end the first call, hang up the receiver. As soon as you have hung up your telephone will ring. When you pick up the receiver, you will be connected with the waiting call.
Ⓜ①	If the first call was on hold, you can return to the first call using this keypad sequence.
Ⓜ①	With this keypad sequence you can reject a waiting call.

---






## Accepting Waiting Calls on Other Telephones

When making calls with a cordless DECT telephone registered on the FRITZ!Box, you can accept waiting calls using the telephone menu.

## Alternating Between Calls




During a telephone call you can establish a connection to a second party. You can alternate between the two parties as often as you like.

Alternating Between Calls	
Call 1 Ⓜ	You are talking with party 1.
Ⓜ	Press the Hold (“R”) button.
Ⓜ	<p>Call party 2.</p> <ul style="list-style-type: none"> <li>• Dial an external telephone number,</li> <li>• or dial * and * and an internal telephone number.</li> </ul> <p><b>Internal numbers:</b></p> <p>Socket “FON” of the FRITZ!Box: 1</p> <p>Cordless DECT telephones: 610 – 615</p> <p>IP telephones: 620 – 629</p>
Call 2 Ⓜ	<p>When party 2 picks up the receiver the call has been established.</p> <p>The connection with party 1 is on hold.</p>
Ⓜ	<p>If you would like to return to the waiting party 1, dial the keypad sequence at left.</p> <p>With this keypad sequence you can alternate between the two parties as often as you like.</p>

Ending Hold	
	The waiting party hangs up and you continue the call with the other party.
	or You end the call with party 2 by dialing the keypad sequence at left. The conversation with party 1 is resumed.
  	or You can end the active call by hanging up the handset. Your phone rings. As soon as you pick up the receiver you are connected with the waiting party.

### Consultation / Hold

You can put a telephone call on hold in order to consult with another party. You call the second party. The party to the other call does not hear the consultation; after you are finished you can resume the call that was on hold.

Consultation / Hold	
Call 1 	You are talking to caller 1.
	Press the Hold button. Call 1 is on hold. Party 1 can no longer hear you.
	Establish the connection to party 2: Dial an internal telephone number (see <a href="#">page 75</a> ) or an external telephone number.



Consultation / Hold	
Call 2 ⌚	If party 2 accepts the call, you can conduct the conversation.
Ⓜ	If party 2's line is busy or the call is not answered, press the Hold button again to return to call 1.
Ⓜ 1	Use this keypad sequence to return from call 2 back to call 1. Call 1 is now active again.  If you only press the Hold button, the connection to caller 2 remains on hold until caller 2 hangs up.  You can also end call 2 by hanging up the receiver. Your telephone rings and after you pick up the receiver again you will be connected with party 1.

### Using Keypad Shortcuts

With keypad sequences you can control the services and features for your Internet telephone numbers.

For information about which keypad sequences you can use, contact your telephone carrier.

#### Entering Keypad Sequences on an Extension with Automatic Outside Dialing

⌚	Pick up the handset.
*#<Seq>	Dial the sequence shown at left. <Seq> stands for a keyboard sequence.

#### 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 a keyboard sequence.



Automatic outside dialing is the default setting in the FRITZ!Box. If you make a lot of internal calls, you may want to disable automatic outside dialing. For instructions, see [page 127](#).

## 13 FRITZ!Box as a DECT Base Station

A DECT base station is integrated in your FRITZ!Box, on which you can register and configure a total of up to six cordless telephones. This chapter describes various functions of the DECT base station.

### 13.1 Paging Cordless Telephones

If you have misplaced a cordless telephone, you can find it by using a paging call:

1. Briefly press the DECT button of the FRITZ!Box. All cordless telephones registered on the FRITZ!Box will ring.
2. To end the paging call press the DECT button on the FRITZ!Box again, or any button on your cordless telephone.


### 13.2 Deregistering a Cordless Telephone from the FRITZ!Box



For instructions on how to register a cordless telephone on the FRITZ!Box, see [page 34](#).

1. Open the FRITZ!Box user interface (see [page 30](#)).
2. Click “DECT”.

The “Cordless Telephones” page presents an overview of the registered cordless telephones.

3. Click the “Delete”  button next to the cordless telephone to be deregistered.

The cordless telephone will be deregistered from the FRITZ!Box.

If you deregister all of the cordless telephones from the FRITZ!Box, the DECT function of the FRITZ!Box is switched off automatically.

### 13.3 Enabling DECT Eco

The DECT Eco function allows the FRITZ!Box to switch off the DECT network whenever all of the cordless telephones registered are on stand-by.

The connection between the FRITZ!Box and the cordless telephones remains active. You can place and accept calls at any time.

#### Prerequisite for Using DECT Eco

DECT Eco can be used only if all of the cordless telephones registered on the FRITZ!Box support DECT Eco.

To find out whether your cordless telephone supports DECT Eco, see the “DECT / DECT Monitor” menu in the FRITZ!Box user interface.



All of the latest FRITZ!Fon models by AVM support DECT Eco (see also [AVM Products for the FRITZ!Box from page 135](#)).

#### Enabling DECT Eco in the FRITZ!Box

1. Open the user interface of the FRITZ!Box in a web browser ([fritz.box](http://fritz.box)).
2. Select “DECT / Base Station”.
3. Enable the “DECT Eco” option and define when DECT Eco should be active.
4. Click the “Apply” button to save the settings.
5. Register all of the cordless phones on the FRITZ!Box again.

Now DECT Eco is enabled.

## 14 The FRITZ!Box Home Network

The FRITZ!Box connects your network devices, USB devices and storage devices in what we call a FRITZ!Box home network. In the home network the FRITZ!Box makes data like images, music and videos available to all connected users and allows them to share a printer.

### Network Devices

Network devices include, for instance, computers, game consoles and smartphones that are connected with the FRITZ!Box via a network cable connection or via WLAN.

All network devices can access each other's folders released for sharing, and share connected USB devices and available memory.

If you would like to learn more about the possibilities of network devices in your FRITZ!Box home network, continue reading in the chapter [Network Devices in the FRITZ!Box Home Network from page 87](#).

### USB Devices

USB devices include, for instance, printers, multi-function devices, and flash memory on the USB ports of the FRITZ!Box.

Connected USB devices can be used jointly and simultaneously by all network devices of your FRITZ!Box home network.

For more information about how to best configure USB devices in your home network and how to use them securely, see the chapter [USB Devices in the FRITZ!Box Home Network from page 97](#).

### Storage (NAS)

The memory of the FRITZ!Box includes storage media like flash memory or hard drives connected to the USB ports of the FRITZ!Box.

What is more, the FRITZ!Box can manage online storage configured on the server of your telecommunications provider.

For more information about how to access the memory in your FRITZ!Box home network safely and conveniently, see the chapter [Accessing USB Memory from page 99](#).

## 15 Network Devices in the FRITZ!Box Home Network

All network devices connected with the FRITZ!Box comprise a network. Network devices include, for instance, computers, game consoles and smartphones. The devices can be connected with the FRITZ!Box by cable or wirelessly. This chapter describes the network settings in the FRITZ!Box and how you can change them. You will also learn how you can change the IP settings for the computer in the most common operating systems.

### 15.1 Network Settings in the FRITZ!Box

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 (from [page 146](#)) explains concepts and terminology having to do with IP networks.

#### Network Overview

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

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

For each user and each network device, you find is an entry in the network overview. The columns have the following meanings:

Icon	Each name is preceded by a green LED if the device is actively connected with the FRITZ!Box, but currently not using the Internet connection. Any device using the Internet connection appears with a green-blue globe icon in front of its name.
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.
Connection	The WLAN icon is displayed for wireless connections.
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 entry in editing mode. 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 Assigning the Same IP address

The editing mode 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.



### Starting the Computer – Wake on LAN

The editing mode 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.

### IP Settings in the FRITZ!Box

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

FRITZ!Box Factory Settings	
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:

This IP address is used by the FRITZ!Box itself	192.168.178.1
This IP address is the broadcast address used to send messages into the network	192.168.178.255

## IP Address in the FRITZ!Box

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.

## 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.

## DHCP Server of the FRITZ!Box

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 the their IP settings. For more information, see the section [Obtaining an IP Address Automatically from page 93](#).

### **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 when the DHCP server is disabled, 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

---



Here too: each IP address can be assigned only once.

### Changing Network Settings

In order to change the network settings of the FRITZ!Box, the Expert Mode must be enabled in the user interface:

1. Select the “System / Expert Mode” menu and enable “Show expert settings”.
2. Select the “Home Network / Network” menu.
3. Select the “Network Settings” page.
4. Click the “IP Addresses” button.  
The “IP Settings” page is opened.
5. Make the desired changes and then confirm with “OK” so that all changes will be applied.



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.

### 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., connection status, data transmission). UPnP service thus allows you to monitor your FRITZ!Box from a connected computer.

Here is how to change the UPnP settings:

1. Open the FRITZ!Box user interface (see [page 30](#)).
2. Make sure that the expert mode is enabled in the “System / Expert Mode” menu.
3. Configure the UPnP settings in the “Home Network / Network” menu on the “Programs” page.

## 15.2 Obtaining an IP Address Automatically

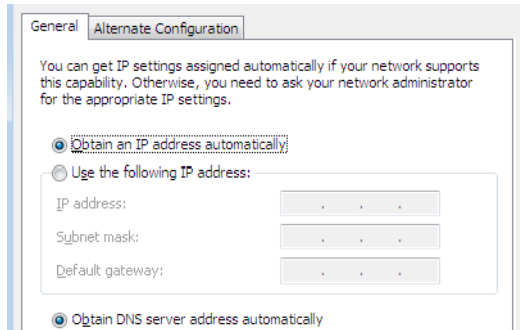
The FRITZ!Box has its own DHCP server, which assigns IP addresses to the connected computers. The connected computers must be configured such that they can receive their IP addresses automatically. The steps for checking and adjusting this option differ among the operating systems. See the relevant section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



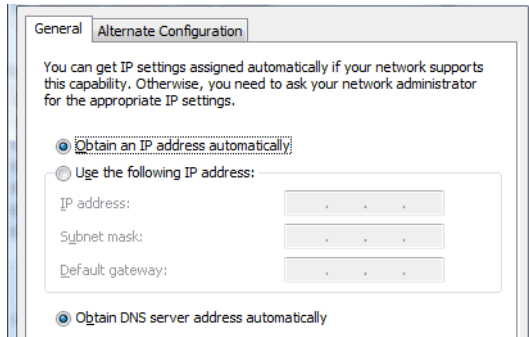
Properties of the Internet protocol (TCP/IP)

7. Confirm your selection by clicking “OK”.

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”.



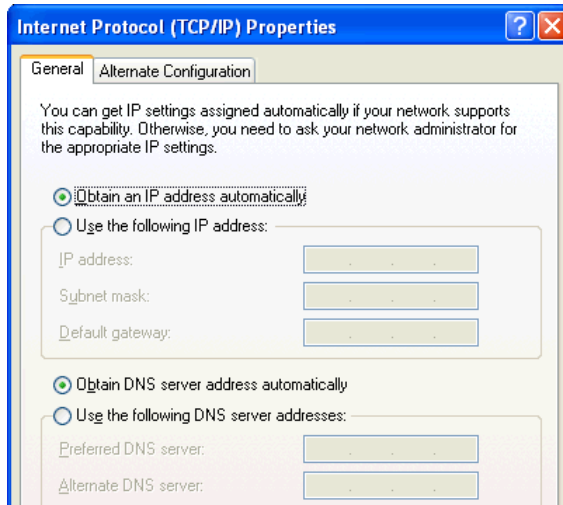
Properties of the Internet protocol (TCP/IP)

7. Confirm your selection by clicking “OK”.

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 list.
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:

[www.tldp.org/HOWTO/NET3-4-HOWTO-5.html](http://www.tldp.org/HOWTO/NET3-4-HOWTO-5.html)



## 16 USB Devices in the FRITZ!Box Home Network

The FRITZ!Box has a USB port to which you can connect various USB devices. All network devices in the FRITZ!Box home network can use these USB devices jointly and simultaneously.

This chapter describes how to share a printer in the network, which USB devices can be used in your FRITZ!Box home network, and how to use these devices safely.

### 16.1 Power Supply for USB Devices

You can connect USB devices with the following properties to the FRITZ!Box:

- Some USB device require more than one USB port for operation, for instance, hard drives with a USB Y cable. Connect this type of USB devices to the FRITZ!Box using a USB hub with its own power supply.
- The total current consumption of connected USB devices without their own power supply may not exceed 500 mA. Check the rating plates of the connected USB devices.

USB devices that exceed the total current consumption of 500 mA can be connected to the FRITZ!Box using a USB hub with its own power supply.

### 16.2 USB Devices on the FRITZ!Box

These USB devices can be connected to the FRITZ!Box:

- You can connect up to four USB storage media like hard disks, USB flash drives or card readers.
- USB storage media must use the file systems EXT2, FAT, FAT32 or NTFS. On storage media with the FAT and FAT32 file systems you can use files up to a size of 4 GB. In the NTFS file system there is no limit to the size of files that can be used.
- You can connect **one** standard USB printer or **one** all-in-one device with scanner and fax function. The complete range of functions available in a all-in-one printers

device is guaranteed only with the USB remote connection of the FRITZ!Box (see also: [Sharing a USB Printer on page 99](#)).

- You can connect a USB hub to the FRITZ!Box and use up to four USB devices at this hub.

You can use USB hubs with or without a separate power supply. We recommend deploying a USB hub with its own power supply if the USB devices to be connected exceed a total current consumption of 500 mA (see also: [Power Supply for USB Devices on page 97](#)).

- You can connect a USB stick from the FRITZ!WLAN USB Stick series by AVM to conveniently establish secure WLAN connections using AVM Stick & Surf (see: [Establishing a WLAN Connection with AVM Stick & Surf on page 25](#)).

## 16.3 Using USB Devices Safely

Follow the instructions below about how to use USB devices on your FRITZ!Box.

- The FRITZ!Box can not defend the USB memory from external influences. This means that voltage spikes or drops, like those that occur during electrical storms, may lead to data losses on connected USB memory media. We recommend making regular backups of the USB memory contents to avoid any losses.
- Whenever you want to remove USB devices from the FRITZ!Box, go to the “Home Network / USB Devices” area in the FRITZ!Box user interface to remove them safely and avoid any loss of data.

## 16.4 Accessing USB Memory

The participants in the home network have various possibilities for accessing the various memory media of the FRITZ!Box.

- Participants in the home network can use FTP software like FireFTP to exchange files among the FRITZ!Box storage media and workplaces.

Alternatively, you can enter <ftp://fritz-box> in the address line of your Internet browser to access the memory of the FRITZ!Box.

If you would like to use FTP software, see the documentation of the software as well as the instructions in the Online Help of the FRITZ!Box user interface.

- For access to media data like music, images and videos available on the memory of the FRITZ!Box you can enable the FRITZ!Box media server. Suitable playback devices like TV sets, web radios, smartphones and the Windows Media Player can then call up the data for streaming from the media server.

Playback devices to be used in connection with the media server must support the UPnP/AV standard.

Enable the “media server” function in the FRITZ!Box user interface under “Home Network / Storage (NAS) / Options Enabled”.

## 16.5 Sharing a USB Printer

You can connect a USB printer to the USB port of the FRITZ!Box to make it available to all participants in your home network. You can either release the printer for sharing as a network printer or use the FRITZ!Box USB remote connection software to connect it with a computer. Which option is preferable depends on how you intend to use the printer.

### Using a USB Printer as a Network Printer

Configure the USB printer as a network printer on the FRITZ!Box if

- the participants in the home network are to be able to use the printer jointly and simultaneously.
- the printer is to be used by computers that use an operating system other than Windows (e.g. Mac OS X or Linux).

For information about how to configure a USB printer as a network printer, see the section [Setting Up a USB Printer as a Network Printer on page 100](#).

### Using a USB Printer with FRITZ!Box USB Remote Connection

Configure the USB printer on the FRITZ!Box with the FRITZ!Box USB Remote Connection if

- the USB printer is an all-in-one device (fax/printer/scanner) and the entire range of functions is to be used.
- the USB printer is equipped with convenient features like ink level display and you would like to use these.
- the USB printer uses bidirectional data exchange. In other words: Not only does the computer send data to the printer, the printer also sends status messages to the computer. This communication in both directions is typical of the “Windows printers” or “GDI printers” that work only with special Windows device drivers.

For information about how to configure a USB printer with the USB Remote Connection, continue reading from the section [Configuring a USB Printer with FRITZ!Box USB Remote Connection on page 103](#).

### Setting Up a USB Printer as a Network Printer

Work through the following steps to connect a USB printer to the FRITZ!Box and configure it for use as a network printer.

#### Preparing Configuration

1. Open the FRITZ!Box user interface.

2. Enable the Expert Mode.
3. Click “Home Network / USB Devices / USB Remote Connection”.
4. Make sure that the option “printers (including all-in-one printers)” is disabled.
5. Click “Apply”.
6. Connect the USB printer to the FRITZ!Box.

This concludes the preparations. Continue reading in the section for your operating system.

### Setting Up a USB Printer in Windows 7, Vista and XP

1. Click “Start / Control Panel” and select the printer category of your operating system:
  - “Devices and Printers” (Windows 7)
  - “Printers” (Windows Vista)
  - “Printers and Faxes” (Windows XP)
2. Click the printer icon with the right mouse button and select “Properties” or “Printer properties”.



If the printer is not displayed, you must first install the printer drivers for this device. Consult the documentation of your printer for instructions.

3. Switch to the “Ports” tab.
4. Click “Add Port ...”.
5. Double-click the “Standard TCP/IP Port” entry and click “Next”.
6. Enter “fritz.box” in the “Printer Name or IP Address” field.



If the FRITZ!Box is configured as a WDS repeater or as an IP client, enter here the IP address at which the FRITZ!Box can be reached within the network.

7. Enter any name you wish in the “Port Name” field and click “Next”.

8. Select the “Custom” option and click “Settings...”, then “Next”.
9. Enable the “Raw” option.
10. Enter “9100” in the “Port Number” field and click “OK”.
11. Click “Next” and confirm with “Finish” and “Close”.
12. In the “[Printer name] properties” window, switch to the “Ports” tab.
13. Disable the “Enable bidirectional support” option and click “Apply”.

The USB printer has been configured and can be used as a network printer.

### Setting Up a USB Printer in Mac OS 10.5

1. Click in the dock on “System settings”.
2. Click “Print & Fax”.
3. Click the “+” sign.
4. Click “IP Printer”.
5. In the “Protocol” drop-down list, select the entry “HP Jet Direct – Socket”.
6. Enter “fritz.box” in the “Address:” input field.



If the FRITZ!Box is configured as a WDS repeater or as an IP client, enter here the IP address at which the FRITZ!Box can be reached within the network.

7. In the “Print Using:” drop-down list, select the printer that is connected to the USB port of your FRITZ!Box.



If the printer is not displayed, you must first install the printer drivers for this device. Consult the documentation of your printer for instructions.

8. Click “Add”.

The USB printer has been configured and can be used as a network printer.

## Setting Up a USB Printer in Other Operating Systems



The names of entries or menus in other operating systems not described above may be slightly different than the terms we use here.

- As the port type, select “Raw TCP”.
- Enter “9100” as the port.
- As the printer name, enter “fritz.box”.



If the FRITZ!Box is configured as a WDS repeater or as an IP client, enter here the IP address at which the FRITZ!Box can be reached within the network.

## Configuring a USB Printer with FRITZ!Box USB Remote Connection

If you are using an all-in-one device or would like to use the convenience features of a USB printer connected to the FRITZ!Box, we recommend installing the FRITZ!Box USB remote connection software. The FRITZ!Box USB remote connection program can be installed on computers with Windows 7, Vista or XP (32- and 64-bit).

### Installing FRITZ!Box USB Remote Connection

Install the program for FRITZ!Box USB remote connection on all of the computers with which you want to use the connected USB device.

1. Connect the USB printer to the USB port of the FRITZ!Box.
2. Open the FRITZ!Box user interface.
3. Click “View” and select the expert mode.
4. Click “Home Network / USB Devices / USB Remote Connection”.
5. Click the “USB remote connection software” link.
6. In the window “USB Remote Connection” click “Download”.
7. Download the file “fritzbox-usb-fernanschluss.exe”.

8. Double-click the file and follow the instructions on your screen.

The FRITZ!Box USB remote connection software is now installed on your computer. Repeat the steps in these instructions for all further Windows users who wish to use the USB remote connection on this computer.



### Enabling the FRITZ!Box USB Remote Connection

1. Open the FRITZ!Box user interface.
2. Click “View” and select the expert mode.
3. Click “Home Network / USB Devices / USB Remote Connection”.
4. Enable the USB remote connection for printers and select the option “printers (including all-in-one printers)”.


For an all-in-one printer with a memory function, also enable the “USB storage media” option.

For an all-in-one printer with a scanner function, also enable the “Others (e.g. scanner)” option.

5. Click “Apply”.

The FRITZ!Box USB remote connection is enabled.

### Using a USB Printer with FRITZ!Box USB Remote Connection

1. Open the FRITZ!Box USB remote connection by clicking the  icon in the Windows task bar.
2. Enter in the “My FRITZ!Box” area the FRITZ!Box password.
3. Click “Refresh”.
4. Click the USB printer in the “Devices” area.

The USB printer is being connected to the computer.



Do not conduct any firmware updates for USB devices that are connected on the FRITZ!Box with the computer via the USB remote connection.

## 17 Saving Energy with FRITZ!Box

The FRITZ!Box combines a variety of devices in one device: LTE modem, WLAN router, media server, answering machine, fax machine and DECT base station for cordless telephones. This means that you generally use much less power with the FRITZ!Box than you would with several separate devices.

What is more, the FRITZ!Box saves energy by reducing processing power on standby and lowering the power consumption of idle functions. The FRITZ!Box also offers various settings for energy-saving operation.

### 17.1 Saving Energy with the WLAN Radio Network

You can reduce the power consumption of the WLAN radio network by

- setting up night service for the WLAN radio network (see [page 53](#)).
- turning off the WLAN radio network with the WLAN button whenever no more WLAN devices are registered on the FRITZ!Box.
- enabling the setting “Automatically reduce transmitter power to the level actually needed”. This setting is configured in the “WLAN / Radio Channel” menu on the FRITZ!Box user interface.

### 17.2 Enabling Energy-saving Mode for USB Hard Drives

In the FRITZ!Box you can enable an energy-saving function for USB hard drives connected to the FRITZ!Box.

When the energy-saving function is enabled, connected USB hard drives will be switched off when they are idle—as long as the hard drives support the energy-saving function.

Enable the energy-saving function in the “Home Network / USB Devices” menu in the FRITZ!Box user interface. You can also test here, whether your USB hard disk supports the energy-saving function.

### 17.3 Saving Energy at the LAN Ports

For the individual LAN ports of your FRITZ!Box you can configure various operation modes. The power consumption of some modes is higher than others. Select the operation mode that is best suited to your needs in order to minimize the power consumption of the LAN ports.

The LAN ports can be configured in the FRITZ!Box user interface. In the “System / Energy Monitor” menu, the following operating modes are available on the “Settings” page:

Operating Mode	Functionality and Power Consumption
Always Enabled	The LAN port is always enabled. Highest power consumption.
Detect Automatically – Power Mode	As needed, the FRITZ!Box establishes LAN connections with a data throughput rate of 1 Gbit/s. Lower power consumption than for the “Always Enabled” setting.
Detect Automatically – Green Mode	Default setting of the FRITZ!Box. As needed, the FRITZ!Box establishes LAN connections with a data throughput rate of 100 Mbit/s. Lower power consumption than for the “Enable Automatically - Power Mode” setting.
Disabled	The LAN port is disabled and consumes no power. The first LAN port cannot be disabled.

## 18 Help in Case of Errors

This chapter provides assistance if you are not able to open the user interface of your FRITZ!Box or are having problems with the DSL or WLAN connection.

For more comprehensive help, see the AVM knowledge database in the Internet, which can be accessed at the following address:

[www.avm.de/en/service/faqs](http://www.avm.de/en/service/faqs)

### 18.1 The User Interface Does Not Open

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

#### Restarting the FRITZ!Box

**The user interface cannot be opened or does not react.**

---

Cause

---

Inconsistencies within the FRITZ!Box.

---

Help

---

1. Restart the FRITZ!Box.  
Remove the power cable from the outlet.
  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 / LTE” LED lights up and stops flashing and, if you have switched on WLAN, the “WLAN” LED remains lit up 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](http://fritz.box) in the address field.
-

## Checking the Cable Connections

**The FRITZ!Box user interface is not displayed in your web browser.**

---

Cause

---

The cable connections are not secure.

---

Help

---

Make sure that all cables are plugged in securely.

---

## Checking Name Resolution

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

---

Cause

---

The name resolution of the FRITZ!Box is not working.

---

Help

1. In the web browser, enter the following IP address in place of [fritz.box](http://fritz.box):  
[192.168.178.1](http://192.168.178.1)
  2. If the user interface opens in response to this address, set the network adapters used to “Obtain the IP address automatically” (see [Obtaining an IP Address Automatically from page 93](#)).
- 

## Checking the IP Address

**The user interface of the FRITZ!Box cannot be opened by a [fritz.box](http://fritz.box) nor by entering [192.168.178.1](http://192.168.178.1).**

---

Cause

---

Incorrect IP address on the connected computer.

---

Help

---

Set the network adapter to DHCP so that the network address can obtain its IP address from the DHCP server of the FRITZ!Box. See the section [Obtaining an IP Address Automatically from page 93](#) for instructions.

---

If you still cannot open the user interface by entering [fritz.box](http://fritz.box) or by [192.168.178.1](http://192.168.178.1), use the fixed IP address of the FRITZ!Box as described on [page 113](#).

---

## Disabling Dial-up Connections

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

---

### 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.

---

### Help

---

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.**

---

### Cause

---

The web browser is set for offline operation.

---

### Help

---

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.**

---

#### Cause

---

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

---

#### Help

---

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 your 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.**

---

Cause

---

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

---

Help

---

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-high” 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 website to the zone:” field:  
[fritz.box](http://fritz.box)  
Click “Add”.
  6. Disable the “Require server verification (https:) for all sites in this zone” option and click “Close”.
-



## Checking Security Software

**The user interface cannot be displayed in the web browser.**

---

Cause

---

Security software is blocking access to the user interface.

---

Help

---

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.

---

## Opening the User Interface of the FRITZ!Box

The FRITZ!Box is equipped with a fixed IP address that cannot be changed. The 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 22](#).
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 93](#)).
3. Restart your computer.
4. Start your Internet browser and enter the FRITZ!Box's fixed IP address:

[169.254.1.1](http://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.

## 18.2 Cannot Establish a WLAN Connection

If you are not able to establish a WLAN connection between your computer and the FRITZ!Box, then please undertake the following measures to seek the source of the error and resolve it.

### Enabling the WLAN Device

#### **The WLAN device cannot find a wireless network.**

---

##### Cause

---

The WLAN device is not ready for operation.

---

##### Help

---

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

---



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

### Enabling WLAN

#### **The wireless network of the FRITZ!Box is not found by the WLAN device.**

---

##### 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.

---

##### Help

---

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 device cannot find the wireless network of the FRITZ!Box.**

---

#### Cause

---

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

---

#### Help

---

In the WLAN settings of the FRITZ!Box, enable the “Name of the radio network visible” option.

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 22](#).
  2. Start a web browser.
  3. Enter [fritz.box](http://fritz.box) in the address field.
  4. In the “Interfaces” area on the “Overview” page, select “WLAN”, or open the “WLAN” menu in the navigation bar on the left.
  5. In the “Radio Network” page, enable the option “Name of the radio network visible”.
  6. Click the “Apply” button at the bottom of the page.
  7. Remove the network cable and try again to establish a connection via WLAN.
- 

## 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 22](#).
2. Start a web browser.

3. Enter [fritz.box](http://fritz.box) in the address field.
4. In the “Interfaces” area on the “Overview” page, and select “WLAN”, or select the “WLAN” menu in the navigation bar on the left.
5. Open the “WLAN / Security” menu.
6. Click the “Apply” button.  
A window with the WLAN security settings will be displayed. Print out the page by clicking the “Print Page” button.
7. 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 device 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 22](#).
2. Open the user interface of the FRITZ!Box in a web browser. Proceed as described in the section [Opening the User Interface on page 30](#).
3. In the “Interfaces” area on the “Overview” page, select “WLAN”, or open the “WLAN” menu in the navigation bar on the left.
4. Click the “WLAN / Security” menu and enable the option “non-encrypted”.
5. Then click the “Apply” button.
6. 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 device and contact the manufacturer of the WLAN device 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: Windows Zero Configuration) in Windows XP with Service Pack 2.**

---

#### Cause

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

---

#### Help

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.

---

### Avoiding WLAN Channels with DFS

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

---

#### Cause

A forced channel change is taking place. In the 5-GHz frequency band the WLAN base station is programmed to change the channel whenever a radar source transmits on the same channel (Dynamic Frequency Selection, DFS).

---

#### Help

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

---

## 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 base stations, 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 “Autochannel”. 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 is interrupted as soon as you apply the changed settings. Afterward you have to reconnect your computer with the FRITZ!Box.

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 22](#).
2. Start a web browser.
3. Enter [fritz.box](http://fritz.box) in the address field.
4. Open the “WLAN / Radio Channel” menu in the navigation bar on the left.
5. You may have to enable the “Adjust radio channel settings” option.
6. Select a different radio channel from the “Radio channel” list.

7. Click the “Apply” button.
8. Remove the network cable and check whether interference continues to occur.

## 19 Configuring FRITZ!Box on the Telephone

Various functions can be enabled and disabled using a telephone connected to the FRITZ!Box. You can also restore the factory settings of the FRITZ!Box using a telephone. Only tone-dialing (dual-tone multifrequency = DTMF) telephones can be used for configuration.

### 19.1 Restoring Factory Settings

When the factory settings are restored to the FRITZ!Box, all of the settings in the FRITZ!Box are returned to their condition upon delivery.



All settings you made in the FRITZ!Box are deleted when the factory settings are restored. This is also true for the configured Internet connection.

---

#### Restoring Factory Settings

---

**#991\*159  
01590\***

Restores the settings in the FRITZ!Box to the factory settings.

---

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

### 19.2 Switching WLAN On and Off

The WLAN function of your FRITZ!Box can be switched on and off using a connected telephone.

---

#### Switching WLAN On and Off

---

**#96\*1\***

Switches the WLAN function on.

**#96\*0\***

Switches the WLAN function off.

---



### 19.3 Turning Do Not Disturb On/Off

For the analog extension “FON” on 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 no longer ring.

Enable Do Not Disturb immediately	
#811*0*	Immediately enables Do Not Disturb for the extension “FON”. Do Not Disturb remains switched on until it is disabled.
#91**	Save your settings.
Enabling Do Not Disturb for a Specific Period	
#801* <Start>* <End>*	Defines the start and end of the period during which Do Not Disturb is enabled on the extension “FON”. Example: Do Not Disturb should be enabled from 8:00 p.m. until 7:00 a.m. daily. Enter “2000” for <start> and “0700” for <end>.
#91**	Saves your settings.
#811*6*	Enables Do Not Disturb on the extension “FON”.
#91**	Save your settings.
Disabling Do Not Disturb	
#811*1*	Disables Do Not Disturb on the extension “FON”.
#91**	Save your settings.

## 19.4 Switching the Alarm On and Off

You can use the telephones connected to the FRITZ!Box as alarms. The alarm can be set individually and enabled or disabled at any time.

### Configuring the Alarm for a Telephone

☎	Pick up the handset.
#881* <time>* <internal telephone number>*	Defines the time at which the telephone with the specified internal telephone number will ring.  For instance, enter #881*0700*1* if the telephone on the “FON” socket should ring at 07:00 a.m.  <b>Internal numbers:</b> Socket “FON” of the FRITZ!Box: 1 Cordless DECT telephones: 610 – 615 IP telephones: 620 – 629
#91**	Save your settings.
☎	Hang up the receiver.

### Enabling the Alarm

☎	Pick up the handset.
#881**	Enable the alarm function.
#91**	Save your settings.
☎	Hang up the handset.

### Disabling the Alarm

☎	Pick up the handset.
#881#	Disable the alarm.
#91**	Save your settings.
☎	Hang up the receiver.

## 19.5 Setting Up Call Diversion

With call diversion you can divert incoming calls. The calls are diverted to an external telephone line or to a certain telephone connected with your FRITZ!Box.

If your telephony provider supports direct diversion of incoming calls, calls will be diverted by your provider. Otherwise the FRITZ!Box establishes a second connection to divert the call. In either case, call diversion to an external line will be charged at your contracted telephone rates.

### Configuring Call Diversion for All Calls

You can set up call diversion for all incoming calls.





For the destination number, enter a complete fixed-line or Internet telephone number. Internet telephone numbers may not contain letters or special characters.

---



#### Configuring Call Diversion for all Incoming Calls

---

	Pick up the handset.
	Enter one of the following three key sequences:
<b>*21* &lt;DNo&gt; *#</b>	Configures immediate call diversion to the destination number <DNo>.
<b>*61* &lt;DNo&gt; *#</b>	Configures delayed call diversion (after 20 seconds) to the destination number <DNo>.
<b>*67* &lt;DNo&gt; *#</b>	Configures call diversion on busy to the destination number <DNo>. Calls will be diverted when the telephone number called is busy.
<b>+++</b>	Wait for the positive acknowledgement tone.
	Hang up the receiver.

---

### Disabling Call Diversion for All Incoming Calls

	Pick up the handset.
	Enter one of the following three key sequences:
<b>*21**#</b>	Disables immediate call diversion.
<b>*61**#</b>	Disables delayed call diversion.
<b>*67**#</b>	Disables call diversion on busy.
<b>***</b>	Wait for the second-long positive acknowledgement tone.
	Hang up the receiver.



### Configuring Call Diversion for the Outgoing Telephone Number

You can set up call diversion for all calls that arrive for the outgoing number of the telephone.





For the destination number, enter a complete fixed-line or Internet telephone number. Internet telephone numbers may not contain letters or special characters.

### Configuring Call Diversion for Outgoing Telephone Numbers

	Pick up the handset.
	Enter one of the following three key sequences:
<b>*21*⟨DNo⟩#</b>	Configures immediate call diversion to the destination number ⟨DNo⟩.
<b>*61*⟨DNo⟩#</b>	Configures delayed call diversion (after 20 seconds) to the destination number ⟨DNo⟩.
<b>*67*⟨DNo⟩#</b>	Configures call diversion on busy to the destination number ⟨DNo⟩.
<b>***</b>	Wait for the second-long positive acknowledgement tone.
	Hang up the receiver.

### Disabling Call Diversion for the Outgoing Telephone Number

	Pick up the handset.
	Enter one of the following three key sequences:
<b>*21*#</b>	Disables immediate call diversion.
<b>*61*#</b>	Disables delayed call diversion.
<b>*67*#</b>	Disables call diversion on busy.
<b>+++</b>	Wait for the second-long positive acknowledgement tone.
	Hang up the receiver.



### Configuring Call Diversion for a Certain Telephone Number



You can set up call diversion for all calls that arrive for a certain telephone number.



For the destination number, enter a complete fixed-line or Internet telephone number. Internet telephone numbers may not contain letters or special characters.

### Configuring Call Diversion for a Certain Telephone Number



	Pick up the handset.
	Enter one of the following three key sequences:
<b>*21*&lt;DNo&gt;</b> <b>*&lt;telephone number&gt;#</b>	Configures immediate call diversion for the telephone number entered to the destination number <DNo>.
<b>*61*&lt;DNo&gt;</b> <b>*&lt;telephone number&gt;#</b>	Configures delayed call diversion (after 20 seconds) for the telephone number entered to the destination number <DNo>.
<b>*67*&lt;DNo&gt;</b> <b>*&lt;telephone number&gt;#</b>	Configures call diversion on busy for the telephone number entered to the destination number <DNo>.
<b>+++</b>	Wait for the second-long positive acknowledgement tone.
	Hang up the receiver.

Disabling Call Diversion for a Certain Telephone Number	
	Pick up the handset.
	Enter one of the following three key sequences:
<b>*21**</b> <telephone number> <b>#</b>	Disables immediate call diversion.
<b>*61**</b> <telephone number> <b>#</b>	Disables delayed call diversion.
<b>*67**</b> <telephone number> <b>#</b>	Disables call diversion on busy.
<b>***</b>	Wait for the second-long positive acknowledgement tone.
	Hang up the receiver.

### Setting Up Call Diversion for the Analog Extension FON



For the destination number, enter a complete fixed-line or Internet telephone number. Internet telephone numbers may not contain letters or special characters.

Setting up Call Diversion for an Analog Extension	
	Pick up the handset.
	Define the kind of call diversion:
<b>#41</b>	Call diversion immediately without ringing
<b>#45</b>	Call diversion immediately with ringing
<b>#42</b>	Call diversion delayed (after 20 seconds)
<b>#43</b>	Call diversion on busy
<b>#44</b>	Call diversion delayed (after 20 seconds) or on busy
	Enter the destination to which the call will be diverted:
<b>1**</b> <DNo> <b>*</b>	Configures call diversion to the destination number <DNo>.
<b>#91**</b>	Save your settings.
	Hang up the receiver.

Disabling Call Diversion for the Analog Extension	
☎	Pick up the handset.
#401**	Disables call diversion.
#91**	Save your settings.
☎	Hang up the receiver.

## 19.6 Disabling Automatic Outside Dialing

You can disable automatic outside dialing on the analog extension “FON” of the FRITZ!Box. When automatic outside dialing is disabled, you will hear an internal dialing tone when you pick up the telephone receiver. This is a good idea if you make a lot of internal calls.

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.
#11*0*	Dial the sequence shown at left. Automatic outside dialing will be disabled.
#91**	Save your settings.
☎	Hang up the receiver.

Enabling Automatic Outside Dialing	
☎	Pick up the handset.
#11*1*	Dial the sequence shown at left. Automatic outside dialing will be enabled.
#91**	Save your settings.
☎	Hang up the receiver.

## 20 Taking FRITZ!Box out of Operation

In this chapter you receive tips and recommendations for taking the FRITZ!Box out of operation.



Please also follow our instructions for the correct disposal of waste equipment on [page 143](#).

### 20.1 Removing the SIM Card

If you want to end operation of the FRITZ!Box, remove the SIM card from the card holder of the FRITZ!Box.

### 20.2 Restoring the FRITZ!Box Factory Settings

Restore the factory settings of the FRITZ!Box. This is strongly recommended if you are planning to pass the FRITZ!Box on to another user.

Resetting the FRITZ!Box has the following effects:

- All settings you made in the FRITZ!Box are then deleted.
- The factory settings' WLAN key will be activated again.
- The IP configuration of the factory settings will be restored.

#### Restoring Factory Settings

1. In the FRITZ!Box user interface, select the “System / Reset” menu.
2. On the “Factory Settings” page, click the “Load Factory Settings” button.

The FRITZ!Box is reset to its factory settings.

### 20.3 Uninstalling Software

Additional software for the FRITZ!Box is available on the web pages of AVM at [www.avm.de/en/download](http://www.avm.de/en/download).

If you have installed supplementary programs on one or more computers, uninstall the software using the control panel of your Windows operating system.



### Uninstalling Software in Windows 7

1. Open “Start / Control Panel / Programs”.
2. Under “Programs and Features”, click “Uninstall a program”.
3. Select in the list the AVM software to be uninstalled.
4. Click the “Uninstall/Change” button.

The software will be uninstalled.

### Uninstalling Software in Windows Vista

1. Open “start / Settings / Control Panel / Programs and Functions”.
2. Select in the list the AVM software to be uninstalled.
3. Click the “Uninstall/Change” button and confirm with “Continue”.

The software will be uninstalled.

### Uninstalling Software 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 software to be uninstalled from the list of “Currently installed programs”.
3. Click the “Change/Remove” button.

The software will be uninstalled.

## 21 Technical Specifications

### 21.1 Ports and Interfaces

- LTE modem compliant with 3GPP standard, release 8 LTE category 3 UE
- One a/b port with a RJ11 socket for connecting analog terminal devices
- DECT base station
- Four LAN ports via RJ45 sockets (standard Ethernet, 10/100/1000 base-T)
- One USB host controller (USB version 2.0)
- WLAN base station 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

### 21.2 Router Functions

- Router
- DHCP server
- Firewall with IP masquerading/NAT
- IPv4 and IPv6
- Child protection and filter lists
- Port forwarding
- Dynamic DNS
- VPN

### 21.3 User Interface and Display

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

### 21.4 Physical Specifications

- Dimensions (WxDxH): approx. 210 x 155 x 25 mm
- Supply voltage: 230 V / 50 Hz
- Maximum power consumption: 18 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%

### 21.5 Cable

#### Network Cable

The network cable (yellow) of the FRITZ!Box 6840 LTE is a standard category 5 (Cat 5) Ethernet cable. Please use a standard STP-type (Shielded Twisted Pair) Ethernet cable of category 5 (Cat 5) to replace or extend the Ethernet cable. To extend the cable you will need a shielded RJ45 double coupling (Cat 5) 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 category smaller than Cat 5 are used, reduced transmission rates may result.

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

## 22 Customer Service

Be it product documentation, frequently asked questions (FAQs) or support: this chapter presents information on all important service topics.

### 22.1 Documentation on the FRITZ!Box

To take advantage of all commands and features of your FRITZ!Box, consult the following documentation:

#### Help

In the FRITZ!Box user interface you can open the comprehensive Help by clicking the “Help” icon and the “Help” buttons.

#### Manual

The FRITZ!Box CD includes a PDF file of the manual in the “Info” folder.

The PDF file of the manual can be opened and downloaded from the Internet at the following address:

[www.avm.de/en/service/manuals](http://www.avm.de/en/service/manuals)

Choose the “FRITZ!Box” product group and then your “FRITZ!Box 6840 LTE”. The PDF is opened.



The current Adobe Acrobat Reader for reading PDF documents can be downloaded from the Internet free of charge at [www.adobe.com](http://www.adobe.com).

#### Readme

The Readme file contains current information which was not yet available at the time the manual was completed. The Readme file is included in the root directory on the FRITZ!Box CD.

## 22.2 Information in the Internet

On its web site AVM presents comprehensive information on your AVM product.

### Videos on the FRITZ!Box

Videos on many of the FRITZ!Box functions are available, showing animated demonstrations of how to set up the individual functions.

The videos can be viewed at the following address:

[www.avm.de/en/service/FRITZ\\_Clips](http://www.avm.de/en/service/FRITZ_Clips)

### Frequently Asked Questions (FAQs)

We would like to make our products as easy to use as possible. If you still have problems, sometimes you need just a tip to resolve them.

In our FAQs you will find answers to the questions users ask about our products most often. The FAQs can be viewed at the following address:

[www.avm.de/en/service/faqs](http://www.avm.de/en/service/faqs)

## 22.3 Support from the Support 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 following chapter again:
  - [Before You Connect the FRITZ!Box from page 15](#)
  - [Connecting FRITZ!Box from page 18](#)
  - [Connecting the Computer to the FRITZ!Box from page 22](#)
2. If you have any problems, seek first aid by consulting the chapter [Help in Case of Errors from page 108](#).

This chapter also presents tips on problems with establishing connections.

3. Read our FAQs in the Internet.

[www.avm.de/en/service/faqs](http://www.avm.de/en/service/faqs)

This site contains answers to questions our customers have frequently asked our Support team.



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](http://www.avm.de/en/service)

1. Select the product for which you need support from the “Support” area.
2. Click the “Mail Form” link to open the e-mail form.
3. Fill out the form in English.
4. Send it to AVM by clicking the “Send” button.

Our Support team will respond by e-mail as quickly as possible.

## 23 AVM Products for the FRITZ!Box

Here we introduce additional devices by AVM that are designed to be used in combination with your FRITZ!Box 6840 LTE.

### FRITZ!Powerline 500E



With FRITZ!Powerline 500E your electrical outlet is transformed into a secure network line. Just connect your devices over the power line — without installing any cables:

- Networks FRITZ!Powerline 500E, computer, printer, TV, stereo, game console, media player and other network devices
- Especially suitable for broadband-intensive applications like streaming, surfing, gaming, Internet TV, video on demand and VoIP
- Throughput of up to 500 Mbit/s over a range of up to 500 meter over your own power mains
- Low operating power consumption, under 1 W on standby
- Encrypted securely ex works with 128-bit AES
- Immediately operational at every outlet
- Immediately ready for operation without any new software
- Available in a practical set with 2 adapters; additional adapters can be networked easily and securely at the touch of a button

For more information, see [www.avm.de/powerline500e](http://www.avm.de/powerline500e).

## FRITZ!WLAN USB Stick N



**Up to 300 Mbit/s**

**Dual band**

**WPA2 (802.11i)**

**Stick & Surf**

FRITZ!WLAN USB Stick N connects your computer easily and safely with your FRITZ!Box WLAN and other compatible WLAN routers:

- USB Stick for WLAN N with up to 300 Mbit/s
- WLAN support for either 2.4-GHz or 5-GHz connections (dual band)
- Supports the conventional standards 802.11n/g/b/a
- WPA2 encryption for maximum WLAN security (802.11i)
- Stick & Surf: secure wireless network without configuration
- Supports WPS for easy, fast configuration of secure WLAN connections

For more information, see [www.avm.de/en/Produkte/FRITZ\\_WLAN/FRITZ\\_WLAN\\_USB\\_Stick\\_N](http://www.avm.de/en/Produkte/FRITZ_WLAN/FRITZ_WLAN_USB_Stick_N).



## FRITZ!WLAN USB Stick



**Up to 150 Mbit/s**

**WPA2 (802.11i)**

**Stick & Surf**

FRITZ!WLAN USB Stick connects your computer easily and safely with any WLAN router:

- USB Stick for WLAN N with up to 150 Mbit/s
- Also supports the WLAN standards 802.11g and b
- WLAN support for 2.4-GHz connections
- WPA2 encryption for maximum WLAN security (802.11i)
- Stick & Surf: secure wireless network without configuration
- Supports WPS for easy, fast configuration of secure WLAN connections

For more information, see [www.avm.de/en/Produkte/FRITZ\\_WLAN/FRITZ\\_WLAN\\_USB\\_Stick](http://www.avm.de/en/Produkte/FRITZ_WLAN/FRITZ_WLAN_USB_Stick).

## FRITZ!WLAN Repeater N/G



**Up to 300 Mbit/s**

**WPS**

**Media function**

With the FRITZ!WLAN Repeater N/G the range of the wireless network can be extended quickly and easily:

- Compatible with all conventional WLAN routers (802.11n/g/b/a radio standards)
- WLAN support for either 2.4-GHz or 5-GHz connections (dual band)
- Simple configuration at the click of a button via WPS, using a Wizard or manually
- Media function: integrated audio output and miniature FM transmitter for transferring music or web radio to stereo/radio

For more information, see [www.avm.de/en/Produkte/FRITZ\\_WLAN/FRITZ\\_WLAN\\_Repeater\\_N\\_G](http://www.avm.de/en/Produkte/FRITZ_WLAN/FRITZ_WLAN_Repeater_N_G).

## FRITZ!WLAN Repeater 300E



**Up to 300 Mbit/s**

**WPS**

**Gigabit LAN**

With the FRITZ!WLAN Repeater 300E the range of the wireless network can be conveniently extended:

- Compatible with all conventional WLAN routers (802.11n/g/b/a radio standards)
- WLAN support for either 2.4-GHz or 5-GHz connections (dual band)
- Simple configuration at the click of a button via WPS, using a Wizard or manually
- Integrated gigabit LAN interface provides for simple integration of network devices into the home network or the Internet

For more information, see [www.avm.de/en/Produkte/FRITZ\\_WLAN/FRITZ\\_WLAN\\_Repeater\\_300E](http://www.avm.de/en/Produkte/FRITZ_WLAN/FRITZ_WLAN_Repeater_300E).

## FRITZ!Fon MT-F



- HD telephony**
- Color display**
- Web radio**
- Reading e-mail**

FRITZ!Fon MT-F is a convenient cordless telephone (DECT) developed especially for the FRITZ!Box:

- Supports HD telephony for natural sound, full duplex hands-free calls and open listening in HD quality
- Voice transmission encrypted upon delivery for greater security
- Intuitive menus on a large color display
- Receive RSS feeds, web radio and podcasts, and read and answer e-mail
- Battery talk time up to 10 hours, up to 6 days on stand-by
- Update with new functions at the press of a button

For more information, see [www.avm.de/en/Produkte/FRITZ-Fon/FRITZFon\\_MT-F](http://www.avm.de/en/Produkte/FRITZ-Fon/FRITZFon_MT-F).

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## Legal Notice

### Legal Notice

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## Declaration of CE Conformity

**The manufacturer** AVM GmbH  
Alt-Moabit 95  
D 10559 Berlin

**herewith declares that the product**  
FRITZ!Box 6840 LTE  
LTE WLAN router

**complies with the following directives:**

1999/5/EC	R&TTE Directive: Radio Equipment and Telecommunications Terminal Equipment
2009/125/EC	EU directive: ecodesign requirements for energy-related products

The following norms were consulted to assess conformity:

- EN 60950-1:2006 + A11:2009 + A1:2010	- EN 300 328 V1.7.1
- EN 55024:2010	- EN 300 893 V1.6.1
- EN 301 489-1 V1.8.1	- EN 301 406 V2.1.1
- EN 301 489-6 V1.3.1	- EN 301 908-1 V4.1.1
- EN 301 489-17 V2.1.1	- EN 301 908-13 V4.2.1
- EN 301 489-24 V1.5.1	- EN 50371:2002
	- EN 50383:2002
	- EN 50385:2002
	- EN 62311:2008



The CE symbol confirms that this product conforms with the above mentioned norms and regulations.

Berlin, 2012-05-15

Peter Foxel, Technical Director

### Indication of Countries

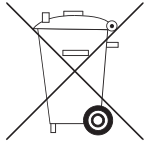
The WLAN radio technology of this device is designed for use in all countries of the European Union and in Switzerland, Norway and Iceland. In France only indoor operation is permitted.

---

## Disposal Information

In accordance with European regulations and the Waste Electrical and Electronic Equipment Act (WEEE), the FRITZ!Box 6840 LTE, as well as all devices and electronic components contained in the package, may **not** be disposed with household waste.

Please bring these to a collection point in your local community for the disposal of electric and electronic appliances.



Symbol for labeling electrical and electronic scrap



Watch for the symbol designating electrical and electronic scrap. Electrical and electronic equipment must be disposed of separately from household waste.

---

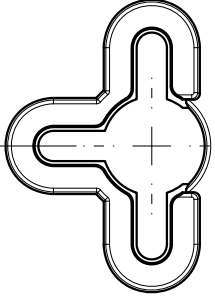
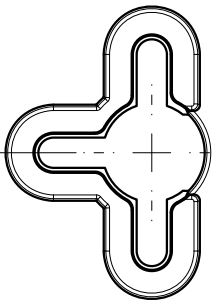
## Drilling Template

See the next page for a drilling template. Use the drilling template as a guide to mark the holes needed to mount the FRITZ!Box on a wall.



Be sure to print out the page with the drilling template in its original size, or 100%. Do not enlarge it, adjust its size, reformat or rescale it in your printer settings.





## Glossary

### 3GPP

short for 3rd Generation Partnership Project

3GPP is an international project in which standardization bodies work together to standardize mobile communications. Participants in the project include the ETSI (European Telecommunication Standards Institute).

### bandwidth management

Bandwidth management distributes the available bandwidth of an Internet connection among various Internet applications.

The bandwidth management of the FRITZ!Box ensures that the speech quality during telephone calls over the Internet is not reduced by surfing activity. The FRITZ!Box adjusts all uploads and downloads to the currently available bandwidth. Furthermore, the FRITZ!Box grants Internet telephony connections a higher priority than Internet data connections. This largely prevents undesired disruptions during Internet telephone calls.

### DDNS

short 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.

## DECT

short for Digital Enhanced Cordless Telecommunications

DECT is a European standard for cordless telephony which was drafted by the European Telecommunications Standards Institute in 1991 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. 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

Gateway ([see glossary](#))

## DHCP

short for Dynamic Host Configuration Protocol

DHCP is a protocol for dynamically negotiating the operating parameters of the TCP/IP protocol ([see glossary](#)). 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 ([see glossary](#)) accidentally assigned more than once.

DHCP is used in IPv4 networks ([see glossary](#)).

## 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.

DHCP is used in IPv4 networks ([see glossary](#)).

## DNS

short 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.

## download

Download designates the transfer of files from the Internet to a computer.

### 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 she or he 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.

### file system

A file system saves and manages files on a data medium (for instance, a hard drive or flash drive). The way the files are stored varies from one file system to the next.

The different operating systems offer different file systems. In Windows 7, Windows Vista and Windows XP the file systems FAT32 and NTFS are used most frequently. The file system of a data storage medium can be changed, for instance from FAT32 to NTFS.

### 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.

Within IPv4 networks, 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

The firmware is the software of an electronic device, which is stored in the device and controls its functions.

### fixed IP address

Fixed IP addresses are IP addresses ([see glossary](#)) which are permanently assigned to a computer or another device like a network printer.

Assigning fixed IP addresses makes sense in cases where a computer is always supposed to be accessible at a certain address (for instance, a web server or an e-mail server).

### FTP

short for File Transfer Protocol

The File Transfer Protocol allows files to be exchanged between two computers in the Internet. A computer on which the files are made available for downloading is called an “FTP server”. A special program is required for downloading files, known as an “FTP client”. Some web browsers contain FTP clients, but they are also available as independent software.

### 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.

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.

### hub

A hub is a device that is used to connect network devices to each other, for instance through an Ethernet. Network devices are connected to each other in a star network, with each network device connected to the hub. There are no direct connections between the network devices.

A hub can either send or receive data. Received data are sent to all connected devices. All connected devices share the data throughput.

### Internet telephony

VoIP ([see glossary](#))

### IP

short 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.

### IPv4

short for Internet Protocol version 4

IPv4 is currently the conventional Internet protocol.

IPv4 addresses are 32 bits long, such that IPv4 offers an address space of  $2^{32}$  IP addresses, or just over four billion. The latest estimates suggest that the last IPv4 addresses will be assigned by the beginning of 2012.

The successor protocol to IPv4 is IPv6.

### IPv6

short for Internet Protocol version 6

The successor protocol to IPv6 is IPv4.

IPv6 addresses are 128 bits long. This means that IPv6 makes approximately 340 undecillion ( $\sim 3.4 \times 10^{36}$ ) IPv6 addresses available. Each private user can be allotted over 18 quintillion public IPv6 addresses from her or his Internet provider.

The dearth of addresses in IPv4 is only one of the reasons for introducing IPv6. IPv6 also offers additional advantageous characteristics in the framework of communication within IP networks.

### 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.

IPv6 addresses are structured differently from IPv4 addresses. IP addresses can be written in decimal, octal or hexadecimal format.

### IP masquerading

IP masquerading is a technique used within IPv4 networks. With 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 as if 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 (IP) is called an IP network.

## LTE

short for Long Term Evolution

LTE is a mobile network technology standard specified by the 3GPP Release 8. LTE provides for high throughput rates and is quite suitable for mobile Internet.

## NAS functionality

NAS is short 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 storage media 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, images 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

short for Network Address Translation

NAT is a technique used within IPv4 networks. NAT is 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

For outside dialing from a telephone system, often the telephone number must be prefixed with a “0”.

In order to establish a call to another party telephone system, first dial the outside dialing prefix and then the external number. If no outside dialing prefix is dialed, the call will be placed within the telephone system.

If automatic outside dialing is enabled on the telephone system, the outside dialing prefix is automatically dialed before the telephone number.

### 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 (malicious applications opening backdoors on computers) 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 ([see glossary](#)) or IP masquerading ([see glossary](#)) 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 eDonkey, 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 IPv4 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.

### public IP address

A public IP address is an IP address ([see glossary](#)) 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.

### 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 WLAN base station to any computer that is to be added to the radio network.

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 base station 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 ([see glossary](#)).

### subnet mask

The subnet mask indicates which part of an IP address ([see glossary](#)) is the network address and which the address of the computer. The network address defines what is called the subnet.

### switch

A switch is a device that connects multiple network devices with each other, for instance through an Ethernet.

In contrast to a hub, a switch can establish direct connections between the connected devices. This makes it possible to send data packets directly to specific recipients.

The entire data throughput is at the disposal of every connected device.

### TCP/IP

short 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.

### 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.

### uplink port

The uplink port on a hub or switch is designed for connecting another hub or switch, or a router. In contrast to the uplink port, there is also a user port for connecting terminal devices.

The send and receive directions are transposed on the uplink port. On some devices the port can change between normal and uplink mode by means of a switch.

### upload

This term designates the procedure of transmitting files from one's own computer to another computer in the Internet.

### UPnP

short 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 ([see glossary](#)), 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

short 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 (transmitting a data stream) of audio, image and video data within networks. Media servers are devices that make audio, image and video data available upon request. Playback devices render the audio, image and video data (television, stereo system, streaming clients). Control devices are remote controls (smartphone, remote control).

## USB

short for Universal Serial Bus

The Universal Serial Bus is an interface for transferring data between a computer and connected devices. It was introduced in 1996. Today nearly all computers have multiple USB ports. USB is used, for instance, to connect many keyboards, mice, printers and external hard drives to the computer.

By now many other devices also have a USB port. For instance, many DVD and Blue-ray players can play back photographs, videos and music directly from a USB storage medium (hard drive, flash drive).

The Universal Serial Bus supports hot plugging. This means that USB devices can be connected without turning the computer off. The Universal Serial Bus also offers a 5-volt power supply. This makes it possible to load devices at the USB port and operate USB devices that do not have a power supply of their own.

The Universal Serial Bus was introduced with the USB 1.0 specification in 1996. In 1998 came the reworked USB 1.1 specification, followed in 2000 by USB 2.0. With 480 Mbit/s, USB 2.0 provides for considerably higher throughput rates than USB 1.0/1.1 (12 Mbit/s).

## VPN

short 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

short for for Voice over IP, also known as Internet telephony

Calls from the Internet are possible to and from the fixed-line network and mobile networks. Various Internet Service Providers and telephony carriers provide SIP-fixed-line gateways for this purpose. The gateways are used to produce voice connections between the Internet and conventional telephone networks.

In principle, VoIP calls can be made over any Internet connection. However, for convenient use with existing terminal devices, and for conversations with the fixed-line and mobile networks, it is important that the Internet Service 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

short 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 base stations or implementing transmission networks with high-power point-to-point radio transmission, even network segments located further away from each other can be linked or network participants in relatively remote locations can be economically and easily integrated into an existing network.

WLAN base stations 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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