

**Vodafone**

# **Anlagen-Anschluss Plus**

**PlusBox 341 user manual**

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# 1 Before you begin

This user manual helps users with basic PC and hardware knowledge to install their PlusBox 341 for use with Anlagen-Anschluss Plus. Via PlusBox 341, you can use a PBX based on Voice over IP (VoIP) or ISDN on your DSL connection.

## 1.1 Important information

Important information in this manual is marked by icons in the margin with the following meanings:

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### WARNING

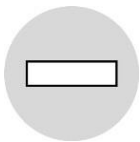


You must always observe this instruction to prevent yourself or others from risk of injury and danger to life!

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### CAUTION

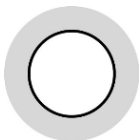


You must follow the instructions to prevent possible injury to yourself or others.

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### ATTENTION



You must observe this instruction to ensure the functionality of your hardware or software, avoid incorrect configurations or prevent data loss.

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### NOTE



Important general or supplementary information on a specific topic.

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## 1.2 Prerequisites

You have received the welcome letter containing the **Modem Installation Code (MIC)**.

All network components to be connected must have at least a **100/1000 Mbit/s Ethernet network interface**.

Your configuration computer has an up-to-date **browser** installed.

### 1.3 Scope of delivery

You will receive a PlusBox 341 from Vodafone, which must include the following parts:

- 1 PlusBox 341, contains label with password on the underside
- 1 purple-coloured DSL cable with RJ-11 plug to TAE-F plug (for telephone socket)
- 1 purple-coloured DSL cable with RJ-11 plugs on both sides
- 1 yellow network cable with RJ-45 plugs on both sides
- 1 plug-in power supply unit

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#### NOTES



Note that PlusBox 341 remains the property of Vodafone and is only leased. Any maintenance may only be carried out by Vodafone or companies authorised by Vodafone.

The PBX and its connection cables are not included in the scope of delivery.

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### 1.4 Safety notes

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#### WARNING



##### **Avoid injuries – read the documentation!**

Before starting the hardware installation for Anlagen-Anschluss Plus, be sure to read this user manual and the manufacturer's documentation for the PBX and other connected terminal devices in order to avoid injury or damage to equipment!

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Note the following:

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#### WARNING



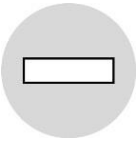
- **Never open the housing of PlusBox 341 – risk of fatal electric shock!**

If a repair is required, only Vodafone or persons authorised by Vodafone may carry out the repair.

- During a thunderstorm, do not install PlusBox 341 and do not plug in or unplug any cables – risk of fatal electric shock!
  - Do not use damaged cables – risk of fatal electric shock!
- 

### 1.5 Intended use

PlusBox 341 connects a PBX with the Vodafone Voice service. It also works as a router to which you can connect network devices.

**CAUTION**

- PlusBox 341 and other devices must be operated free-standing in dry, low-dust indoor areas and with a mains voltage of 230 V at 50 Hz.
- Lay cables so that nobody can step on them or trip over them.
- If you clean the housing, use a dry cloth. Avoid direct contact with water. In particular, the device must never be submerged!
- Position the device so that it is not directly in the sun.

## 1.6 Orientation

The following Chapter 2 shows you how to **connect** PlusBox 341 to the telephone socket, to your PBX and network devices. It also explains the meaning of the **LEDs** on the PlusBox.

Chapter 3 gives you an overview of the PlusBox 341 **user interface**, which you can access via your web browser.

Chapter 4 provides you with a **function overview** that links directly to the respective sections.

Chapter 5 describes the **activation** and **initial setup of** PlusBox 341 for your Voice service (IP Voice or ISDN), whereas Chapter 6 explains the detailed **configuration** of the Internet, LAN, Voice LAN and WiFi connection.

If you are unable to access the user interface, cannot connect to the PBX or receive **error messages** during activation and configuration, you can refer to Chapter 7 for **possible solutions**.

Information on contacting **customer support can be found** in Chapter 8.

Chapter 9 contains a series of **examples** for certain **security-relevant network configurations** that explain the firewall, port mapping and DMZ/Exposed Host functions and their interaction in more detail. There is also a configuration example for a **VPN tunnel** established on a connection to services in the cloud.

Chapter 10 contains a **glossary** of the most important terms used in this user manual. Chapter 11 features an **index**, and Chapters 12 and 13 provide a **list of figures** resp. a **list of tables**.

## 2 Anlagen-Anschluss Plus via DSL

PlusBox 341 supports the following **connection types**:

- **ISDN Voice + Data** (see Section 2.2.1)
- **ISDN Voice only** (see Section 2.2.2)
- **IP Voice only** (see Section 2.2.3)
- **IP Voice + Data** (see Section 2.2.4)

This chapter begins with a schematic representation of the overall connection from the TAE socket to your PBX with connected telephone terminals. We then use a photo of PlusBox 341 to show you which devices you need to connect to which port. The colours of the connection lines in this detailed illustration correspond to the colours of the cables supplied. **Before you put PlusBox 341 into operation, you should check the cabling between the devices.**

### 2.1 Operation with terminal devices other than PlusBox 341

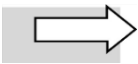
If you want to use a terminal device for your connection other than PlusBox 341 provided by Vodafone, you will find all the necessary data in your **welcome letter** and in your **VoiceManager** Administration Portal at [www.vodafone.de/aaplus-support](http://www.vodafone.de/aaplus-support).

If necessary, please check in advance with the manufacturer of your terminal device whether full utilisation of all functions is possible. Full feature support for the connection can only be guaranteed with the terminal devices provided by Vodafone.

### 2.2 Connecting PlusBox 341

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#### NOTES



For simplification, only one telephone terminal is shown in each of the following illustrations. To connect your telephone terminals to the PBX, please refer to its manufacturer's documentation.

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## 2.2.1 ISDN Voice + Data connection

This connection type allows you to connect an ISDN PBX as well as LAN computers to your PlusBox, directly or via a switch. WiFi is also available.

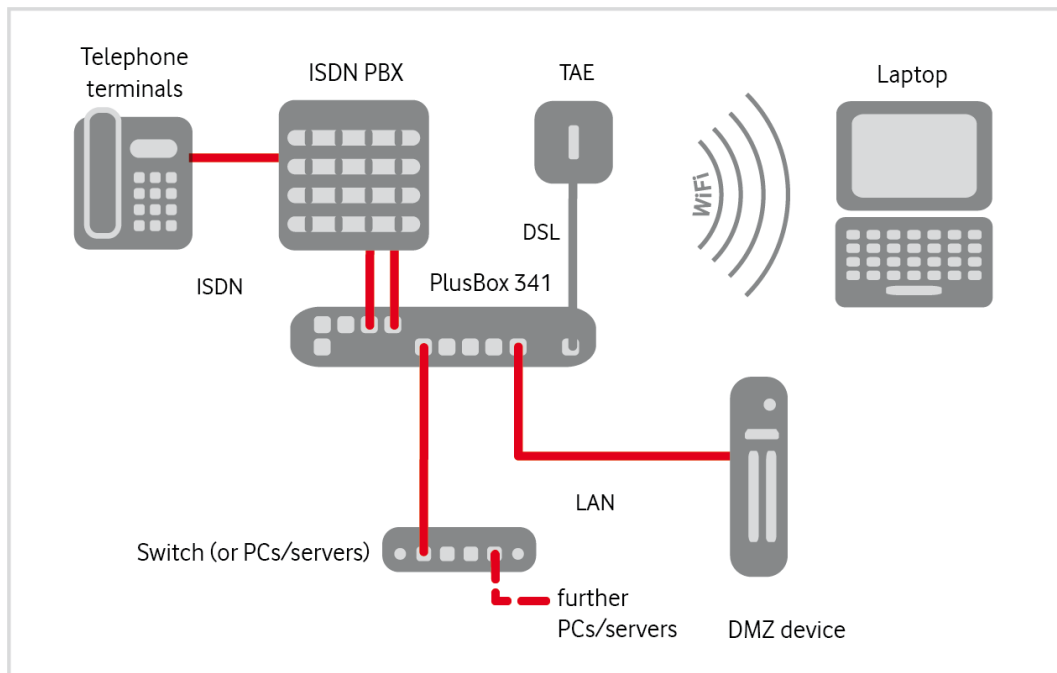


Fig. 1: Anlagen-Anschluss Plus, Connecting hardware with PlusBox 341, ISDN Voice + Data – Overview

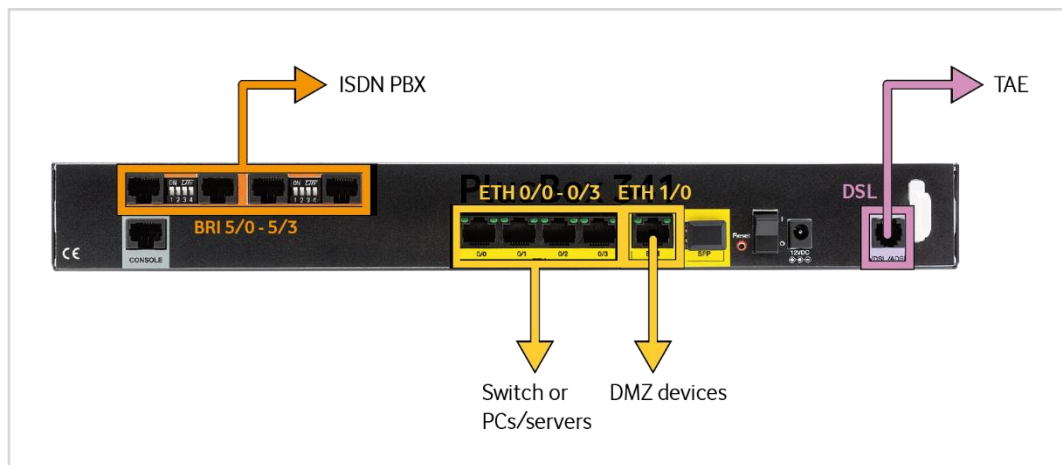
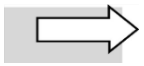


Fig. 2 : Anlagen-Anschluss Plus, Connecting hardware with PlusBox 341, ISDN Voice + Data – Detail

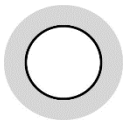
Proceed as follows for connecting the hardware:

1. Connect the **VDSL/ADSL port of PlusBox 341** to the **F-coded socket of your TAE** using the purple DSL cable. The socket is usually labelled with either the letter "F" or with a **telephone symbol that is not crossed out**.
2. **Set up PlusBox 341 for the Voice service.** How to do this is described in Chapter 5.
3. Connect your **PBX** to one or more **ports BRI 5/0 to BRI 5/3 of PlusBox 341**. (The cables required for this are not part of the Vodafone scope of delivery but should be included in the scope of delivery of your PBX).

**NOTE**

To connect the ISDN PBX to PlusBox 341, you usually need one or more non-crossover (also known as "straight through") connection cables not included in the Vodafone scope of delivery. They should be provided by the manufacturer of your PBX (for pin assignment, see Section 7.2), unless otherwise described in their PBX documentation. Refer to that manufacturer's documentation to find out how to connect the cable(s) to the PBX.

4. Connect the **telephone terminals** (telephone, fax, answering machine) to their ports as described in the manufacturer's documentation for your **PBX**.
5. Connect **network devices** such as PCs and servers directly or via a switch to the **ports ETH 0/0 to ETH 0/3** of PlusBox 341. (The network cables required for this are not included in the scope of delivery).
6. If necessary, connect a network device to the **ETH 1/0 port** that is to serve as an Exposed Host. If the Exposed Host function is deactivated (see Section 6.2.4), this port is switched off.

**ATTENTION**

The **Exposed Host network devices** of the **DMZ** (De-Militarised Zone) must always be connected to the **ETH 1/0 port** to ensure their security!

7. **Configure the network devices** via the PlusBox 341 user interface. How to do this is described in Chapter 6.

## 2.2.2 ISDN Voice only connection

This connection type is intended **exclusively** for connecting an **ISDN PBX** to your PlusBox so that you can use the Voice service. LAN and WiFi are not available. PlusBox's LAN interfaces ETH 0/0 to ETH 0/3 are only used to connect the configuration computer for setup and activation of your PlusBox.

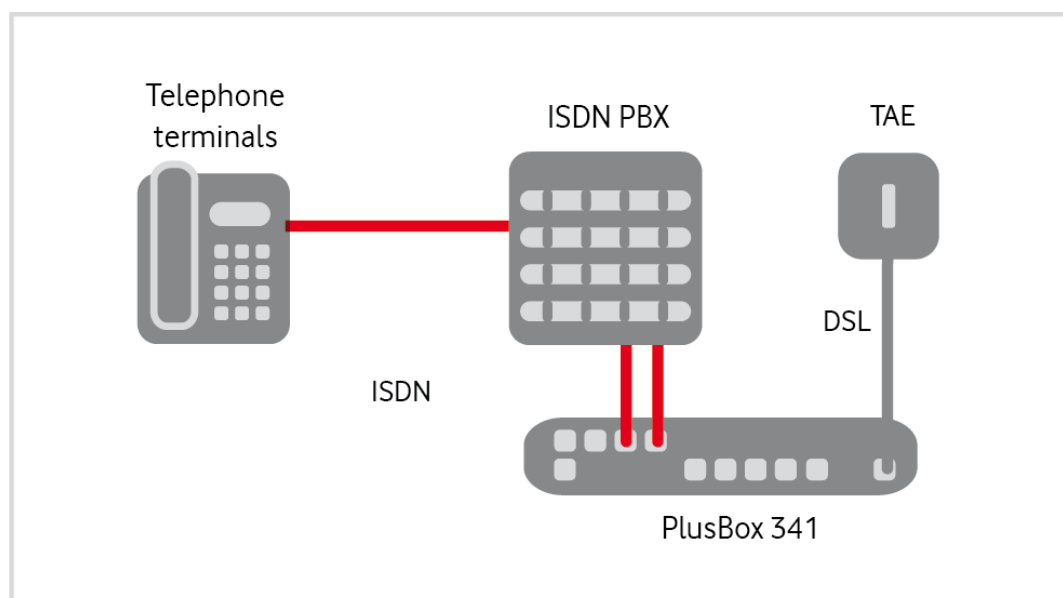


Fig. 3: Anlagen-Anschluss Plus, Connecting hardware with PlusBox 341, ISDN Voice only – Overview



Fig. 4: Anlagen-Anschluss Plus, Connecting hardware with PlusBox 341, ISDN Voice only – Detail

Proceed as follows for connecting the hardware:

1. Connect the **VDSL/ADSL port of PlusBox 341** to the **F-coded socket of your TAE socket** using the purple DSL cable. The socket is usually labelled with either the letter "F" or with a **telephone symbol that is not crossed out**.
2. **Set up PlusBox 341 for the Voice service.** How to do this is described in Chapter 5.
3. Connect your **ISDN PBX** to one or more of the ports BRI 5/0 to BRI 5/3 of PlusBox 341. (The cables required for this are not part of the Vodafone scope of delivery but should be included in the scope of delivery of your PBX).

#### NOTE



To connect the ISDN PBX to PlusBox 341, you usually need one or more non-crossover (also known as "straight through") connection cables not included in the Vodafone scope of delivery. They should be provided by the manufacturer of your PBX (for pin assignment, see Section 7.2), unless otherwise described in their PBX documentation. Refer to that manufacturer's documentation to find out how to connect the cable(s) to the PBX.

4. Connect the **telephony terminals** (telephone, fax, answering machine) to their ports as described in the manufacturer's documentation for your ISDN PBX.

### 2.2.3 IP Voice only connection

This connection type is intended **exclusively** for connecting an **IP PBX** to your PlusBox so that you can use the **Voice service**. LAN and WiFi are not available. PlusBox's LAN interfaces ETH 0/0 to ETH 0/3 are only used to connect the configuration computer for setup and activation of your PlusBox.

#### NOTE



You must select **IP mode** in the **VoiceManager Portal** for this connection to function correctly.

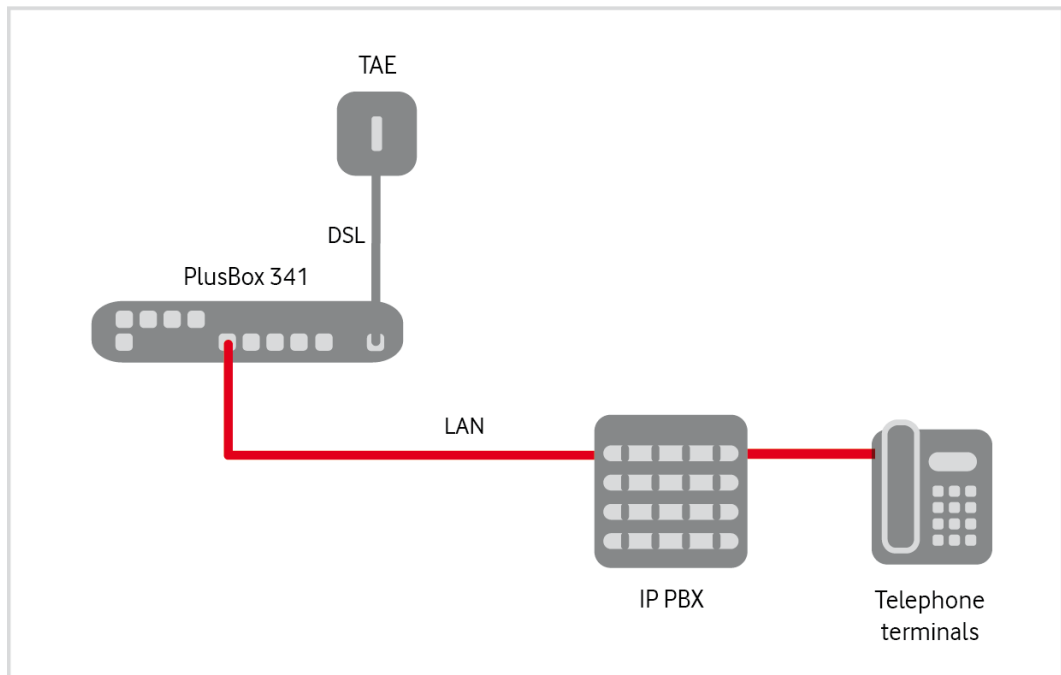


Fig. 5: Anlagen-Anschluss Plus, Connecting hardware with PlusBox 341, IP Voice only – Overview

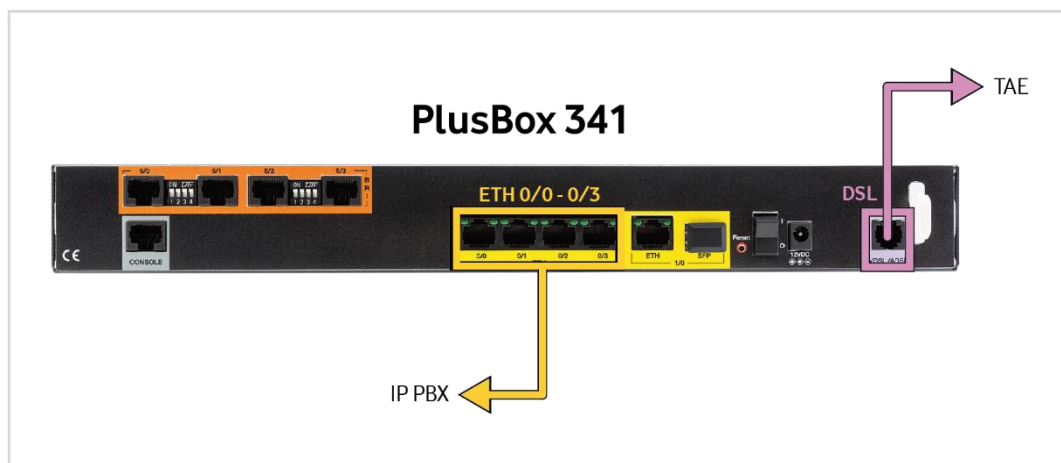


Fig. 6: Anlagen-Anschluss Plus, Connecting hardware with PlusBox 341, IP Voice only – Detail

Proceed as follows for connecting the hardware:

1. Connect the **VDSL/ADSL port of PlusBox 341** to the **F-coded socket of your TAE** using the purple DSL cable. The socket is usually labelled with either the letter "F" or with a **telephone symbol that is not crossed out**.
2. **Set up PlusBox 341 for the Voice service**. How to do this is described in Chapter 5.
3. Connect your **IP PBX** to one or more of the **ports ETH 0/0 to ETH 0/3 of PlusBox 341**. (The cables required for this are not part of the Vodafone scope of delivery but should be included in the scope of delivery of your PBX).
4. Connect the **telephony terminals** (telephone, fax, answering machine) to their ports as described in the manufacturer's documentation for your **IP PBX**.
5. If necessary, connect a network device to the **ETH 1/0 port** that is to serve as an **Exposed Host**. If the Exposed Host function is deactivated (see Section 6.2.4), this port is switched off.

## 2.2.4 IP Voice + Data connection

This connection type allows you to connect an IP PBX as well as LAN computers to your PlusBox, directly or via a switch. WiFi is also available.

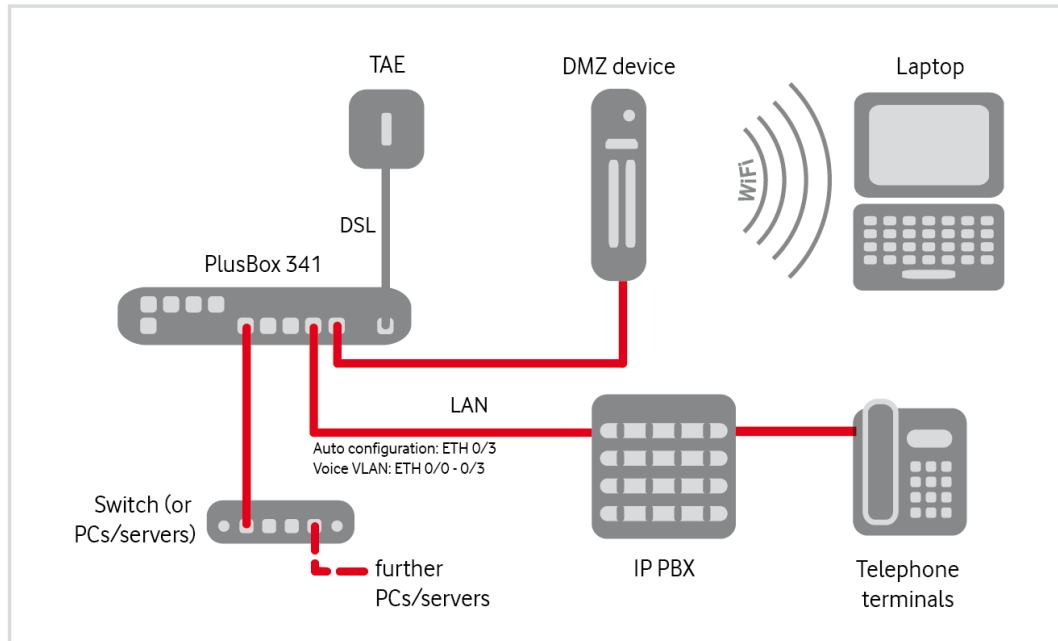


Fig. 7: Anlagen-Anschluss Plus, Connecting hardware with PlusBox 341, IP Voice + Data – Overview

You have two **configuration options** for your Voice LAN: **automatic configuration** via the PlusBox or **manual VLAN configuration** with the corresponding VLAN ID, which depends on the configuration of your IP PBX.

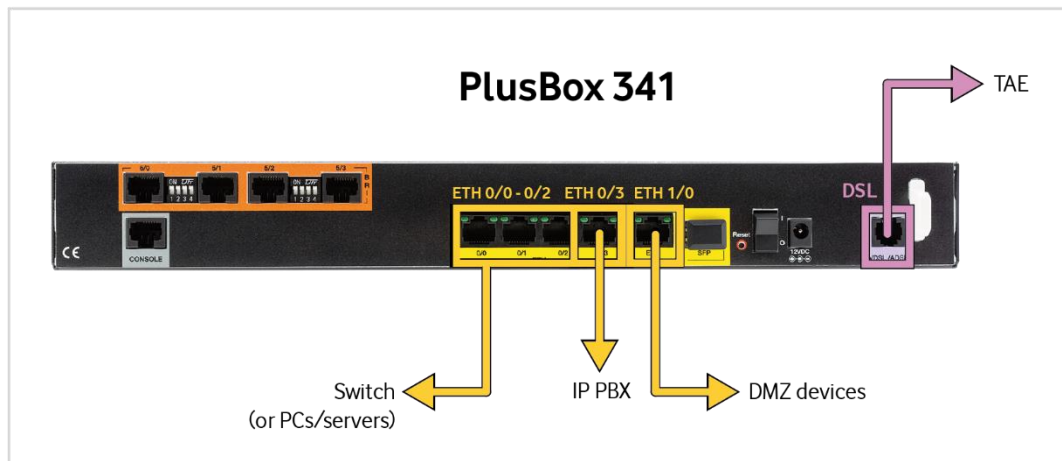


Fig. 8: Anlagen-Anschluss Plus, Connecting hardware with PlusBox 341, IP Voice + Data – Auto configuration detail

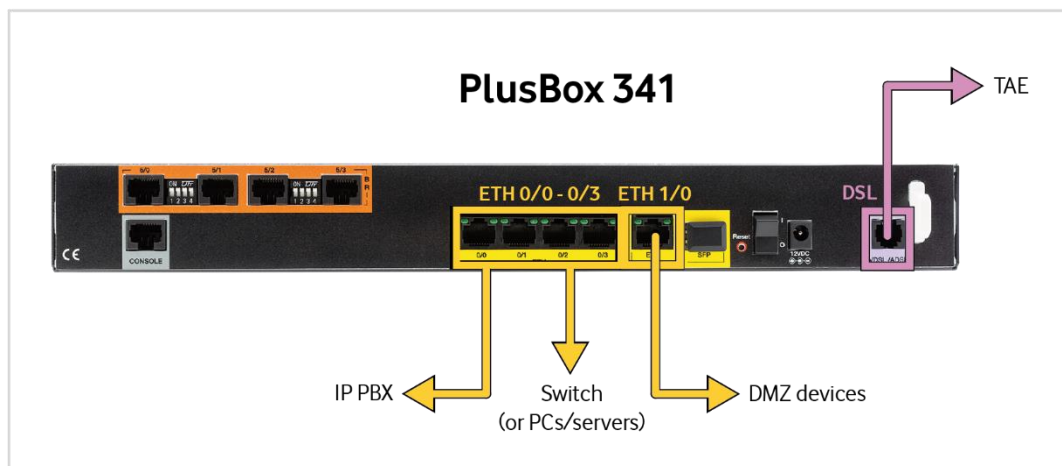
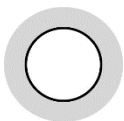


Fig. 9: Anlagen-Anschluss Plus, Connecting hardware with PlusBox 341, IP Voice + Data – VLAN config. detail

Proceed as follows for connecting the hardware:

1. Connect the **VDSL/ADSL port of PlusBox 341** to the **F-coded socket of your TAE** using the purple DSL cable. The socket is usually labelled with either the letter "F" or with a **telephone symbol that is not crossed out**.
2. **Set up PlusBox 341 for the Voice service**. How to do this is described in Chapter 5.
3. Connect your **IP PBX** to **PlusBox 341** as follows:
  - to port **ETH 0/3** – the Voice LAN is **configured automatically**
  - or
  - to one of the ports **ETH 0/0-0/3** – you configure a **VLAN** for the Voice LAN and assign a VLAN ID to it
4. Connect the **telephony terminals** (telephone, fax, answering machine) to their ports as described in the manufacturer's documentation for your **IP PBX**.
5. Connect **network devices** such as PCs and servers directly or via a switch to the other **ETH ports** of PlusBox 341. (The network cables required for this are not included in the scope of delivery).
6. If necessary, connect a network device to the **ETH 1/0 port** that is to serve as an **Exposed Host**. If the Exposed Host function is deactivated (see Section 6.2.4), this port is switched off.

## ATTENTION



The **Exposed Host network devices** of the **DMZ** (De-Militarised Zone) must always be connected to the **ETH 1/0 port** to ensure their security!

7. **Configure the network devices** via PlusBox 341 user interface. How to do this is described in Chapter 6.

**NOTE**

If you want to select **automatic configuration** of the Voice LAN via port **ETH 0/3**, you must connect the **configuration computer** to one of the ports **ETH 0/0 to ETH 0/2**, as only the Voice LAN can be reached via port ETH 0/3, but not the data LAN.

## 2.3 Light indicators (LEDs) on PlusBox 341

This section explains the behaviour of the LEDs on the front of PlusBox 341 after switching on and during operation.

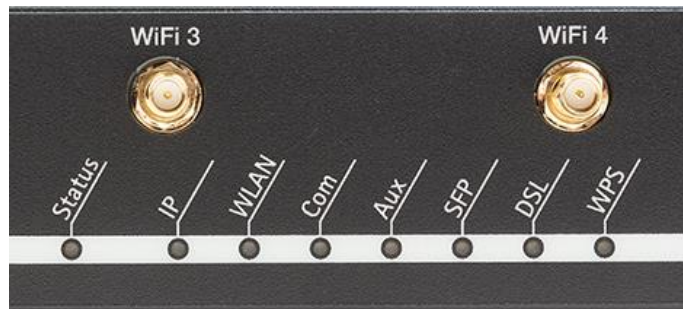


Fig. 10: PlusBox 341 front view (detail)

The LEDs on the front of PlusBox 341 signal the following operating states:

Designation	Colour	Status	Meaning
<b>Status</b>		off	The power supply unit is not plugged in correctly, or there is a problem with power supply, or PlusBox 341 or its power supply unit is defective.
	red	on	PlusBox 341 is correctly connected to the power supply but is not (yet) ready for operation.
	green	flashes	The system restarts.
on		The system has booted and is ready for operation (default setting). You can now enter the Modem Installation Code (MIC).	
<b>IP</b>		off	ETH ports are not used.
	red	on	None of the ETH ports are operational.
	green	flashes	Individual ETH ports are ready for operation.
		on	All ETH ports are ready for operation.

Designation	Colour	Status	Meaning
WiFi	off or red and on		WiFi is deactivated.
	orange	flashes	Main WiFi is activated and is currently transmitting data.
		on	Main WiFi is activated and currently without data traffic.
	green	flashes	Main and Guest WiFi are activated and are currently transmitting data.
		on	Main and Guest WiFi are activated and currently without data traffic.
	Com	off	
red		on	The connection to the PBX is interrupted, no BRI port has been configured, there is no ISDN signalling, or registration in the Vodafone network has not taken place.
green		flashes	At least one call is currently active.
		on	Registration in the Vodafone network is active and the ISDN service is available.
		off	No auto-configuration is set up on PlusBox. Please contact Vodafone customer service (see Chapter 8).
Aux	green	flashes	Alternating <b>3 seconds</b> on, 3 seconds off: Auto configuration is currently being carried out. Alternating <b>1 second</b> on, 1 second off: Auto configuration update has failed. Alternating <b>0.5 seconds</b> on, 0.5 seconds off: Communication between the Vodafone auto configuration server and the PlusBox has failed. Contact Vodafone customer service (see Chapter 8).
		on	Auto configuration was carried out successfully.
	(SFP)	not used	
DSL	off		The DSL connection to the WAN is not configured.
	red	on	The DSL connection to the WAN is interrupted.
	green	flashes	The DSL connection is currently being synchronized.
		on	The DSL connection is synchronized and ready for operation.
WPS	green	flashes	The connection between WiFi network and the WiFi-enabled terminal device is established.

Tab. 1: LEDs on the front of PlusBox 341



## 3 PlusBox 341 user interface

This chapter describes the page structure and navigation, the page types and the most important control elements of your PlusBox 341 user interface.

### 3.1 Page structure and navigation

Most pages of the PlusBox user interface are structured as follows:

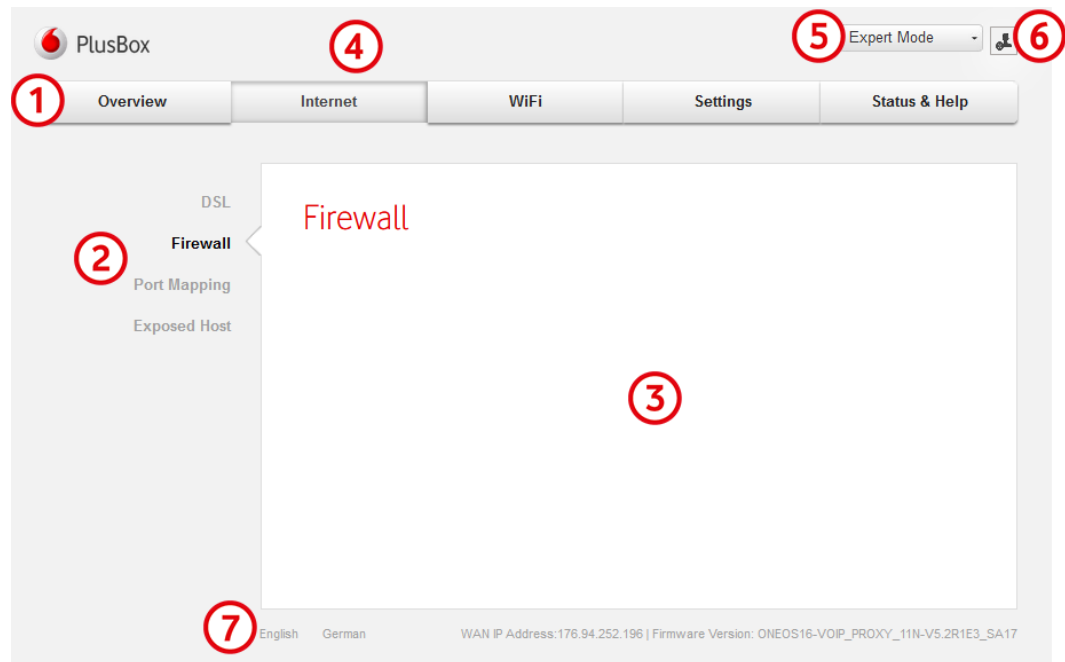


Fig. 11: PlusBox 341, Structure of pages in the user interface

No.	Control element	Action
1	<b>Menu bar</b>	Contains buttons for all <b>main menus</b> . The active main menu is displayed as a pressed button (in the example, the Internet main menu).  Depending on the connection (see Tab. 6), not all or other main menus are available.
2	<b>Navigation bar</b>	Here you select the desired <b>submenu</b> of the active main menu to display it in the content window (3).  The active submenu is displayed in black, those not selected in grey.
3	<b>Content window</b>	Displays the <b>contents</b> of the selected submenu, such as the <b>status display, configuration masks and overviews</b> .  The arrow-shaped bulge from the white rectangular shape points to the active submenu in the navigation bar (2). The name of the submenu is displayed as a red heading in the content window.
4	<b>User status bar</b>	Displays the user's <b>login status</b> and any changes made to the basic settings

No.	Control element	Action
5	List field for mode selection	Here you can choose between the simplified <b>Basic mode</b> view , in which only the most important submenus are displayed, and the <b>Expert mode</b> view, which offers extensive configuration options.
6	User button	<b>Log out</b> from PlusBox user interface
7	PlusBox status bar	Displays the <b>WAN IP address</b> of PlusBox and its <b>firmware version</b> .  On the left side of this status bar, you can change the user interface <b>display language</b> in real time by one click: <b>DE</b> for German and <b>EN</b> for English.

Tab. 2: PlusBox 341, Control elements of a menu page

## 3.2 Page types and user interface control elements

The user interface offers the following three basic types of content pages:

- **Status overview page** without or almost without any configuration options, which only serve to display the status
- **Simple configuration page** in which you can apply some basic settings
- **Complex configuration page** with extensive configuration options, often with pop-up windows for individual configuration areas.

The following subsections show examples of submenu content pages for these three page types. Depending on the functionality, these contain different control elements which are explained in the respective subsection. In addition, there are some special pages that are not included in this schema, in particular the **Overview** page (see Section 6.1).

### 3.2.1 Status overview page

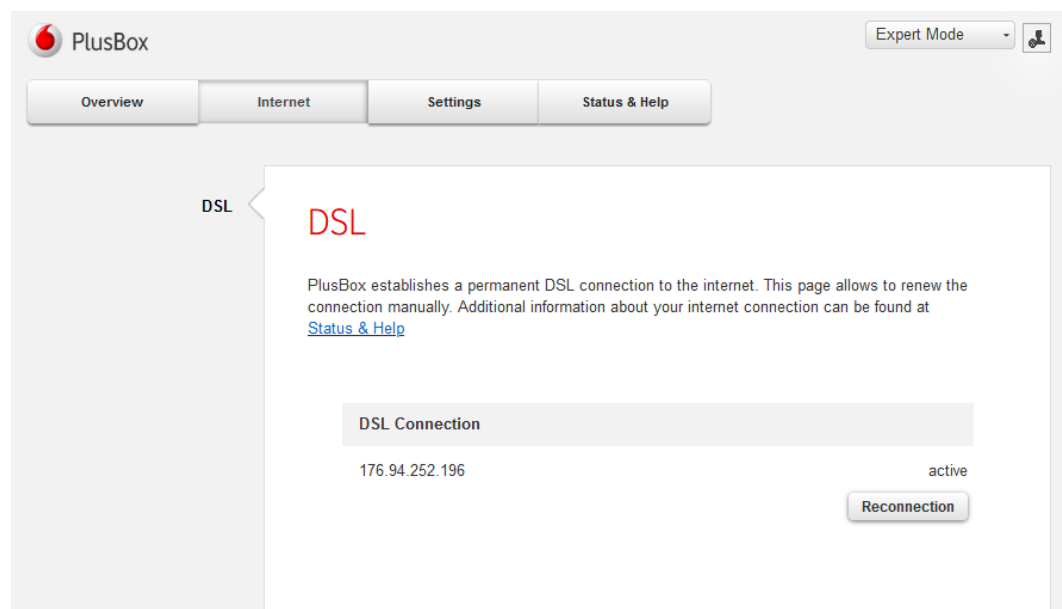


Fig. 12: PlusBox 341, Page types: Example of a status overview page

In the **DSL** submenu content page of the **Internet** main menu, it is primarily the status of the DSL connection that is relevant, namely the WAN IP address and the **active** connection status. The only

control element on this page is the **Reconnection** button, which you can use to re-establish an interrupted DSL connection.

### 3.2.2 Simple configuration page

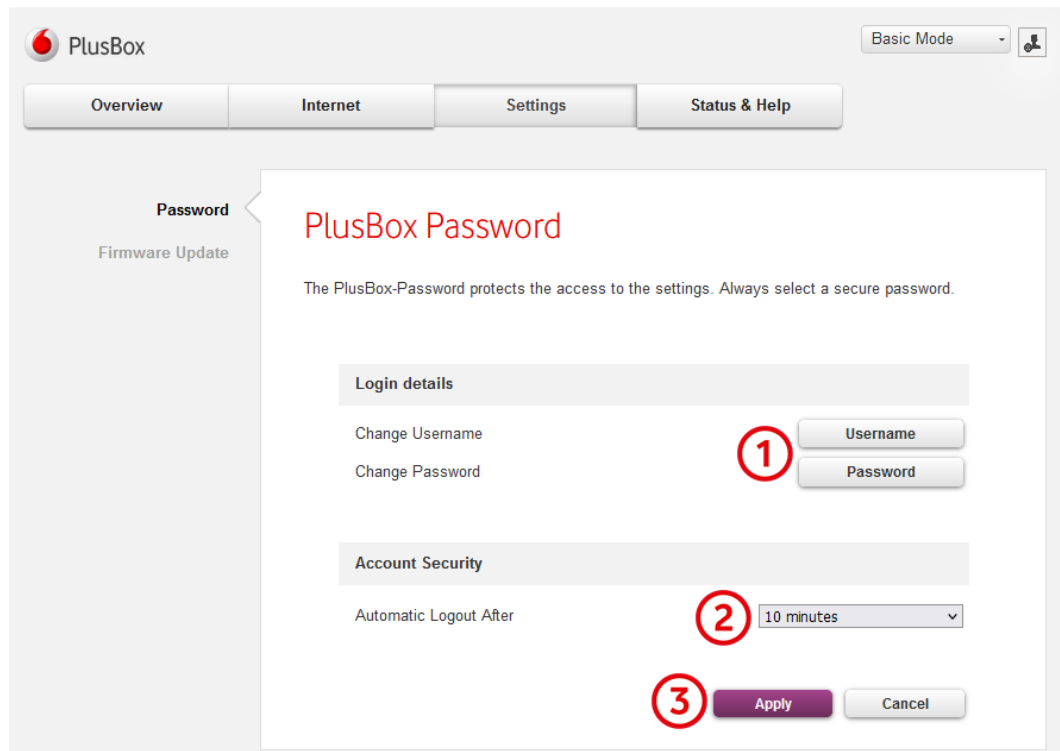


Fig. 13: PlusBox 341, Page types: Example of a simple configuration page

No.	Control element	Action on the example page
1	Function button	Click to open pop-up editing windows for the specified functions
2	List field	Expand available periods, select desired period
3	Default buttons Apply/Cancel	Click to accept or discard the changes you have made. The button for the <b>default action</b> is displayed with a <b>purple background</b> , the alternative action with a grey background.

Tab. 3: PlusBox 341, Control elements of a simple configuration page

### 3.2.3 Complex configuration page

Fig. 14: PlusBox 341, Page types: Example of a complex configuration page

No.	Control element	Action on the example page
1	Slider	Drag to activate/deactivate the WiFi function, individual WiFis and the visibility of the WiFi name (SSID)
2	Text field	Enter the desired WiFi name
3	List field	Expand entries for band selection and security mode by clicking on the small arrow on the right, select the desired entry
4	Checkbox	Activate to display WiFi password in plain text
5	Function button	Click to change WiFi password
6	Default buttons Apply/Cancel	Click to accept or discard the changes you have made. The button for the <b>default action</b> is displayed with a <b>purple background</b> , the alternative action with a grey background.

Tab. 4: PlusBox 341, Control elements of a complex configuration page




Apart from complex content pages, there are also somewhat **more complex pop-up editing windows**:

Fig. 15: PlusBox 341, Page types: Example of a complex pop-up editing window

In addition to the aforementioned types of control elements text field (1), list field (2) and default buttons (4), the above pop-up editing window contains **radio buttons (3)** with the **options** Port and Port Range, of which only one can be active at a time (in the example, this is the port range, indicated by the green dot inside the circle).

### 3.3 Additional user interface control elements

The buttons not yet described have the following meaning:

Symbol	Presentation (text)	Meaning
	Plus	Add entry
	Rubbish bin	Delete entry
	Gear wheels	Edit settings

Tab. 5: PlusBox 341, Additional control elements in the user interface

## 4 Functional overview of PlusBox 341

**Functions** available in PlusBox 341 vary depending on the ordered **connection type**. Tab. 6 shows you which functions you can use with your connection type and in which **menu** you will find these functions. Menus labelled **[E]** can only be called up in Expert mode. Hold down the **Ctrl** key and **click** the **section name** to directly access the description of the respective function.

### Example:

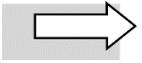
You ordered the **IP Voice + Data** connection type and want to configure the **firewall**. At the intersection of the **Firewall [E]** row and the **IP Voice + Data** column, there is a cell with the entry **6.2.2**.

Hold down the **Ctrl** key and click this information directly retrieve the corresponding section of the manual.

Functions			Connection type			
Main menu	Submenu 1	Submenu 2	ISDN Voice + Data	ISDN Voice only	IP Voice only	IP Voice + Data
<b>Overview</b> (symbols)	DSL		x	x	x	x
	Ethernet		x	x	x	x
	Voice LAN		--	--	--	x
	WiFi		x	--	--	x
	Guest WiFi		x	--	--	x
<b>Internet</b>	DSL		6.2.1	6.2.1	6.2.1	6.2.1
	Firewall [E]		6.2.2	--	--	6.2.2
	Port Mapping [E]		6.2.3	--	--	6.2.3
	Exposed Host [E]		6.2.4	--	--	6.2.4
<b>WiFi</b>	General		6.3.1	--	--	6.3.1
	WPS		6.3.2	--	--	6.3.2
	MAC Filter [E]		6.3.3	--	--	6.3.3
	Advanced Settings [E]		6.3.4	--	--	6.3.4
<b>Settings</b>	PlusBox Password		6.4.1	6.4.1	6.4.1	6.4.1
	Firmware Update		6.4.2	6.4.2	6.4.2	6.4.2
	Configuration [E]		6.4.3	6.4.3	6.4.3	6.4.3
	Network [E]		6.4.4	6.4.4	6.4.4	6.4.4
		LAN [E]	6.4.4.1	6.4.4.1	6.4.4.1	6.4.4.1
		Voice LAN [E]	--	--	--	6.4.4.2
		WiFi [E]	6.4.4.3	--	--	6.4.4.3
		Guest WiFi [E]	6.4.4.3	--	--	6.4.4.3
		PlusBox Reset & Reboot [E]	6.4.5	6.4.5	6.4.5	6.4.5
<b>Status &amp; Help</b>	PlusBox Status		6.5.1	6.5.1	6.5.1	6.5.1
	Diagnostic program [E]		6.5.3	6.5.3	6.5.3	6.5.3
	About		6.5.4	6.5.4	6.5.4	6.5.4

Tab. 6 : PlusBox 341 functions

---

**NOTE**

The **Overview** page contains only icons that you can click to access the respective content pages. Therefore, only **crosses** are placed here if the corresponding **menu** with its functions **can be invoked**.

If you click symbols for which there are no accessible menus in the selected interface (indicated by -- in the table), you will receive an **error message**.

---

## 5 Setting up PlusBox 341 for Voice service

Carry out the configuration on your PlusBox 341 as described below. First configure the computer with which you access PlusBox 341 configuration interface. Then set up PlusBox 341 for the Voice service via this configuration interface.

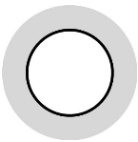
### 5.1 Setting up the configuration computer

The computer you wish to use to configure PlusBox 341 must obtain its IP address dynamically via DHCP (Dynamic Host Configuration Protocol).

Ensure as follows that the computer is set up accordingly (default setting):

1. Connect one of the **ports ETH 0/0 to ETH 0/2** of PlusBox 341 to a LAN interface of your configuration computer via the yellow LAN cable.

#### ATTENTION



In **IP Voice + Data** connection, you **cannot use ETH 0/3 port** if you have selected the **automatic configuration of the Voice LAN** via this port (not the VLAN variant), see Section 6.4.4.2.

In this case, the **Voice LAN** is located in a **different network segment** than the LAN for data traffic and you would not be able to access its user interface.

2. Configure your computer with the following TCP/IP properties:

Parameters	Selection
IPv4 address	Obtain an IP address automatically
DNS server address	Obtain DNS server address automatically

Tab. 7: Network settings for configuration computer

To do this, proceed as follows (description for Windows 10, other Windows operating systems similar):

3. Right-click the Windows start icon and select the **Settings** entry.

The **Settings** window opens.

4. Select Network and Internet.

The **Status – Network status** window opens.

5. In the Advanced network settings area, click the Change adapter options entry.

The **Network connections** window opens.

6. **Right-click** the icon with the name of the Internet connection to be configured to call up context menus.

7. Select the **Properties** context menu.

The **[Connection name] properties** window opens.

8. Select the entry Internet Protocol Version 4 (TCP/IPv4).

9. Click the **Properties** button.

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



10. Activate the options **Obtain IP address automatically** and **Obtain DNS server address automatically**.
11. Confirm the entries by clicking **OK**.

You have now applied all necessary network settings.

## 5.2 Activating and setting up PlusBox 341

This section describes how to activate PlusBox 341 with the Modem Installation Code (MIC) and to apply the necessary basic settings.

### NOTES



If PlusBox 341 does not behave as described below during configuration and you receive an error message instead, see Chapter 7 to find out how to rectify the error.

The **configuration** via the user interface **described below** is **only** possible if you use a **cable during setup** (and also for subsequent changes). Connect PlusBox 341 to the configuration computer via a network cable as described in Section 5.1.

1. Open your Internet browser and enter the following address: **http://192.168.2.1** or alternatively **plus.box**.

The start page opens.

2. Enter your **Username** and the **Password** which you will find on the underside of PlusBox 341:

The screenshot shows the PlusBox 341 web interface. At the top left, there is a red circular icon with a white plus sign and the text 'PlusBox'. Below this, the word 'Welcome!' is displayed in a large, red font. A horizontal line separates the header from the main content area. On the left side of the main area, there is a small image of the PlusBox 341 device. To the right of the image, there is a text prompt: 'Please enter your PlusBox username and password to get access to the setup menu.' Below this prompt are two input fields: 'Username' with the text 'root' entered, and 'Password' with a series of dots. To the right of the password field is a button labeled 'Forgotten Password'. At the bottom center of the form is a purple button labeled 'Log In'.

Fig. 16: PlusBox 341, Enter username and password

3. Click **Log In**.

The **Activation wizard** starts:

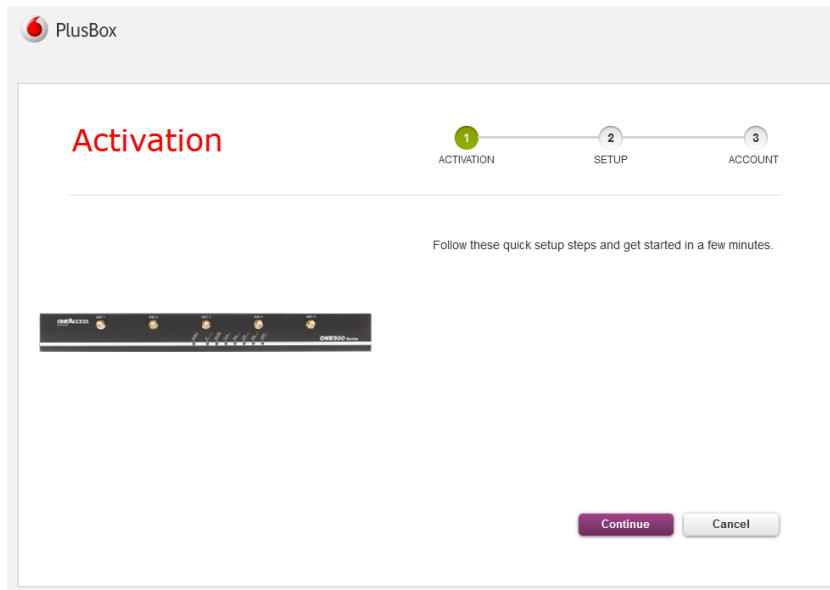


Fig. 17: PlusBox 341, Activation wizard, Step 1: Activation

You are prompted to connect PlusBox 341 to the TAE socket. socket. If you have not already done so, connect PlusBox 341 to the telephone socket using the purple DSL cable.

4. Click **Continue**.

The DSL line gets checked. The input screen for the Modem Installation Code (MIC) opens:

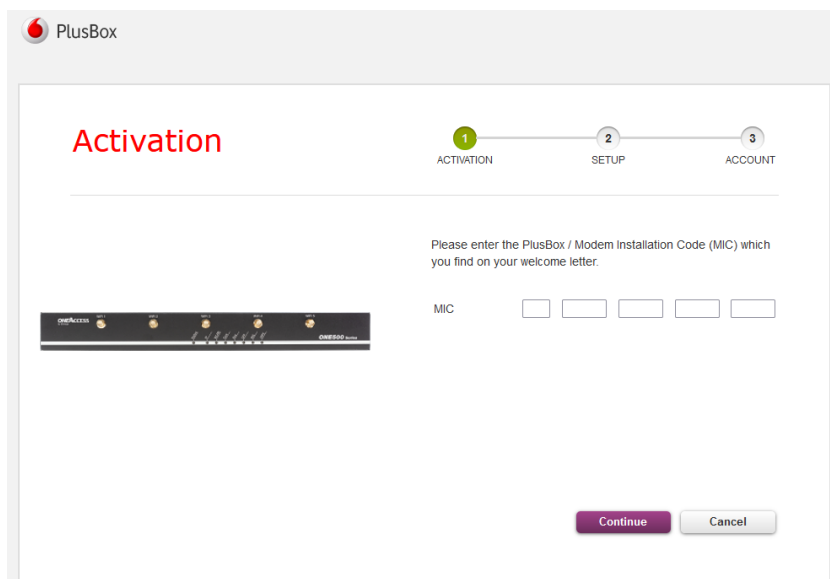


Fig. 18: PlusBox 341, Activation wizard, MIC input

5. Enter the 22-digit **Modem Installation Code (MIC)** from your welcome letter and click **Continue**.

The MIC gets checked, and then activation is carried out. After successful activation, you receive a corresponding message:

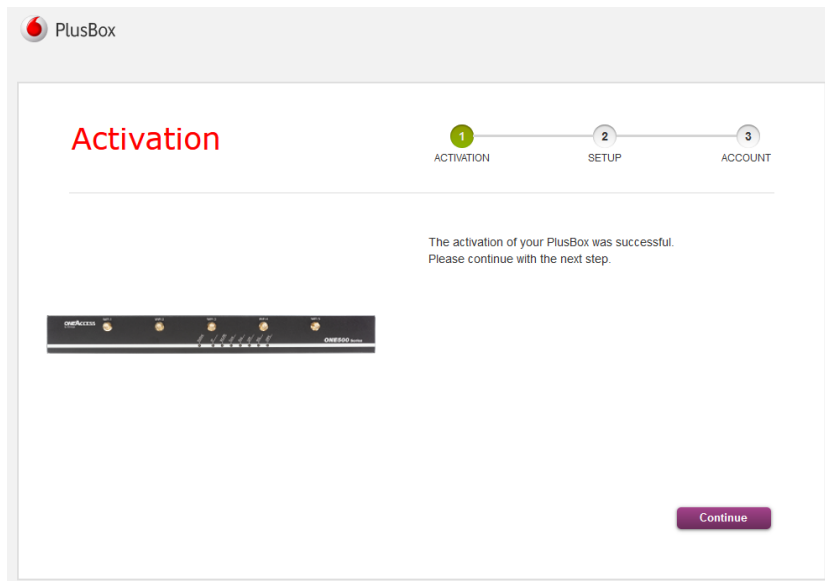


Fig. 19: PlusBox 341, Activation successful

6. Click **Continue**.

The Setup page opens. Here you can restore a configuration saved on your computer (not possible during initial setup):

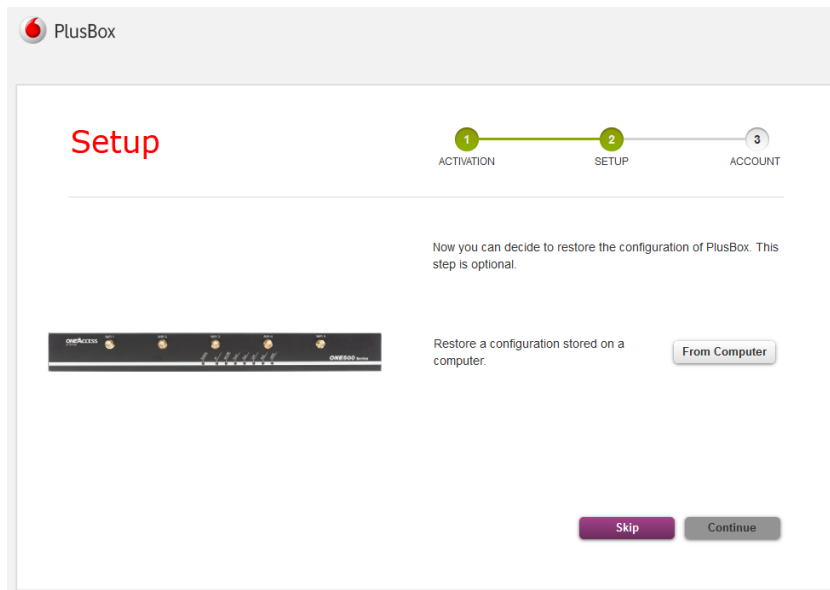


Fig. 20: PlusBox 341, Activation wizard, Step 2: Setup

7. Click **Skip**.

**NOTE**

**WiFi setup** described below is possible only for the **ISDN Voice + Data** and **IP Voice + Data** connection types.

If you ordered ISDN or IP in the **Voice only** variant, continue with **step 12**.

You can now define the basic settings for your **WiFi network**:

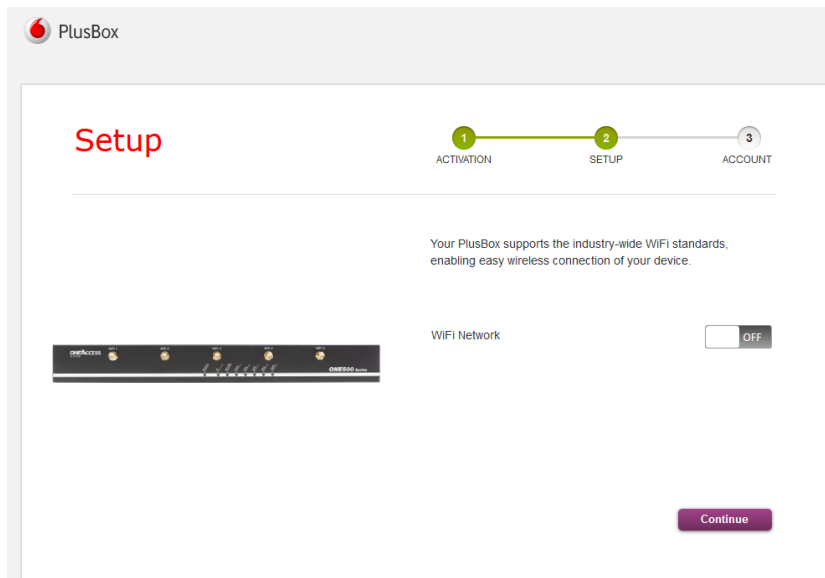


Fig. 21: PlusBox 341, Activation wizard, Setting up the WiFi network

8. To do this, move the slider to the right to switch on the network.

The input mask for **WiFi settings** opens:

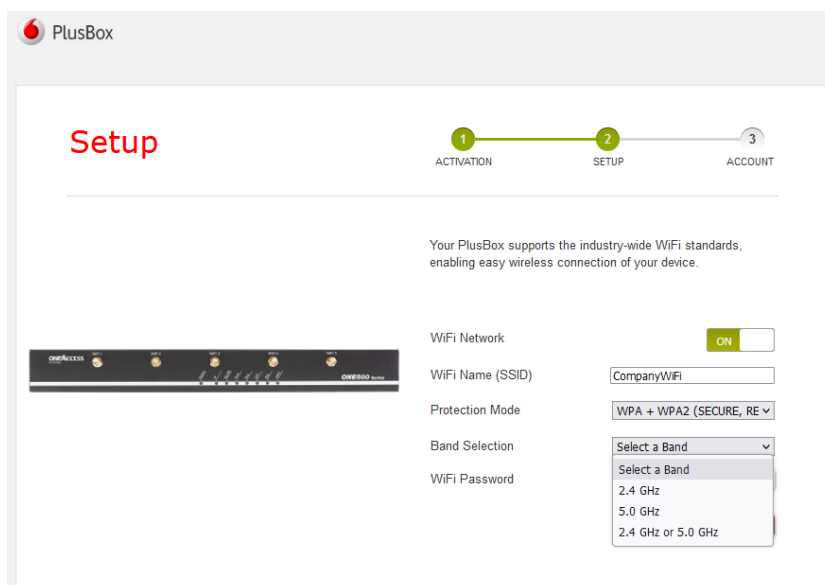


Fig. 22: PlusBox 341, Activation wizard, Defining WiFi settings

9. Make the following entries:

- desired **WiFi Name**

- **Protection Mode** (recommended: **WPA2 PSK**)
- **Band Selection:** 2.4 GHz, 5 GHz or automatic selection between these bands
- **WiFi Password:** Click **Change Password**

When entering the password in the pop-up editing window, according to the criteria displayed in the message, you are continuously shown how secure the selected password is – from red (Weak) to yellow to green (Strong):

Fig. 23: PlusBox 341, Activation wizard, Changing password for WiFi network

10. Click **Save** to close the pop-up window.

You receive a confirmation message on successful saving in a separate pop-up window.

11. Click **Continue** in the wizard.

The **Account** page opens:

Fig. 24: PlusBox 341, Activation wizard, Step 3: Account

12. Enter the desired **PlusBox password** in the **New Password** field, **Confirm password** and click **Continue**.

This completes the basic configuration. You receive the following message:

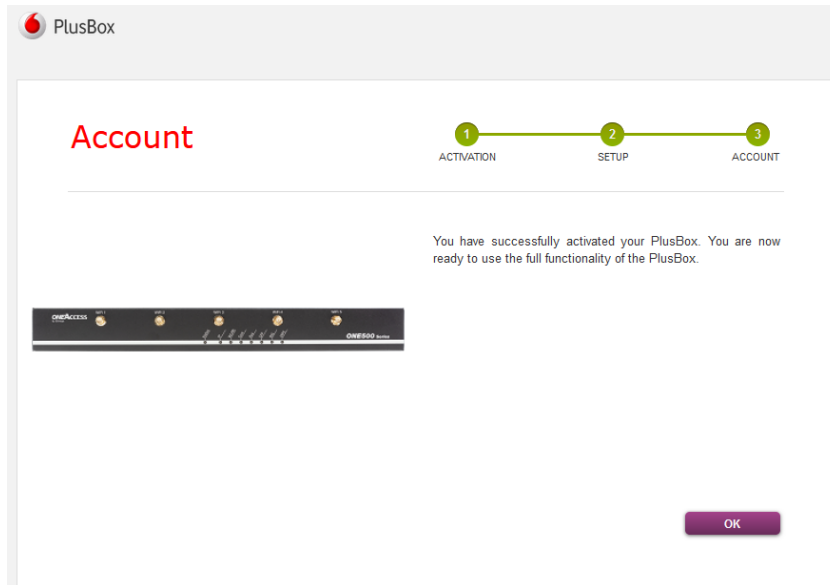


Fig. 25: PlusBox 341, Activation wizard, Account set-up completed

PlusBox 341 is now prepared for Voice service operation with Anlagen-Anschluss Plus as well as for Internet access. You can check this on the status page of PlusBox 341, see Section 6.5.1.

In Chapter 6, you find how to apply further settings to your (Ethernet or WiFi) network.

## 6 Configuring PlusBox 341 for Internet access

This chapter describes the configuration options on the individual content pages. For each of the submenus, the heading indicates in which modes (Basic/Expert mode) it is available.

### NOTE



Depending on the ordered connection type, different main and sub menus are displayed. The range of device icons displayed and their status on the Overview page also depend on the connection type.

### 6.1 Overview

The overview page is an individual page type that is available for both Basic and Expert mode. As only the main menu exists here without any submenus, the navigation bar is omitted:

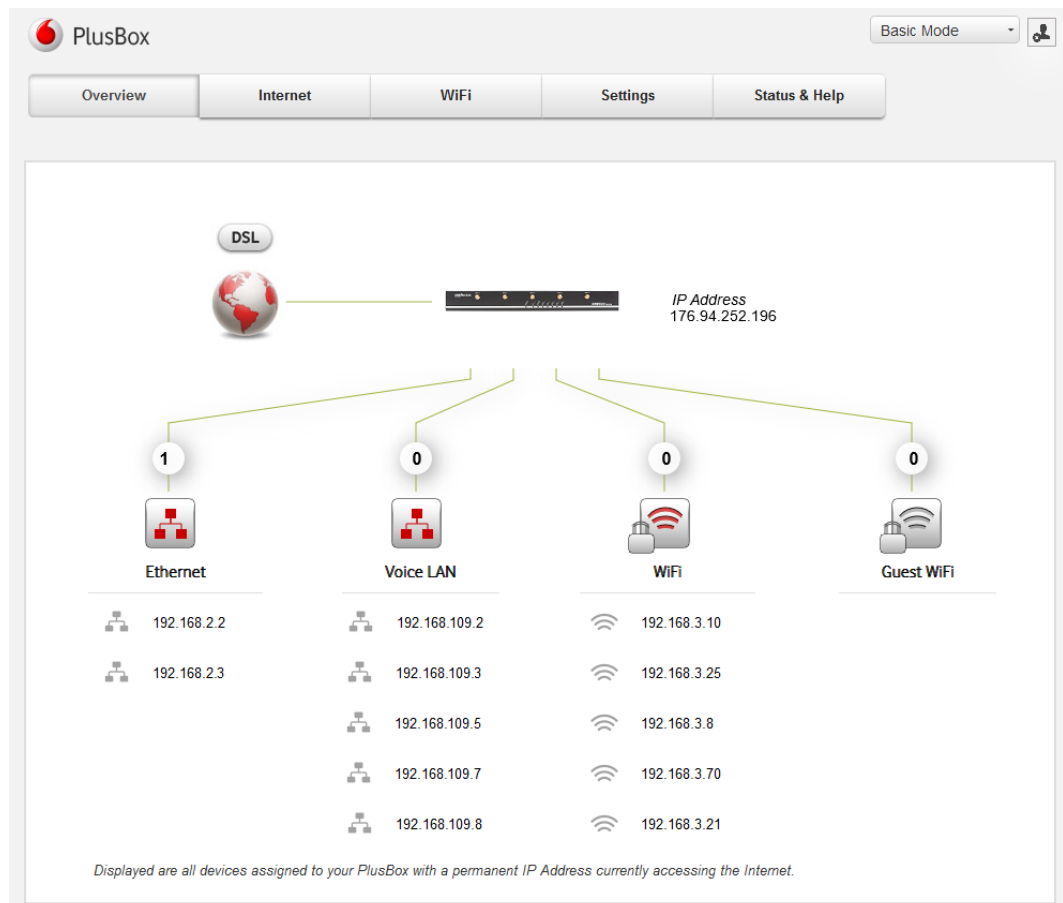


Fig. 26: PlusBox 341, Overview page (example for IP Voice + Data connection)

On the Overview page, you immediately recognize **WAN, LAN and WiFi status** of your PlusBox 341 (the latter if available for your chosen connection type). The **IP address** and **network type**, as well as

the **number of connected network devices** per type are displayed. If available, you can use the green arrow at the bottom to expand the list for additional devices that are not initially displayed.

If a WiFi network is **deactivated**, this is indicated by the **icon** being **greyed out**. WiFi networks with configured **encryption** contain a **lock** next to the WiFi symbol.

Click any network type icon to get more information about the status of that network. Both the icons and the network type names are linked to the corresponding status pages.

To query the **DSL status**, click the **globe** or the designation **DSL** above it. For **PlusBox 341 status** in general, click the **PlusBox image**.

If there is a **problem with the DSL connection**, this is indicated by a small **warning triangle symbol** next to the label **DSL**.

## 6.2 Internet

This section describes the functions of the **Internet** main menu. The **DSL** submenu is available for **all connection types** (see Tab. 6). The **Firewall**, **Port Mapping** and **Exposed Host** submenus are **only available** for **ISDN Voice + Data** and **IP Voice + Data** connections, as no potentially harmful data traffic for internal networks can occur in the voice-only variant.

### NOTE



The following subsections primarily describe the operation of the submenus. For background information on the **Firewall**, **Port Mapping** and **Exposed Host** submenus and for explanatory **configuration scenarios**, see Chapter 9.

### 6.2.1 DSL (Basic and Expert)

The **DSL** content page, which is available in both Basic and Expert mode, shows the **IP address** and the **active** or **inactive status** of the DSL connection:

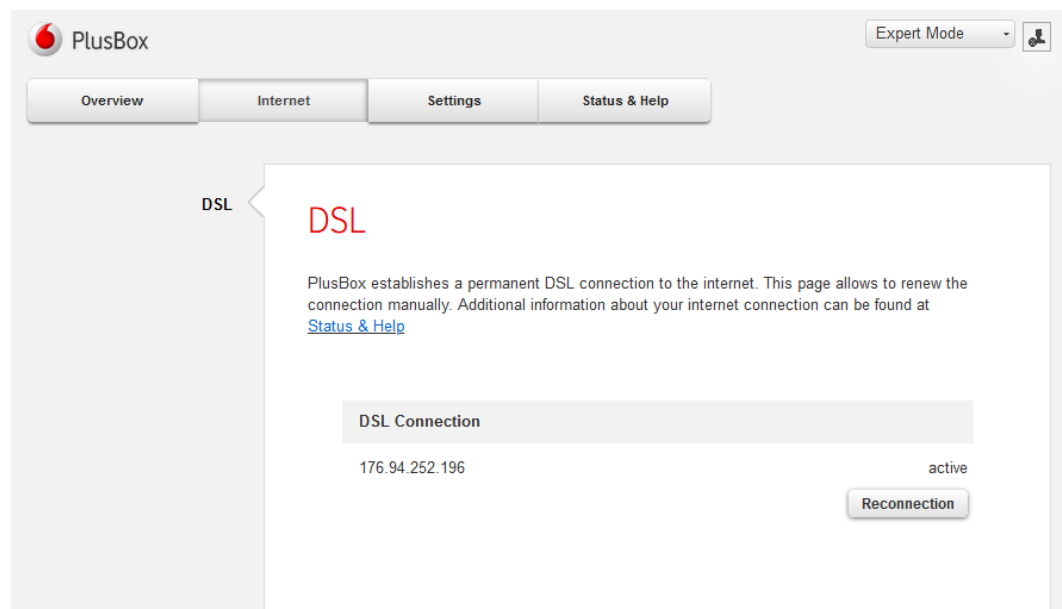


Fig. 27: PlusBox 341, DSL content page

If the DSL connection is interrupted, use the **Reconnection** button to re-establish the connection.



## 6.2.2 Firewall (Expert)

The **Firewall** content page is available for **ISDN Voice + Data** and **IP Voice + Data** connections only, and only in Expert mode.

Devices connected to the **LAN ports ETH 0/0 to 0/3** of PlusBox 341 are **not accessible from the Internet in the default setting** and are protected by the integrated firewall. Similar rules also apply to devices located in the WiFi, Guest WiFi or Voice LAN.

The integrated firewall works as a **stateful firewall** so that you no longer need to additionally configure the return path for allowed network traffic from the LAN, Voice LAN and WiFi zones to the WAN (Internet), as this is automatically enabled.

The **firewall** integrated in the PlusBox **cannot be deactivated**. In the **Firewall** content page (only available in Expert mode), you can, however, explicitly define which services and connections between which zones are allowed and which are denied, configuring **Firewall Rules**:

The screenshot shows the PlusBox 341 web interface in Expert Mode. The 'Firewall' page is active, displaying a sidebar with 'DSL', 'Firewall', 'Port Mapping', and 'Exposed Host' options. The main content area is titled 'Firewall' and includes a warning message: 'Your PlusBox provides extensive firewall functionality which protects against common attacks. It is strongly suggested not to deactivate the firewall.'

The 'Firewall Rules' section features a 'Select Zone Pair' dropdown menu set to 'WAN to DMZ'. Below this is a table with the following data:

Name	Detail Information	Port (-Range)	Action
Default	Source IP address: 0.0.0.0 -255.255.255.255 Destination IP address: 0.0.0.0 -255.255.255.255 Protocol: IP		Allow

Below the table is a '+' icon for adding new rules. The 'General Firewall Settings' section contains three toggle switches, all currently set to 'OFF':

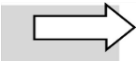
- Ping to WAN interface
- LAN to WiFi zone traffic allowed
- WiFi to LAN zone traffic allowed

At the bottom right, there are 'Apply' and 'Cancel' buttons.

Fig. 28: PlusBox 341, Firewall content page

In this content page, you can define up to 10 individual **firewall rules**.

## NOTES




This does not include **implicit** ports created by Port Mapping (see Section 6.2.3) for data traffic from the WAN (Internet) to one of the local zones. In the **Firewall** content page, these rules' designations start with **Default PM**, and they are numbered consecutively. The link to the respective implicit rule takes you to the **Port Mapping** overview page.

The designation of your customized firewall rule may contain up to 16 of the following characters: **a-z**, **A-Z**, **0-9** and **-** (hyphen, underscore). Umlauts, ß and spaces are not permitted.

Use the **sliders** at the bottom of the page to define whether and in which direction **data traffic between LAN and WiFi** is allowed via all ports. For security reasons, you can also activate or deactivate the option to check **WAN port accessibility** using a **Ping** (ICMP).

Proceed as follows to **create** new **Firewall Rules** or to **edit** existing ones:

- From the **Select Zone Pair** list field, select the zones between which data traffic is to be permitted or rejected according to your security concept. The following zones are available in different direction pairs:
  - WAN
  - LAN
  - Voice LAN (only for IP Voice + Data connection)
  - WiFi (only for ISDN Voice + Data and IP Voice + Data connections)
  - Guest WiFi (only for ISDN Voice + Data and IP Voice + Data connections)
  - DMZ (Demilitarized Zone) – this zone serves as a kind of buffer between the computers in the internal network that want to access certain services on the Internet and the potentially insecure WAN, from which malware should not enter the LAN or WiFi
- Click the **+** (plus) button to add a new firewall rule for the selected zone pair or the  (gear wheels) button to edit an existing rule.

A pop-up window for editing the **Firewall Rules** opens:

Fig. 29 : PlusBox 341, Pop-up editing window for firewall rules

- Enter a meaningful **Name** for the rule to be created in the text field of the same name.
- For data traffic between the zones, select a **Protocol** from the list field:

- IP
  - ICMP
  - TCP
  - UDP
  - SCTP
5. Use the **Source IP Address** radio buttons to select whether you want to specify a **Single** address or an address **Range** for the computer in the source zone.
  6. In the text fields, enter the IP address or the IP address range of the computer in the source zone.
  7. Use the **Port Type** radio buttons to select whether you want to specify a single **Port** for data traffic or a **Port Range** for the computer in the source zone.
  8. Enter the desired port or port range of the computer from the source zone in the text fields of the same name.
  9. For the **Destination IP Address** and the destination **Port Type**, proceed in the same way as described in steps 5 to 8.
  10. In the **Action** list box, select whether you want to **Allow**, **Reject** or **Deny** the currently defined action.
  11. Save the rule using the **Save** button.

The editing window is closed.

12. In the **General Firewall Settings** area, use the sliders to **activate** or **deactivate** the following settings:
  - **Ping to WAN interface**
  - **LAN to WiFi zone traffic allowed (ISDN and IP Voice + Data only)**
  - **WiFi to LAN zone traffic allowed (ISDN and IP Voice + Data only)**
13. By clicking the **Apply** button, confirm the firewall configuration for PlusBox 341.

### 6.2.3 Port Mapping (Expert)

The **Port Mapping** content page is available for **ISDN Voice + Data** and **IP Voice + Data** connections only, and only in Expert mode.

Use the Port Mapping function to protect the computers in your LAN, Voice LAN or WiFi to which connection requests from the Internet are to be forwarded directly. To do this, you assign to a **Public Port (Range)** of your server a (different) **Local Port (Range)** for receiving connection requests.

---

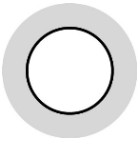
#### Example:

You want to configure your web server with the **public TCP port range 8000 to 8003**: Open the **Local port 8000** for its LAN IP address 192.168.2.100.

---

The firewall thus automatically opens for the application defined by the port number for this zone pair in the selected communication direction.

If you define Port Mappings, these are treated as **implicit firewall rules** for data traffic from the WAN (Internet) to one of the local zones. They are transferred to the **Firewall** content page (see Section 6.2.2), with a **Default PM** in the beginning of their designation, and are numbered consecutively.

**ATTENTION**

Please note that such **specifically defined Port Mapping rules** have a **higher priority than the firewall's default setting** and therefore **overwrite Default** firewall rules!

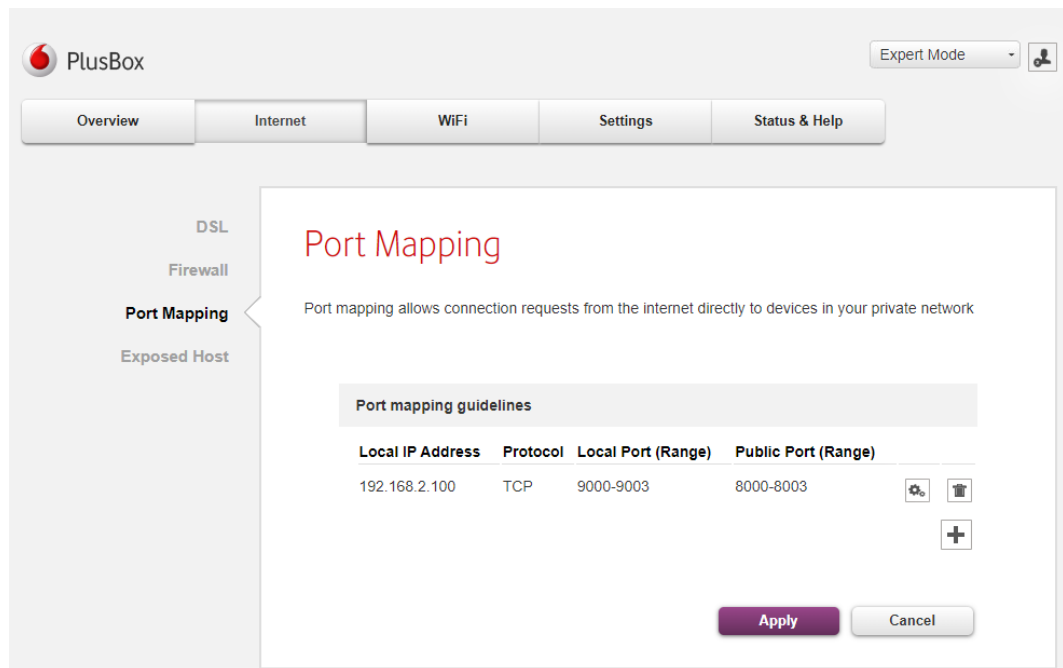



Fig. 30: PlusBox 341, Port Mapping content page

In the example shown here, the Port Mapping is configured for a server in the LAN, specified by its **Local IP Address**. Its **Local Port Range** 9000-9003 is mapped to a **Public Port Range** 8000-8003, used for HTTP servers on the Internet.

Proceed as follows if you want to **add** a new **Port Mapping** or if you want to **add** an existing one:

1. Click the **+** (plus) button to add a new port mapping or on  (gear wheels) to change an existing one.

A separate Change port mapping or Add port mapping window opens.

2. Enter the **local IP address** of the computer in your LAN or WiFi for which the port mapping is to be configured in the text field of the same name.
3. Select a **protocol** for data traffic between the Internet and the local computer from the list box:
  - TCP
  - UDP
4. Use the **Type** radio button to select whether you want to use a single **Port** or a **Port Range** for allowed data traffic from the Internet to the local network.
5. Enter the **Public Port** or **Public Port Range** of the local computer in the text field of the same name.
6. Enter the **Local Port** or **Local Port Range** of the local computer in the text field of the same name.

## 7. Save the Port Mapping:

Fig. 31: PlusBox 341, Pop-up editing window for Port Mapping

The pop-up editing window closes.

## 8. Click the **Save** button to transfer the Port Mapping configuration to the PlusBox.

### 6.2.4 Exposed Host (Expert)

The **Exposed Host** content page is available for **ISDN Voice + Data** and **IP Voice + Data** connections only, and only in Expert mode.

This function allows you to make a computer accessible that, according to the firewall rules (see Section 6.2.2), is not accessible. This computer is located in the **DMZ (Demilitarized Zone)**, which is referred to as such because it is freely accessible, unlike the other protected zones, e.g. LAN and WiFi.

By activating the Exposed Host function in the PlusBox user interface, the previously blocked PlusBox port **ETH 1/0** is released, and a DMZ is set up.

In the **default setting before activating** the Exposed Host function, **outbound data traffic from computers in the DMZ is denied**, not even to the WAN (Internet). To allow specified data flows from the DMZ to other zones, you must define corresponding firewall rules (see Section 6.2.2).

After activating the Exposed Host function, data traffic from the Internet (WAN) is routed to the computer in the DMZ defined in the **Exposed Host IP address** field (see Fig. 32) – unless a differing Port Mapping is defined for specific data flows (see Section 6.2.3), which would divert this type of traffic to another zone or another computer.

There are two different configuration options for a server in the DMZ that is to be accessed from a computer located outside the local networks:

- DMZ server as an **Exposed Host**: The IP address defined for the Exposed Host (see Fig. 32) is the IP address of the server that shall actually be accessed. This server can be accessed from the local networks/zones and the WAN (Internet) via all ports for all types of network traffic.
- DMZ server (**not exposed**): This server has an IP address that differs from the **Exposed Host IP address** (see Fig. 32). For the non-exposed DMZ server, you define Port Mapping rules (see Section 6.2.3) that open only those ports that are actually required for accessing the respective service, e.g. port 80 for HTTP. In this case, as the Exposed Host IP address, you enter any address other than the actual IP address of the Exposed Host – if required, even an IP address that is not used by any of the DMZ devices. The advantage of this variant is that all ports that are not required are closed and therefore the non-exposed DMZ server cannot be reached via these ports by malware that an attacker would use to take over the server.

Further information on the default configuration of the DMZ after activating the Exposed Host function can be found in Section 9.4 and some use cases in Sections 9.5 to 9.7 of this manual.

Proceed as follows to set up an Exposed Host:

1. Via the slider, activate the **Exposed Host Function** which is deactivated by default.

The Exposed Host content page displays additional text fields for entering the **IP addresses** of the **Exposed Host** and **PlusBox 341** as well as the **subnet mask**:

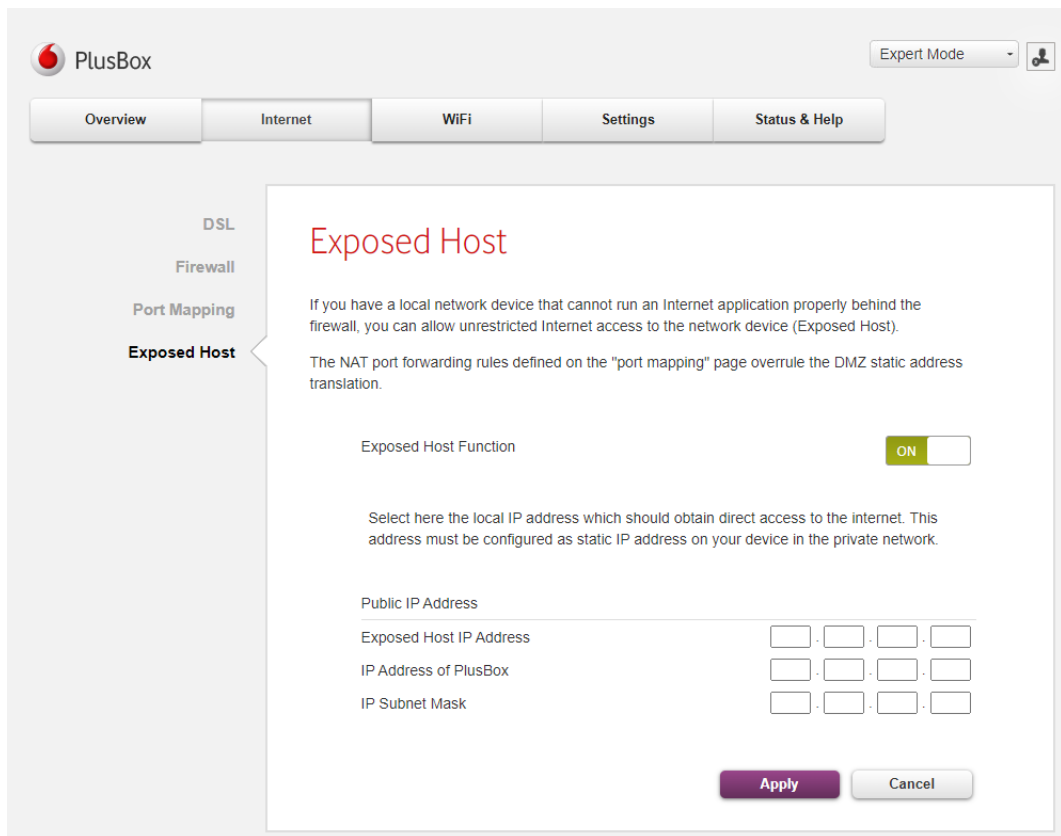


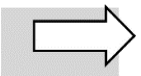
Fig. 32: PlusBox 341, Exposed Host content page

2. In the text fields of the same name, enter the **Exposed Host IP address**, the **IP Address of PlusBox** and the **IP Subnet Mask**.
3. Confirm the Exposed Host configuration of the PlusBox by clicking the **Apply** button.

## 6.3 WiFi

This section describes the functions of the **WiFi** main menu. Two Wireless LANs are available: the **Main WiFi** and a **Guest WiFi** which you can activate if required.

### NOTE



For security reasons, you cannot access the PlusBox 341 user interface via WiFi, but only via an Ethernet connection your LAN.

### 6.3.1 General WiFi Settings (Basic and Expert)

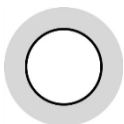
The **General WiFi Settings** content page is available in both Basic and Expert mode:

Fig. 33: PlusBox 341, General WiFi Settings content page

Proceed as follows to configure your **Main** and/or **Guest WiFi**:

1. **Activate** the desired WiFi using the slider.
2. Enter the desired **WiFi** Name (SSID in the text field of the same name).
3. **Activate** or **deactivate** the **Broadcast SSID** option using the slider, depending on whether the assigned name should be displayed to outsiders or not.
4. From the **Protection Mode** list field list box, click the arrow button to select an encryption type for your WiFi.

#### CAUTION



The **encryption type recommended** by Vodafone is **WPA2 PSK**. If you select an encryption type that is not recommended or no encryption at all, you will receive a warning message below the input mask. Some specific insecure encryption types are not supported by PlusBox 341, which is also displayed.

5. If required, check the **Display Characters** (normal ASCII display) or **Display in HEX** (display in hexadecimal notation) checkbox to display the selected **WiFi Password** in plain text.

- If required, click the **Change Password** button.

The **Set New Password** popup editing window opens.

- Enter a New Password** according to the criteria displayed in the editing window message and **Re-enter** it in the second text field.

As you enter the password, you are continuously shown how secure the selected password is – from red (weak) to yellow to green (strong):

Fig. 34: PlusBox 341, Setting new password for WiFi network

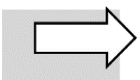
- Click **Save** to close the pop-up window.

In a separate pop-up window, you receive a message that your new password has successfully been saved.

- Click the **Save** button in the content window to transfer the configuration to the PlusBox.

### 6.3.2 WPS (Basic and Expert)

#### NOTES



For the WPS functionality, an **active WiFi network** is **required**.

**Not all terminal devices support** Wi-Fi setup via **WPS**. Check the manufacturer's documentation for your terminal device to see whether WPS support is available.

To simplify WiFi network setup, PlusBox 341 can be set up to either use **WiFi Protected Setup (WPS)** for **automatically detecting new WiFi devices** or to **generate a PIN** by which a new WiFi device must initially log on to the PlusBox.

Both functions are available on the **WPS** content page, which can be accessed in both Basic and Expert mode.

Proceed as follows to **automatically connect PlusBox 341 and a new WiFi device** using the **WPS-Push** procedure:

- Activate** the **WPS Function** and **WPS-Push** method using the respective sliders.
- Select the desired WiFi from the **WPS is applied to** list field by clicking on the arrow button: **Main WiFi** or **Guest WiFi**.
- Click the **Connect** button in the **Push Button on Device** window area.
- Click the **Apply** button at the bottom of the window.



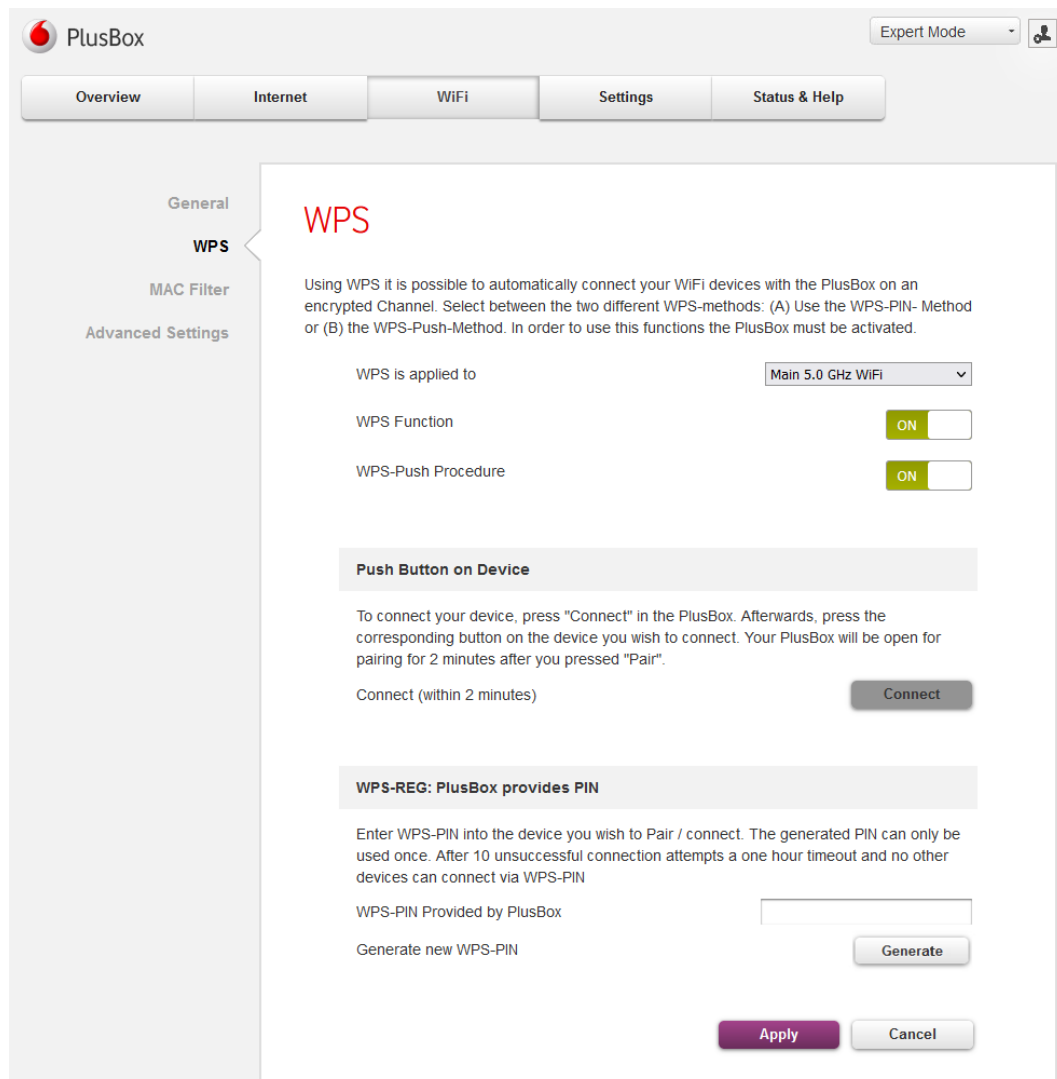


Fig. 35: PlusBox 341, WPS content page, Automatically connecting WiFi device via WPS Push

5. Then immediately activate the search for a WiFi hotspot on your WiFi-enabled terminal device. The two devices connect via WiFi.

Proceed as follows to **connect PlusBox 341 and the new WiFi device** using the **WPS-REG** method:

1. **Activate** the **WPS Function** using the slider.
2. If required, **Generate** a **new WPS-PIN** using the **Generate** button or write down the non-editable **WPS-PIN Provided by PlusBox**.
3. Click the **Apply** button at the bottom of the page.

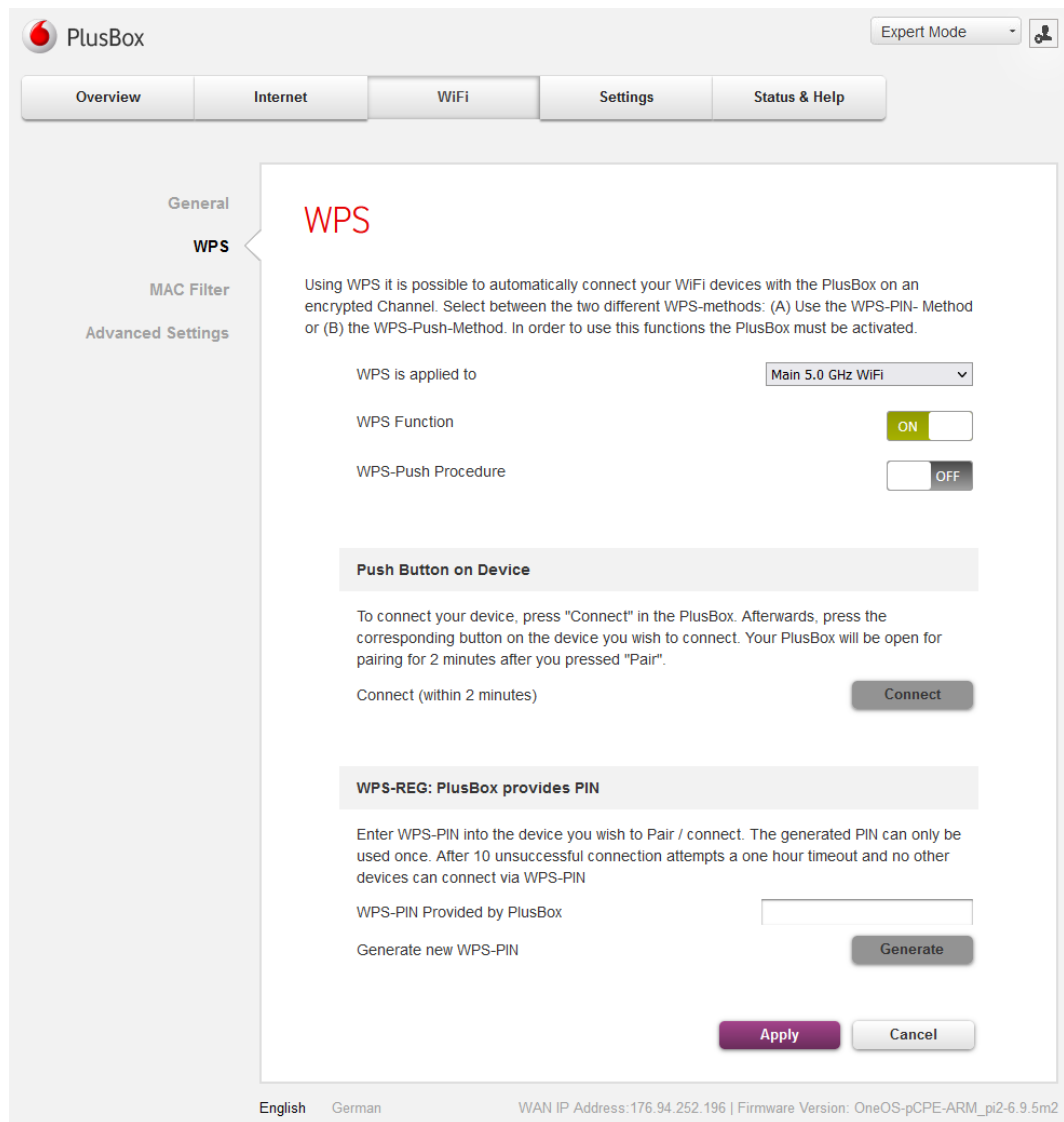


Fig. 36: PlusBox 341, WPS content page, Connecting WiFi device via WPS-REG (PIN)

4. Immediately afterwards, activate the search for a WiFi hotspot on your WiFi-enabled terminal device and enter the PIN requested by PlusBox 341.

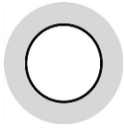
The two devices connect via WiFi.

### 6.3.3 MAC Filter (Expert)

The **MAC Filter** content page is available in Expert mode only.

The security advantage of MAC filtering (MAC = **M**edia **A**ccess **C**ontrol) lies in the fact that only devices that are registered with their **MAC address**, a globally unique hardware identifier, are granted access to the WiFi network.

Conversely, you can also use the MAC filter to exclude from accessing the WiFi network certain WiFi devices whose MAC address is known to you, so that the MAC filter list acts as a **blacklist** in this case.

**CAUTION**

As long as you have not transferred a newly created **entry** in the MAC filter list to PlusBox 341 using the **Apply** button, it can be edited and **may be accidentally overwritten or deleted!** If you want to create several entries in succession, it is therefore advisable to transfer the new entries to PlusBox configuration from time to time to be on the safe side.

Proceed as follows to add a network device to the MAC filter list of PlusBox 341:

1. **Activate** the **MAC Filter** slider for the desired WiFi (main WiFi or Guest WiFi).
2. Select from the list box whether you want to **Allow** or **Deny Access for listed devices**.
3. Enter a meaningful **Device Name** in the text field.
4. In the **MAC Address** text fields, enter the MAC address of the device (often found on its underside):

The screenshot shows the PlusBox 341 web interface. The top navigation bar includes 'Overview', 'Internet', 'WiFi', 'Settings', and 'Status & Help'. The left sidebar has 'General', 'WPS', 'MAC Filter', and 'Advanced Settings'. The main content area is titled 'MAC Filter' and contains the following sections:

- Main WiFi:**
  - MAC Filter:  ON
  - Access for listed devices: Allow
  - Device Name: Robert's Laptop
  - MAC Address: 00 : 1D : 60 : 4A : 8C : CB
  - Buttons: + (add), - (delete)
- Guest WiFi:**
  - MAC Filter:  OFF
  - Access for listed devices: Deny
  - Device Name: (empty)
  - MAC Address: (empty)
  - Buttons: + (add)

At the bottom right, there are 'Apply' and 'Cancel' buttons.

Fig. 37: PlusBox 341, MAC Filter content page

5. If required, **add** another **entry** using the **+** (plus) button and repeat steps 3 and 4 for the other network device. You can create up to 32 MAC filter entries.
6. If necessary, **delete** superfluous **entries** using the **☒** (rubbish bin) button.
7. Click the **Apply** button at the bottom of the window.

### 6.3.4 Advanced Settings (Expert)

The **Advanced Settings** content page, in which you can make some default settings for your WiFi networks, is available in Expert mode only:

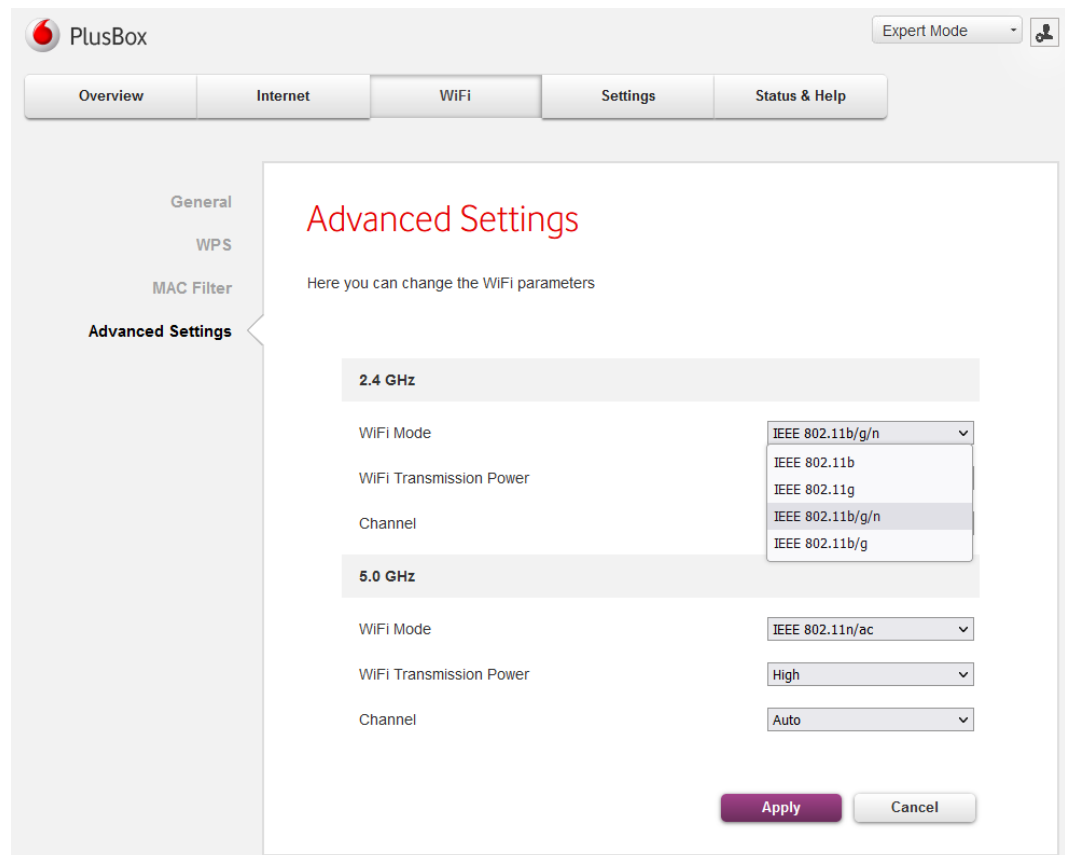


Fig. 38: PlusBox 341, Advanced Settings content page

If necessary, change the following settings for the 2.4 GHz and 5.0 GHz frequency bands:

- **WiFi Mode:** desired WiFi standard supported by PlusBox 341
- **WiFi Transmission Power:** high, medium or weak
- **Channel:** Change to any radio channel **between 1 and 12** to avoid crowded radio channels that reduce the bandwidth, alternatively **Auto** mode, by which PlusBox 341 automatically searches for a suitable radio channel

**Apply** the changes.

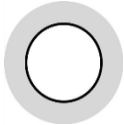
## 6.4 Settings

This section describes the functions of the **Settings** main menu.

### 6.4.1 PlusBox Password (Basic and Expert)

The **PlusBox Password** content page, on which you can change the access data for PlusBox 341, is available in both Basic and Expert mode.

#### CAUTION



For security reasons, Vodafone recommends for setup (see Section 5.2) after the first login to change the access data on the label on the underside of PlusBox 341 to a user name and a password of your choice.

Make a note of the changed access data and keep them in a safe place. You can also **back up** the **configuration** in the PlusBox and on a computer connected to the PlusBox (see Section 6.4.3).

You can use this **backup file** to reload the saved configuration. This is even possible using the backup file from the computer after resetting the PlusBox to the factory settings (e.g. if you have forgotten the password).

Fig. 39: PlusBox 341, PlusBox Password content page

Change the following settings:

- **Username:** In the editing window popping up, you need to enter the old username, the desired new username (twice for confirmation) and then **save** the changes.
- **Password:** Enter your old password in the pop-up input window and then proceed as described in Section 6.3.1, step 7.
- **Automatic Logout After:** Select the desired time period from the list box – 5, 15 or 30 minutes.

**Apply** the changes.

## 6.4.2 Firmware Update (Basic and Expert)

The **Firmware Update** content page is available in both Basic and Expert mode.

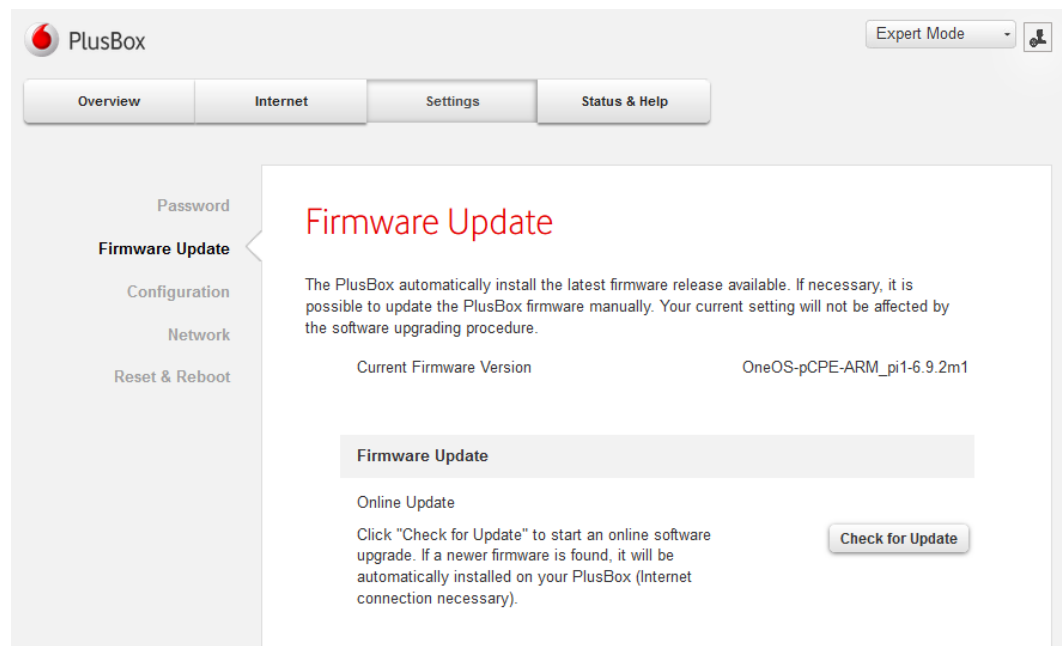


Fig. 40: PlusBox 341, Firmware Update content page

The **Current Firmware Version** is displayed in the upper area.

To start an **Online Update** of the firmware, proceed as follows:

1. Click **Check for Update**.

A pop-up warning message opens that all connections (Internet, Voice and LAN connections) will be disconnected during restart of PlusBox 341 if a new firmware version is available.

2. Confirm the warning message.

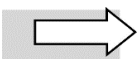
Depending on the current firmware status, you will be informed that the firmware found on PlusBox 341 is already the latest version, or a newer version will be installed, which may take a few minutes.

3. Confirm the respective messages.

## 6.4.3 Configuration (Expert)

The **Configuration** content page is available in Expert mode only. This is where you specify how and where a backup file containing the latest configuration is saved.

### NOTE



PlusBox 341 automatically backs up the configuration file once a day and additionally once a week.

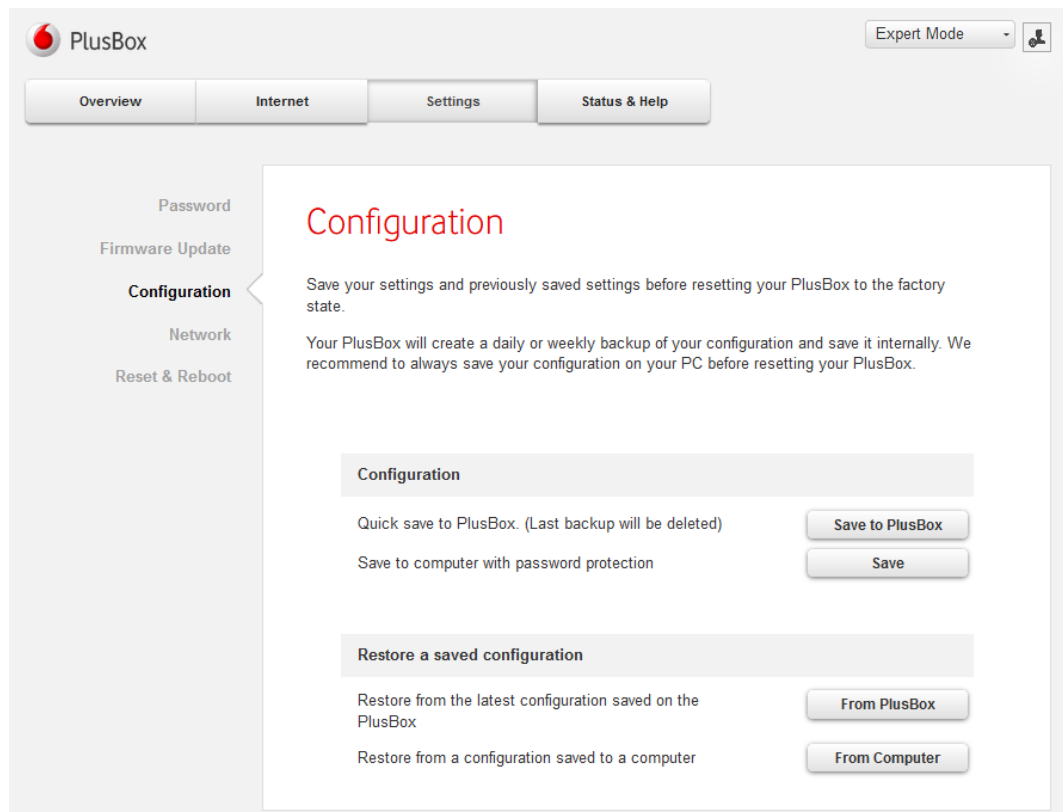


Fig. 41: PlusBox 341, Configuration content page

Proceed as follows to **save a current configuration file for later use** (e.g. after resetting to the factory settings, see Section 6.4.5) a:

1. Create a backup file:
  - To save a **backup file** to the PlusBox, click the **Save to PlusBox** button.
  - To save a **backup file** to your computer, click the **Save** button.

In both cases, a **pop-up editing window** opens in which you can (Save to PlusBox) resp. must **enter a comment** (Save to computer). When saving to a computer, a **Password** is also required:

**Save Configuration to Computer**

Please add a comment describing this configuration.

Please create a password to protect your data.

Password

Confirm password

Fig. 42: PlusBox 341, Saving configuration to computer

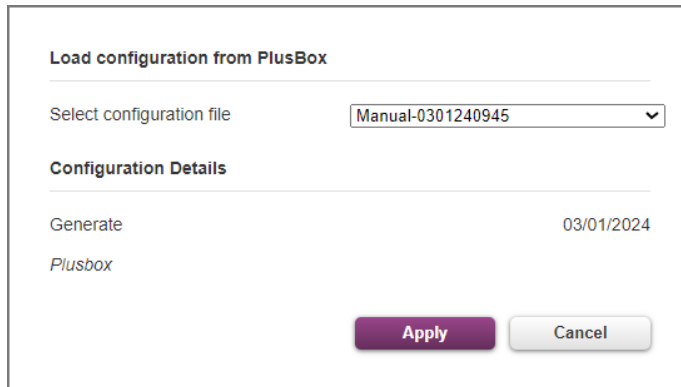
2. Click **Save** to close the pop-up window.

3. Then click the **Apply** button in the **Configuration** content window to transfer the configuration to PlusBox 341.

To **restore a saved configuration file**, proceed as follows:

1. Load the configuration file into PlusBox:
  - using the **From PlusBox** button
  - or
  - using the **From Computer** button.
2. Confirm the security message in the window that opens.

When loading the configuration file from the computer, your directory system opens for file selection. When loading from PlusBox, the following pop-up window opens:

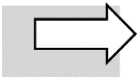


Load configuration from PlusBox	
Select configuration file	Manual-0301240945
Configuration Details	
Generate	03/01/2024
Plusbox	Plusbox
<b>Apply</b> Cancel	

Fig. 43: PlusBox 341, Loading configuration file from PlusBox

3. **Select** the desired **configuration file** from the list box: either the last daily (as shown in the example) or the last weekly backup file.



**NOTE**

A backup file is automatically generated once a day and once a week. As long as you have not made a manual backup, up to 2 files are available. With manual backups, a further backup file is created in addition to the two automatic backup files (daily and weekly). During commissioning, the automatic backup files are not yet available, which is why the number of backup files differs depending on the period (first 24 hours, first week and thereafter).

4. Load the backup file into PlusBox.

The configuration is carried out. This may take some time.

5. Confirm the final message with **OK**.

### 6.4.4 LAN Network (Expert)

The **LAN Network** content page is available in Expert mode only.

It offers configuration options for (a maximum of) four different local networks, which are displayed as submenus in the navigation bar after clicking the **Network** submenu:

- **LAN**
- **Voice LAN** – available only for the **IP Voice + Data** connection
- **WiFi** (your main WiFi network) – available only for **ISDN** and **IP Voice + Data** connections
- **Guest WiFi** – available only for **ISDN** and **IP Voice + Data** connections

Common to all network configuration pages is the **Network Settings** area (shown here using the **LAN Network** example):

PlusBox Expert Mode

Overview Internet Settings Status & Help

Password  
Firmware Update  
Configuration  
Network  
**LAN**  
Reset & Reboot

## LAN Network

This page allows to configure IP addresses used in your home network. In case DHCP is used, PlusBox automatically assigns an IP address to devices connected to the network. Using static DHCP it is possible to always assign the same IP address to specific devices.

**Network Settings**

IP Address of PlusBox

IP Subnet Mask

DHCP Server  OFF

Fig. 44: PlusBox 341, LAN Network content page, before DHCP activation

If required, activate the **DHCP server** (DHCP = **D**ynamic **H**ost **C**onfiguration **P**rotocol) to dynamically assign IP addresses to the computers in the LAN (or Voice LAN, WiFi or Guest WiFi networks).

### 6.4.4.1 LAN Network (Expert)

The **LAN Network** content page is available in Expert mode only, in two different versions:

- **ISDN Voice only** and **IP Voice only** connection types – here you define only those network settings that must be configured for access to the **user interface of your PlusBox**.  
No other network components are provided for data traffic. This means that you **cannot connect any other devices to the LAN**.  
The **DHCP server** for dynamic IP address assignment must be located in the same local network as the PlusBox.
- **ISDN and IP Voice + Data** connection types – here you define the IP address range for **all LAN components** (PlusBox and other devices).

Fig. 45 shows the configuration options for the **LAN** for **ISDN** and **IP Voice + Data** connections:

The screenshot displays the PlusBox 341 web interface in Expert Mode, specifically the LAN Network configuration page. The page is titled 'LAN Network' and includes a descriptive paragraph: 'This page allows to configure IP addresses used in your home network. In case DHCP is used, PlusBox automatically assigns an IP address to devices connected to the network. Using static DHCP it is possible to always assign the same IP address to specific devices.'

The configuration is organized into three main sections:

- Network Settings:**
  - IP Address of PlusBox: 192 . 168 . 2 . 1
  - IP Subnet Mask: 255 . 255 . 255 . 0
  - DHCP Server: ON (checked)
- DHCP Server Parameters:**
  - Address Pool Start IP: 192 . 168 . 2 . 2
  - Address Pools End IP: 192 . 168 . 2 . 254
  - Lease Time: Unlimited (dropdown menu)
- Static DHCP - LAN Network:**
  - MAC Address: (empty field)
  - IP Address: No rules set

At the bottom right, there are 'Apply' and 'Cancel' buttons.

Fig. 45: PlusBox 341, LAN Network content page (ISDN and IP Voice + Data)

Proceed as follows to **define** the **DHCP settings** for your **LAN**:

1. Enter the **IP address of PlusBox** in the text fields provided.

The **IP Subnet Mask** is automatically derived from this entry.

2. **Activate** the **DHCP Server** using the slider.

The **DHCP Server Parameters** window area is automatically expanded.

3. Define an **address pool** between **Address Pool Start IP** and **Address Pool End IP**, from which the server assigns the addresses to the connected computers.

---

## NOTE



The IP addresses with 1 and 255 for the last octet (last input field) are reserved elsewhere in the network and must not be used.

---

4. For the **Lease Time**, select either **24 hours** and **Unlimited** from the list field.
5. If you want to define that a specific network device always gets the same IP address assigned dynamically, enter the MAC address of this device in the **Static DHCP - LAN Network** area.
6. **Apply** the configuration of the DHCP server to the PlusBox.

### 6.4.4.2 Voice LAN Network (Expert)

The **Voice LAN Network** content page is available for the **IP Voice + Data** connection only, and only in Expert mode.

Its configuration is largely identical to that for the **LAN Network** (see Section 6.4.4.1), except for the following differences:

- **Interface Selection:** In this area, select the port to which the IP PBX is connected:
  - **ETH 0/3** – the **IP PBX** must be **physically connected** to this port for the Voice LAN Network to be **configured automatically**
 or
  - **ETH 0/0-0/3** – for manual configuration of a **VLAN** for the Voice LAN  
PlusBox assigns IP addresses from the configured address pool to the telephone terminal devices that are connected to the IP PBX. The IP addresses of the connected telephones are therefore displayed on PlusBox Overview page, see Fig. 47.
- **DHCP Client:** Activate this option if the **PlusBox** is to be regarded **as a DHCP client** in the Voice LAN Network. In this case, the IP address is assigned by the connected IP PBX.
- **DHCP Server:** Activate this option if the **PlusBox** is to be regarded **as a DHCP server** in the Voice LAN Network. In this case, the IP address is assigned by the PlusBox; IP addresses are displayed in the overview for the connected telephone terminals.

**Voice LAN Network via automatic configuration**

**Automatic configuration example for a Voice LAN Network:**

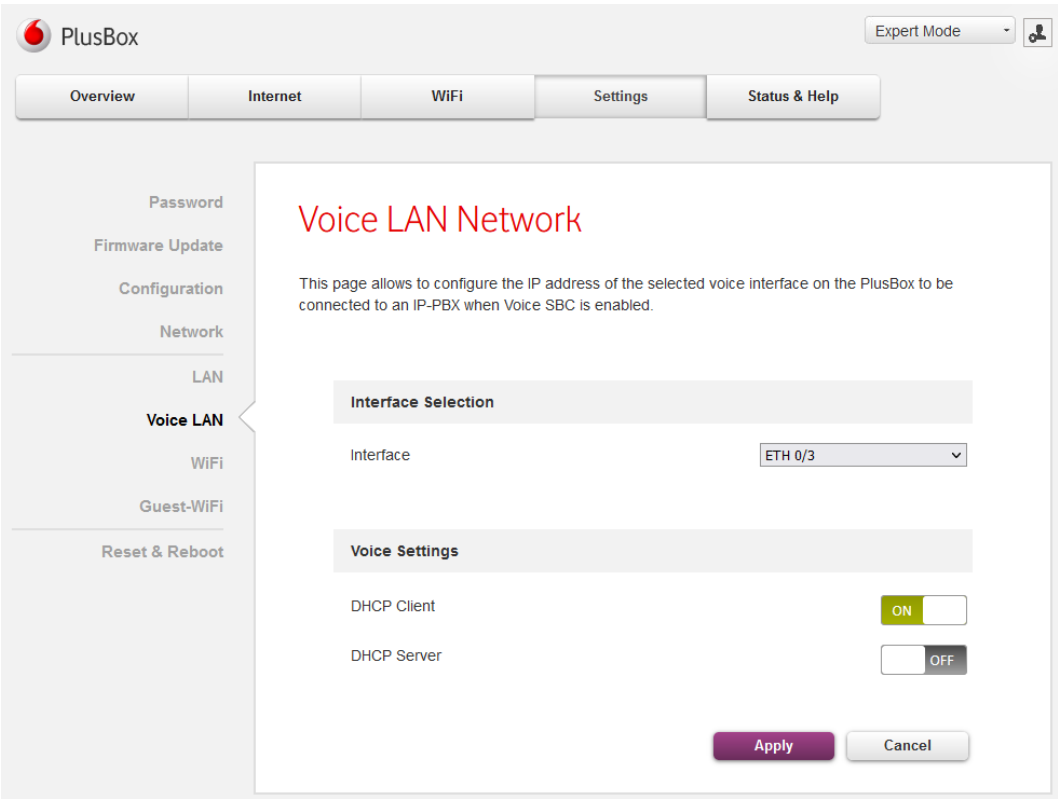


Fig. 46: PlusBox 341, Voice LAN Network content page, ETH 0/3 configuration (IP Voice + Data)

## Voice LAN Network via VLAN

**Configuration** example for a **Voice LAN Network** realized via a separate **VLAN**:

The screenshot shows the 'Voice LAN Network' configuration page in the PlusBox 341 web interface. The page is divided into several sections:

- Interface Selection:**
  - Interface: ETH 0/0-0/3
  - VLAN ID (0-4095): 25
- Network Settings:**
  - DHCP Client: OFF
  - IP Address of PlusBox: 192.168.109.1
  - IP Subnet Mask: 255.255.255.0
  - DHCP Server: ON
- DHCP Server Parameters:**
  - Address Pool Start IP: 192.168.109.2
  - Address Pools End IP: 192.168.109.254
  - Lease Time: Unlimited
- Static DHCP-Voice LAN Network:**
  - MAC Address: (empty)
  - IP Address: No rules set

At the bottom of the page, there are 'Apply' and 'Cancel' buttons.

Fig. 47 : PlusBox 341, Voice LAN Network content page, VLAN configuration (IP Voice + Data)

### 6.4.4.3 WiFi and Guest WiFi (Expert)

The **WiFi** and **Guest WiFi** content pages (Guest WiFi is identical in configuration to WiFi) are available for **ISDN** and **IP Voice + Data** connections only, and only in Expert mode.

Proceed as follows to define the **DHCP settings** for your **WiFi** or **Guest WiFi**:

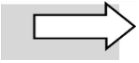
1. Enter the **IP Address of PlusBox** in the text fields provided.

The **IP Subnet Mask** is automatically derived from this entry.

2. **Activate** the **DHCP Server** using the slider.

The **DHCP Server Parameters** window area is automatically expanded.

3. Define an **address pool** between **Address Pool Start IP** and **Address Pool End IP**, from which the server assigns the addresses to the connected computers.

**NOTE**

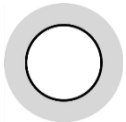
The IP addresses with 1 and 255 for the last octet (last input field) are reserved elsewhere in the network and must not be used.

4. For the **Lease Time**, select either **24 hours** or **Unlimited** from the list field.
5. If you want to specify that a specific network device always gets assigned the same IP address dynamically, enter the MAC address of this device in the **Static DHCP – WiFi Network** area.
6. **Apply** the configuration of the DHCP server to the PlusBox.

### 6.4.5 PlusBox Reset & Reboot (Expert)

The **Reset & Restart** content page is available in Expert mode only.

Use the **Reset** button to reset PlusBox 341 to its factory settings.

**CAUTION**

As the daily backups are not retained when resetting your PlusBox 341 to the factory settings, **you should in advance save the configuration file to prevent possible data loss!** To back up the configuration file, see Section 6.4.3.

Use the button **Restart** button to restart PlusBox 341 in the event of a system failure.

**NOTE**

Alternatively, you can reset the PlusBox to its factory settings by inserting a narrow, elongated object (e.g. a bent paper clip) into the **Reset hole** on the back of PlusBox and hold it down for **at least 5 seconds**. The narrow hole is located between the ETH 1/0 ports and the On/Off switch.

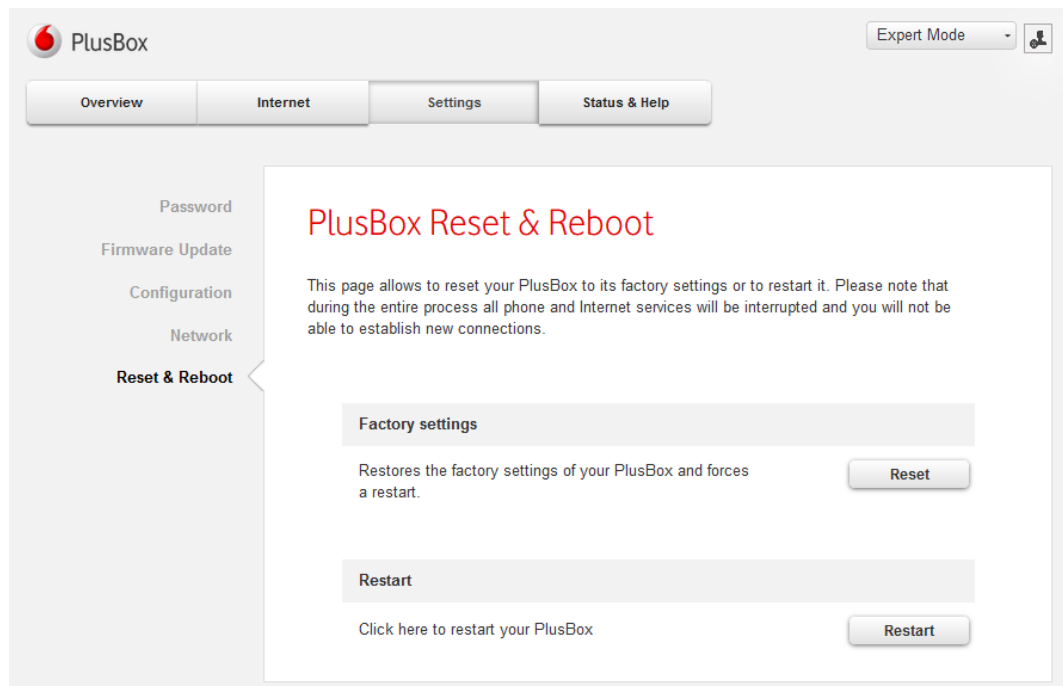


Fig. 48: PlusBox 341, PlusBox Reset & Reboot content page

After clicking the button, confirm the security message in the pop-up window that opens.

## 6.5 Status & Help

This section describes the functions of the **Status & Help** main menu.

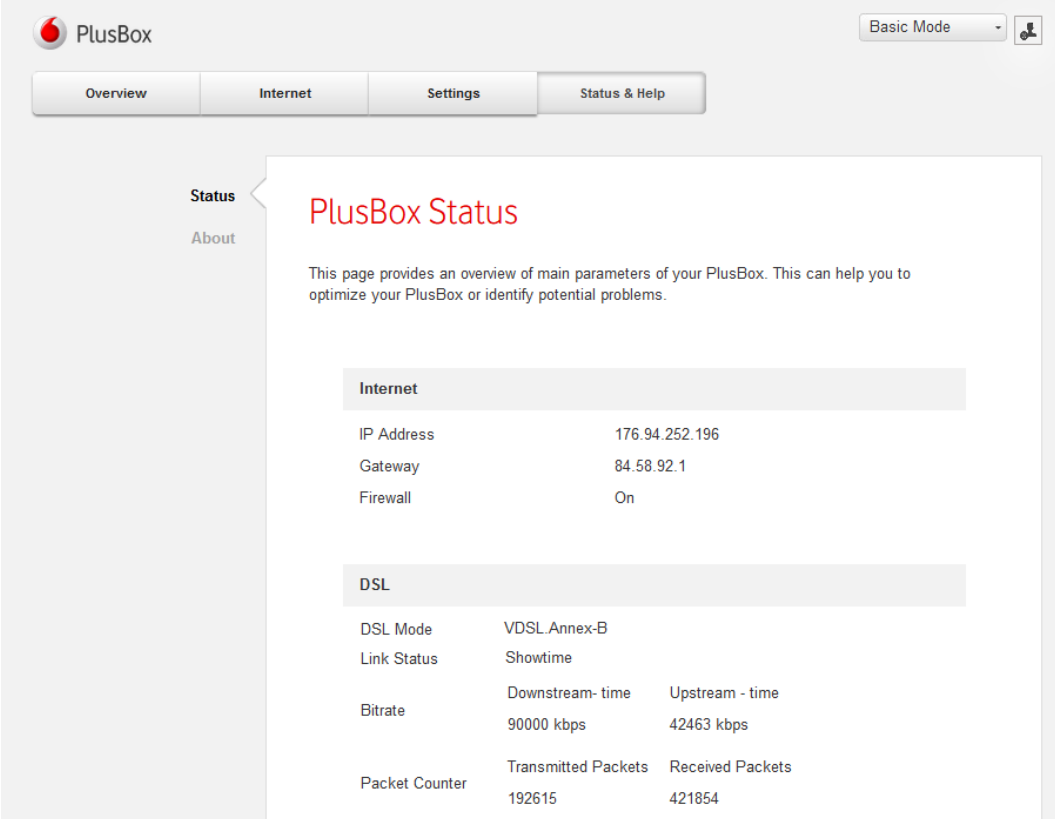
### 6.5.1 PlusBox Status (Basic and Expert)

The **PlusBox Status** content page is available in both Basic and Expert mode. It is **purely an overview page** of the status of PlusBox functionality, which is divided into the following areas:

- Internet
- DSL
- LAN network
- Voice LAN network (IP Voice + Data connection only)
- Ethernet ports
- Main WiFi
- Guest WiFi
- Telephony
- ISDN interfaces
- System

In the **Internet** area at the top, the public **IP Address** of your Internet access and that of PlusBox 341 as a **Gateway** and the status of the **Firewall** (on/off).

Under **DSL**, the **DSL Mode** (e.g. Annex-B or Annex-J), the **Link Status** and the **Bitrate** for downstream and upstream traffic are displayed, as well as the **Packet Counter** for sent and received packets.



The screenshot shows the PlusBox web interface. At the top, there is a navigation bar with tabs for Overview, Internet, Settings, and Status & Help. The 'Status & Help' tab is active. On the left, there is a sidebar with 'Status' and 'About' options. The main content area is titled 'PlusBox Status' and contains a descriptive paragraph. Below this, there are two sections: 'Internet' and 'DSL', each containing a table of status information.

Internet		
IP Address	176.94.252.196	
Gateway	84.58.92.1	
Firewall	On	

DSL		
DSL Mode	VDSL Annex-B	
Link Status	Showtime	
Bitrate	Downstream - time	Upstream - time
	90000 kbps	42463 kbps
Packet Counter	Transmitted Packets	Received Packets
	192615	421854

Fig. 49: PlusBox 341, PlusBox Status content page, Internet and DSL

In the **LAN Network** area, the private address range of your **IP Network** is displayed, as well as the **Default Gateway**, the **MAC Address** of PlusBox 341 and the status of the **DHCP Server** (On/Off).



For each of the **Ethernet Ports**, the **Status** (Up/Down), the **Downstream** and the **Upstream speed** are displayed:

LAN Network			
IP Network		192.168.2.0/24	
Default Gateway		192.168.2.1	
MAC Address		70:fc: [redacted]	
DHCP Server		On	

Ethernet Ports			
GigabitEthernet 0/0	Status	Downstream-time	Upstream - time
	Down	0 (Kbps.)	0 (Kbps.)
GigabitEthernet 0/1	Status	Downstream-time	Upstream - time
	Up	0.5419921875 (Kbps.)	2.3603515625 (Kbps.)
GigabitEthernet 0/2	Status	Downstream-time	Upstream - time
	Down	0 (Kbps.)	0 (Kbps.)
GigabitEthernet 0/3	Status	Downstream-time	Upstream - time
	Down	0 (Kbps.)	0 (Kbps.)
GigabitEthernet 1/0	Status	Downstream-time	Upstream - time
	Down	0 (Kbps.)	0 (Kbps.)

Fig. 50: PlusBox 341, PlusBox Status content page, LAN Network and Ethernet Ports content page

In the **Main WiFi** and **Guest WiFi** areas, the **Status** of the respective WiFi network, its **Name**, **MAC Address** and encryption method (**Security**) are displayed. It is also indicated whether or not **DHCP** is active:

Main WiFi	
Status	On
Name	SSID1
MAC Address	70:fc: [redacted]
Security	wpa-mixed-psk
DHCP Server	On

Guest WiFi	
Status	On
Name	SSID2
MAC Address	62:fc: [redacted]
Security	wpa-mixed-psk
DHCP Server	On

Fig. 51: PlusBox 341, PlusBox Status content page, Main WiFi and Guest WiFi

Finally, the **System** area contains **general hardware and firmware information** about your PlusBox 341:

System	
Serial Number	T2227
Firmware Version	OneOS-pCPE-ARM_pi1-6.9.2m1
GUI Version	WCF-VFE-V6-2.1.6.T2
Hardware Type	
Date/Time	September 26th 2023 13:30:19
Uptime since last Reboot	0 day(s), 4 hour(s), 37 minute(s) and 55 second(s)
CPU 1 Usage	15.0 %
CPU 2 Usage	1.0 %
Memory Usage	67.9%

Fig. 52: PlusBox 341, PlusBox Status content page, System

## 6.5.2 Telephony, ISDN interfaces, Voice LAN Network

The display in the **Telephony** and **ISDN Interfaces** areas differs depending on the connection type, as shown in the following sections. The **Voice LAN network** area is only relevant for IP Voice + Data connections.

### 6.5.2.1 ISDN Voice + Data connection

In the **Telephony** area, the **Registration Identifier** of the SIP account by which the root number of your PBX can be reached is displayed.

Under **ISDN Interfaces**, information is provided for each interface as to whether it is active on the physical layer (**Layer 1**) and on the data link layer (**Layer 2**). The **Update Interval** for the status display is listed below the interface information.

In the following example, the ISDN PBX is connected to the **BRI 5/1** interface. All other ISDN interfaces are in **not active** status. The call number of the PBX is not displayed because all call numbers are managed on the ISDN PBX itself:

Telephony	
Registration Identifier	Status
entrST210000000004	registered

ISDN Interfaces				
	BRI 5/0	BRI 5/1	BRI 5/2	BRI 5/3
Layer 1	not active	active	not active	not active
Layer 2	not active	active	not active	not active
Update Interval	60 seconds			

Fig. 53: PlusBox 341, Status content page, Voice LAN and ISDN interfaces (ISDN Voice + Data)

### 6.5.2.2 ISDN Voice only connection

In the **Telephony** area, the **Registration identifier** of the SIP account by which the root number of your PBX can be reached is displayed.

Under **ISDN Interfaces**, information is provided for each interface as to whether it is active on the Physical Layer (**Layer 1**) and on the Data Link Layer (**Layer 2**). The **Update interval** for the status display is listed below the interface information.

In the following example, the **ISDN PBX** is connected to the **BRI 5/0** interface. All **other ISDN interfaces** are in **not active** status. The PBX root number is not displayed because all call numbers are managed on the ISDN PBX itself:

Telephony				
Registration Identifier	Status			
entrST210000000004	registered			
ISDN Interfaces				
	BRI 5/0	BRI 5/1	BRI 5/2	BRI 5/3
Layer 1	not active	active	not active	not active
Layer 2	not active	active	not active	not active
Update Interval	60 seconds			

Fig. 54: PlusBox 341, Status content page, Voice LAN and ISDN interfaces (ISDN Voice only)

### 6.5.2.3 IP Voice only connection

In the IP Voice only connection, **no call number** is **displayed** as the subscriber and registration status are managed via your IP PBX in IP mode.

All **ISDN Interfaces** are in **not active** status:

Telephony				
Registration Identifier	Status			
entrST210000000004	registered			
ISDN Interfaces				
	BRI 5/0	BRI 5/1	BRI 5/2	BRI 5/3
Layer 1	not active	active	not active	not active
Layer 2	not active	active	not active	not active
Update Interval	60 seconds			

Fig. 55: PlusBox 341, Status content page, Telephony and ISDN interfaces (IP Voice only)

#### NOTE



For this connection type, you can select any LAN port from **ETH 0/0 to ETH 0/3** to **connect** your IP PBX.

### 6.5.2.4 IP Voice + Data connection

In the **PlusBox Status** menu, **no phone number** is displayed in the **Telephony** area when IP Voice + Data is connected, as the subscriber and registration status are managed via your IP PBX in IP mode. All **ISDN Interfaces** are in **not active** status:

Telephony				
Your installed number				
ISDN Interfaces				
	BRI 5/0	BRI 5/1	BRI 5/2	BRI 5/3
Layer 1	not active	not active	not active	not active
Layer 2	not active	not active	not active	not active
Update Interval	60 seconds			

Fig. 56: PlusBox 341, Status content page, telephony and ISDN interfaces (IP Voice + Data)

The **Voice LAN Network** area can have two different **configurations** when IP Voice + Data is connected, depending on which affects the **function of the Ethernet port of PlusBox** to which the IP PBX is connected, see Section 6.4.4.2:

- **Voice LAN manual VLAN configuration:** The IP PBX can be **connected to any port ETH 0/0 to ETH 0/3**.
- **Automatic Voice LAN configuration:** The IP PBX must be **physically connected to the ETH 0/3 port** so that the Voice LAN receives its default IP configuration.

Voice LAN Network	
IP Network	192.168.2.0/24
Default Gateway	192.168.2.1
MAC Address	70:fc: [redacted]
DHCP Server	On

Fig. 57: PlusBox 341, Status content page, Voice LAN Network (IP Voice + Data)

### 6.5.3 Diagnostic program (Expert)

The **Diagnostic program** content page is available in Expert mode only. You can start various tests to diagnose the connections using the respective buttons. For the **Ping Test**, enter in the corresponding text field the **host name** or **IP address** of the server whose connection status you want to test:

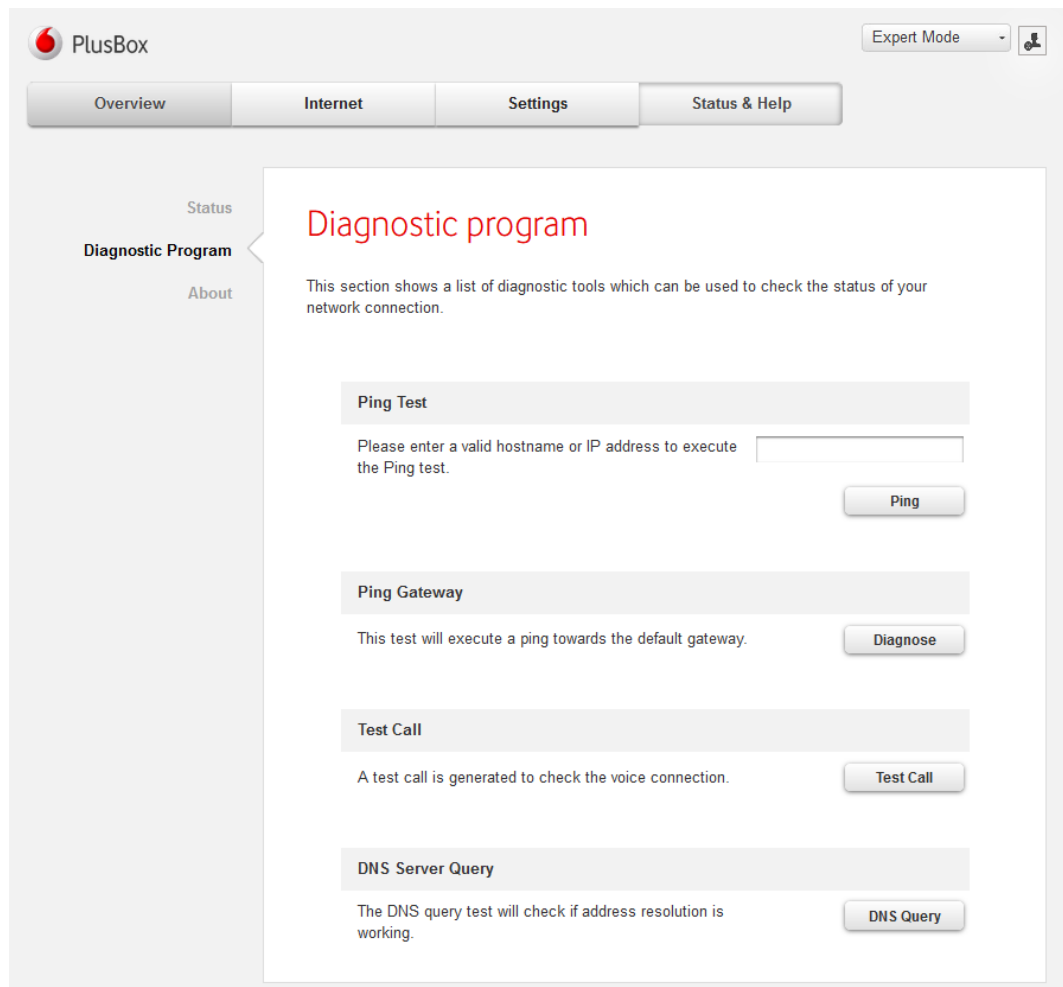


Fig. 58: PlusBox 341, Diagnostic program content page

**NOTE**

The **Test Call** function is **not available** for **IP Voice + Data** and **IP Voice only** connections (even if it is displayed for IP Voice only connections). For these connection types, this functionality is provided by the IP PBX. Further information can be found in the IP PBX manufacturer's documentation.

As soon as the respective test has been executed, a separate pop-up window opens to inform you about **successful execution (with further information on the tested parameters)** or an **error message**.

Confirm the message.

### 6.5.4 About (Basic and Expert)

The **About** content page is available in both Basic and Expert mode. It is **purely an overview page** of the **open source software modules** used for programming PlusBox user interface, of their respective **version** and **licence type**.

## 7 Troubleshooting

This chapter provides solutions to the most common problems with PlusBox 341.

### 7.1 Error messages

This section lists the most common error messages and solutions for the errors displayed.

#### 7.1.1 Incomplete Modem Installation Code (MIC)

**Error message:**

Wrong MIC. The entered PlusBox Installation Code entered is invalid or not complete. Please enter the PlusBox Installation Code again.

**Solution:**

Enter the modem installation code from the welcome letter again.

#### 7.1.2 Invalid Modem Installation Code (MIC)

**Error message:**

Invalid MIC. Please register all 22 characters according to your welcome letter.

**Solution:**

Check whether you entered the 2 letters and 20 digits of the modem installation code from the welcome letter and correct your entry.

#### 7.1.3 Invalid user name or password or password

**Error message:**

Invalid Username or Password

Your Username or Password are incorrect. Please try again.

**Solution:**

Enter your username and password again. You will find this information on the bottom of PlusBox 341.


#### 7.1.4 Captcha incorrectly adopted

**Error message:**

Designation not correct. Please try again.

**Solution:**

To confirm your changes, re-enter the characters from the Captcha image in the text field.

If you cannot recognise some characters, request a new captcha via the  button .

### 7.1.5 Activation failed

**Error message:**

Provisioning failed. Authentication with Provisioning Server was unsuccessful. Please try again later.

or

**The Provisioning Server is not reachable.**

**Solution:**

Check that the plugs of the purple DSL cable between the telephone socket and PlusBox 341 are firmly plugged into the correct sockets/ports of these two devices: **TAE-F** socket on the telephone socket (usually labelled with **F** or a non-crossed-out telephone) and **DSL** port on PlusBox 341.

If activation does not work despite correct cabling and firmly connected plugs, try again a short time later.

### 7.1.6 Configuration page is not displayed

**Error message:**

You disabled JavaScript. Please enable JavaScript in your browser settings to optimize the display quality.

**Solution:**


Activate JavaScript in the browser settings so that the configuration screen is displayed with all the required input/selection elements.

## 7.2 No connection to the ISDN PBX

If the **Com** LED of PlusBox 341 lights up red continuously, the connection from PlusBox to the ISDN PBX is interrupted. The most common causes for this are as follows:

- **Registration failed:** On the **Status** page, check whether telephony registration is set to **registered** (see Section 6.5.2)
- **Pin assignment** of the connection cable plugs does not correspond to the pin assignment of the BRI ports

The RJ-45 plugs of the cable for connecting the ISDN PBX to one of the **BRI ports** must feature the following **pin assignment**:

Pin	Terminal function		Illustration
1	(without)		 <p>PlusBox BRI ports</p>
2	(without)		
3	Receive A (+)	inbound	
4	Transmit A (+)	outbound	
5	Transmit B (-)	outbound	
6	Receive B (-)	inbound	
7	(without)		
8	(without)		

Tab. 8: PlusBox 341, Pin assignment to BRI ports

## 7.3 No WiFi connection to the user interface

Can't connect to the user interface of your PlusBox 341 via WiFi?

This is not an error, but a **security precaution**, as WiFi access is easier to attack from outside than LAN access. Access to the user interface is possible at any time via a cable connection your LAN.

## 8 Customer service

In case of trouble, Vodafone **Service Hotline** will help you when you call the number given in the welcome letter. You will also find this number on the invoices for your Anlagen-Anschluss Plus connection.

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### WARNING



**Never use damaged devices or accessories – danger to life due to electric shock!**

If your PlusBox 341 or one of its accessories is damaged, please call Vodafone Business immediately to request a replacement, using the number provided in the welcome letter.

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## 9 Configuring security settings (examples)

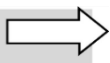
This chapter describes the default security settings in PlusBox 341 configured for the LAN (see Section 9.1) and the Demilitarized Zone (DMZ, see Section 9.4), as well as examples of some typical security-relevant configuration scenarios.

You can use the following configuration options (individually or in combination) to establish network security:

- Firewall rules (see Section 6.2.2)
- Port Mapping (see Section 6.2.3)
- Configuration of the DMZ / Exposed Host (see Section 6.2.4)
- VPN tunnelling

---

### NOTE



In the following, individual work steps are no longer described in detail as in Sections 6.2.2 to 6.2.4 for the respective functions. This chapter focuses on briefly presenting overview illustrations of configuration scenarios and on these scenarios' implementation in the PlusBox user interface, shown in the screenshots below.

---

The **overview illustrations** for the respective configuration scenarios are structured as follows:

- In the default configuration for LAN and DMZ, all allowed and denied data traffic flows are displayed using wide arrows. For all other configuration examples, only the relevant elements are shown, i.e., those that deviate from the default configuration.
- A **wide red arrow** without text means that all data traffic between these two subnets/firewall zones is denied.
- A **wide green arrow** without text means that all data traffic between these two subnets/firewall zones is allowed.
- A **wide green arrow with further details** means that the data traffic between these two subnets/firewall zones is restricted as specified.
- The **information** next to a wide green arrow (IP address and port) always **refers to the target server**, i.e. to a computer in the network to which the arrowhead points.

### 9.1 LAN default configuration (ISDN/IP Voice + Data)

All devices connected to **ETH 0/0 to ETH 0/3 LAN ports** of PlusBox 341, as well as the devices in the WiFi and Guest WiFi networks, **cannot be reached from the Internet** by the integrated firewall in the **default setting**, but conversely can **access Internet content**.

This **default setting** is stored on the **Firewall** page in the **Default** section, see Fig. 28.

By **default**, PlusBox 341 **firewall settings for the LAN** are determined as follows:

- Internet (WAN) → local networks LAN, Voice LAN, WiFi and Guest WiFi: Data traffic **denied**
- Local networks LAN, Voice LAN, WiFi and Guest WiFi → Internet (WAN): Data traffic **allowed** without restriction
- WiFi → LAN: Data traffic **denied**
- LAN, Voice LAN → WiFi: Data traffic **denied**
- DMZ → LAN, Voice LAN: Data traffic **denied**
- LAN, WiFi and Guest WiFi → DMZ: Data traffic **allowed** without restriction
- Voice LAN → DMZ: Data traffic **allowed**
- LAN → Telephony LAN: Data traffic **allowed**
- Voice LAN → LAN: Data traffic **denied**
- DMZ → Internet (WAN): Data traffic **denied**
- Internet (WAN) → DMZ: Data traffic **allowed** without restriction

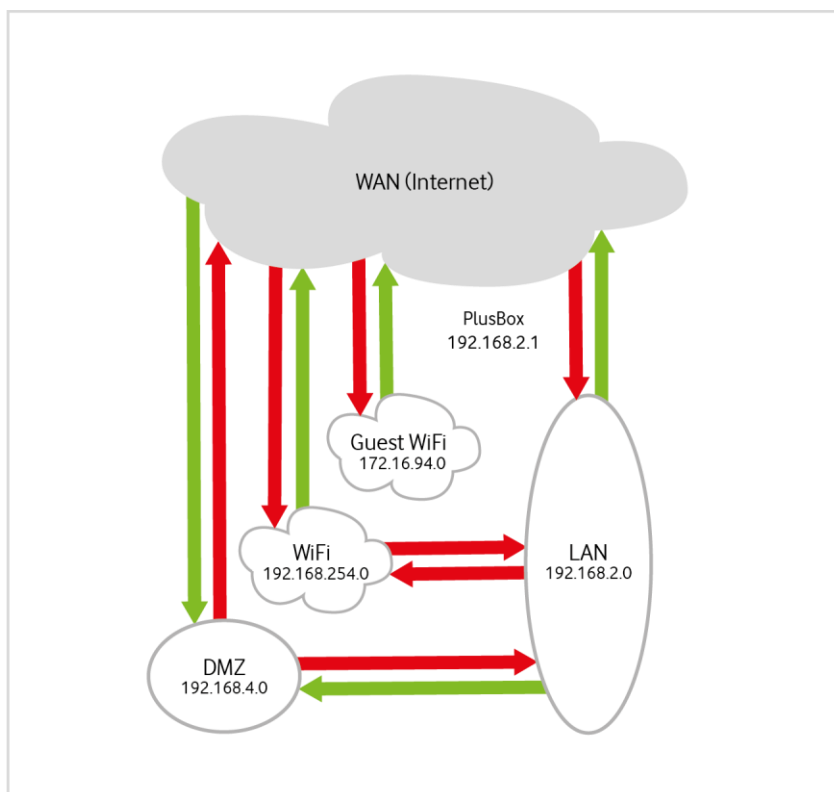


Fig. 59: PlusBox 341, Default firewall configuration for LAN (ISDN/IP Voice + Data)

To make a network device in the LAN or WiFi, e.g. a server, accessible from the Internet, you must configure a **Port Mapping** from the WAN to this subnet (see Section 6.2.3). This opens the firewall for the desired service. The **IP address** and the **port number of the destination server** in your subnet is required for this configuration.

## NOTES



For the sake of clarity, Fig. 59 shows the firewall configuration for the LAN without the Voice LAN zone. Data traffic allowed from and to the Voice LAN zone is shown in Fig. 60.

Section 9.3 provides the example of a PlusBox configuration of an HTTP server in the LAN that shall be accessible from the Internet as well as from the WiFi network and from the DMZ.

## 9.2 Voice LAN default configuration (IP Voice + Data only)

The **default firewall settings** for data traffic to and from the Voice LAN largely correspond to the default configuration for the LAN (Section 9.1), with the following **deviations or additions for the Voice LAN**:

- Voice LAN → DMZ: Data traffic **allowed**
- LAN → Voice LAN: Data traffic **allowed** without restriction
- Voice LAN → LAN: Data traffic **denied**

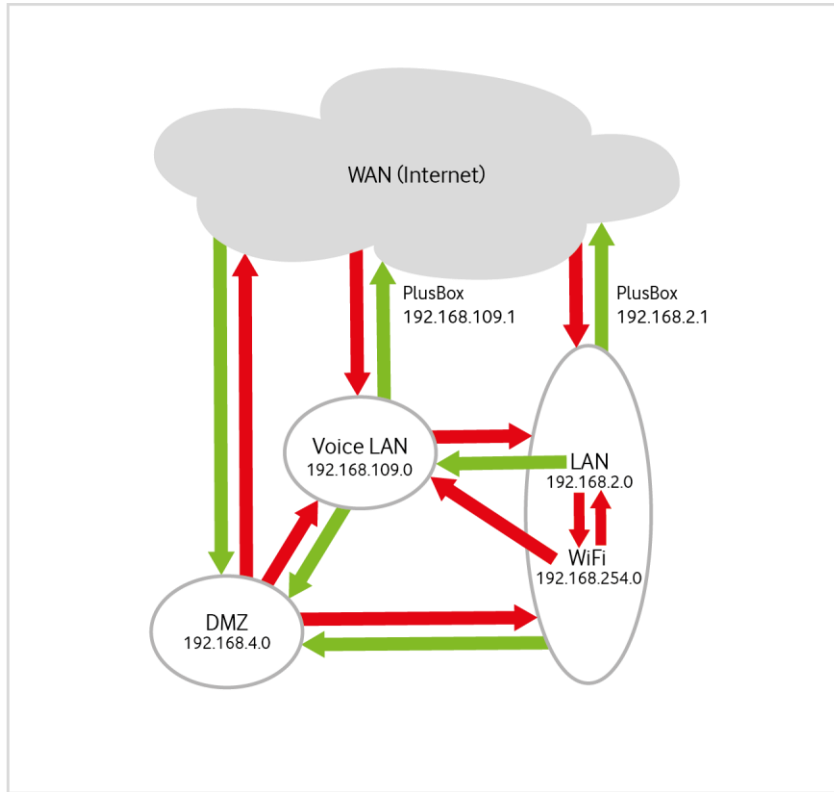


Fig. 60: PlusBox 341, Default firewall configuration for Voice LAN (IP Voice + Data)

### NOTE



In order to avoid crossing lines, Fig. 60 depicts **LAN and WiFi together** and no longer explicitly shows the Guest WiFi. The arrow for denied data traffic from the Voice LAN to the LAN and the WiFi network ends at the elliptical border of the combined zone – this means that it applies to both the LAN and the WiFi network.

Conversely, the arrows that originate **within** the summarised zone apply to data traffic to the Voice LAN, but only from the zone stated right beneath the arrow's end. The data traffic direction **LAN → Voice LAN** is therefore **allowed**, whereas **WiFi → Voice LAN** is **denied**.

Data traffic in **LAN → Voice LAN** direction is **allowed** without restriction, e.g. to enable operation of **soft clients in the LAN**. This firewall rule is also required to enable **configuration of the IP PBX from a computer in the LAN**.

If you require a remote configuration option for the IP PBX via a jump host, you must explicitly enable the DMZ → Voice LAN connection.

The following sections use some application scenarios to show you how to change the default firewall rules to allow the desired data flows.

### 9.3 Scenario 1: HTTP server in the LAN

An HTTP server in the LAN shall be made accessible from the Internet (WAN) – initially, access is blocked by default. Computers from the WiFi network and from the DMZ should also be able to access the HTTP server.

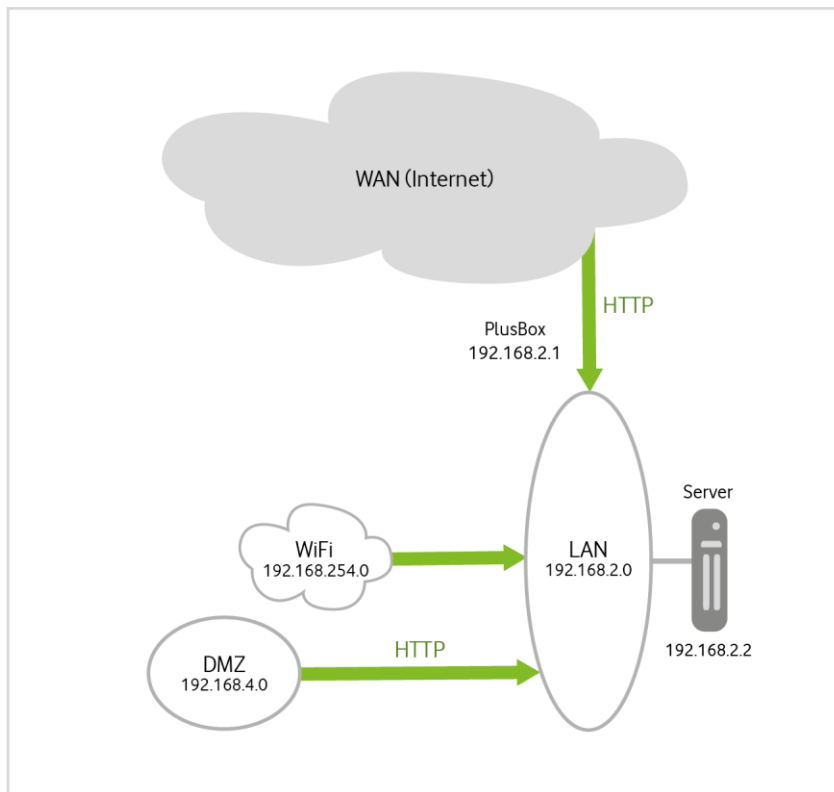


Fig. 61: PlusBox 341, HTTP server in the LAN – sample configuration

Proceed as follows to configure the access options mentioned:

1. For WAN-to-LAN traffic, define a **Port Mapping** (see Section 6.2.3) to target port 80 (HTTP) for the IP address of your HTTP server in the LAN (192.168.2.2 in the sample configuration):

The screenshot shows the 'Add Port mapping' configuration window. The 'Local IP Address' field is set to 192.168.2.2. The 'Protocol' dropdown is set to TCP. The 'Type' section has 'Port' selected with a radio button. The 'Public Port' field is set to 80, and the 'Local Port' field is also set to 80. At the bottom, there are 'Save' and 'Cancel' buttons.

Fig. 62: PlusBox 341, Port Mapping from WAN to LAN for HTTP

- Switch **On**, using the slider on the Firewall configuration page (see Section 6.2.2), **WiFi to LAN zone traffic allowed** (without restriction):

**General Firewall Settings**

Ping to WAN interface  OFF

LAN to WiFi zone traffic allowed  OFF

**WiFi to LAN zone traffic allowed**  ON

Apply Cancel

Fig. 63: PlusBox 341, Allowing data traffic from WiFi to LAN

- On the Firewall configuration page, set up a rule for the **DMZ-to-LAN zone pair** that **allows data traffic to the destination port 80 (HTTP)** of your server:

**Add Firewall Rule - DMZ to LAN**

Name

Protocol

**Source**

Source IP Address  Single  Range

.  .  .  -  .  .  .

Port Type  Port  Port Range

**Destination**

Destination IP Address  Single  Range

.  .  .

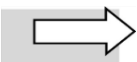
Port Type  Port  Port Range

Action

Save Cancel

Fig. 64: PlusBox 341, Allowing data traffic from DMZ to LAN for HTTP

## NOTE



The steps given here for firewall configuration for a server in the LAN apply analogously to servers in the WiFi network.

## 9.4 DMZ/Exposed Host default configuration after activation

In the default setting of PlusBox 341, **prior to Exposed Host function activation**, all data traffic between the so-called Demilitarized Zone (**DMZ**) and other subnets/firewall zones is denied on the basis of a correspondingly defined firewall rule.

By setting up an **Exposed Host** (see Section 6.2.4), whose subnet is referred to as a Demilitarized Zone (**DMZ**) due to its free accessibility, computers from the Internet, LAN, WiFi or Guest WiFi networks can be granted secure access to server services in your network. Conversely, you can operate in the DMZ a computer that is to download content from the Internet to prevent any malware from entering your local networks.

**ETH 1/0** port of PlusBox 341 (see Fig. 2 on page 9) is reserved for **DMZ/Exposed Host** functionality. This port is **deactivated by default**. If you activate it and configure the settings of the connected computer accordingly, the previously blocked data traffic from the WAN (Internet), LAN, WiFi and Guest WiFi networks to this computer in the DMZ is initially allowed without any restrictions. You can then define the desired restrictions using firewall rules.

### NOTE



DMZ functionality is not available for ISDN Voice only and IP Voice only connections. Accordingly, ETH 1/0 port of PlusBox 341 is deactivated for these connection types.

The default firewall settings of PlusBox 341 for the DMZ are defined as follows when the **Exposed Host** function is activated:

- Internet (WAN) → DMZ: Data traffic **allowed** without restriction
- DMZ → Internet (WAN): Data traffic **denied**
- Local networks LAN, WiFi and Guest WiFi → DMZ: Data traffic **allowed** without restriction
- DMZ → LAN: Data traffic **denied**

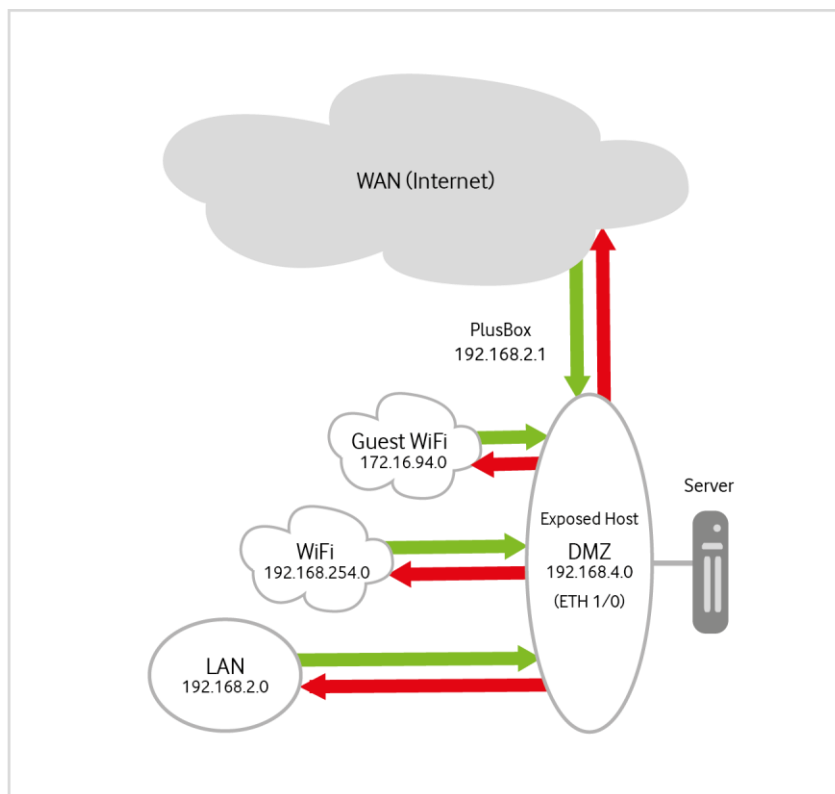


Fig. 65: PlusBox 341, DMZ/Exposed Host default configuration

If you want to set up an Exposed Host in the DMZ, you must **activate** the **Exposed Host** function and, if necessary, restrict the allowed data traffic types between the respective zones and the DMZ using firewall rules.

**NOTE**

To describe how to configure PlusBox 341 for secure software download from the Internet, Section 9.5 uses the corresponding example of a server in the DMZ.

## 9.5 Scenario 2: Software download via DMZ host

A server in the DMZ shall be allowed to download software from the Internet (WAN). Computers in the LAN, WiFi and Guest WiFi networks shall be granted access to this DMZ server.

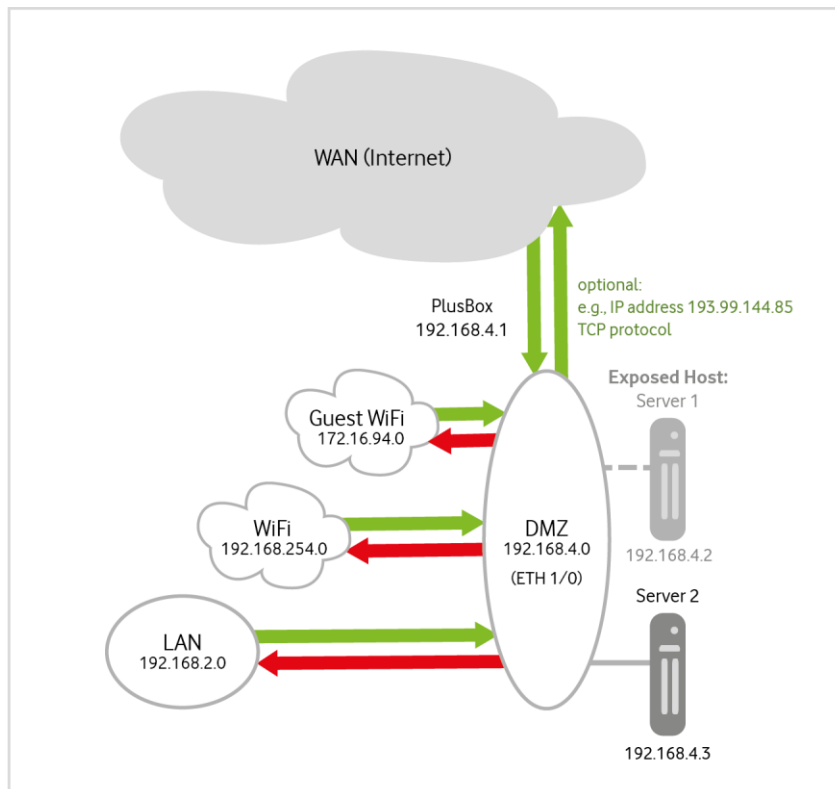


Fig. 66: PlusBox 341, Software download via DMZ host – sample configuration

Proceed as follows to configure the server in the DMZ for software download:

1. Use the slider on the **Exposed Host** content page to activate the corresponding function (see Section 6.2.4) in order to **allow data traffic** from the LAN, WiFi and Guest WiFi networks to the DMZ and from the DMZ to the WAN:



Fig. 67: PlusBox 341, Activating Exposed Host functionality

2. Enter the **IP Addresses** of the **Exposed Host** and **PlusBox** as well as the **IP Subnet Mask** for the DMZ subnet in the pop-up editing window that opens:

Select here the local IP address which should obtain direct access to the internet. This address must be configured as static IP address on your device in the private network.

Public IP Address

Exposed Host IP Address

IP Address of PlusBox

IP Subnet Mask

Fig. 68: PlusBox 341, Entering IP addresses for Exposed Host functionality

**NOTE**

For the coupling network between PlusBox 341 and Exposed Host, you can only enter a unique IP network that is not already used for your LAN, WiFi or Guest WiFi networks.

3. On the Firewall configuration page for the server in the DMZ, add a rule for the **DMZ-to-WAN zone pair** (without restriction) (see Fig. 69), **or**
4. On the firewall configuration page for the server in the DMZ, set up a rule for the **DMZ-to-WAN zone pair** only **for a specific server** on the Internet (optional in the sample configuration: a server for software download at www.heise.de, accesible via its IP address 193.99.144.85) and only for the **TCP protocol** (see Fig. 70).

**Add Firewall Rule - DMZ to WAN**

Name

Protocol

**Source**

Source IP Address  Single  Range

**Destination**

Destination IP Address  Single  Range

Action

Fig. 69: PlusBox 341, Allowing IP data traffic from DMZ to WAN



**Add Firewall Rule - DMZ to WAN**

Name:

Protocol:

**Source**

Source IP Address:  Single  Range  
 .  .  .

Port Type:  Port  Port Range  
 -

**Destination**

Destination IP Address:  Single  Range  
 .  .  .

Port Type:  Port  Port Range  
 -

Action:

Fig. 70: PlusBox 341, Allowing TCP data traffic from DMZ to WAN for specific WAN server

### 9.6 Scenario 3: DMZ host uses Internet NTP server

A server in the DMZ (this may or may not be an Exposed Host) shall be allowed to access an NTP server on the Internet. The computers from the LAN, WiFi and Guest WiFi network shall be granted access to the DMZ server.

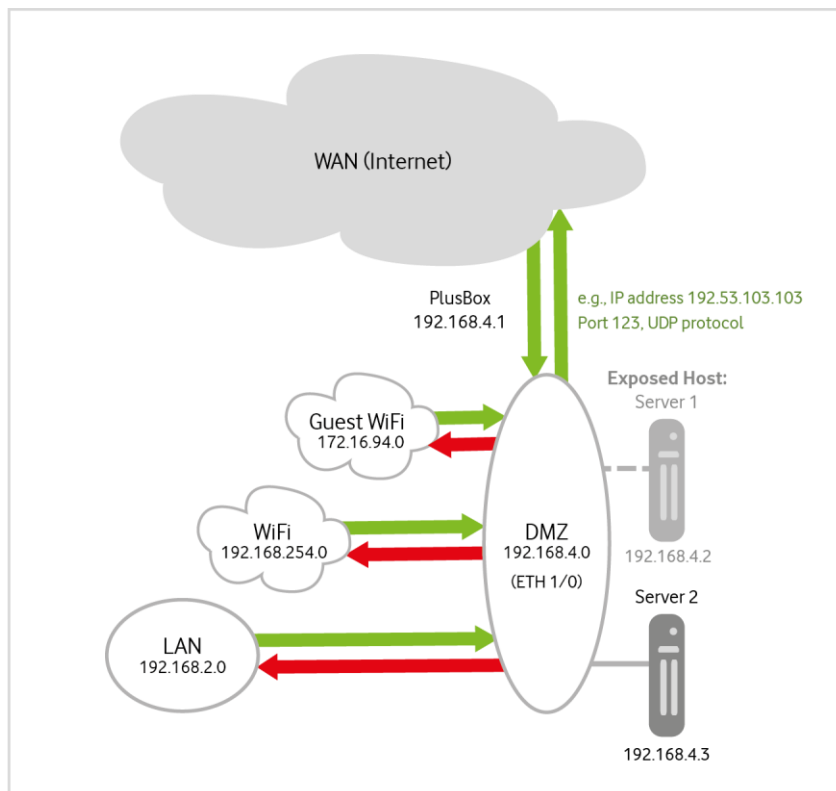


Fig. 71: PlusBox 341, DMZ computer uses Internet NTP server – sample configuration

Proceed as follows to configure the access options mentioned:

1. Activate the Exposed Host function and enter the IP addresses and the IP subnet mask for the DMZ subnet as described in steps 1 and 2 of the scenario in Section 9.5.
2. On the Firewall configuration page for the server in the DMZ, add a rule for the **DMZ-to-WAN zone pair** for an **NTP server** on the Internet (in the sample configuration: NTP server of Physikalisch-Technische Bundesanstalt Braunschweig, with IP address 192.53.103.103), entering **Port 123** for **NTP** and the **UDP Protocol**:

**Add Firewall Rule - DMZ to WAN**

---

Name

Protocol

**Source**

---

Source IP Address  Single  Range  
 .  .  .

Port Type  Port  Port Range  
 -

**Destination**

---

Destination IP Address  Single  Range  
 .  .  .

Port Type  Port  Port Range

Action

Fig. 72: PlusBox 341, Enabling data traffic from DMZ to WAN for specific NTP server

## 9.7 Scenario 4: Web server in the DMZ

In this scenario, a **web server** is provided in the DMZ as an **Exposed Host** whose server services can be accessed by computers from the Internet. In contrast, only computers from the LAN are granted access to a download server also provided in the DMZ.

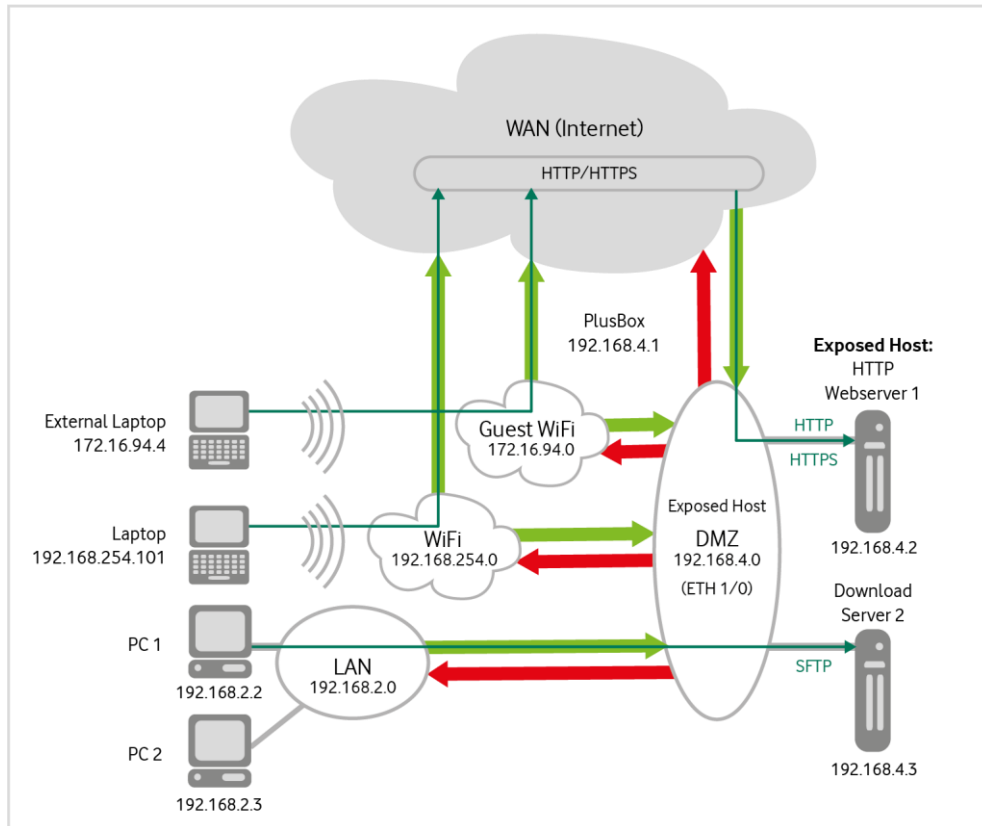


Fig. 73: PlusBox 341, Sample configuration web server in DMZ

### NOTE



When configuring the servers in the DMZ, note the **difference** between an **Exposed Host** that is freely accessible from the Internet and a **non-exposed DMZ server** (see explanation in Section 6.2.4).

Proceed as follows to configure access from the Internet (WAN) to the web server in the DMZ:

1. Activate the Exposed Host function and enter IP addresses for the web server that is to act as the Exposed Host (192.168.4.2) as well as for PlusBox 341 and for the subnet mask for the DMZ subnet – see description in steps 1 and 2 of the scenario in Section 9.5.
2. **Configure the web server in the DMZ** that acts as an Exposed Host so that it allows **HTTP and HTTPS traffic from the Internet only**. Further information on server settings can be found in its manufacturer documentation.
3. **Configure the download server in the DMZ** so that it allows **SFTP data traffic from the LAN only**. Further information on server settings can be found in its manufacturer documentation.

## 9.8 Scenario 5: VPN router in the LAN

- The connected PCs can communicate in the company LAN that uses the local subnet IP 192.168.30.0. Access to the VPN within the cloud is tunneled via an encrypted connection.
- This VPN connection is established by the router via a second local subnet 192.168.2.0. The firewall rules for the encrypted connection and for remote maintenance on the VPN router are defined via PlusBox 341, which is located in this subnet.

### NOTE



Due to lack of space, in the following illustration, the IP addresses, ports and the respective transport protocol of the target servers are shown in abbreviated form compared to the other illustrations.

The dashed line from the router to the cloud and to the data centre where the available services are located represents an encrypted data flow within a VPN tunnel.

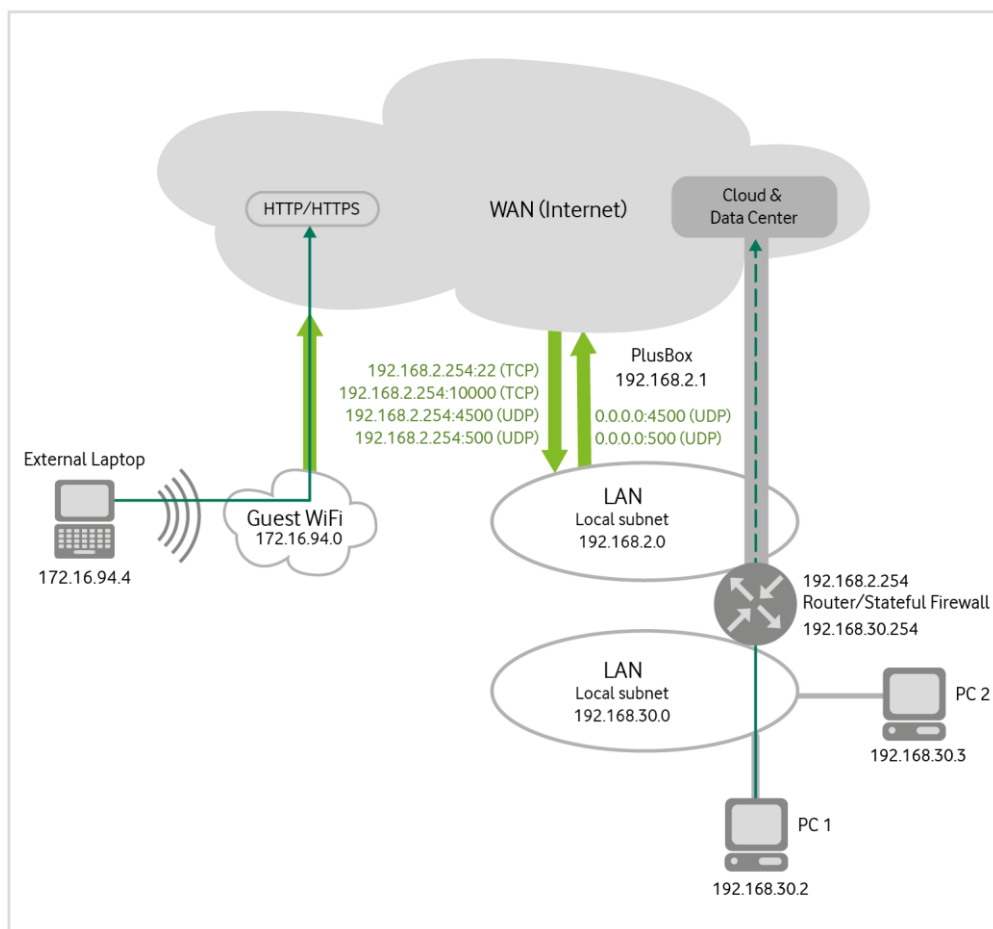


Fig. 74: PlusBox 341, Sample configuration VPN router in the LAN

Proceed as follows to configure the rules for the VPN connection:

1. For remote maintenance of the VPN router (see Section 6.2.3), add a **Port Mapping** from WAN to LAN for the IP address of the VPN router in the LAN (192.168.2.254) and fill in **the destination port number 22 (SSH)**:

**Add Port mapping**

Local IP Address: 192 . 168 . 2 . 254

Protocol: TCP

Type:  Port  Port Range

Public Port: 22

Local Port: 22

Save Cancel

Fig. 75: PlusBox 341, Port Mapping from WAN to LAN for SSH

- On the Firewall configuration page (see Section 6.2.2), add a rule for the for the encrypted connection for **LAN-to-WAN zone pair IPSec data traffic transported via TCP**:

**LAN\_to\_WAN - Edit Firewall Rule**

Name: IPSEC-TCP

Protocol: TCP

**Source**

Source IP Address:  Single  Range  
192 . 168 . 2 . 254

Port Type:  Port  Port Range  
1 - 65535

**Destination**

Destination IP Address:  Single  Range  
0 . 0 . 0 . 0 - 255 . 255 . 255 . 255

Port Type:  Port  Port Range  
10000

Action: Allow

Save Cancel

Fig. 76: PlusBox 341, Allowing IPSec TCP traffic from LAN to WAN

**NOTE**

In the sample configuration, the router also works as a **stateful firewall**, which is why the return path for the configured data traffic type is implicitly free. If you are using an older type of firewall, you may need to explicitly set up the return path from the WAN to the LAN, defining an additional firewall rule.

- On the Firewall configuration page (see Section 6.2.2), add a rule for the for the encrypted connection for **LAN-to-WAN zone pair IPSec data traffic transported via UDP**:

**LAN\_to\_WAN - Edit Firewall Rule**

Name

Protocol

**Source**

Source IP Address  Single  Range  
 .  .  .

Port Type  Port  Port Range  
 -

**Destination**

Destination IP Address  Single  Range  
 .  .  .

Port Type  Port  Port Range

Action

Fig. 77: PlusBox 341, Allowing IPSec UDP data traffic from LAN to WAN

- Add a rule for the return path of the encrypted connection for **IPSec data traffic transported via UDP**, i.e. for the **WAN-to-LAN zone pair**:

**Add Firewall Rule - WAN to LAN**

Name

Protocol

**Source**

Source IP Address  Single  Range  
 .  .  .  -  .  .  .

Port Type  Port  Port Range

**Destination**

Destination IP Address  Single  Range  
 .  .  .

Port Type  Port  Port Range  
 -

Action

Fig. 78: PlusBox 341, Enabling IPSec UDP traffic from WAN to LAN

5. **DenyAny** other type of data traffic from the LAN to the WAN:

**Add Firewall Rule - LAN to WAN**

Name

Protocol

**Source**

Source IP Address  Single  Range

.  .  .  -  .  .  .


**Destination**










Destination IP Address  Single  Range

.  .  .  -  .  .  .

Action

Fig. 79: PlusBox 341, Denying any other data traffic from LAN to WAN

6. Check the priority of the individual firewall rules (highest priority at the top) and change the order using the  (move up) button if necessary:
- **IPSec rules** at the top
  - Followed by the rule for **any other data traffic** to be **denied**
  - Finally, the **default rule** preconfigured on PlusBox 341

Firewall Rules				
Select Zone Pair				LAN to WAN
Name	Detail Information	Port (-Range)	Action	
IPSEC-UDP	Source IP address: 192.168.2.254	1 - 65535	Allow	  
	Destination IP address: 0.0.0.0	10000		
	Protocol: UDP			
IPSEC-TCP	Source IP address: 192.168.2.254	1 - 65535	Allow	  
	Destination IP address: 0.0.0.0	10000		
	-255.255.255.255			
	Protocol: TCP			
DenyAny	Source IP address: 0.0.0.0		Deny	  
	-255.255.255.255			
	Destination IP address: 0.0.0.0			
	-255.255.255.255			
	Protocol: IP			
Default	Source IP address: 0.0.0.0		Allow	
	-255.255.255.255			
	Destination IP address: 0.0.0.0			
	-255.255.255.255			
	Protocol: IP			




Fig. 80: PlusBox 341, Firewall rules with descending priority order



## 10 Glossary

Term/abbreviation	Explanation
BRI	<b>Basic Rate Interface</b> : → ISDN basic connection with 2 bearer channels (B-channels) at 64 kbit/s and one data channel (D-channel) at 16 kbit/s bandwidth
Browser	Programme that invokes and displays web pages on the → WWW
Captcha	<b>Completely Automated Public Turing test to tell Computers and Humans Apart</b> : automatically generated pattern that a user must enter after filling out a browser-based form. This serves to ensure that a human user and not a robot has made the entries, as humans are much better at recognising patterns.
DMZ	<b>Demilitarized Zone</b> : zone within a network security concept which, in contrast to the other protected → firewall zones, is freely accessible for data traffic
DNS	<b>Domain Name System</b> : directory service that establishes the mapping between → host names (e.g. www.customer.com) and → IP addresses (e.g. 192.168.0.1)
Domain (Domain)	Coherent part of the → DNS. For example, the host names www.customer.com and test.customer.com are located in the domain customer.com.
Download	Transferring files from a → server
DSL	<b>Digital Subscriber Line</b> : fast digital Internet access via telephony copper cable
Ethernet	Technology that specifies → protocols and hardware for data networks connected via network cables
Exposed Host	Computer in the → DMZ that is explicitly accessible for network traffic from zones for which it should not be accessible according to the defined → firewall rules
Firewall	Security system that protects a computer network from unwanted network access
Host name	Alphanumeric name of a computer in an → IP network, e.g. www.customer.com
HTTP	<b>Hypertext Transfer Protocol</b> : → protocol for exchanging HTML documents on the → WWW
HTTPS	<b>Hypertext Transfer Protocol Secure</b> : secure variant of → HTTP in which data are transmitted in encrypted form. This is achieved through a combination of → HTTP and → SLL.
ICMP	<b>Internet Control Message Protocol</b> : Internet protocol for the exchange of information and error messages via → IP
IP	<b>Internet Protocol</b> : → protocol used to transmit data packets in local networks and on the Internet
IP address	Unique numerical address of each subscriber in an → IP network. In IP version 4, IP addresses consist of four numbers between 0 and 255, separated by dots, e.g. 134.195.12.17.
ISDN	<b>Integrated Services Digital Network</b> : international standard for the digital telephone network with the connection types Basic Rate Interface (→ BRI) and Primary Rate Interface (PRI).
Jumphost	Interposed → server that routes data traffic through firewalls using a secure channel
LAN	<b>Local Area Network</b> : local computer network
MAC address	<b>Media Access Control address</b> : globally unique hardware address of a network component (also: physical address, Ethernet ID)

<b>Term/abbreviation</b>	<b>Explanation</b>
MIC	<b>Modem Installation Code:</b> code for automatic installation of your PlusBox 341, which you will receive in the welcome letter
Port (IP)	Number that specifies the requested service on the addressed destination computer (e.g. port 80 for HTTP)
Port (hardware)	Connection socket of a network component (e.g. a computer or a router)
Protocol	Exact agreement on how data is exchanged between two or more computers or programmes
Router	Network coupling element for connecting and/or networking identical or different local networks (→ LAN)
SCTP	<b>Stream Control Transmission Protocol:</b> reliable connection-oriented → protocol used to transport telephony signalling data via (connectionless) → IP networks
Server (Software)	Programme that provides services that can be used by another → client programme
Server (Hardware)	Computer on which one or more server programmes are running
SSL	<b>Secure Sockets Layer:</b> encryption protocol for secure data transmission on the Internet
Stateful Firewall	→ Firewall that monitors the connection status of network traffic and allows only those data packets to pass whose characteristics match a known active network connection
TCP	<b>Transmission Control Protocol:</b> → protocol that is based on the Internet Protocol (→ IP) and enables data to be exchanged between two computers or programmes
UDP	<b>User Datagram Protocol:</b> Minimum connectionless → protocol with which data is transmitted via → IP networks to the → port for the desired service on the destination computer
Upload	Transferring files to a → server
VLAN	<b>Virtual → LAN:</b> configuration used for logical segmentation of a local network. Direct communication between stations in different VLANs is not possible.
Voice LAN	Separate → LAN for Voice functions which is created in the network configuration of PlusBox (for IP Voice + Data connections only)
WAN	<b>Wide Area Network.</b> Computer network that extends over a large geographical area, e.g. over countries or continents (in contrast to a → LAN)
WiFi	<b>Wireless Fidelity:</b> standard for local wireless networks
WPS	<b>WiFi Protected Setup:</b> Standard for setting up an encrypted → WiFi
WWW	<b>World Wide Web:</b> The WWW enables access to digitally stored documents that are offered by → web servers on the Internet. Access is established via a → browser.

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