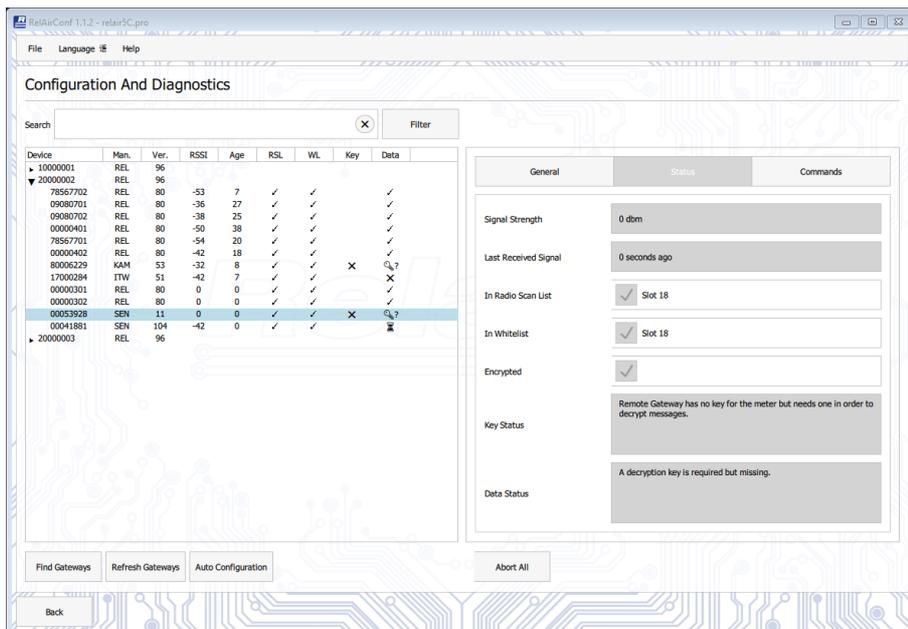


RelAirConf

Configuration Software
for the
Wireless-To-Wired M-Bus Gateways
RelAir R2M Home / Pro / ProX



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This documentation is valid from software version: V1.2.1

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1 Description of RelAir R2M Gateways

The RelAir R2M allows you to integrate up to 63 Wireless M-Bus meters into your existing M-Bus installation. For this purpose the OMS-compliant gateway stores the meter data and answers a request by the M-Bus Master with the last answer telegram. The Gateway receives devices with wireless M-Bus interfaces compliant with EN13757-4 at 868 MHz in S1, T1 or C1 mode and is OMS compliant. The RelAir R2M decodes unencrypted or AES encrypted telegrams according to Mode 5 or 7.



Picture: Wireless M-Bus system with PadPuls M2W, RelAir R2M Gateway and PW250

Because of the configurable whitelist it is of course possible to run several RelAir R2M in one M-Bus network. Due to the integrated mini USB interface the RelAir R2M can also be used as a full operational Wireless M-Bus Master, which e.g. in combination with MBSheet enables a read out. The gateway works without an external power supply and is either supplied from the M-Bus (5 standard loads) or via the USB interface.

Attention: Never connect an M-Bus Master and a USB cable at the same time!

A configuration of the whitelist and the receive mode (C1, S1, T1, C1+T1) is absolutely necessary.

With the free PC software RelAirConf the setting of the parameters, the keys and the whitelists is very comfortable.

You can get this software here:

- On our homepage www.relay.de
- On the CD „Tools&Docs“ enclosed with the product

2 Installation

The RelAirConf software for parameterizing the Wireless M-Bus to M-Bus Gateways RelAir R2M is a 32-bit application that can be executed on an IBM-PC compatible computer under the operating systems Windows 10 / 8.1 / 7.

If you want to perform the configuration via the USB interface, please first install the FTDI driver for the virtual comport of the RelAir R2M from our homepage www.relay.de, the CD "Tools & Docs" or from the site of the chip manufacturer: <http://www.ftdichip.com/Drivers/VCP.htm>. Subsequent connect the USB cable to a free USB port on the PC. Now a new virtual serial port should be created in your control panel. Please choose this new serial port later in the RelAirConf software.

If you want to configure the gateway (s) in an M-Bus system, you need transparent access to the M-Bus via a serial interface of the used M-Bus level converter. The serial interface can be a real RS232C or even a virtual serial comport e.g. a USB or Ethernet interface.

Please start the file "RelAirConf-x.y.z.exe" from Windows Explorer or via "Start - Run" to install the software. Please note that the file must not be started from a network drive. In the file name are the placeholders x.y.z for the corresponding version number, e.g. 1.1.1. The language of the installer is automatically selected based on the language of your operating system. During installation, you will be asked to accept the license terms. On the desktop, a link to the program "RelAirConf" and the uninstall program "Uninstall RelAirConf" will be created. Please first execute the uninstall program before installing a new version if there is already an older version.



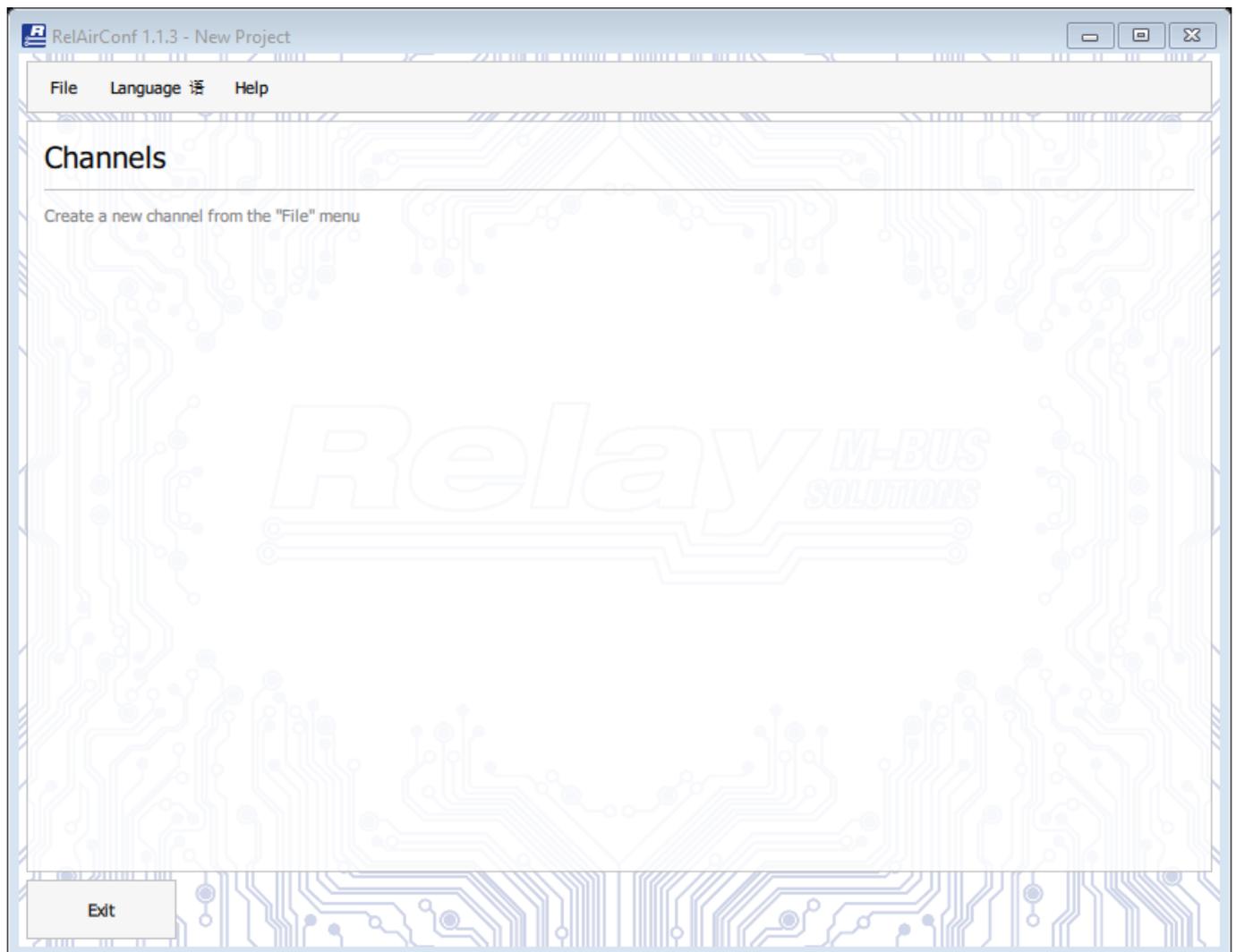
3 Operation

The program is started by double-clicking on the icon shown on the right.



3.1 Fast pass manual configuration

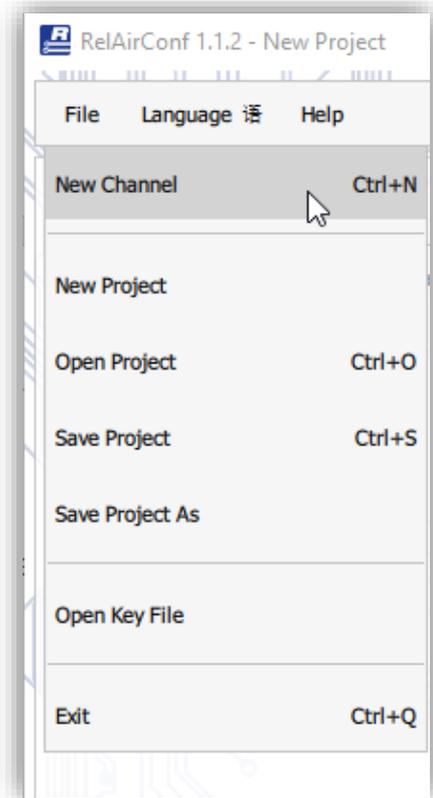
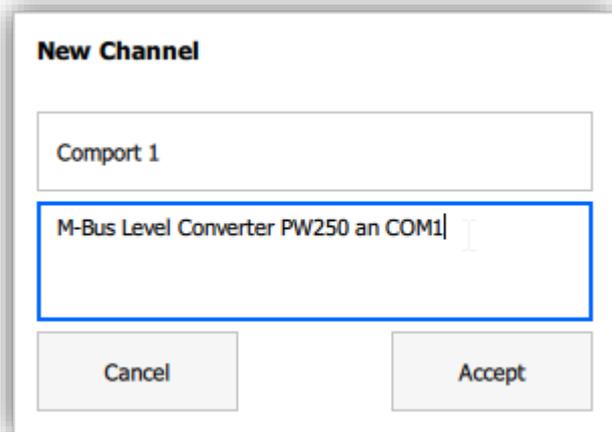
When you first start you'll see the user interface with a new, empty project:



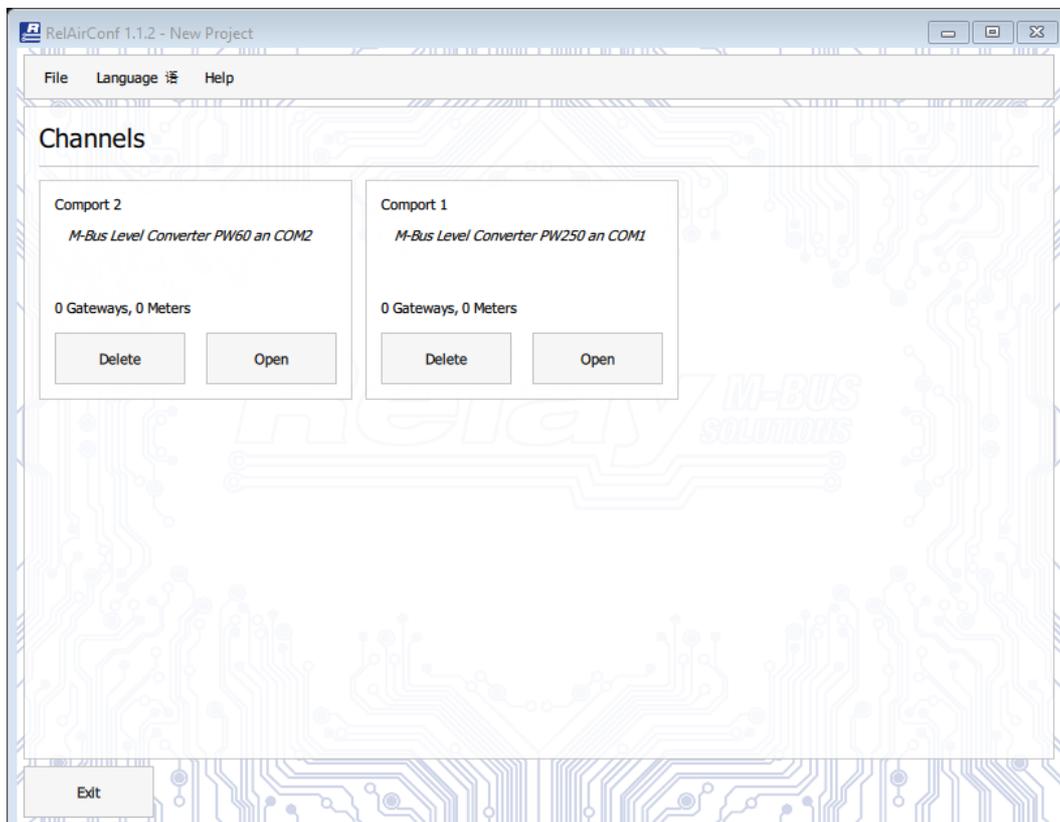
A project is a logical group (= property or site) of channels to which one or more gateways are assigned. A channel may include a gateway (e.g., via the USB interface) or multiple gateways connected via the M-Bus interface of an M-Bus level converter. A channel always includes a serial or virtual serial interface of the used PC. All settings and meters are saved in the associated project file. When restarting the program, the last active project is automatically opened.

In the first step you create a new channel:
Menu „File – New Channel“
or use the keyboard shortcut „Ctrl+N“

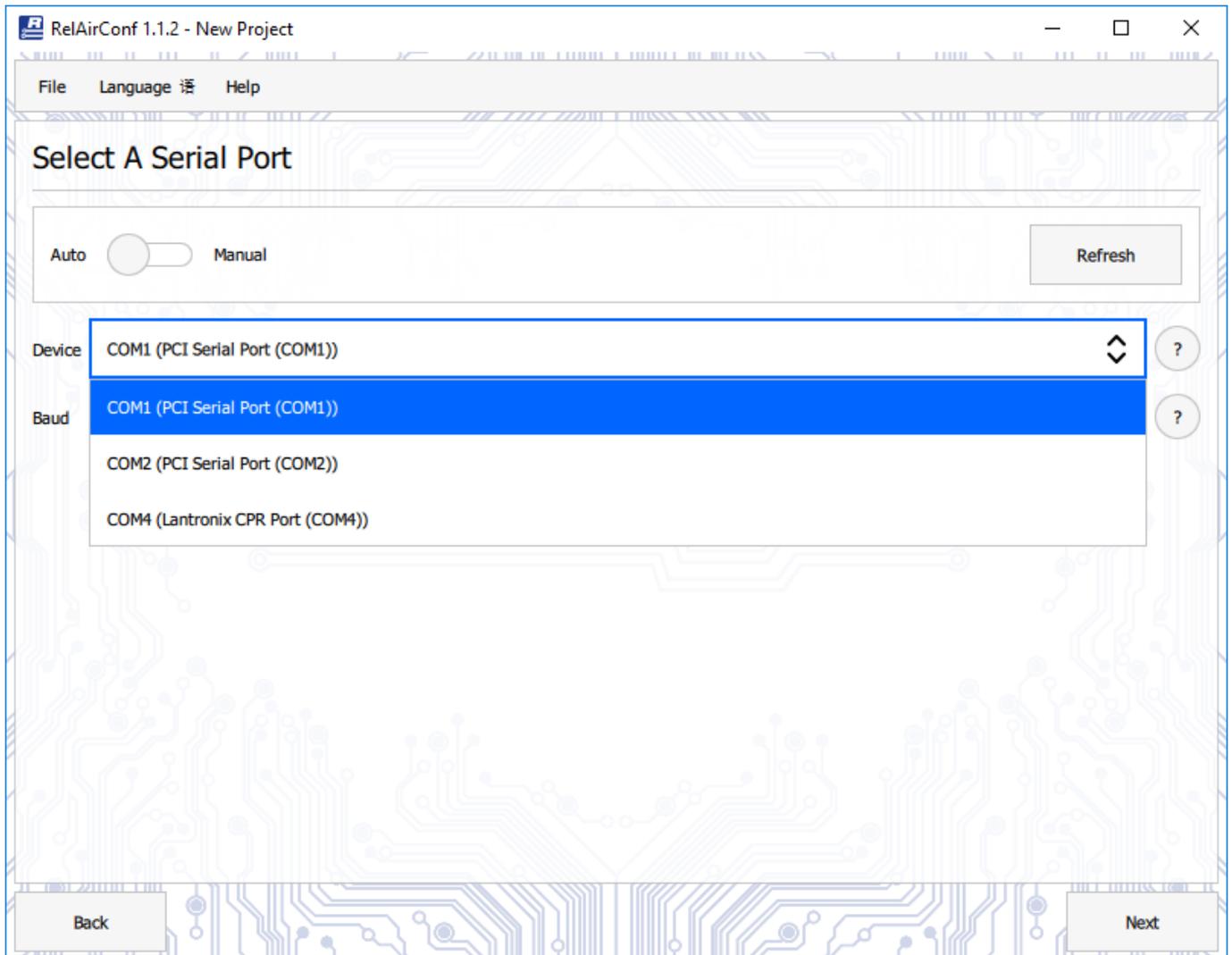
Please enter a name and a description for this channel in the following dialog:



With the button "Accept" the channel is created and displayed on the program interface. You can also create additional channels here, as the following figure shows.

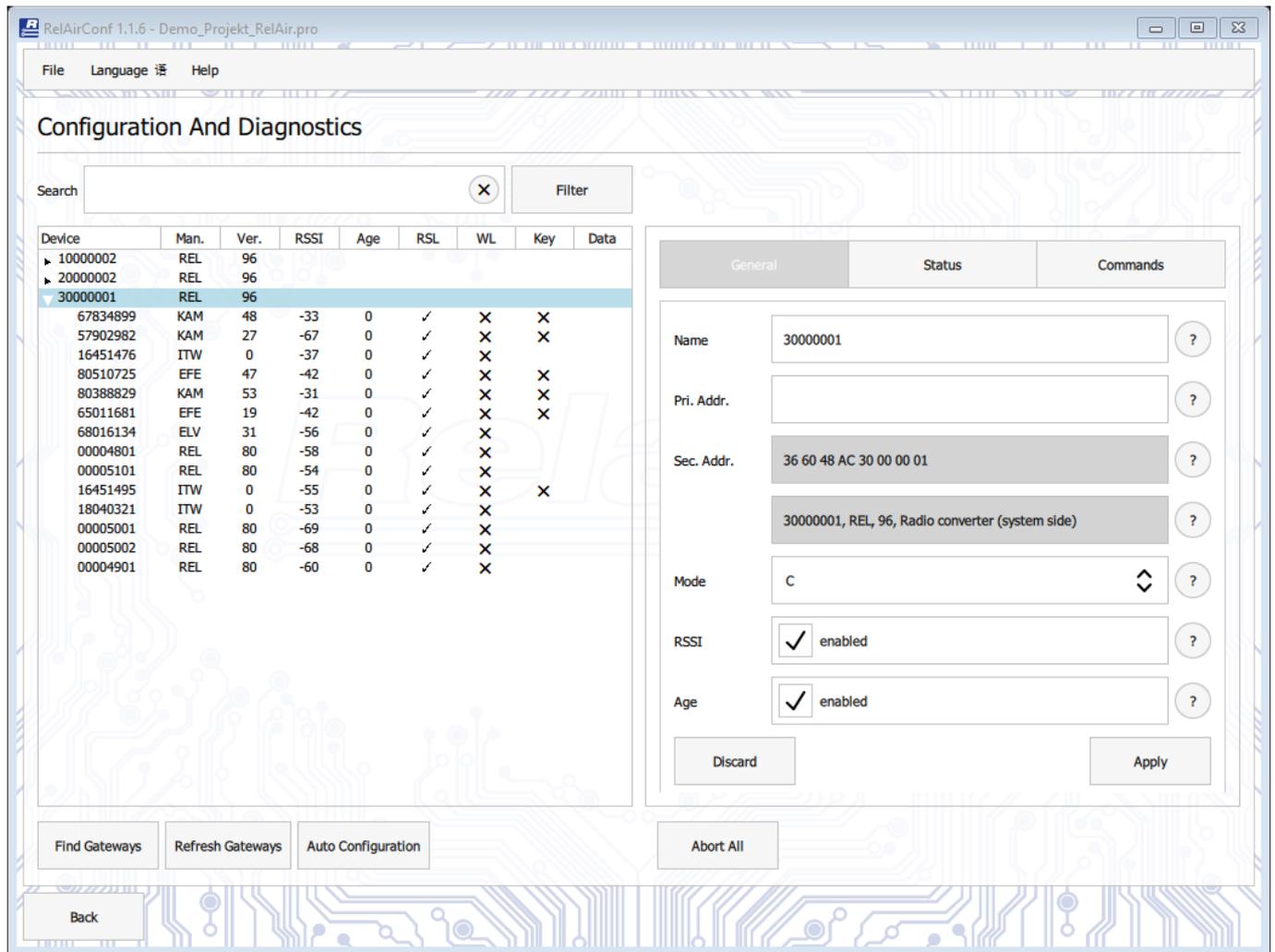


Now open the new channel and select the appropriate comport. In this case, this is the PC internal, serial PCI port COM1. The virtual ports of the RelAir R2M gateways, which may be connected via USB, appear in the list as COMx (USB Serial Port). But beware: That could also be virtual ports of other manufacturers. If you have reconnected a gateway via USB, you can refresh the list with the "Update" button. A manual input of the serial port is alternatively possible, if it should be missing in the list. To do this, move the slider from "Auto" to "Manual".



Now we recommend to save the project with the created channels first: Menu "File - Save Project" and specify the folder together with the file name. Then click on the button "Next" and come to the actual main window "Configuration and Diagnosis", where you can configure all settings of the gateways of this channel.

Please start the search for the RelAir R2M devices with the button "Find Gateways". Depending on the number of gateways and the number and address distribution of real M-Bus meters, it may take a while (15 minutes and more are possible) to find all the devices. In the following example 3 gateways have been found:



Please repeat the search again if not all devices were found during the search. The Radio Scan List (RSL = the list of receivable wireless M-Bus meters) of each gateway is automatically read after the search. By clicking on the arrow in front of the ID of a gateway, the view of the respective RSL can be opened or closed.

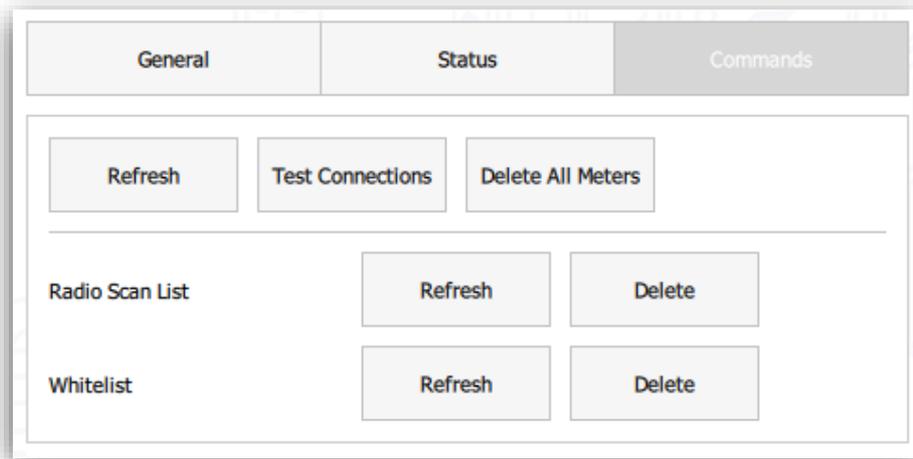
The settings of the receiver marked in the left area can be seen in the right area of the tabs "General", "Status" and "Commands". Please first set the receiving mode for the Wireless M-Bus via the "Mode" selection box according to the transmitters in the system. There are modes S, T and C and C+T for devices with firmware version V1.5.0 or higher to choose from. From firmware version V1.5.0 there are the options "RSSI" and "Age" available. The RSSI (relative signal strength) and / or the age (past time since last reception in seconds) are added to the end of the M-Bus telegrams of all meters for diagnostic purposes if activated. If you have changed a field and have not yet transferred it to the RelAir R2M, this field will be highlighted in yellow. With the button "Apply" the changes are transferred to the gateway. Please first set the correct mode for all receivers.

If you click the question mark after one of the fields, you will see a detailed explanation of that field.

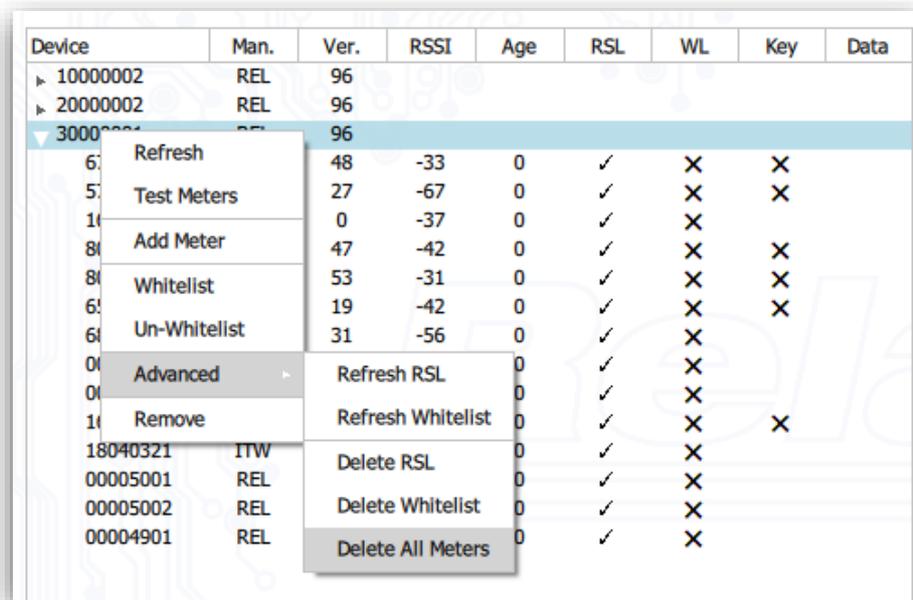
After setting the mode, the RelAir R2M waits for telegrams from radio transmitters.

At this point you should delete the lists of the received transmitters (= Radio Scan List RSL) and possibly present whitelists of the RelAir R2M devices. There are two methods:

1. For single receivers in the right part of the window in the sheet "Commands" using the button „Delete All Meters“.



2. For single receivers from the context menu with the right mouse button and „Advanced - Delete All Meters“



Now you have to keep the receivers on reception for a sufficiently long time so that as many of the stations as possible are included in the Radio Scan List (max. 488 units). The RelAir R2M constantly expands the RSL in the background when new devices are received. Depending on the transmission interval of the meters, you should let the receivers scan for at least half an hour. If the system has transmitters that transmit less frequently, e.g. every 2 hours, you have to wait longer. After the waiting time please press the button "Refresh Gateways" to read the RSL of all receivers. Then the RSL of all gateways are displayed:

Configuration And Diagnostics

Search Filter

Device	Man.	Ver.	RSSI	Age	RSL	WL	Key	Data
▶ 10000002	REL	96						
▶ 20000002	REL	96						
▶ 30000001	REL	96						
67834899	KAM	48	-33	0	✓	✗	✗	
57902982	KAM	27	-67	0	✓	✗	✗	
16451476	ITW	0	-37	0	✓	✗		
80510725	EFE	47	-42	0	✓	✗	✗	
80388829	KAM	53	-31	0	✓	✗	✗	
65011681	EFE	19	-42	0	✓	✗	✗	
68016134	ELV	31	-56	0	✓	✗		
00004801	REL	80	-58	0	✓	✗		
00005101	REL	80	-54	0	✓	✗		
16451495	ITW	0	-55	0	✓	✗	✗	
18040321	ITW	0	-53	0	✓	✗		
00005001	REL	80	-69	0	✓	✗		
00005002	REL	80	-68	0	✓	✗		
00004901	REL	80	-60	0	✓	✗		

Find Gateways Refresh Gateways Auto Configuration Abort All

Back

General Status Commands

Firmware version 1.5.0

Found During Scan

Meters 14

RSL Entries 14

Whitelist Entries 0

Here the list of the receiver with the ID = 300000001 is expanded in the view to see the 14 entries of the RSL. These properties are shown in the list for the individual meters

Man.: Manufacturer code from the Wireless M-Bus Protocol

Ver.: Version from the Wireless M-Bus Protocol

RSSI: Receive signal strength indicator RSSI (from the time of saving into the RSL):
 Strong reception for negative value with small amount, e.g. -30 dBm
 Weak reception for negative value with small amount, e.g. -103 dBm

Age: Age of the last received telegram, in seconds: only for meters in the Whitelist

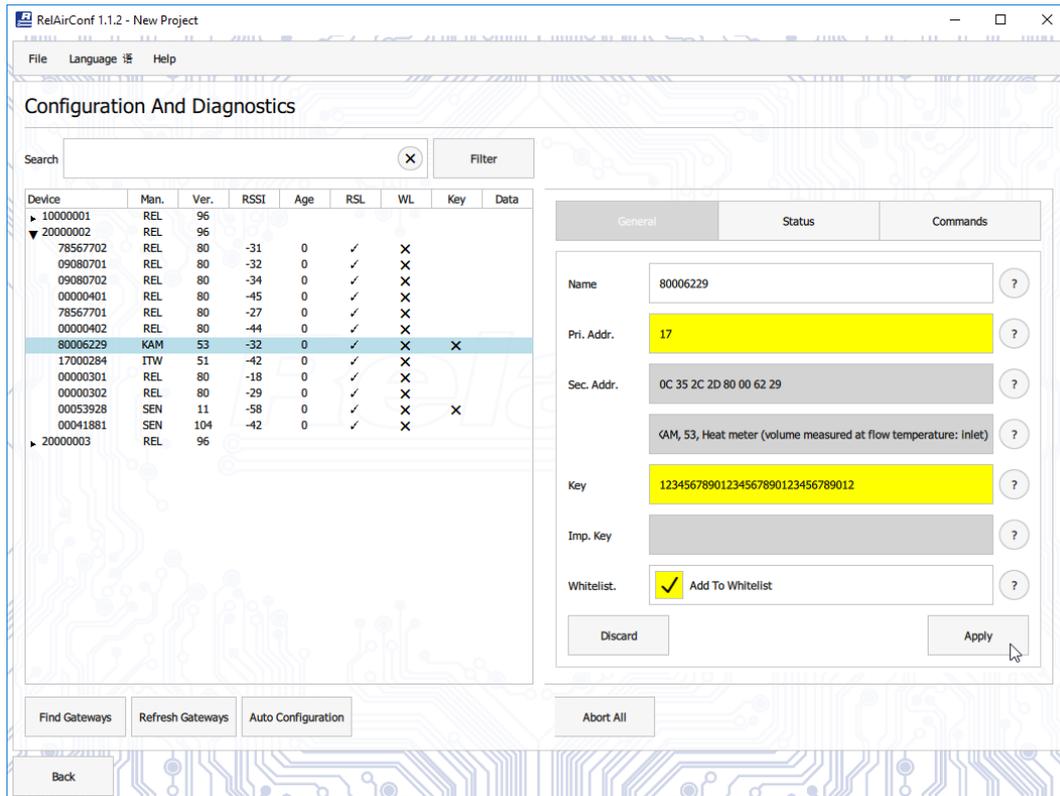
RSL: marked with ✓, if the meter is in the Radio Scan List

WL: marked with ✓, if the meter is in the Whitelist, otherwise ✗

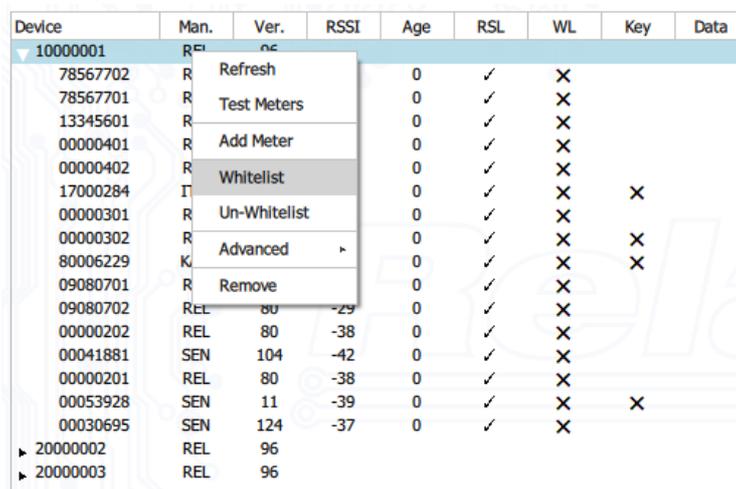
Key.: marked with ✓, if the key is programmed, marked with ✗: key is missing
 empty: no key required

Data: See on page 12

You can now enter a possibly required key (32 characters consisting of 0 to 9, A to F) per receiver for each meter to decode the telegram and at the same time add the counter to the whitelist. All meters that are in the whitelist of the receiver are simulated as wired M-Bus slaves by the gateway. The whitelist can contain up to 63 meters. You can enter a unique primary address in the "Pri.Addr." field, which can later be used as an alternative to the secondary address for reading the meter through the M-Bus. Fields changed during edit are highlighted in yellow. Write the changes to the gateway with the "Apply" button. A click on the question mark shows you an explanation of the corresponding field.



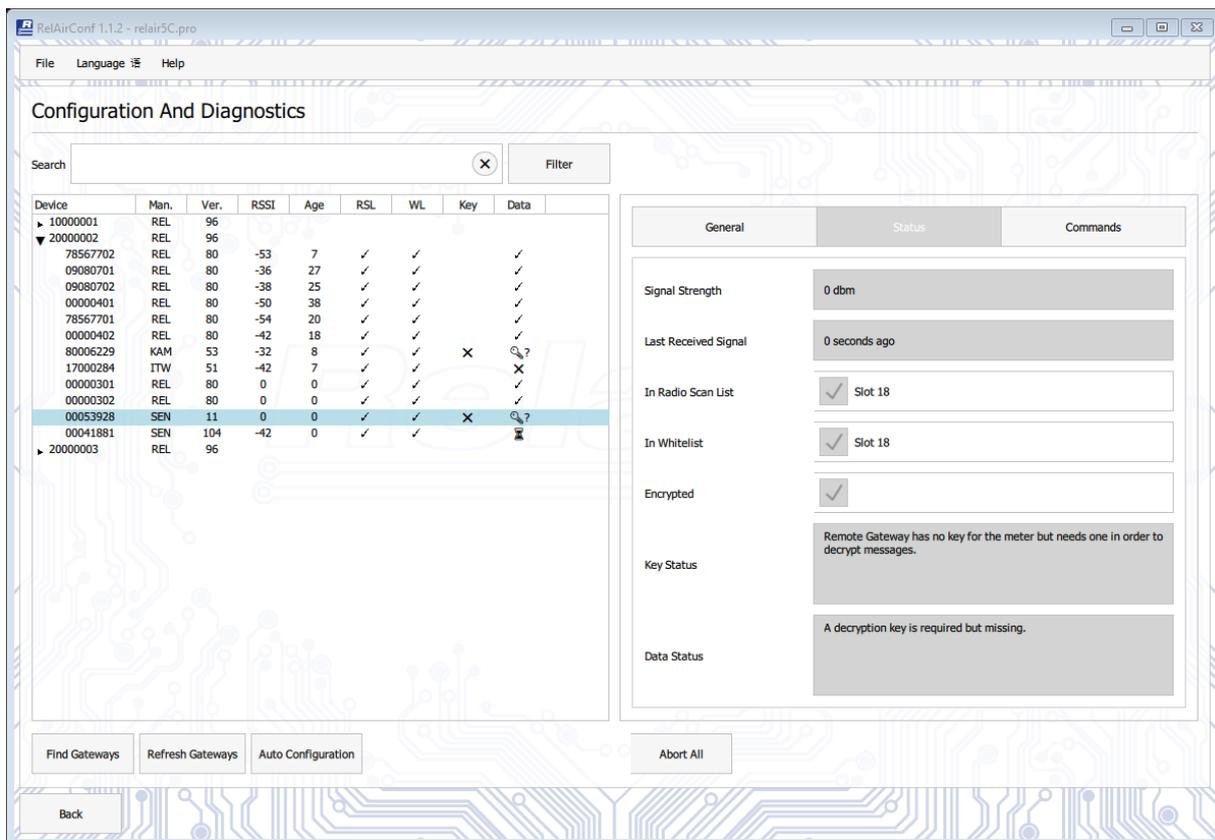
By right-clicking on the meter, you can also set all the meters of a receiver to the whitelist at the same time using the context menu:



Attention:

Please make absolutely sure that the transmitters are clearly assigned to exactly one receiver, i.e. only be in the Whitelist for just one RelAir R2M. Otherwise collisions would occur in the M-Bus network, because each meter of the whitelist is simulated by the gateways as a wired M-Bus slave. This would prevent a readout of the data in the M-Bus network. The automatic configuration (chapter 3.2.2) may help you with this task.

After the whitelisting has been done, the gateway waits for the next telegram of the transmitters. Only after the next reception the data can be read out via the M-Bus. This may require a good half hour, depending on the transmission frequency of the meters.



The "Data" column shows the status of the decoding for each meter. The status of a single meter can be updated with the context menu "Test Meter". If you right-click on a receiver, you can update the status of all counters of this receiver: Context menu "Test Meters". The aim should be to see the check mark ✓ in the column "Data" of all meters that are in the whitelist.

The possible symbols mean:

- ✓ Data has been received and decoded correctly.
- ⌚ Data has not yet been received, please wait and use "Test Meter".
- 🔑? A key is required, but none is set.
- 🔑⚡ The message could not be decrypted. Please wait or change the key.

After you have made all the settings, you should save the project. Please note that the keys of the meters cannot be read out of the RelAir R2M devices.

3.2 Automatic Configuration

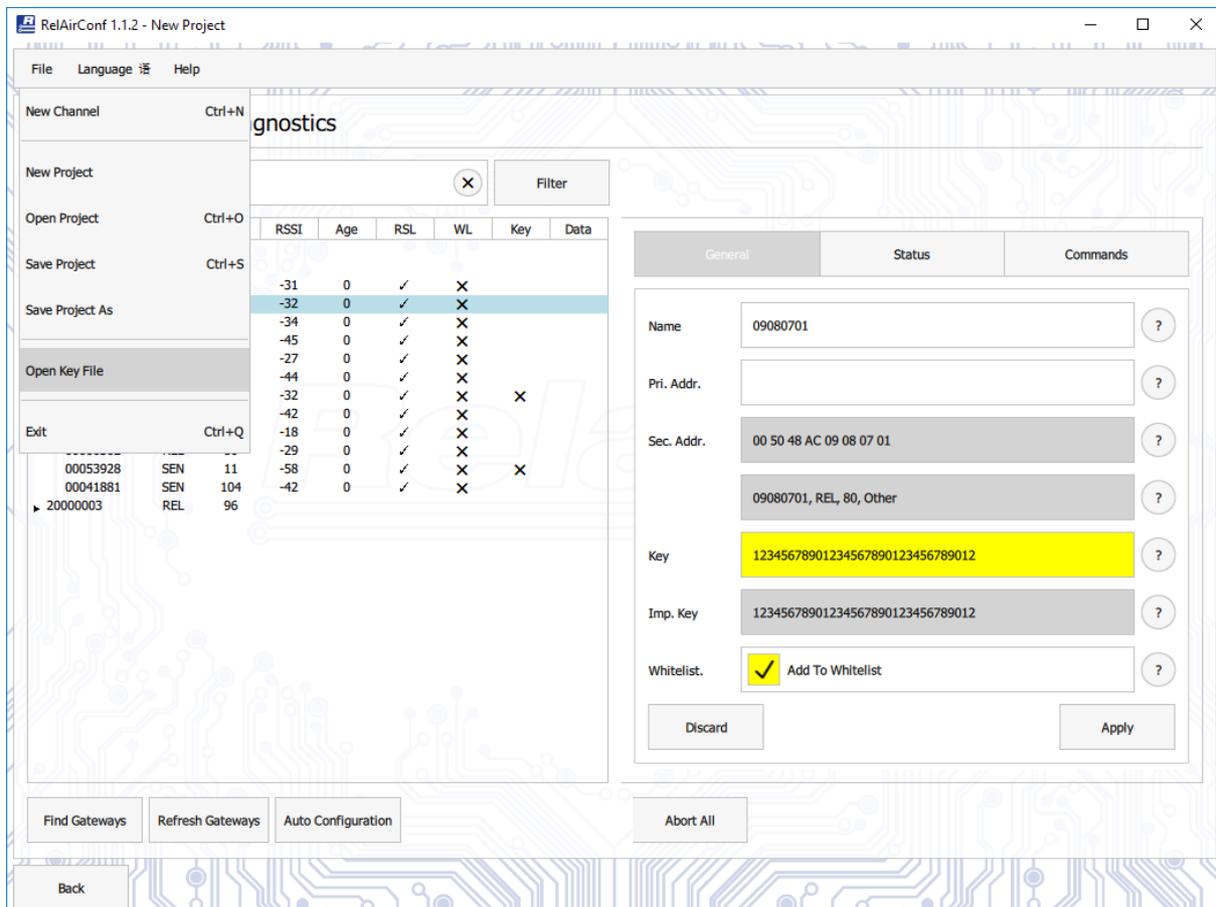
The steps of key input and manual addition of meters to the whitelists of the individual receivers in a system with more than one RelAir R2M can be mostly automated, in contrast to the explanations in chapter 3.1.

3.2.1 Import of Keys

You can read the keys from a CSV table and automatically assign them to the meters to avoid manual key input. Some manufacturers supply files for individual meter keys per delivery, while other manufacturers use ex-factory so-called global manufacturer-dependent keys, which apply to all meters supplied, at least for one delivery. The following options are available for importing keys into RelAirConf for individual lines in the text file:

- 1) ID, key: individual key for a single ID
Example: 67146207, Ad4ed92b1771435ab46b49b77d73437f
- 2) Manufacturer code, key: global key for all meters of this manufacturer
Example: ZZZ, Bd4ed92b1771435ab46b49b77d73437f
- 3) Manufacturer code, ID, Key: individual key for a single ID of the manufacturer XXX
XXX,61010274, 2d4ed92b1771435ab46b49b77d73437f #from here: comment

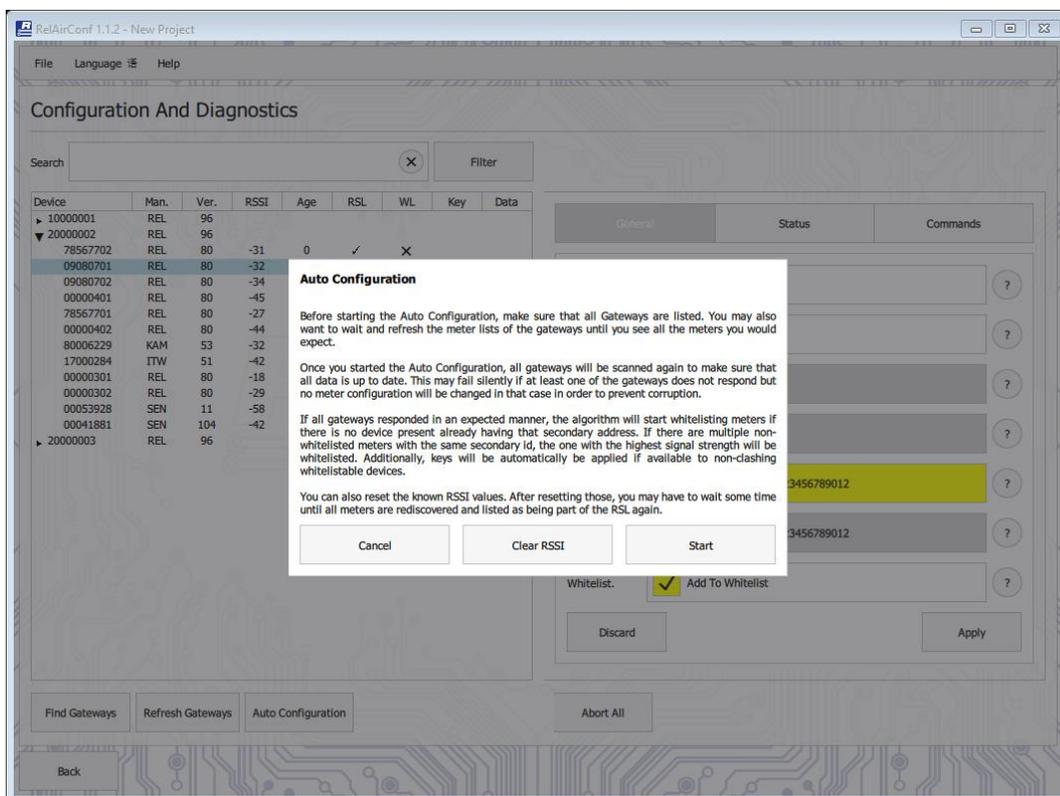
Instead of a comma, a semicolon can also be used. Spaces are ignored.



The menu entry "File - Open Key File" opens a dialog for selecting the file. Subsequently, the respective keys are assigned to the individual meters or all meters of a manufacturer. The key of a meter is entered into both the "Key" field and the "Imp. Key "(Imported key). The "Key" field is then highlighted in yellow, as usual, to indicate that the key has been changed and still has to be written to the gateway with the "Apply" button.

3.2.2 Automatic Whitelisting

The software offers the possibility of automatically assigning the meters to the whitelists in an M-Bus system with more than one RelAir R2M based on the received signal strength indicator RSSI. This function relieves the user of the laborious manual assignment and enters each meter at the gateway with the individually strongest reception. After setting the reception modes in the gateways and, if necessary, importing the keys (see section 3.2.2), start the automatic whitelisting by clicking on the "Auto Configuration" button:



The program now informs you that you should not start this function until all receivers and meters have been found. If this is the case, it is advisable to first delete the RSSI values (field strengths) of all meters, because these originate from the time of the first reception of the respective meter and could therefore be outdated. With the button "Clear RSSI" these data are deleted and updated with the next reception. This means that you should wait here for a while depending on the transmission intervals of the meters, e.g. 15 minutes.

After this waiting time you can start the automatic configuration with the button "Start". The data of the meters are then updated, following the meters are assigned, the imported keys are entered and each meter is written into the whitelist of exactly one RelAir R2M. At the end the software will show you a summarization of the whitelisting.

3.3 Description of all menu entries

The main menu of the RelAirConf software offers these three points: **File / Language / Help**. Some commonly used submenus have a keyboard shortcut that you can use directly to quickly execute the command without a mouse. An example is the command "Ctrl-Q" (Exit). The key "Ctrl" is e.g. on German keyboards also labelled with "Strg".

3.3.1 Menu „File“



New Channel:

Creates a new channel within the active project

New Project:

Creates a new project (collection of channels)

Open Project:

Opens an existing project for editing. The file name of the active project is displayed in the title bar.

Save Project:

Saves the current project under the existing file name

Save Project As:

Saves the current project under a new file name

Open Key File:

Reads the keys from a CSV file (chapter 3.2.2)

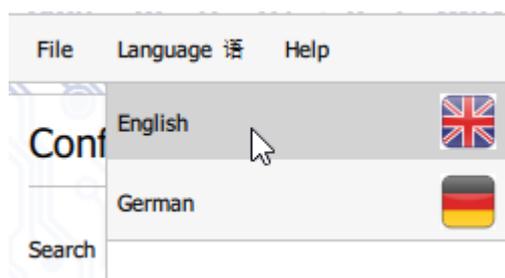
Export Csv:

Stores the device list to a CSV file

Exit:

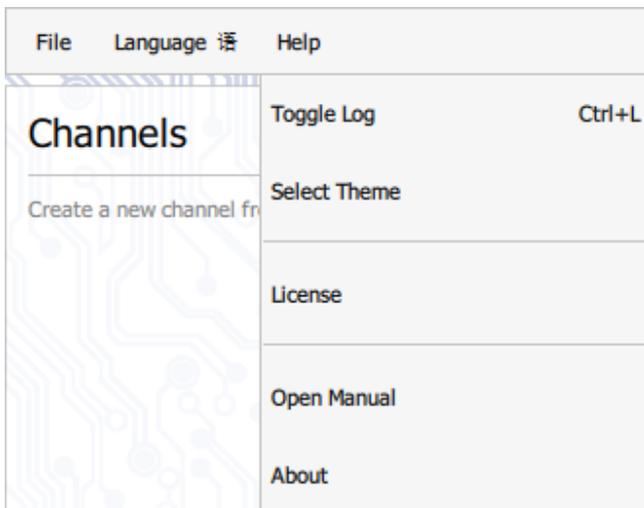
Closes the software

3.3.2 Menu „Language“



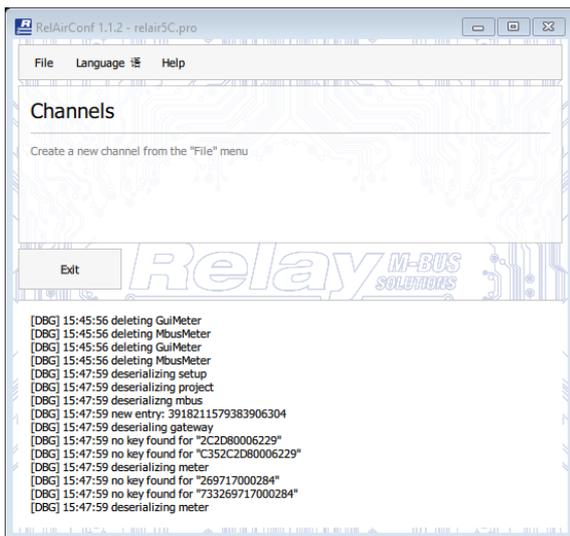
Here you can switch the language of the user interface between German and English. The change is effective immediately without restarting.

3.3.3 Menu „Help“



In addition to the PDF manual and the license information, the "Help" menu also includes the option to show protocol window and change the colour design of the user interface.

Toggle Log:



Shows or hides a window for logging communication with the gateways. This can provide information about possible communication errors in the event of an error.

Select Theme:

Here you can choose between various colour designs for the user interface, e.g. to increase the contrast or to get an inverse representation.

License:

Shows the license information about the software and the used libraries.

Open Manual:

Open this guide in your PDF viewer.

About:

Shows the file paths to the settings file and the automatically generated log file (useful for troubleshooting). You will additionally see a link to Relay GmbH.