BAB TECHNOLOGIE GmbH

KNX**CONVERTER**
Documentation

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EN

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1 KNX CONVERTER

Product:	KNX**CONVERTER**
Application:	ASCII Gateway
Type:	REG (DIN Rail mounted)
Interface:	KNX
Article number:	10401

KNX**CONVERTER** is a device for DIN rail mounting with an electric power consumption of less than 5W. Actually KNX**CONVERTER** serves as a gateway between Ethernet LAN and KNX Twisted Pair.

All required software and hardware settings are already stored in the KNX**CONVERTER**. No additional software is needed for operation.

KNX**CONVERTER** has its own user interface as a LCD display allowing to configure the device without a PC. It has also a configuration web interface reachable from any updated browser. As KNX**CONVERTER** device is connected to LAN it may be operated from anywhere.

In addition the KNX**CONVERTER** has an IP-Router functionality (tunnelling and routing protocol) can be activated and used as line or area coupler.

1.1 FUNCTIONAL OVERVIEW

You do not require any special software to configure the KNX**CONVERTER**. For basic requirements you can simply use the LCD display and navigation buttons integrated to the device. Thus, a PC is not necessary.

For depth requirements the web interface allows you to sharpen your configuration and access to specific functions. Any up-to-date standard-internet browser allows you to connect to your KNX**CONVERTER**s web interface.

Following services and configuration are available from the web interface:

- Network configuration
- General information and configuration (Name, location, Device info., Date and time, language ...)
- KNX configuration
- Enable or disable services (Tunneling, Routing)
- Configuration of TCP and UDP connections
- Monitoring function (of IP addresses, KNX devices and values of KNX group addresses)
- Connections configuration
- Route table configuration
- Clients simulation

1.2 TECHNICAL DATA

Article No.: 10401 (KNX)

- Operating voltage: 12 – 32V DC
- Typical power consumption 300 mA at 12V DC
- Power consumption: <= 5 W
- Connection: Power supply via screw-type terminal
- Resistant to climate: EN 50090-2-2
- Ambient temperature: -5 to +35 °C
- Rel. humidity (non-condensing): 5% to 80%

Mechanical data

- Assembly: Modular device (REG) housing 4 TP
- Dimensions (W x H x D) in mm: 72 x 90 x 63
- Housing: Plastic
- Degree of protection: IP20 (according to EN 60529)

Interfaces:

- Ethernet over RJ-45 connector
- KNX®/TP connection
- 4x USB 2.0

Software requirements

- Operating System independent
- Communication: Network interface
- Browser: current browser

1.3 GENERAL INFORMATION ON THIS MANUAL

Please note that all information and images published in this manual are without liability. The software described in this manual is developed persistently for the purpose of our customers, so the content in the manual may differ from the actual status.

www.bab-tec.de.

1.4 SCOPE OF DELIVERY AND INTERFACES

The scope of delivery of KNX**CONVERTER** includes the following content:

- 1x KNX**CONVERTER** KNX
- 1x enclosed CD

A power supply unit for the KNX CONVERTER is NOT included in the scope of delivery!

In addition to the connection for the power supply (**12-32 V DC**), the KNX**CONVERTER** has the following interfaces:

- 1x RJ 45 Ethernet 100Mbit/s Full Duplex
- 4x USB 2.0
- KNX® / TP connection

FACTORY SETTING ON DELIVERY:

IP address: 192.168.1.228
Username: "admin"
Password: "admin"

1.5 UPDATES

We reserve the right to offer firmware updates free of charge for the KNX**CONVERTER**. We inform you about new firmware in our newsletter or on our homepage. The update files are available in the download section on our homepage.

www.bab-tec.de.

1.6 IMPORTANT INFORMATION ON THE OPERATING INSTRUCTIONS

We reserve the right to make technical and formal changes to the product in the interests of technical progress. The information in this documentation may therefore not necessarily be up to date. Information on current KNX**CONVERTER** firmware and on this description (“KNX**CONVERTER** documentation”) can be found at

www.bab-tec.de.

2 INSTALLATION AND CONFIGURATION

For initial operation of the device actually valid security information has to be paid attention to. For commissioning besides the usual peripherals (power supply, network, KNX bus), may also be a PC with a network connection and a patch or crossover cable is required.

Important note: Before you disconnect the power supply, please shut down the KNX CONVERTER via its web interface first (Configuration/System)!

2.1 SAFETY INSTRUCTIONS

Working on low-voltage systems and on the EIB is only allowed to trained and qualified personnel. Installation and connection of the bus mains, the 12 – 32 Volt DC mains as well as the integrated units, have to be performed in accordance with current DIN VDE guidelines as well as the EIB-manual.

This component is intended to be installed for application in distribution boards resp. control panels and can be used for installation in

- Indoor applications,
- Dry rooms,
- Low-voltage distributors,
- Mini-boxes

Doing so, you have to respect the environment-requirements, compliant with the protection class and permitted operating temperature of the EIB-unit.

The line with integrated choke cannot be used as the operating voltage of 12-32 V DC.

Safety and regulatory compliance standards:

- DIN EN 55024 Einrichtungen der Informationstechnik
  (equipments of information technology)
- DIN EN 60950 Sicherheit von Einrichtungen der Informationstechnik.
  (safety of information technology)
- DIN EN 50090-2-2 Elektrische Systemtechnik für Heim und Gebäude.
  (electrical systems for home and buildings)

CE- qualification according to:

- EMV- Richtlinie (Wohn- und Zweckbau) (EMV-guideline, residential- and functional building)
- EN 50081-1 (EMV-guideline)
- EN 50082-2 (EMV-guideline)
- EN 50090-2-2 (EMV-guideline)

! Note - Functional security!
In case of special requirements regarding risks to life or property (functional safety), appropriate additional measures have to be taken. These measures must have the necessary independence from the operation of the KNX CONVERTER and always have to be available.

Measures to reduce risk you can take from the Tables "Functional safety" of the "Building Control Handbook, Fundamentals" from ZVEH / ZVEI.

2.2 KNX CONVERTER OVERVIEW

The following picture illustrates KNX**CONVERTER** KNX.

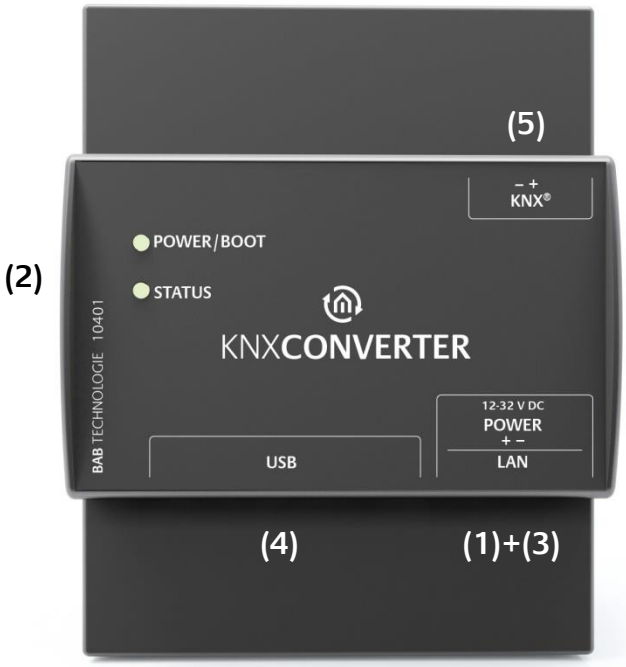


Figure 1: KNX CONVERTER overview

(1) Voltage supply: 12-32 V DC (direct voltage)
(2) Power/Boot and Status LEDs
(3) RJ45 female connector for Ethernet LAN
(4) 4x USB female connector
(5) KNX/TP bus terminal

MAINS CONNECTOR

The mains adapter is connected at the bottom right corner of the KNX**CONVERTER** (front view).
Please note the admissible voltage and polarity!

Important notice: Please shut down the KNX**CONVERTER** via the web interface (under configuration / system) before disconnecting it from the power supply.

KNX BUS (TWISTED PAIR) CONNECTION

The KNX/TP bus connector is at the top right corner of the KNX**CONVERTER**. It is used for the KNX TP bus.
Please ensure correct polarity!

SIGNAL LEDS

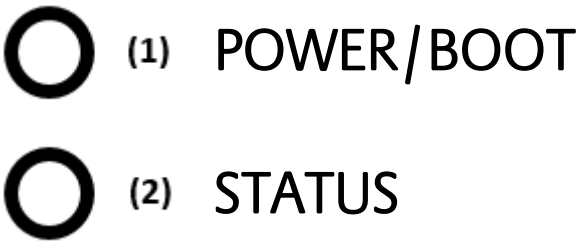


Figure 2: Status LEDs

POWER/BOOT LED (1)

- During booting, the POWER/BOOT LED alternates between orange and green.
- The POWER/BOOT LED changes to green once the KNX**CONVERTER** has been completely booted and is ready for operation.

STATUS LED (2)

- The status LED lights up green once the KNX**CONVERTER** has been completely booted and is ready for operation.
- After having booted the KNX**CONVERTER**, the status LED is permanently lit in the form of two quick successive beats (heart beats) with a subsequent short break.
  This is also an indication of the KNX**CONVERTER** utilisation: the higher the frequency of the flashing LED, the higher the utilisation of the KNX**CONVERTER**.

USB CONNECTORS

The KNX**CONVERTER** is equipped with two USB female connectors. They are arranged at the left side next to the LAN and the voltage supply connection of the KNX**CONVERTER**. Both USB connectors can be used for data export.

2.3 INSTALLATION

In order to avoid any unnecessary risks, please observe the following instructions for installation and initial operation.

ATTENTION!
Please make sure that the KNX CONVERTER is not protected against polarity and surge voltage.

GENERAL

Ambient conditions

Operating voltage:	12 - 32 Volt DC
Power consumption:	<= 5 W
Resistance to climate:	according to EN 50090-2-2
Ambient temperature:	0 - 45°C
Rel. humidity (non-condensing):	5% - 80%

Connecting the device
Simply snap the KNX**CONVERTER** onto a top hat rail according to DIN EN 60715.

Voltage supply
When establishing the power supply, please make sure that sufficient power is available. Connect the power supply unit to the screw-type terminals according to the marking.

Network
LAN access is required for KNX**CONVERTER** configuration. This may be implemented either via an existing LAN or via a direct connection (between PC and KNX**CONVERTER**).

Client PC requirements
A network-compatible PC is required for KNX**CONVERTER** operations. The PC must have a current browser.

ETS
The KNX**CONVERTER** does not require an ETS application. It is not necessary to program the bus coupler. However, the KNX group addresses with corresponding data types are required for KNX**CONVERTER** use. For their import to the KNX**CONVERTER**, the KNX project as of ETS version 4 is required.

ADDITIONALLY FOR KNX

To provide ideal operating conditions, the KNX**CONVERTER** should be connected to the KNX bus.

Connecting the device

- Connect the bus line to the bus terminal.
- Switch on the bus voltage.

READINESS FOR OPERATION

Once everything is connected, you can switch on the KNX**CONVERTER**. To check correct installation, wait until the device is completely booted. This will take approximately 2 minutes. Watch the LEDs at the front to this end. The green POWER/BOOT LED must constantly light up after booting.

LANGUAGE

Web interface

The language used for the KNX**CONVERTER** web interface depends on the language set in the browser. Currently, the languages German and English are provided in the KNX**CONVERTER**. If the browser is set to a language other than German or English, English is used for the KNX**CONVERTER** interface.

SYSTEM REQUIREMENTS

- Current browser (e.g. Firefox, Chrome, Safari, etc.)

2.4 INITIAL OPERATION

When the KNX**CONVERTER** is booted up proper it can be put into operation. For this, it may happen that some basic settings have to be adjusted. These settings have to be made comfortable via the web interface.

ACCESS DATA FOR THE WEB INTERFACE

The KNX**CONVERTER** is delivered with factory-made settings. In order to access to the web interface, type the default IP address in your browser:

- Default IP address => **192.168.1.228**
- Subnet Mask => **255.255.255.0**
- Standard Username => **admin**
- Default Password => **admin**

ESTABLISH CONNECTION

In order to configure the KNX**CONVERTER**, a current browser and a network connection to the device are required. If the device is in the condition of delivery, it can be accessed at the above-mentioned IP address and the network settings must be adjusted to the address range, where necessary. Please follow the information given in the chapter "*Adjust the network settings of your computer*" for this purpose.

2.4.1.1 ACCESS THE KNX CONVERTER WEB INTERFACE

The KNX**CONVERTER** is configured via its web interface so that it can be configured via each web browser. In order to call up the web interface, please proceed as described below:

- Open a browser and enter the IP address of the KNX**CONVERTER** into the address line (Information about the factory settings can be found in chapter "*2.4 INITIAL OPERATION*")

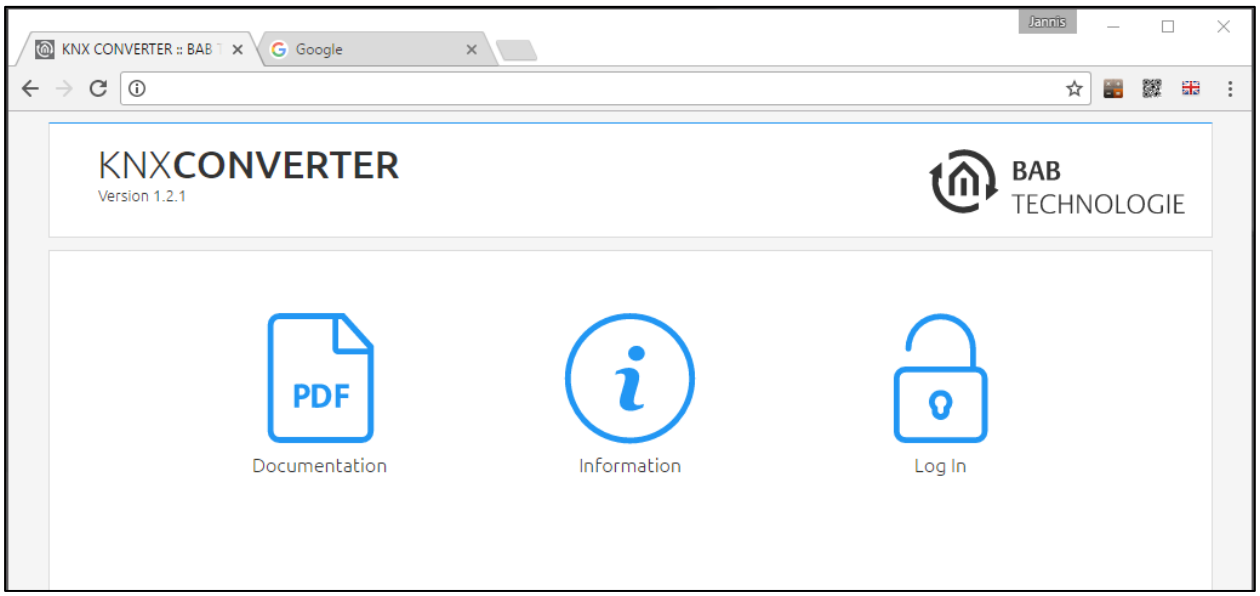


Figure 3: KNX**CONVERTER** start page

- You will reach the KNX**CONVERTER** start page. The “Login” unlocks the “Configuration” Functions whereas “Information” shows general system information.
- Use the user data to log in to the web interface: "Log In". (Information on the authorisation settings can be found in chapter "*2.4 INITIAL OPERATION*")
- You can then also access the "Configuration" menu item. See chapter 3.2 “CONFIGURATION” ITEM

  After successfully logging in, the following sections are available.
  - Client Simulation
  - Configuration
  - Documentation
  - Information
  - Log Out
- To return to the main menu, just click on the header graphic or the BAB TECHNOLOGIE logo.

2.4.1.2 FIND THE KNX CONVERTER IN THE NETWORK USING THE BAB STARTER

If you do not know the network settings of the device, the BAB STARTER can help you to find out with which IP address the device is available. The software is available for Windows and MAC systems and can be found on the supplied CD or at www.bab-tec.de in the download section. For detailed information, please observe the separate documentation with respect to BAB STARTER!

2.4.1.3 BAB STARTER INSTALLATION

For Microsoft Windows you receive a *.zip file to download. For MAC OS X, a *.mpkg file is available.

Note: A detailed description for BAB STARTER can be found in the related documentation on the supplied CD or can be downloaded at www.bab-tec.de.

Windows installation

- Run "BAB_STARTER_[Version]_setup.exe" to start the installation.
- Follow the instructions in the InstallShield Wizard and click on "Continue".
- In the end, confirm the installation with "Finish".

Thereafter, the BAB STARTER can be found in the Windows Start menu folder "BAB TECHNOLOGIE GmbH".

MAC OS installation

- Double click on "BAB STARTER_[Version].mpkg".

Note: It is possible that your system will advise you of a non-verified developer. In this regard, please note the information on the "Apple Gatekeeper"; see:
https://support.apple.com/de-de/HT202491 (as of 5 October 2015)

- Follow the instructions of the installation process and click on "Continue" to continue the installation.

The message "The installation was successful" confirms the successful installation. The BAB STARTER icon now appears in the "Programs" folder.

2.4.1.4 RUN BAB STARTER

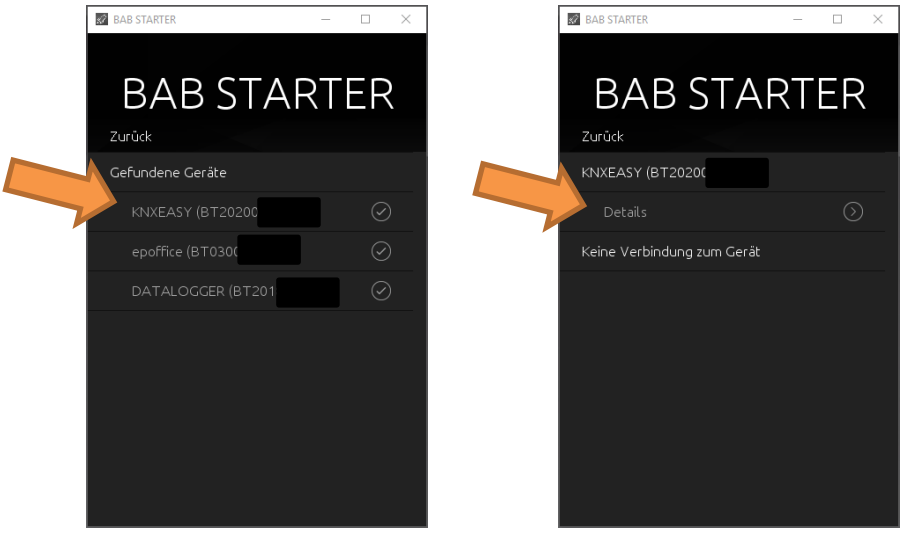
Click on the BAB STARTER program icon to start the application

To display all active BAB devices in the network, click on the "Search for Devices..." menu after you have called up the STARTER.

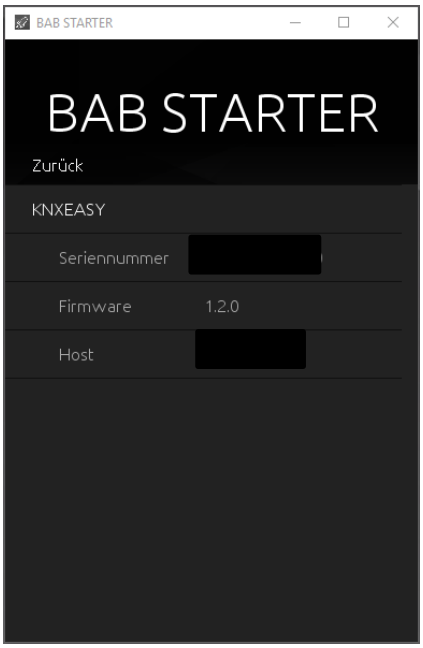
2.4.1.5 DEVICES IN THE FOREIGN NETWORK AREA

Whether a device is in the network area of your computer is highlighted by the contrast intensity of the entries. If the entry is displayed with low contrast, the device is not in the same network area (subnet) and cannot be reached without changes.

To learn more about the network settings of the device, click on the respective entry and then on "Details".



The following display shows the serial number, firmware and IP address (host).



- To bring the device into the network area of your computer, please proceed as described in chapter "*ADJUST THE NETWORK SETTINGS OF YOUR COMPUTER*".

2.4.1.6 DEVICES IN THE SAME NETWORK AREA

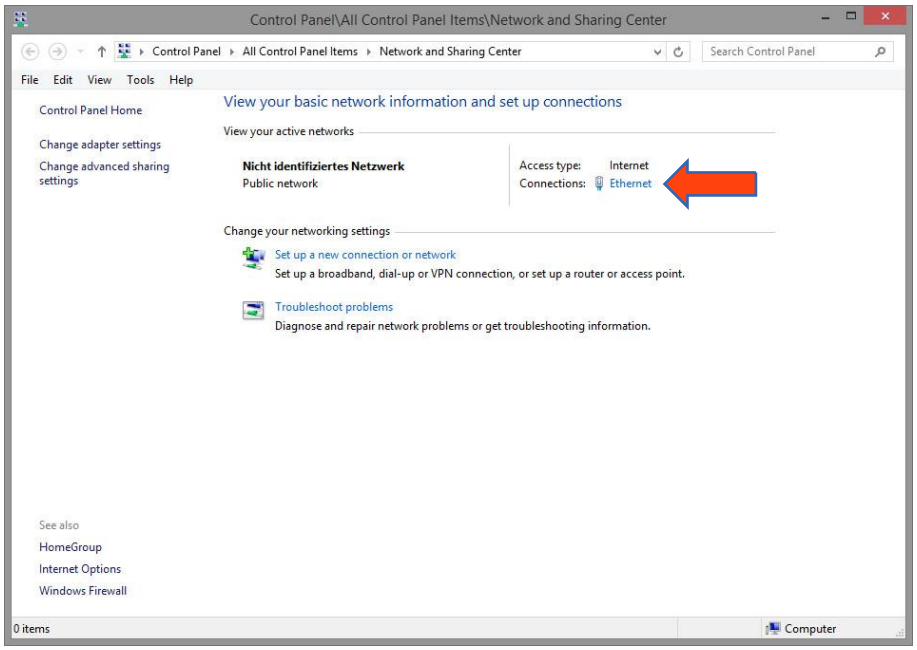
If check mark is visible, this means that the device is in the same network area (subnet) and can be accessed immediately.

Click on the entry so that the next menu opens. Apart from the device details, you can access the SYSTEM here, which leads you to the configuration surface of the KNX**CONVERTER**.

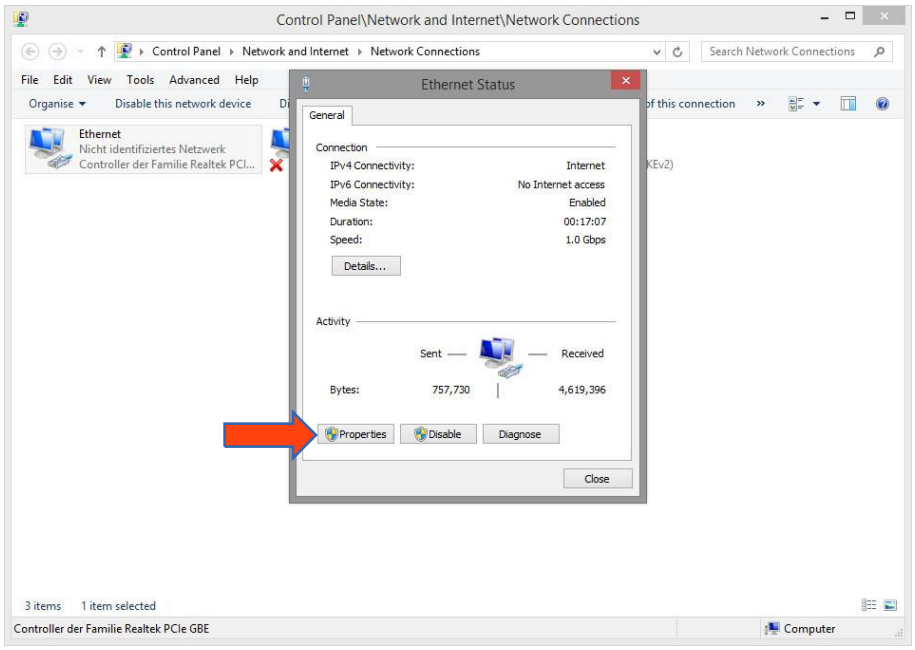
2.4.1.7 ADJUST THE NETWORK SETTINGS OF YOUR COMPUTER

In order to adjust the network settings of your computer and establish a connection to the device, please proceed as described below:

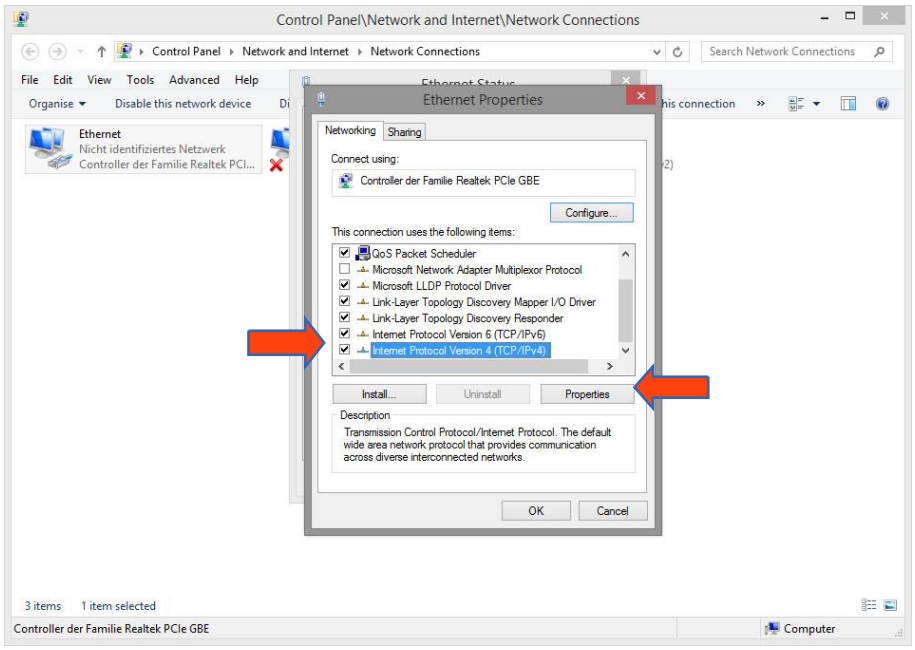
- Open the IP address settings (under Windows 7):
- Click "Start Button" --> "Control Panel" --> "Network"
- Select "Network Connection", then "LAN Connection" ("Intel PRO1000 GT" in the figure below).



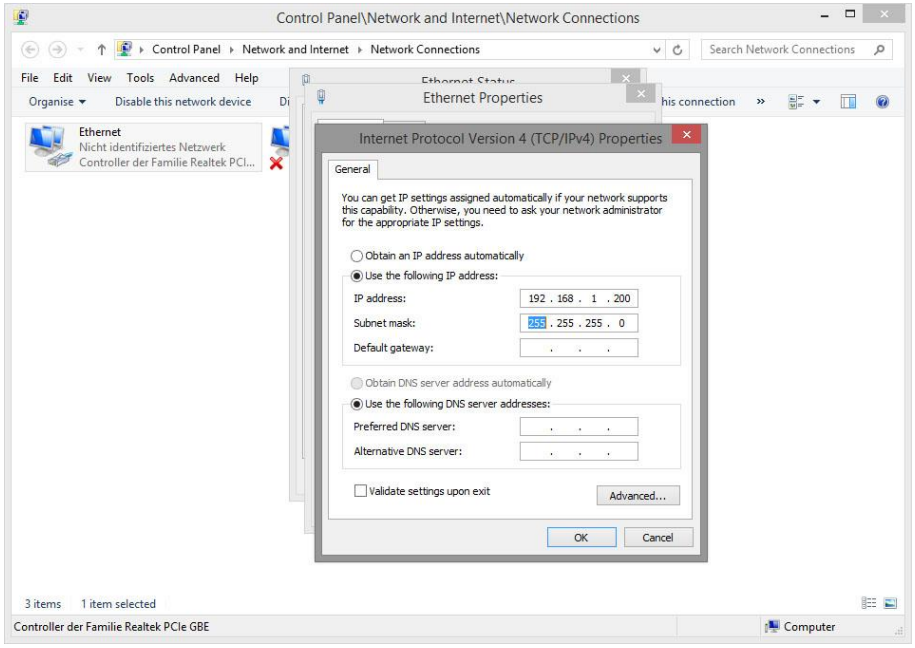
- Then click "Properties":



- Select "Internet protocol Version 4 (TCP/IPv4)" and click "Properties" again:



- Now note down the current IP address settings or take a screenshot in order to ensure that you can reset the IP address setting following the configuration of the KNX**CONVERTER**.
- Now change the IP address settings (IP address and subnet mask) as required:



Example of a valid configuration for the factory settings of the KNX**CONVERTER**:

- Free IP address: 192.168.1.228
- Subnet mask: 255.255.255.0
- Now confirm your input with "OK".
- Close all windows until the "Windows Network and Sharing Center Settings" window is shown.

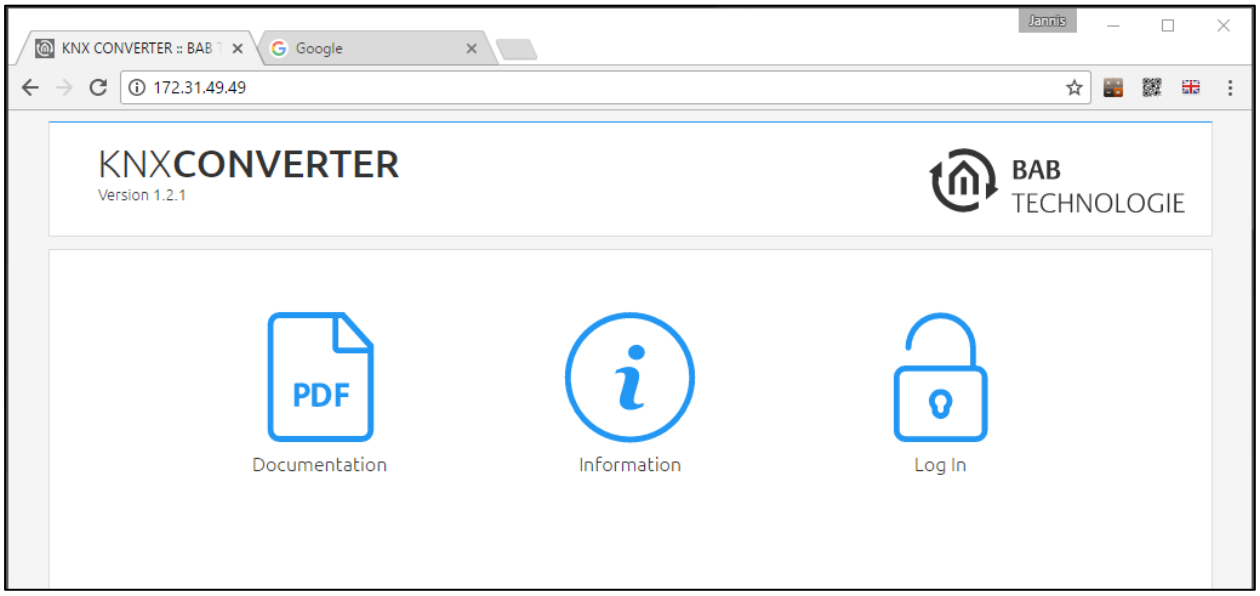
Thus, you have adjusted the network settings of your PC to those of the KNX**CONVERTER**. You can access the web interface of the KNX**CONVERTER** by means of the browser. Restore the original network settings of your PC by following the steps described above as soon as you have configured the KNX**CONVERTER** correspondingly.

If the IP address of your PC and your KNX**CONVERTER** are in the same network mask, you can continue with the configuration.

2.4.1.8 ADJUST THE NETWORK SETTINGS OF THE KNX CONVERTER

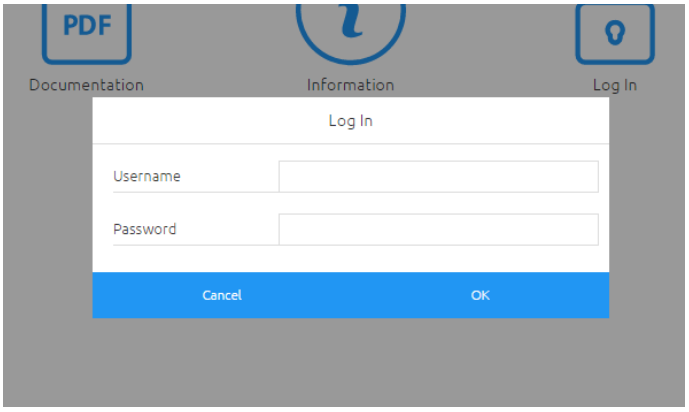
If the network prerequisites have been created, you can now access the configuration of the KNX**CONVERTER** in order to adjust the network settings to the local requirements there. To do this, please proceed as described below:

- Enter the IP address of the KNX**CONVERTER** in the address line of your browser (for factory settings: 192.168.1.228).



- The start page of the KNX**CONVERTER** opens up. Click "Log In".
- A login dialog appears. For factory settings, the login data is as follows:

User name: **admin**
Password: **admin**

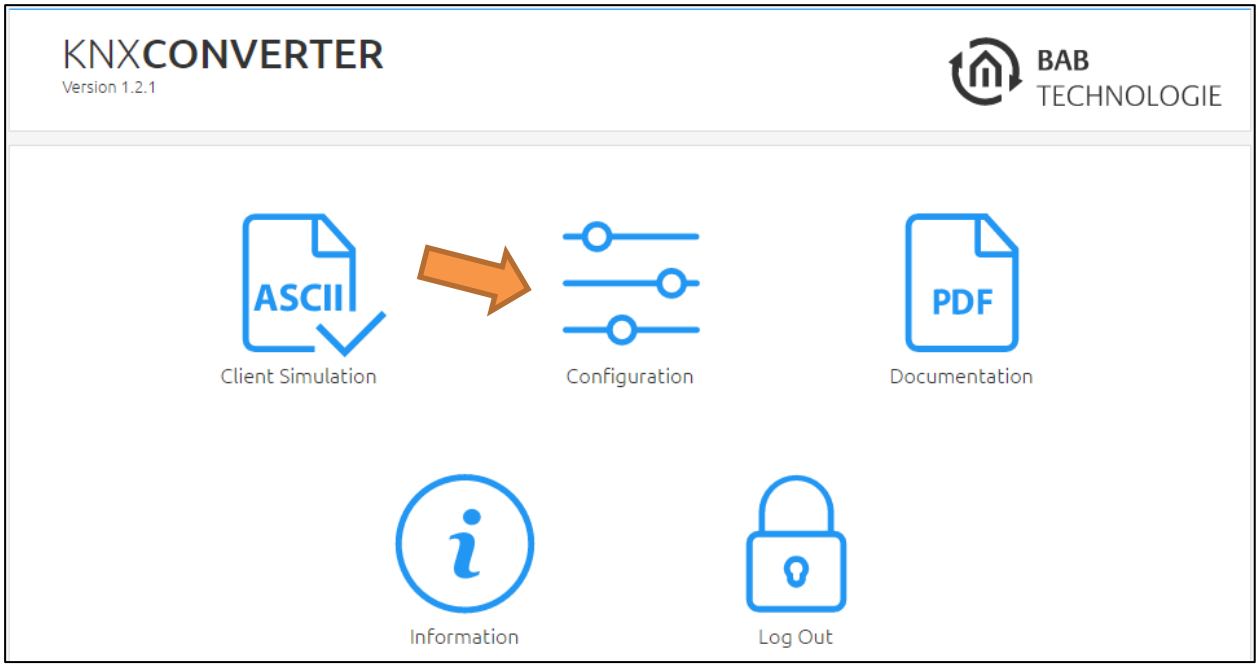


Note: The password must be changed immediately when logging in for the first time. If the password is lost, the device cannot be reset!

Note: Logging in only works if the browser is authorised to save cookies!

- The view on the start page changes. You can now access the following levels:
  - KNX CONVERTER
  - Configuration
  - Documentation
  - Information
  - Log Out

- In order to change the IP address of the KNX**CONVERTER**, please click "Configuration"



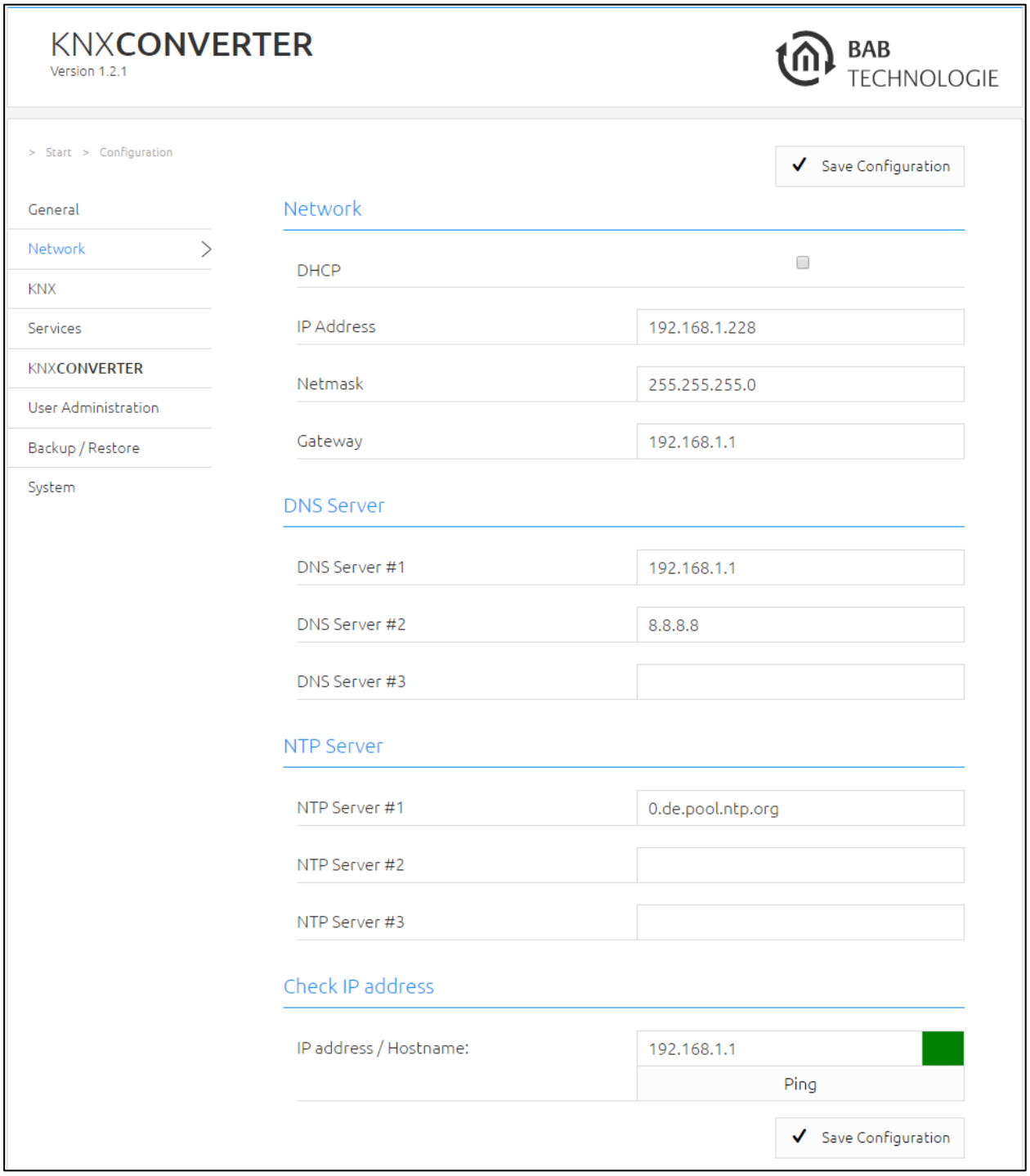
The configuration menu opens up. You can make the following settings in the "Network" menu item:

DHCP: If DHCP is active, the device automatically obtains the network settings. A DHCP server must be available in the local network.

IP address / subnet mask / gateway: Field for the static assignment of IP addresses. Please make also sure that the subnet mask (often 255.255.255.0) and the gateway entry are correct. (Often the IP address of the WLAN router).
Note: Without a correct gateway entry, the device will not be able to communicate with the Internet.

DNS server: DNS is the abbreviation for Domain Name System. The DNS server converts Internet addresses, for example "www.bab-tec.de" into the IP address "121.21.21.175" and vice versa. Without a valid DNS entry, NTP-, weather- or UPnP services do not work.

NTP server: NTP is a free service for synchronising the system time of Internet-compatible devices. If it is not possible to establish the connection to an NTP-Server, the system time must always be checked and adjusted manually (see menu "Configuration/General")
NTP-Server list: e.g. http://www.pool.ntp.org/zone/europe



Change the IP address settings as required. **In order to save the settings made, click "Save Configuration".** The server in the device is restarted, the browser automatically connects to the new IP address if possible.

Note: Please bear in mind that you might have to reset the IP address of your computer to the initial value in order to be able to access the KNX CONVERTER after the change has been made.

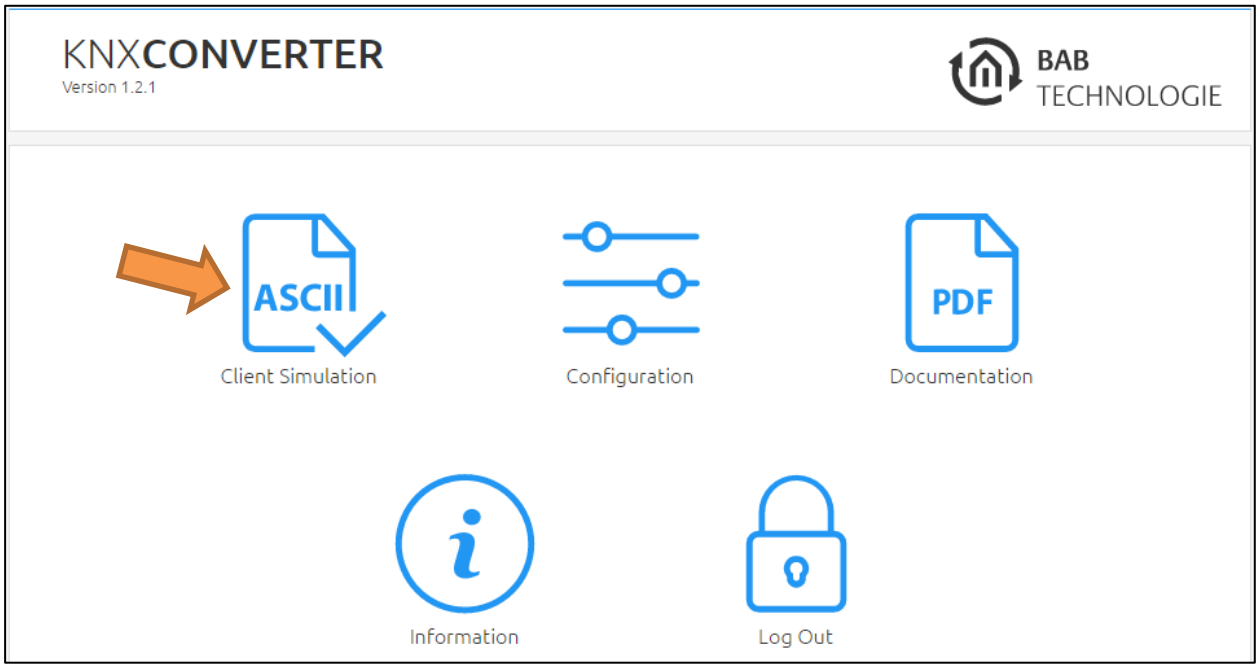
Specialty when activating DHCP
If you have activated DHCP for the KNX**CONVERTER** according to the steps mentioned above, please use the BAB STARTER like depicted in the chapter "*Find the KNX CONVERTER in the network using the BAB STARTER*" to find out the current IP-address.

3 KNX CONVERTER MENU

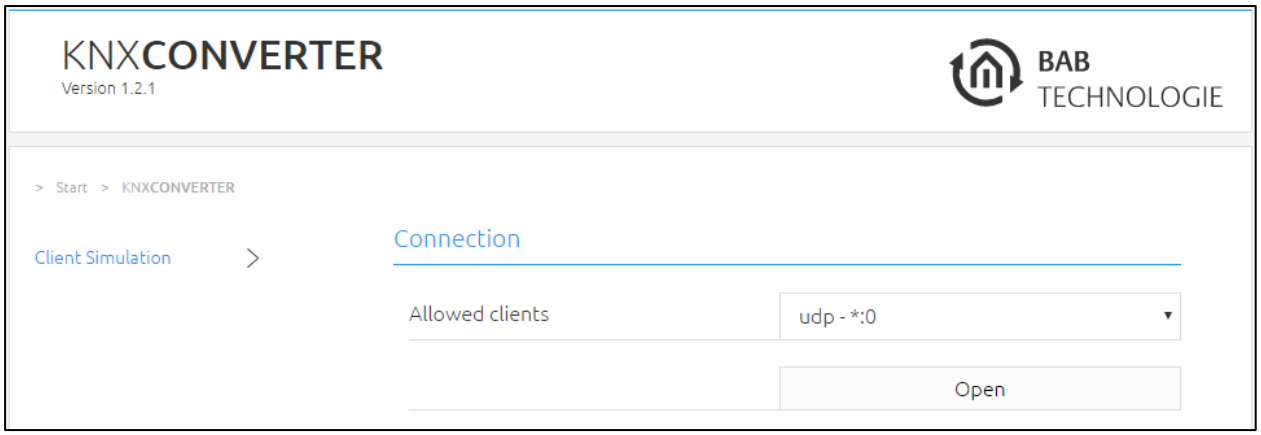
Description of the individual items in the main menu, in the listed order.

3.1 CLIENT SIMULATION

In the web interface, go to "Client Simulation". Client simulation is made to help you building ASCII strings you will use in your own UDP, TCP or HTTP client.



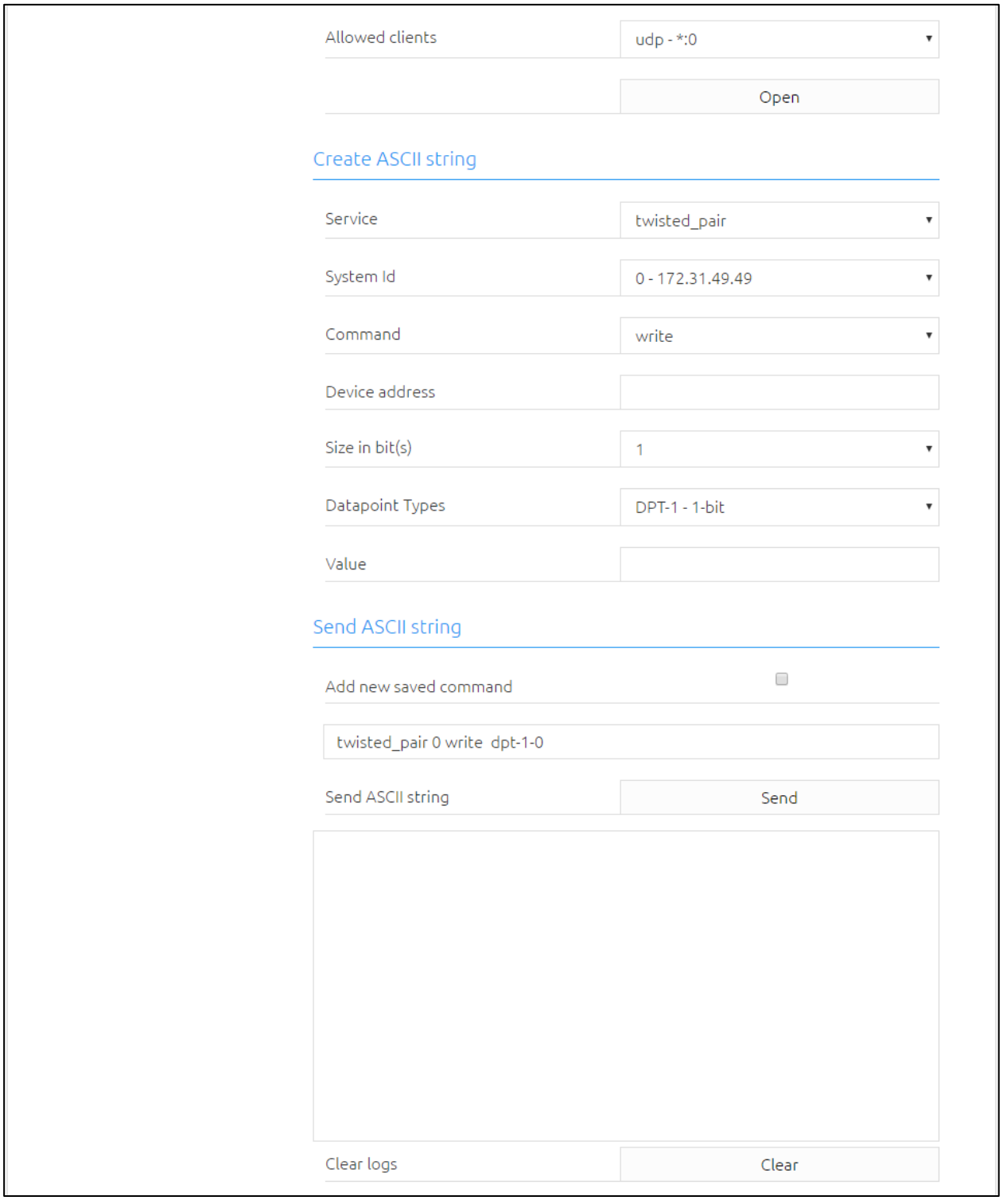
CONNECTION



In the "Connection" part, you have the list of connections ("Allowed clients") you have configured. When you click on open/connect, a real Java client is actually created according to your configuration to communicate with servers. The only difference with your own client is that ours are opened/connected on "localhost" *(Find further information in the Appendix under the Chapter "Connection")*.

CREATE ASCII STRING

Each field of the Client simulation give you the possibility to build a correct ASCII string.



3.1.1.1 SERVICE

You can choose between “twisted_pair” and “routing”.

3.1.1.2 SYSTEM ID

It gives you the list of available System ID present in the route table.

3.1.1.3 COMMAND

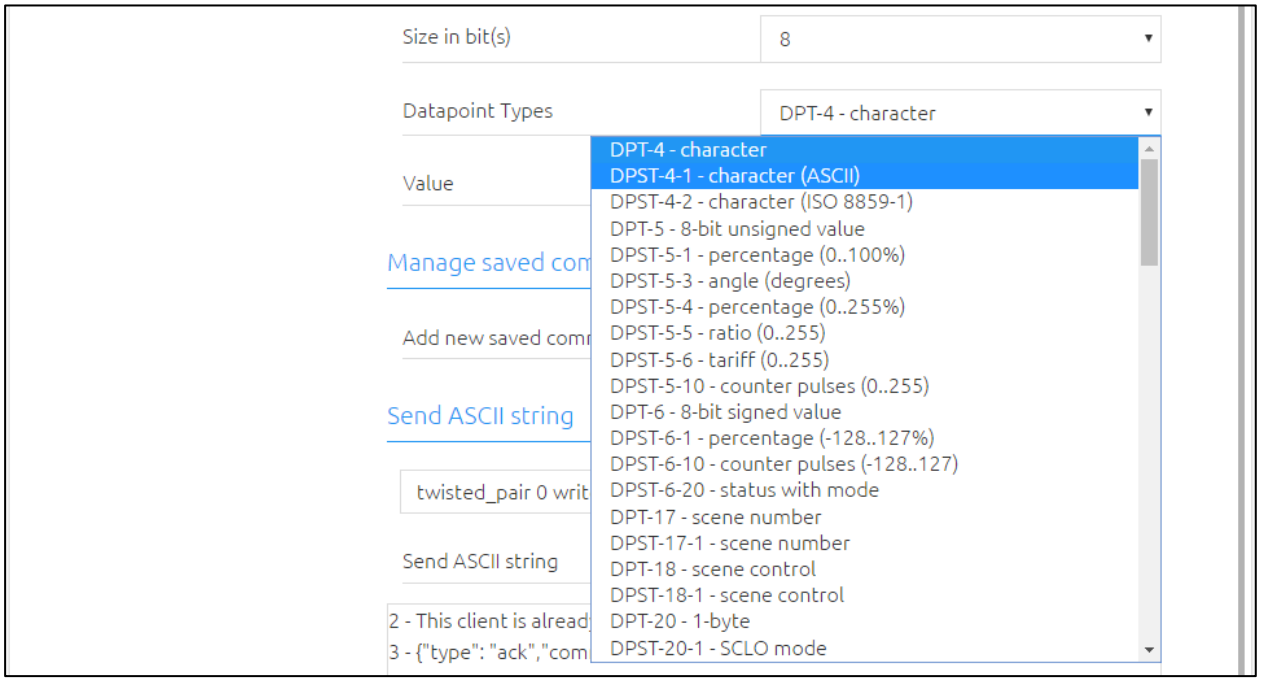
You can choose between “read” and “write”.

3.1.1.4 DEVICE ADDRESSES

If an ETS project has been imported, you can choose a device in the the list of devices. Each device shows its name, group address, and the physical address of the device it belongs to. Otherwise you can type a KNX group address.

3.1.1.5 DATAPOINT TYPES

If an ETS project has been imported and datatypes has been configured, you can choose a datatype in the list of datatypes. Otherwise you can choose a datatype according to data size.



3.1.1.6 VALUE

You can choose a value if there are from the imported ETS Project pre-defined values types. Otherwise you can enter a value.

3.1.1.7 ASCII STRING FIELD

This field displays the generated ASCII string. It is also editable; therefore do not hesitate to test all different possibilities.

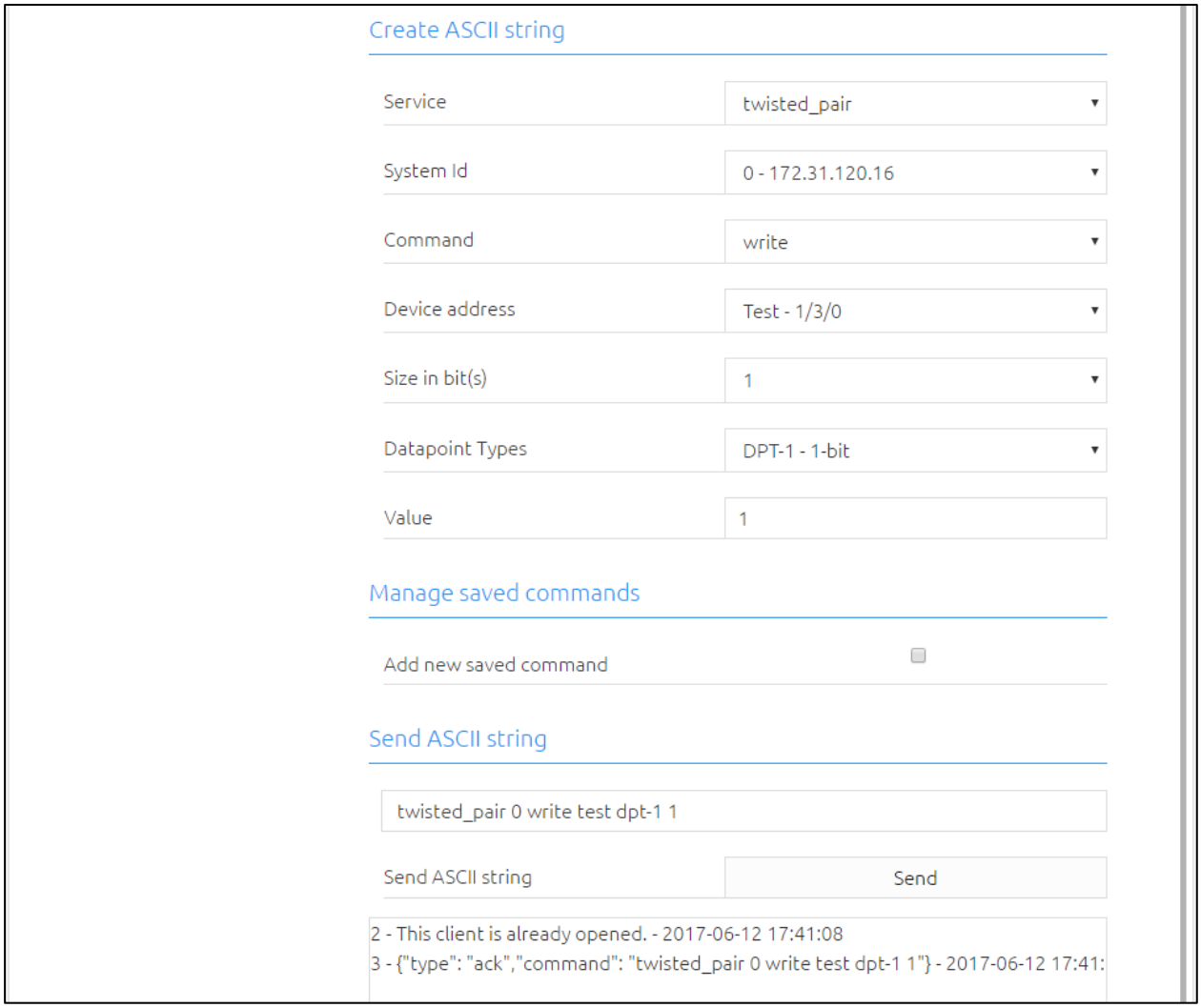
3.1.1.8 SEND ASCII STRING

Send the ASCII string displayed in the ASCII string field.

3.1.1.9 LOGS

All logs are displayed in the bottom field. You can clear logs with the clear button.

3.1.1.10 EXAMPLE



HTTP

3.1.1.11 SEND ASCII STRINGS

You are also able to send ASCII strings via HTTP POST and GET.

POST

POST is used to send a “write” command to KNX**CONVERTER**. The address for this POST is:

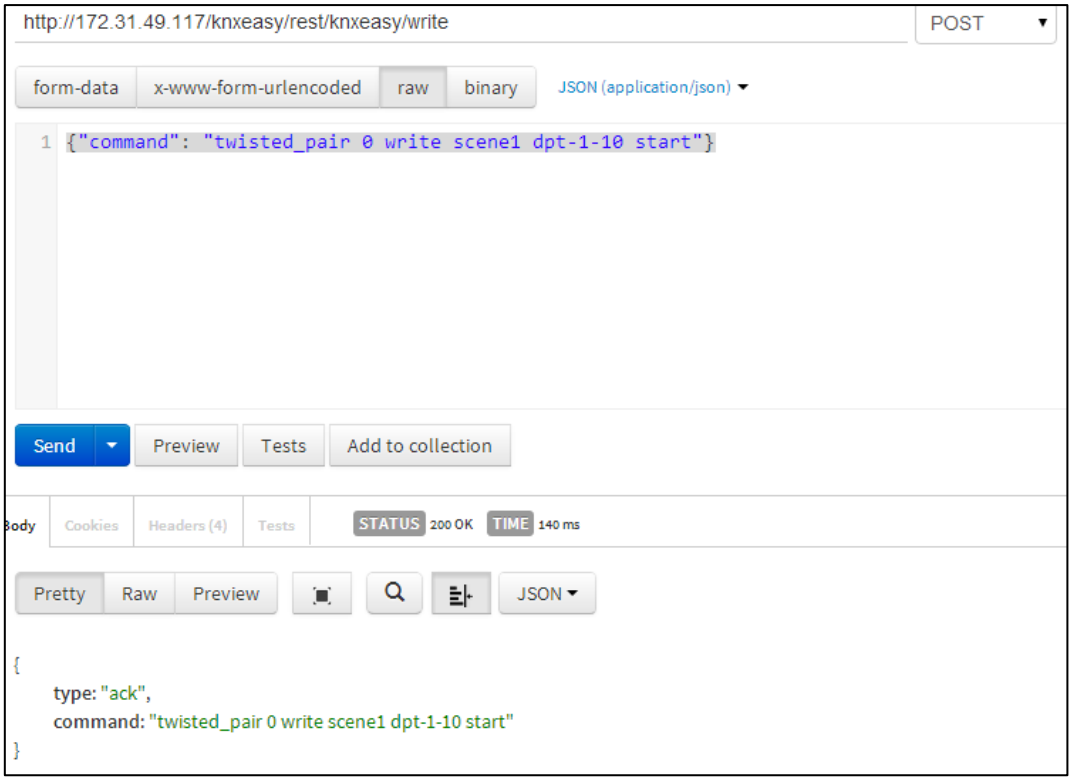
http://[IP address]/knxconverter/rest/knxconverter/write

The command is sent as request data in a JSON format:
{"command": "[command]"}

For example:
{"command": "twisted_pair 0 write scene1 dpt-1-10 start"}

The response of the command is sent in the reponse of the HTTP request:
{"type": "ack","command": "twisted_pair 0 write scene1 dpt-1-10 start"}

HINT: The browser application POSTMAN for Google Chrome or with the http-Request Job of the EIB**PORT** Logic Editor gives you the possibility to send HTTP requests:



You can also send requests directly from the Client simulation just like you do with the other protocols, with the send button.

GET

GET is used to send a “read” command to KNX**CONVERTER**. The address for this GET is:

http://[IP address]/knxconverter/rest/knxconverter/read

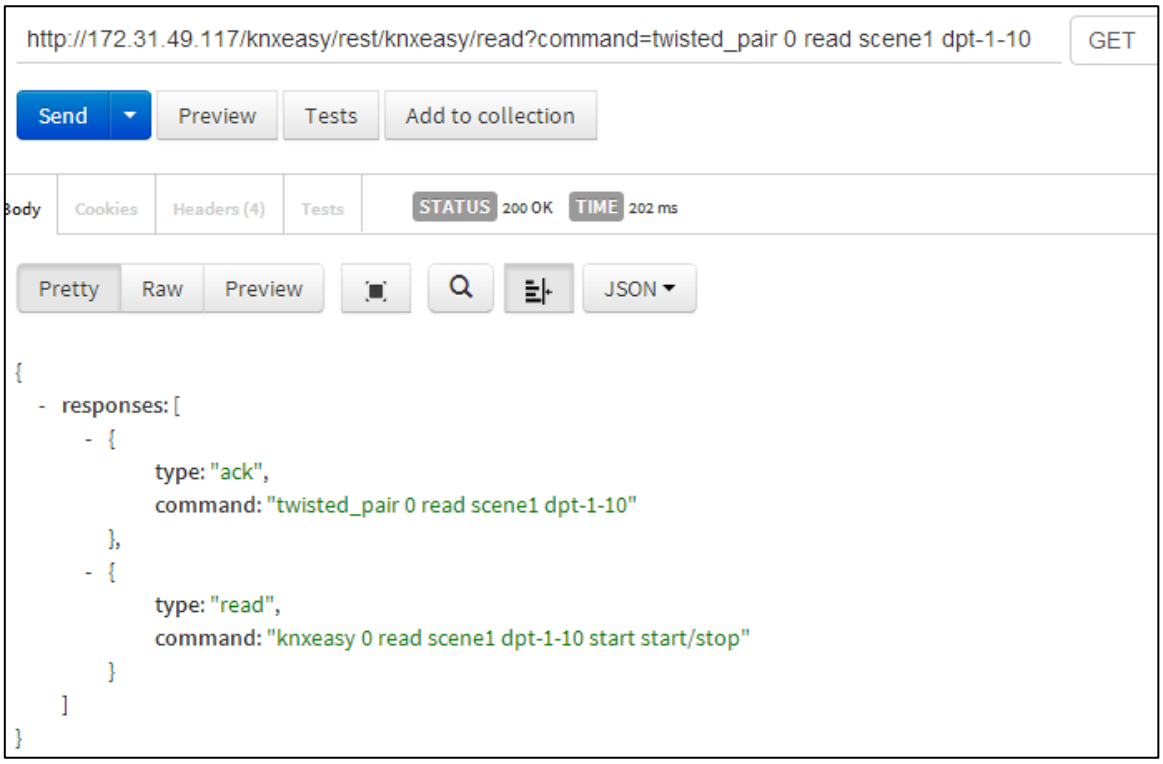
The command is sent as request parameter in text format:
?command=[command]

For example:
http://172.31.49.117/knxconverter/rest/knxconverter/read?command=twisted_pair 0 read scene1 dpt-1-10

The response of the command is sent in the reponse of the HTTP request. It might contain more than one response. For example one ack and the read response. Therefore responses are displayed as JSON “responses” array:

{"responses":[{"type": "ack","command": "twisted_pair 0 read scene1 dpt-1-10"},{"type": "read","command": " knxconverter 0 read scene1 dpt-1-10 start start/stop"}]}

HINT: The browser application POSTMAN from Google Chrome gives you the possibility to send HTTP requests:



You can also send requests directly from the Client simulation just like you do with the other protocols, with the send button.

3.1.1.12 READABLE INFORMATIONEN (HTTP VIA GET)

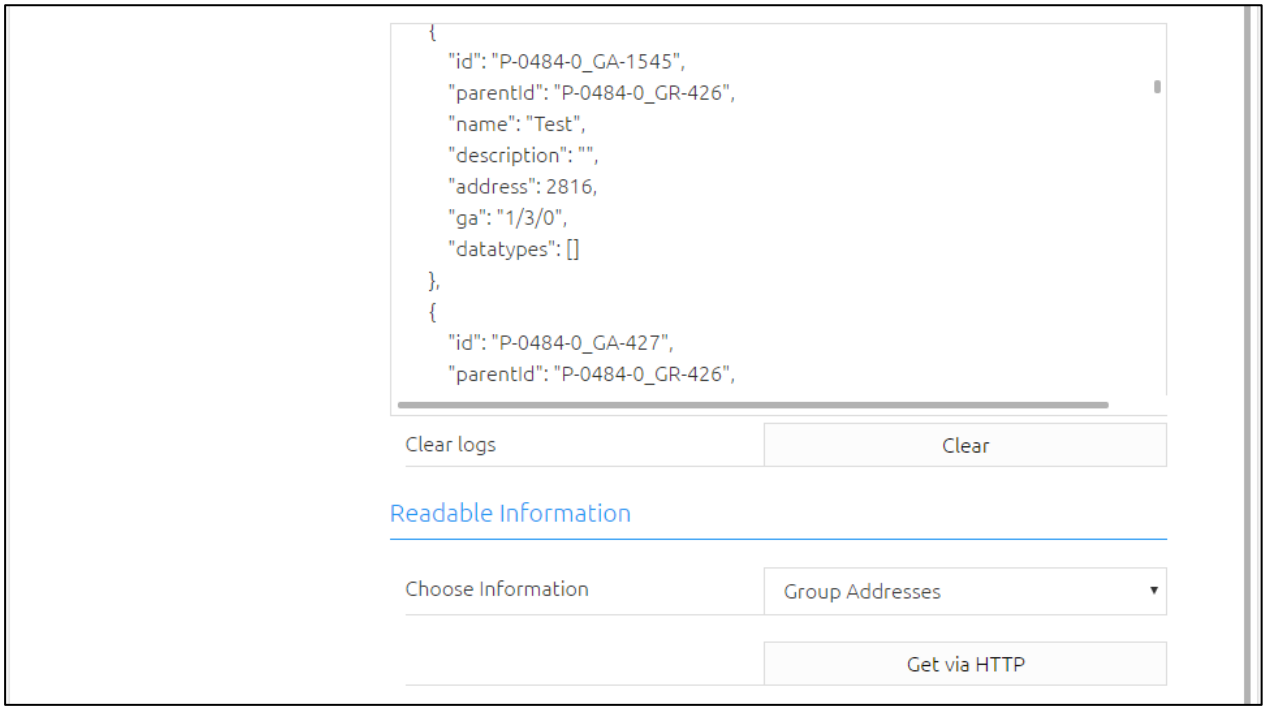
If you need it in your own application, you can get via a HTTP GET request different files containing many information in a JSON format, especially information from the ETS project. Addresses are:

http://[IP address]/knxconverter/rest/knxconverter/[path]

For [path] possible values:

- Group Addresses: path is "**groupaddresses**".
  Contains all the information about group addresses you configured in your ETS project.
- Topology: path is "**topology**".
  Contains all the information of your KNX topology configured in your ETS project.
- Datatypes: path is "**datatypes**".
  Contains the entire list of Data point types available in the KNX protocol, and many information about each of them.
- Saved command: path is "**commands**".
  Contains the list of every saved command (see next chapter: "Saved command").

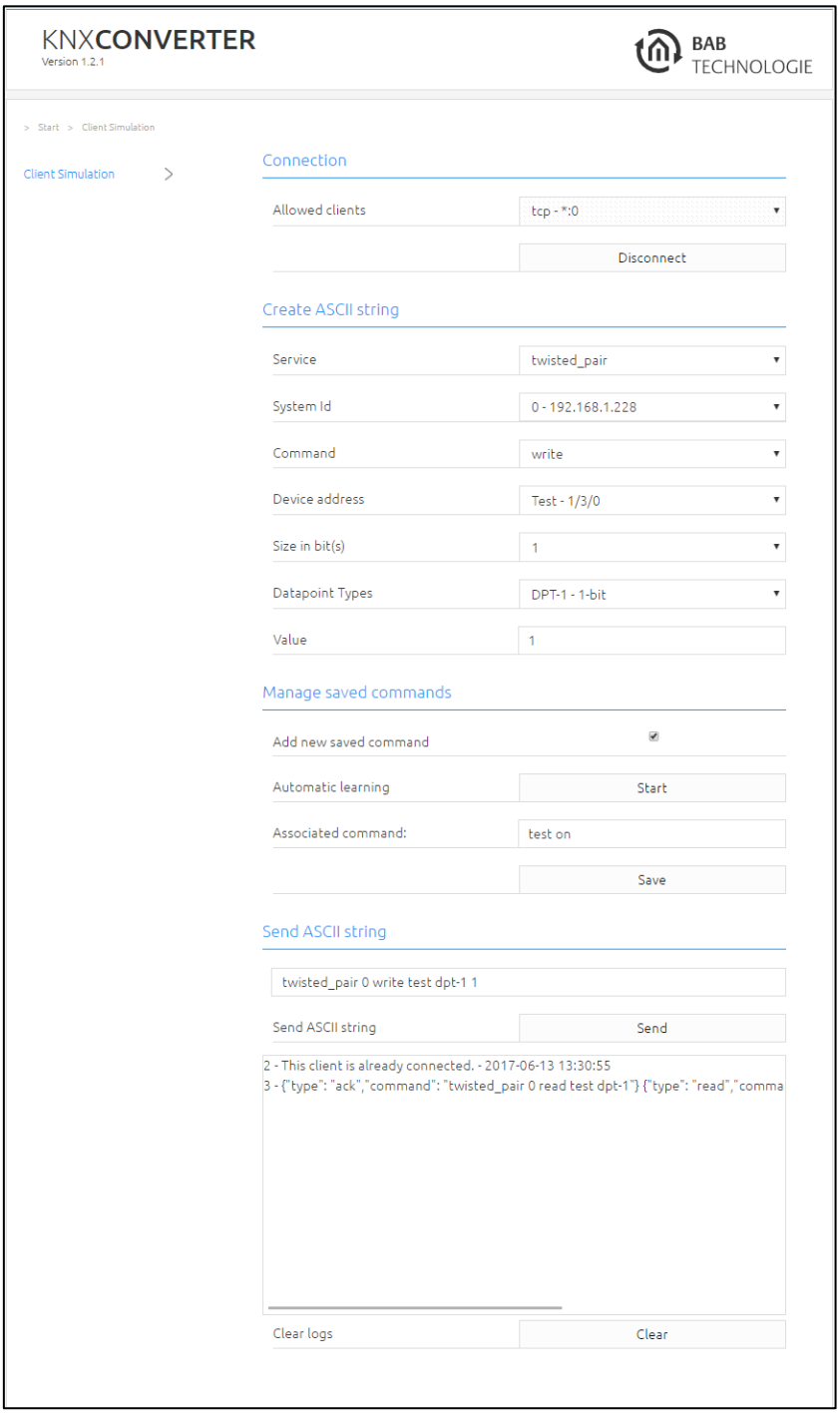
You can also send these HTTP GET requests from the Client simulation. As soon as you choose HTTP protocol, an extra menu appears. Choose the file you want to get from the GET select menu and press on the GET button. The file content appears in the log area.



SAVED COMMAND

In order to simplify even more the commands send to or receive from KNX**CONVERTER**, you are able to save string commands corresponding to a normal KNX**CONVERTER** ASCI command. For example for normal KNX**CONVERTER** ASCI command “twisted_pair 0 write shutter1 dpt-1-9 open” you can enter your own string for example “Test on”. From now KNX**CONVERTER** will interpret both strings as the same. Therefore to open your shutter, you can simply send the command “open shutter”.
HINT: New commands are created with the client simulation.

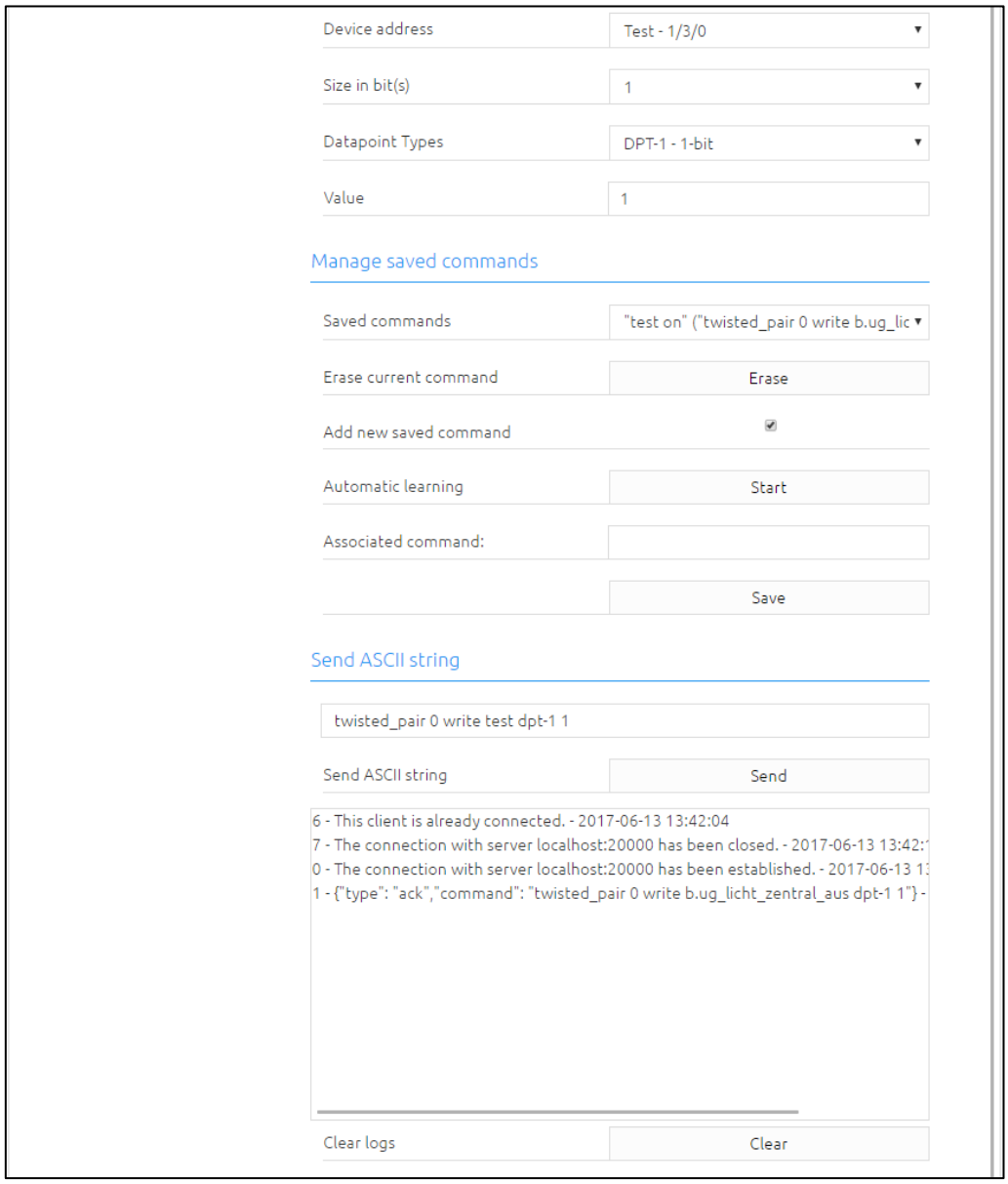
3.1.1.13 MANUAL COMMAND LEARNING



In the Client simulation, click on the checkbox “Add new saved command”. An “Associated command” text input and a “Save” button appears. Simply build a KNX**CONVERTER** ASCII string as you normally do.

When you finished to configure your string, write your own associated command in the “Associated command” text input and finally click on the save button.

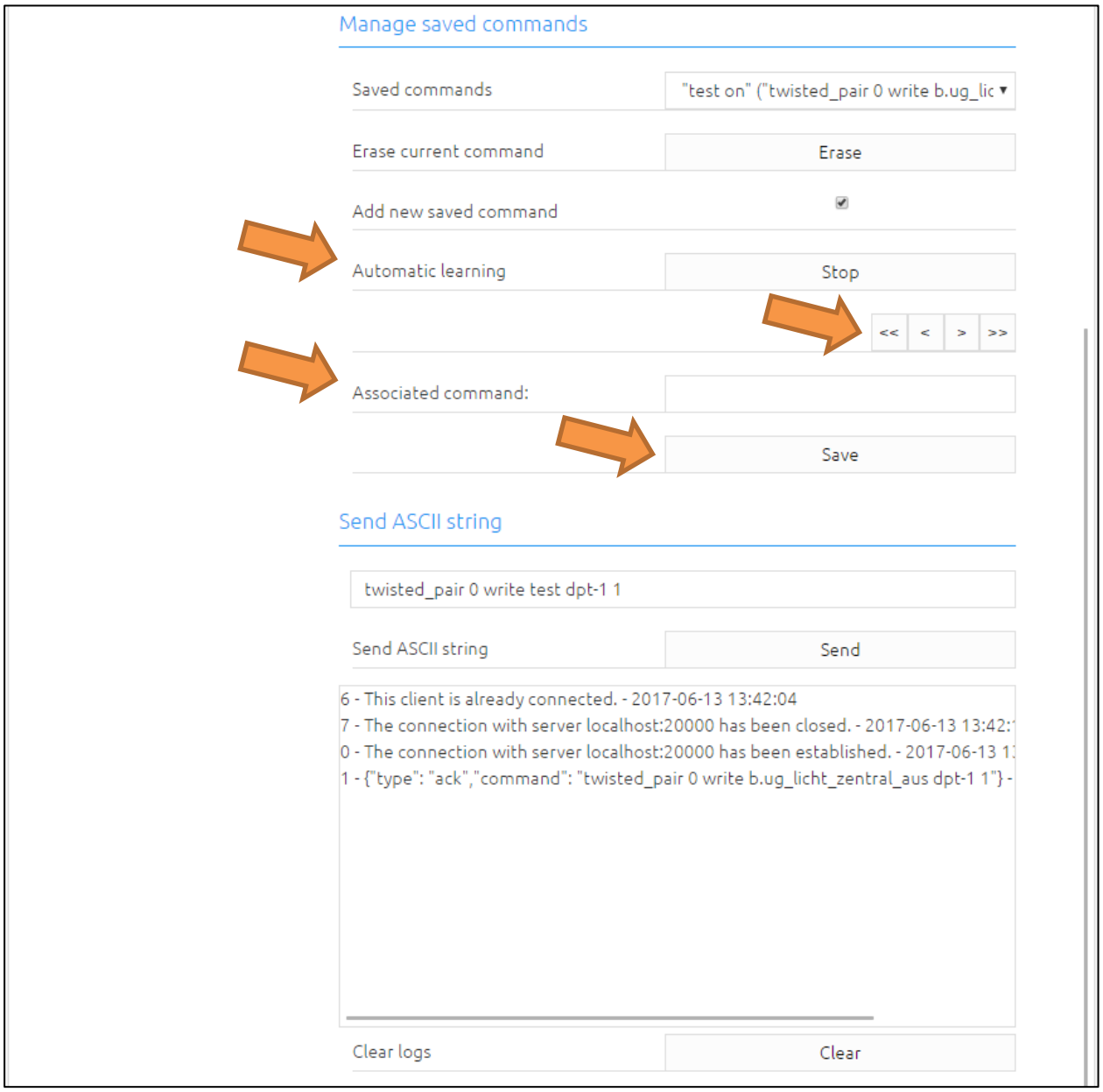
As soon as you save, saved commands are now available and the list of these saved commands appears.



You can now send this saved command via TCP for example. Note that an “Erase” button appears when you select a saved command in order to erase this command from the list of saved commands. Note also the ack contains always the normal KNX**CONVERTER** ASCII string.

3.1.1.14 AUTOMATIC COMMAND LEARNING

In the Client simulation, click on the checkbox “Add new saved command”. An “Automatic learning” button, an “Associated command” text input and a “Save” button appears. Connect via TCP for example, click “Start” on the “Automatic learning” button.

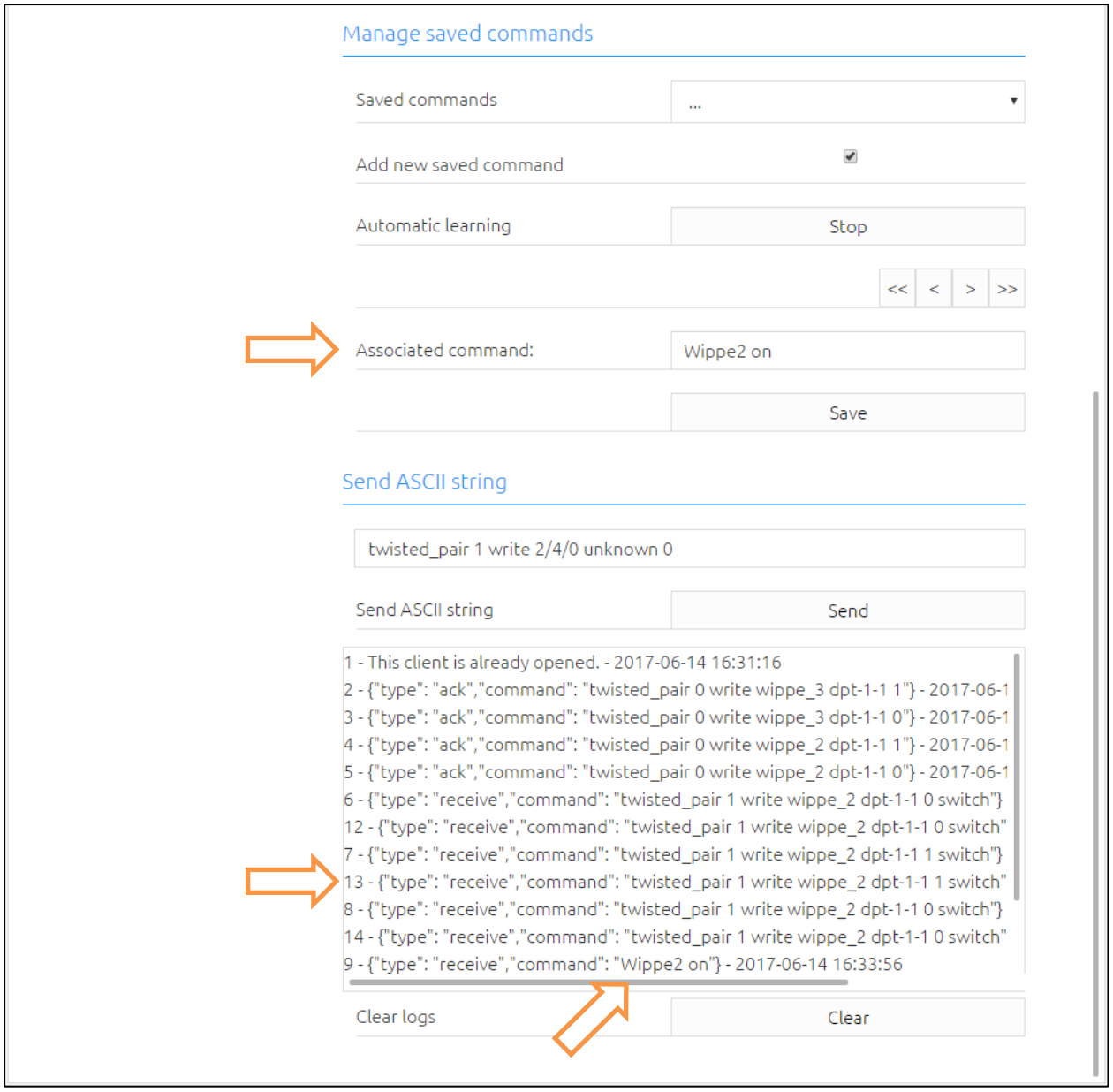


Every telegrams received will be saved in a list, you can then navigate in this list with these appeared buttons:

- “<<”: Display the first command in the list.
- “<”: Display the precedent command in the list.
- “>”: Display the next command in the list.
- “>>”: Display the last command in the list.

When you have chosen the received command in the list, enter your associated command in the “Associated command” text input and click on the save button. A new saved command is added.

See in the LOG dialog box, all received telegrams, are listed as ASCII character strings including time stamps (see next figure). Saved commands will not show as ASCII character strings.

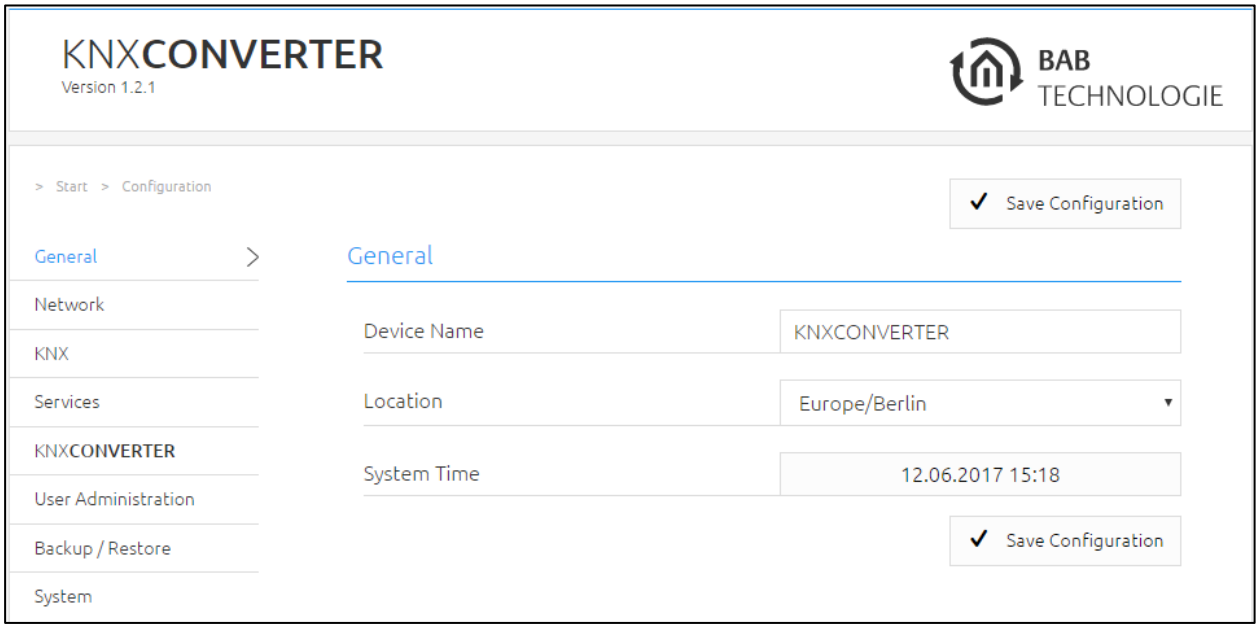


3.2 “CONFIGURATION” ITEM

The following configuration areas are provided in this item:

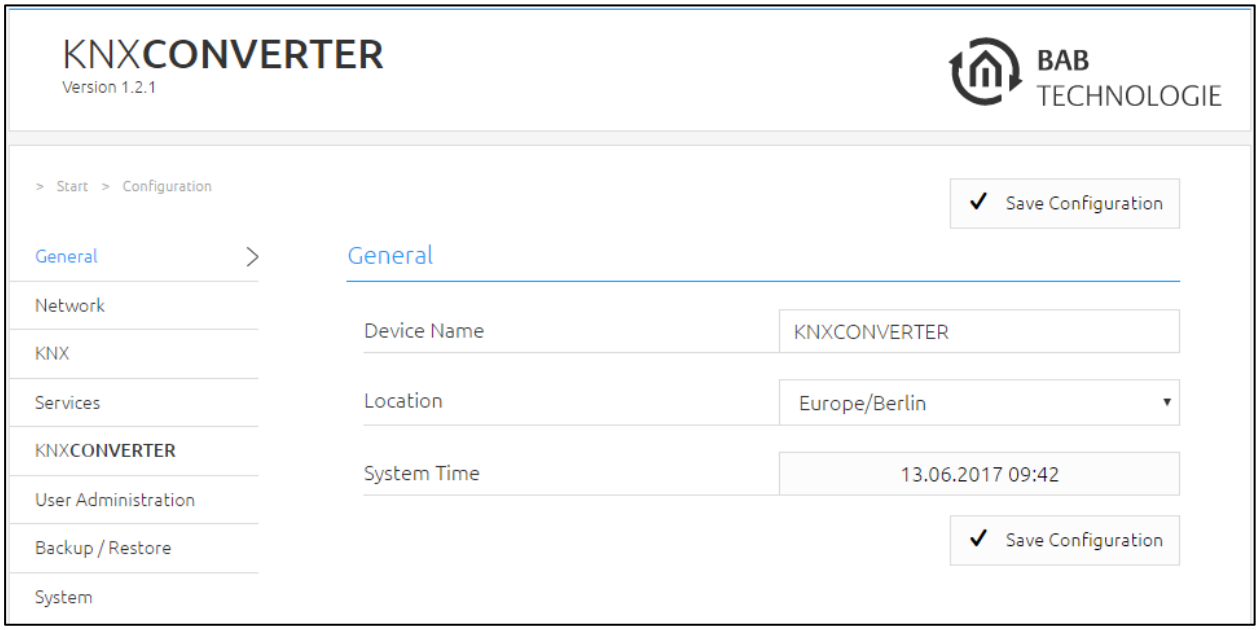
- General
- Network
- KNX
- Services
- KNX CONVERTER
- User administration
- Save settings
- System

Changed settings are not saved until you press the “Save configuration” button in the KNX CONVERTER



GENERAL

General settings are configured under “Configuration” and “General”.



Device name

Specify a unique device name so that you can distinguish the KNX**CONVERTER** from other BAB TECHNOLOGIE devices, if any. The device name is shown in the DiscoveryTool and in the BAB STARTER.

Installation location

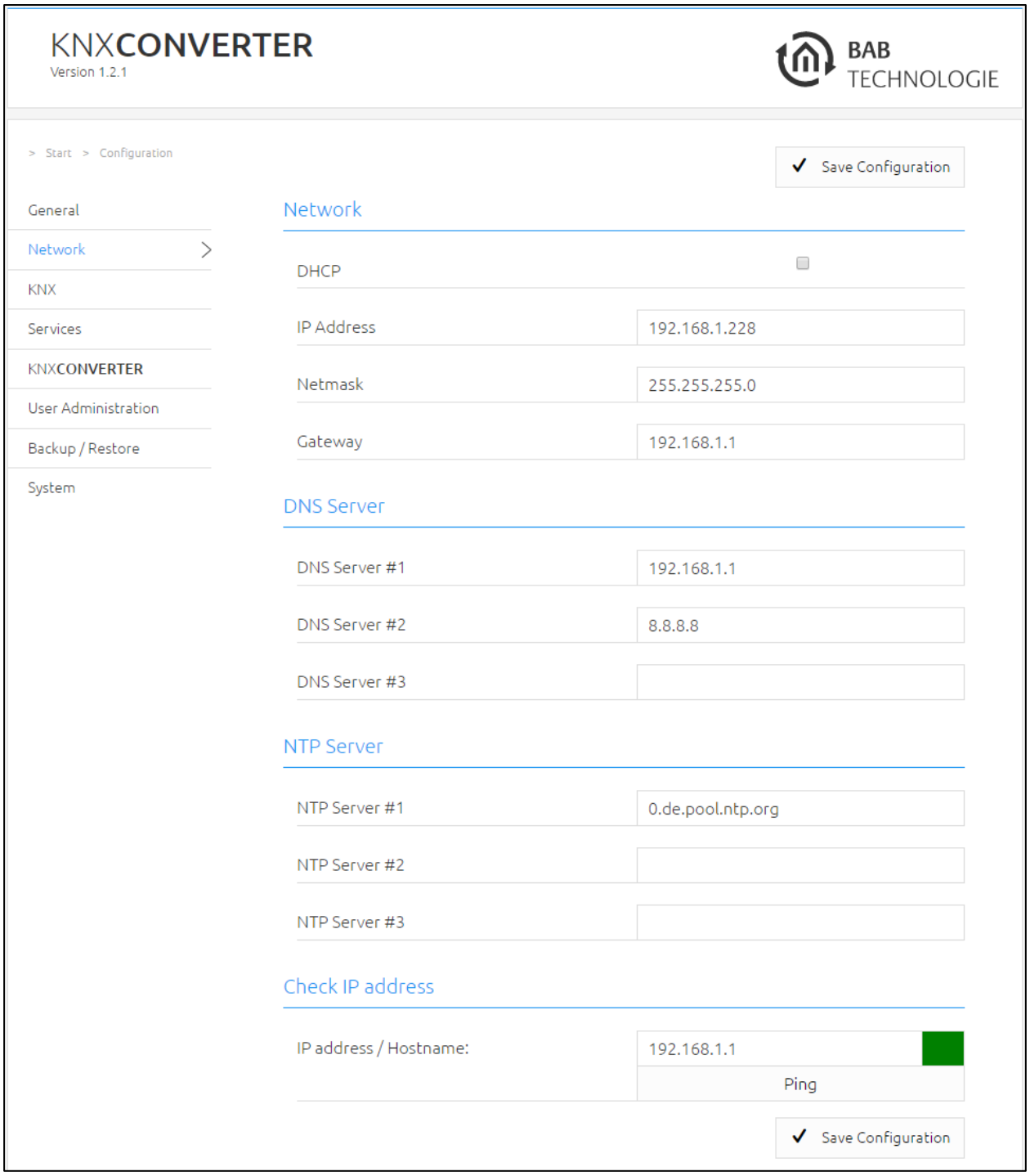
The installation location primarily determines the local system time of the device. Adjust it to the correct time zone.

System time

The current system time of the device is shown. By clicking the button, the system time of the device is synchronised with that of the PC. For automatic time synchronisation, up to three NTP time servers can be entered at the “Network” configuration section.

NETWORK

In the "Network" menu item, several changes can be made, for example changes to the IP address, DNS server or the NTP server. In addition, the DHCP function can be switched on / off.



DHCP

If the DHCP function is active, the KNX**CONVERTER** automatically obtains the network settings. A DHCP server must be available in the local network.

IP address / network mask / gateway

If DHCP is not active, the network settings must be carried out statically. In case of doubt, contact your network administrator as to which settings are to be carried out. Please note that an IP address may never be assigned twice in a local network.

DNS server 1-3

DNS is the abbreviation for Domain Name System. The DNS server converts Internet addresses (e.g. www.bab-tec.de) into the IP address (e.g. 99.199.99.199) and vice versa. Neither NTP service nor mail traffic can be carried out without a valid DNS entry.

NTP server 1-3

NTP is a free service for synchronising the system time of Internet-compatible devices. If time synchronisation is not possible, please check the system time of the KNX**CONVERTER** on a regular basis. See chapter "General"!

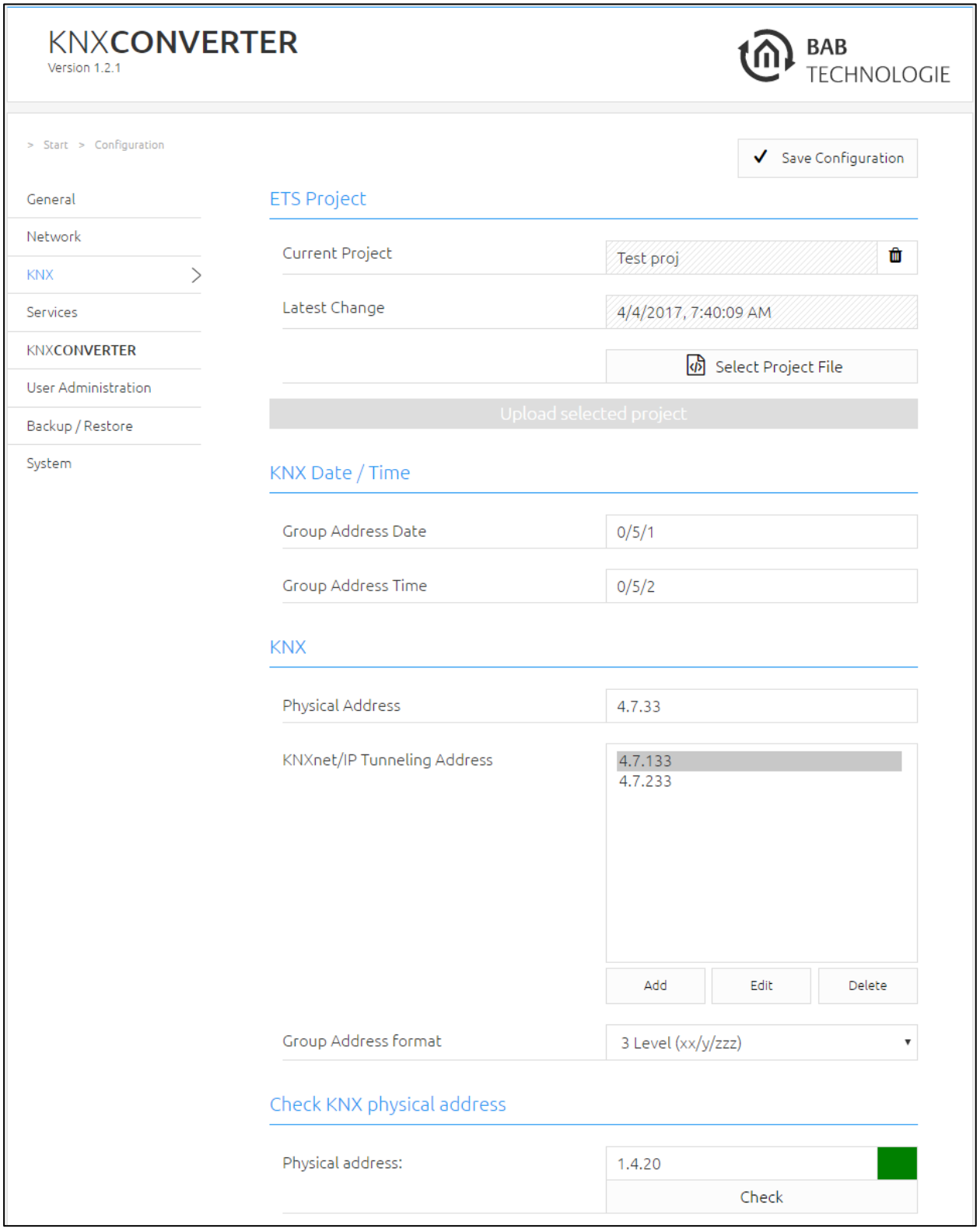
NTP server list: e.g. http://www.pool.ntp.org/zone/europe

CHECKING THE IP ADDRESS

The KNX**CONVERTER** is in the position to check whether IP addresses and host names can be accessed in the network and in the Internet or not. Enter the IP addresses or host names to be checked in the “IP address / host name” text field. Press the “Ping” button to start the check. Any entered address which is available is indicated by a green rectangle with the message “Found”. Any address which cannot be accessed is indicated by a red rectangle with the message “Not found”.

KNX

The KNX-specific settings of the KNX**CONVERTER** are made in the "KNX" menu.



KNX DATE / TIME

The KNX**CONVERTER** can also synchronise its time settings via the KNX bus. The group addresses for the date and time of a KNX time transmitter are entered here.

Physical address

Enter the physical address which is to be used by the KNX**CONVERTER** in KNX. Please make sure that the physical address corresponds to the line and does not occur twice.

KNXnet/IP tunnelling address

This address is used by the internal KNXnet/IP server for a KNXnet/IP tunnelling connection established to the device (e.g. for using the KNX**CONVERTER** as a programming interface). Please note that this address must not be the same as the physical address (see above) and that it must not be used by any other participant in the line either.

Uploading the ETS project

ETS4 and ETS5 can export files with the ending ".knxproj". These files include information on the KNX project. In ETS, you have the option to precisely define the data type.

NOTE: For switch actuators, you can thus enter e.g. "on"/"off" instead of the values "0"/"1". The function for exporting these data is in the ETS menu under "Projects" > "Export".

Via the web interface, the project file is directly imported to the database of the KNX**CONVERTER** so that any information is directly available.
By clicking on "Select project file", a file dialogue opens up where the path to the .knxproj file is indicated. Complete the upload by clicking on "Upload selected project".

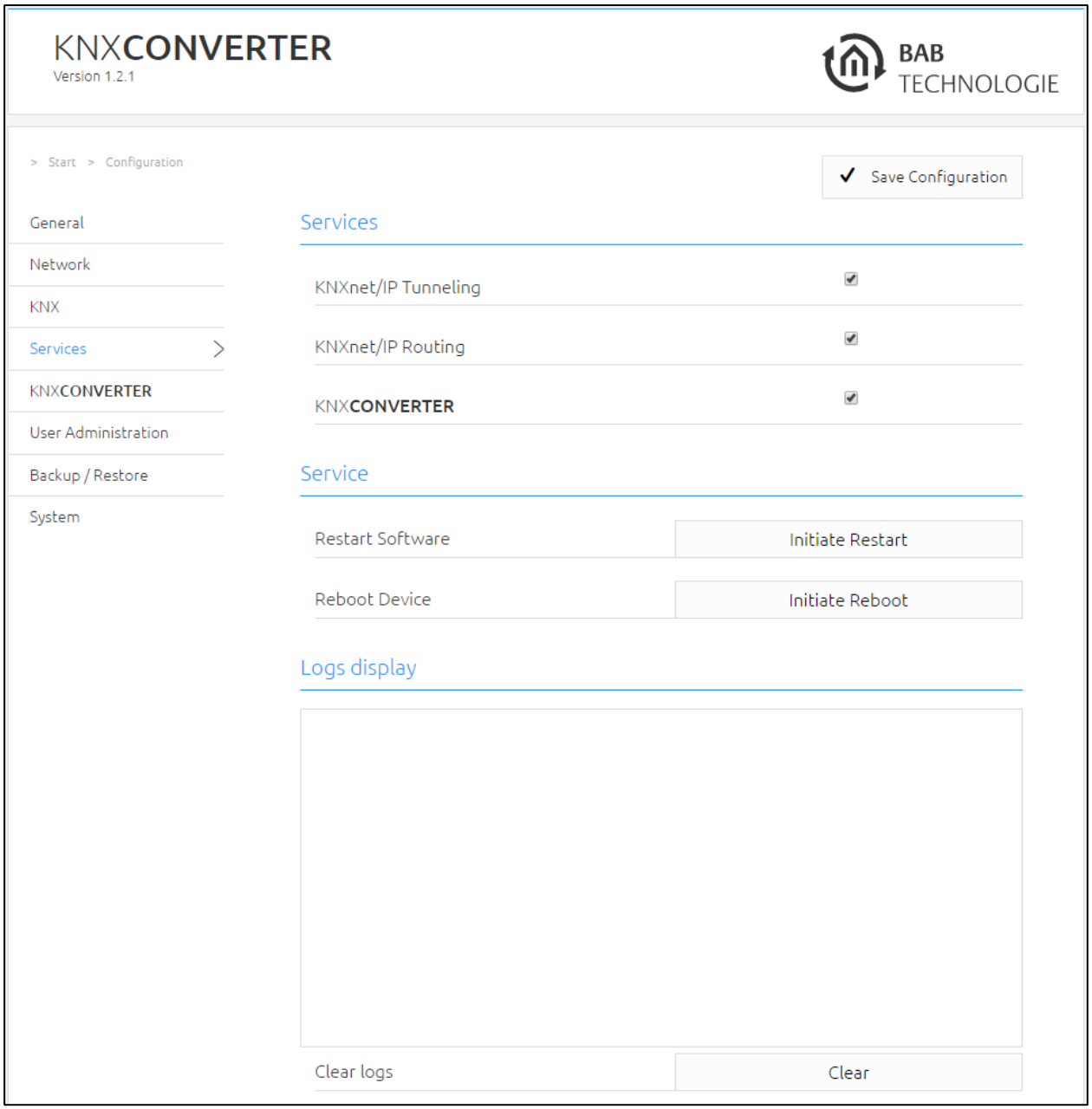
By uploading the .knxproj file, you also import the KNX topology to the database. This includes the data point types of the group addresses.

CHECKING THE PHYSICAL ADDRESS

The KNX**CONVERTER** is in the position to check whether physical addresses are available in the KNX bus or not (according to the same principle as ETS). Enter the physical address to be checked in the text field. Press the "Check" button to start the function. Any entered KNX participant which is available is indicated by a green rectangle with the message "Found". Otherwise, a red rectangle with the message "Not found" appears.

SERVICES

The KNXnet/IP routing and tunnelling logs can be activated/deactivated in the web interface under “Configuration” > “Services”



KNXnet/IP Routing
Activates KNXnet/IP routing for coupling lines and areas via IP. Can only be activated if the physical address corresponds to that of a line or area coupler. KNXnet/IP routing is based on multicast, and all participants send to a multicast group 224.0.23.12. Since multicast packages are usually not transferred by routers, "routing" only works within a subnet.

KNXnet/IP tunnelling
Activates the KNXnet/IP tunnelling access to the device. This connection can be used to program KNX devices or to exchange data. In this context, the KNX**CONVERTER** is the server. The above-mentioned address is used as the physical address for the connection. For each address, only one connection can be established at any one time. On the TCP/IP layer, the connection is made by means of unicast to UDP port 3671.

KNX CONVERTER

Under this section, the KNXCONVERTER Service can be activated and deactivated.

Service

Under this section, the KNXCONVERTER can be rebooted (“Reboot device”) and shut down (“Shut down device”).

Important notice: Please shut down the KNX CONVERTER via the web interface (under configuration / services) before disconnecting it from the power supply.

Logs

The log messages are issued at the bottom section of this view. The messages include errors, warnings or information text. A maximum of hundred entries are logged with a time stamp. These entries are removed with the “Delete” button.

KNX CONVERTER

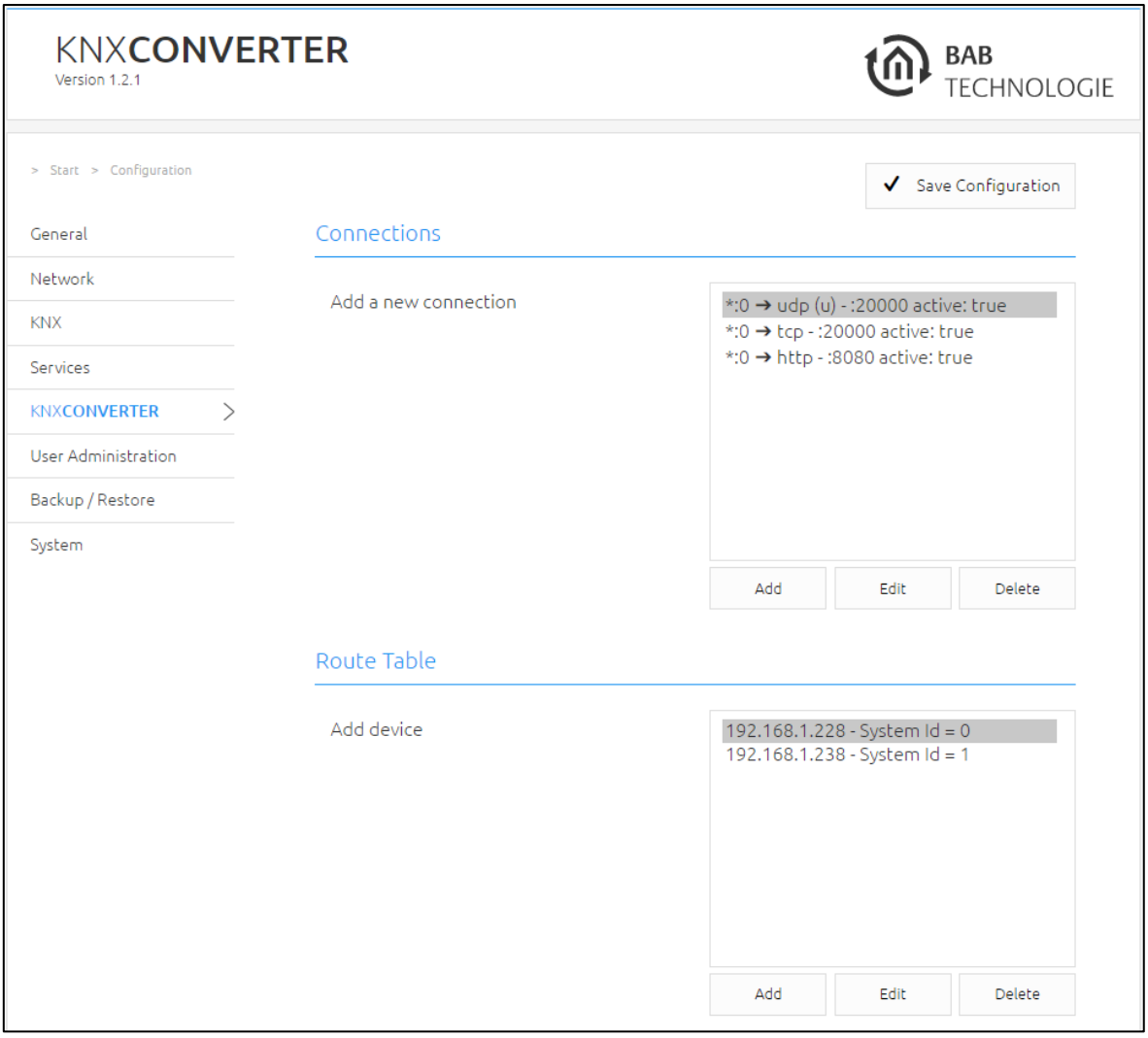
KNX**CONVERTER** behaves as a gateway between an easy ASCII protocol and KNX protocols (KNX Twisted Pair and KNXnet/IP). KNX**CONVERTER** works in both ways, it turns received ASCII strings into KNX telegrams and received KNX telegrams into ASCII strings. KNX**CONVERTER** uses Client/Server communications in order to send and receive ASCII strings.

Available protocols:

- TCP
- UDP (Unicast, Multicast, Broadcast)
- HTTP

KNX**CONVERTER** contains the server side. Servers are dynamically created according to clients configured by the user. A communication between an internal server and a client defined by the user is called "connection".

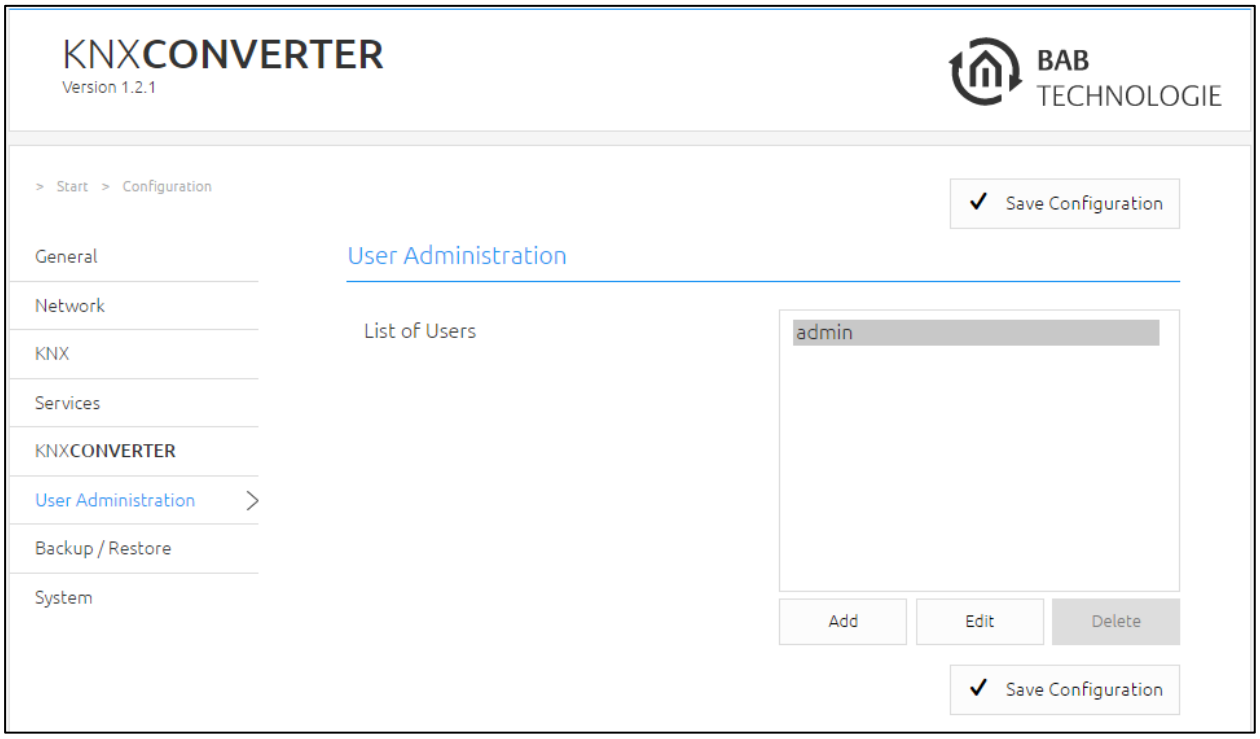
NOTE: You can configure up to 50 connections.



FIND FURTHER INFORMATION IN APPENDIX CHAPTER "KNX CONVERTER".

USER ADMINISTRATION

Under “Configuration" > "User administration", new users are created and existing users are edited.

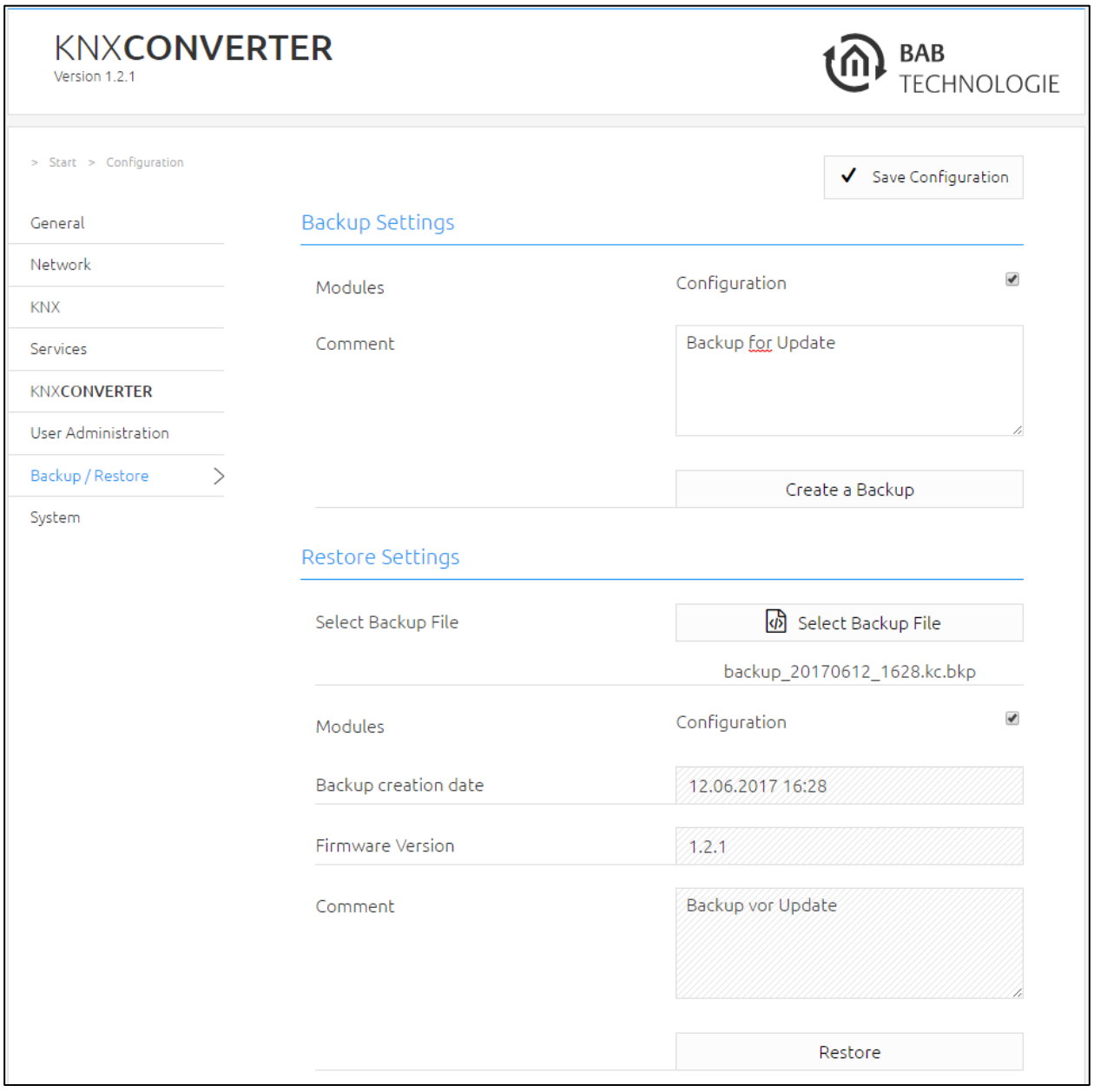


Press the “Add” button to open up a new window where new users can be created. Enter the user name and the password (twice, for confirmation).

To change the name or the password of a user, you must select this user in the list and press the “Edit” button. A new window opens up where the name or the password can be changed.

SAVING THE SETTINGS

For safety reasons, the configuration data of the KNX**CONVERTER** should be backed up at regular intervals in order to ensure that the current configuration status can be restored at any time. A current backup is also required for firmware updates in order to restore the condition before the update.



3.2.1.1 CREATING A BACKUP

Select the checkboxes under “Modules” to set which configuration data is to be backed up.

- *Configuration:* All configuration data.

Note: The network settings are not backed up; these are separate from the backup data.

Comments regarding the backup can be added in the “Comments” field.

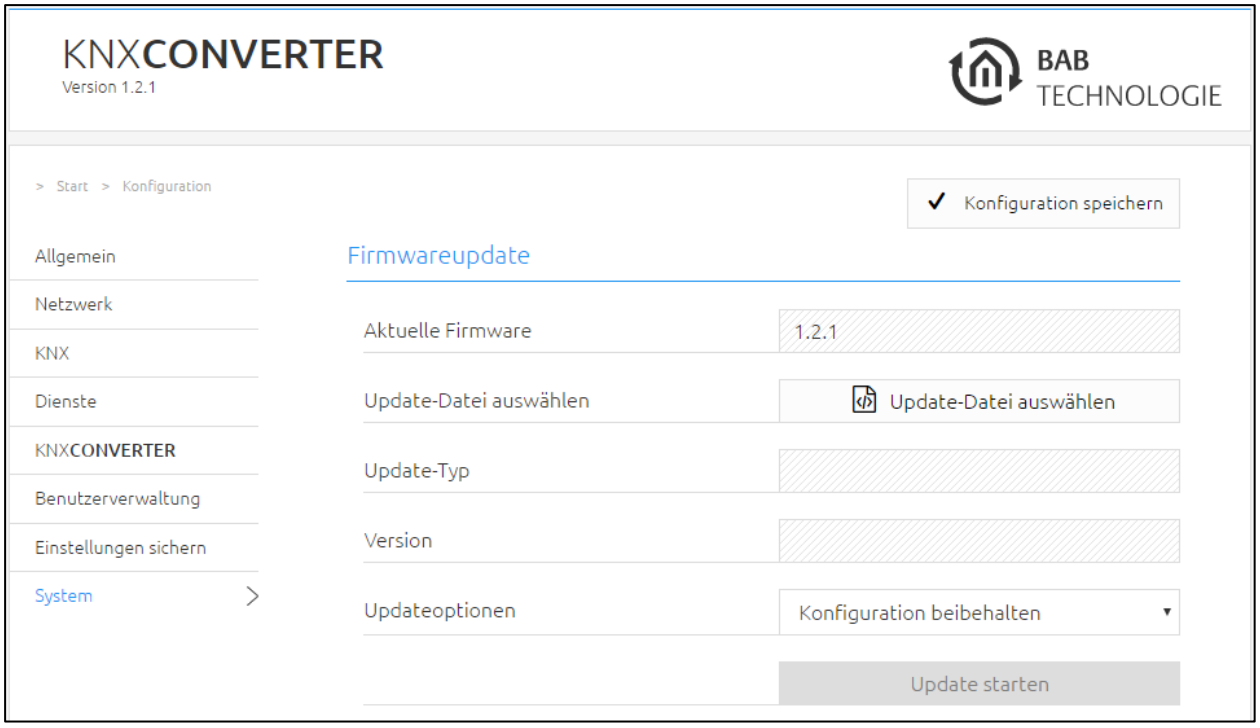
- Click on “Create backup” to launch the backup process.
- The backup file is generated by the system and provided automatically for download using the browser download dialogue.

3.2.1.2 RESTORING A BACKUP

- Choose a KNX**CONVERTER** backup file via the "Select Backup File" button. The files have the ending "backup_*****.kc.bkp" (***** is replacement character fot the timestamp)
- In the "Backup creation date", "*Firmware* Version" and "Comment" sections, information about the currently chosen file is shown.
- In the "Modules" section, it is shown which modules are available in the chosen backup file. Using the check boxes, it is also possible to determine which modules are to be restored.
- Configuration: All configuration data except for the KNX**CONVERTER** configuration data.

Note: The network settings are not part of the backup file.

SYSTEM



Important notice: Please shut down the KNX CONVERTER via the web interface (under configuration / system) before disconnecting it from the power supply.

3.2.1.3 FIRMWARE UPDATE

Each KNX**CONVERTER** can be updated. The firmware update is free of charge. The current firmware files can be found on the BAB TECHNOLOGIE homepage. Proceed as follows to update the KNX**CONVERTER**:

- Download the current firmware image from the download area www.bab-tec.de.
- Unpack the file to any folder.

Note: Generate a new backup before you launch the update (see "CREATING A BACKUP"). The update process restores the factory settings.

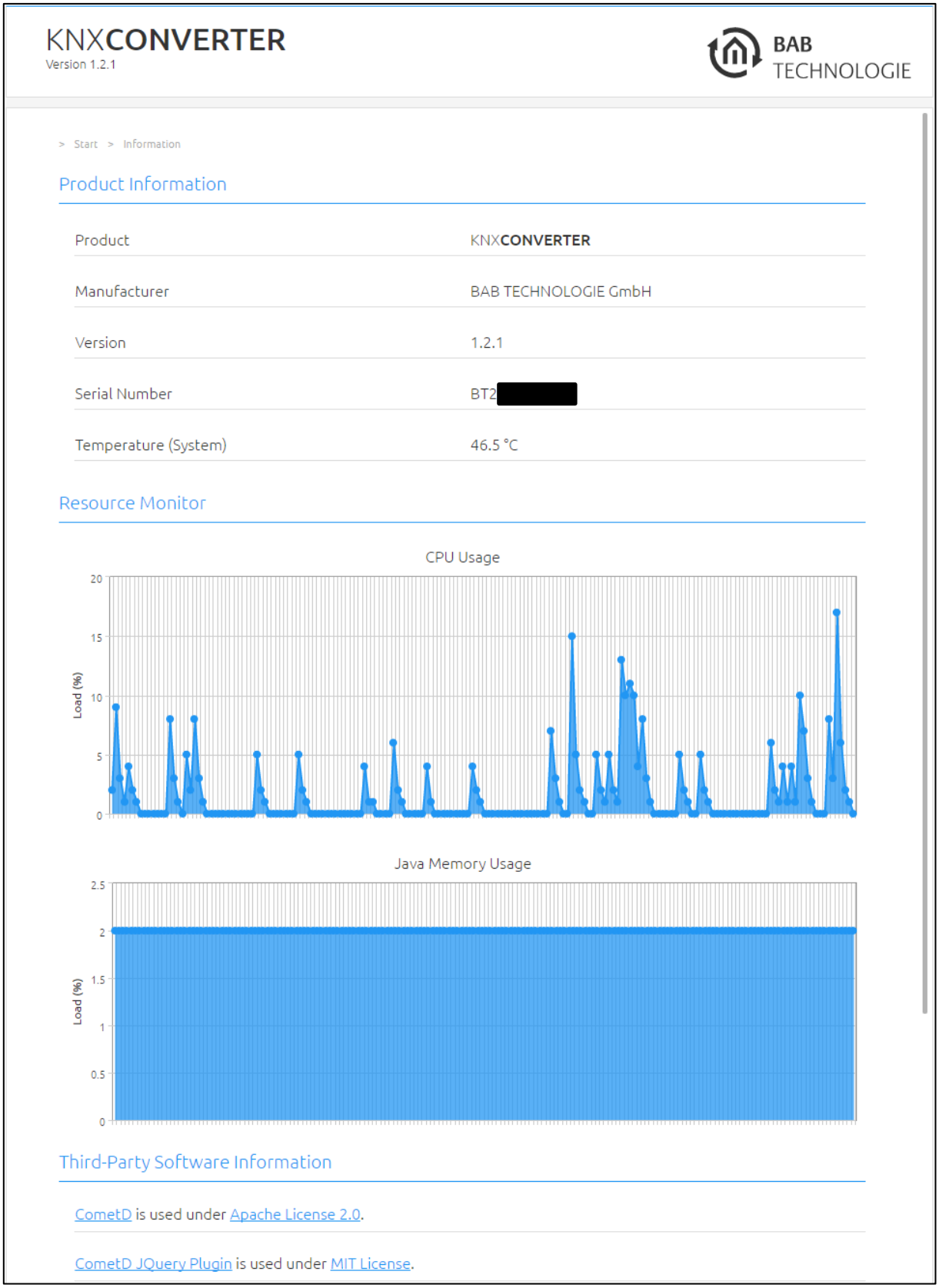
- Open "Configuration" – "System".
- Select the firmware image file (*.bin extension) using the "Select update file" dialogue. Update type and version are displayed.
- Decide how to perform the update. The following option can be selected:
  - "Keep Configuration" restores the configuration after the update. PLEASE CREATE FOR SECURE ALWAYS A BACKUP.
  - "Keep Network Settings" keep your current network settings after the update.
  - "Reset Configuration" set the KNX**CONVERTER** after the update to the factory settings.

Note: If the "Keep network settings" checkbox is not selected, the KNX CONVERTER can be accessed at the default IP address after the update (For factory settings, see "2.4 INITIAL OPERATION").

- Launch the update by clicking on "Perform Update".
- Wait until the update is complete. The Web interface is updated automatically once the process has been successfully completed.
- The update restores the device factory settings. Individual settings are only loaded again when you restore a backup (see "3.2.1.2 RESTORING A BACKUP"). Except the option "Keep Network Settings" or "Keep Configuration" has been enabled.

3.3 “INFORMATION” ITEM

The last menu item (in the main menu) designated “Information” is on the web interface. It includes data such as the KNX**CONVERTER** name, firmware version, serial number, JAVA memory/processor utilisation and temperature. This item is accessible even without registration.



4 APPENDIX

4.1 UPDATE

The software updates for the KNX**CONVERTER** are free, but they are defined for the hardware versions.
If the software update is intended for a different hardware version, the hardware can be updated by an upgrade. Upgrades are not free; they are carried out at BAB TECHNOLOGIE GmbH.

Before carrying out an update on the KNX**CONVERTER**, a backup should be saved. Thus it is possible to restore the previous condition on the new firmware after the update (see chapter "Saving the settings").

New firmware versions are published on our homepage.

CARRYING OUT AN UPDATE

The "Firmware update" function is to be found under "Configuration" > "System".

The "Current firmware" field shows the currently installed firmware version.

Press "Select update file" to select the firmware file. The version number to which the KNX**CONVERTER** is to be updated must be at least the same or higher than the installed version.

The option
- "Keep configuration" prompts the configuration of the KNX**CONVERTER** to be restored after the update.
- "Keep network settings" prompts the network configuration to be kept after the configuration.
- "Reset configuration" resets the KNX**CONVERTER** to the factory default settings after the update.

"Start update" starts the update process.

4.2 KNX CONVERTER IN DETAIL

INTRODUCTION

KNX**CONVERTER** behaves as a gateway between an easy ASCII protocol and KNX protocols (KNX Twisted Pair and KNXnet/IP). KNX**CONVERTER** works in both ways, it turns received ASCII strings into KNX telegrams and received KNX telegrams into ASCII strings. KNX**CONVERTER** uses Client/Server communications in order to send and receive ASCII strings.

Available protocols:

- TCP
- UDP (unicast, multicast, broadcast)
- HTTP

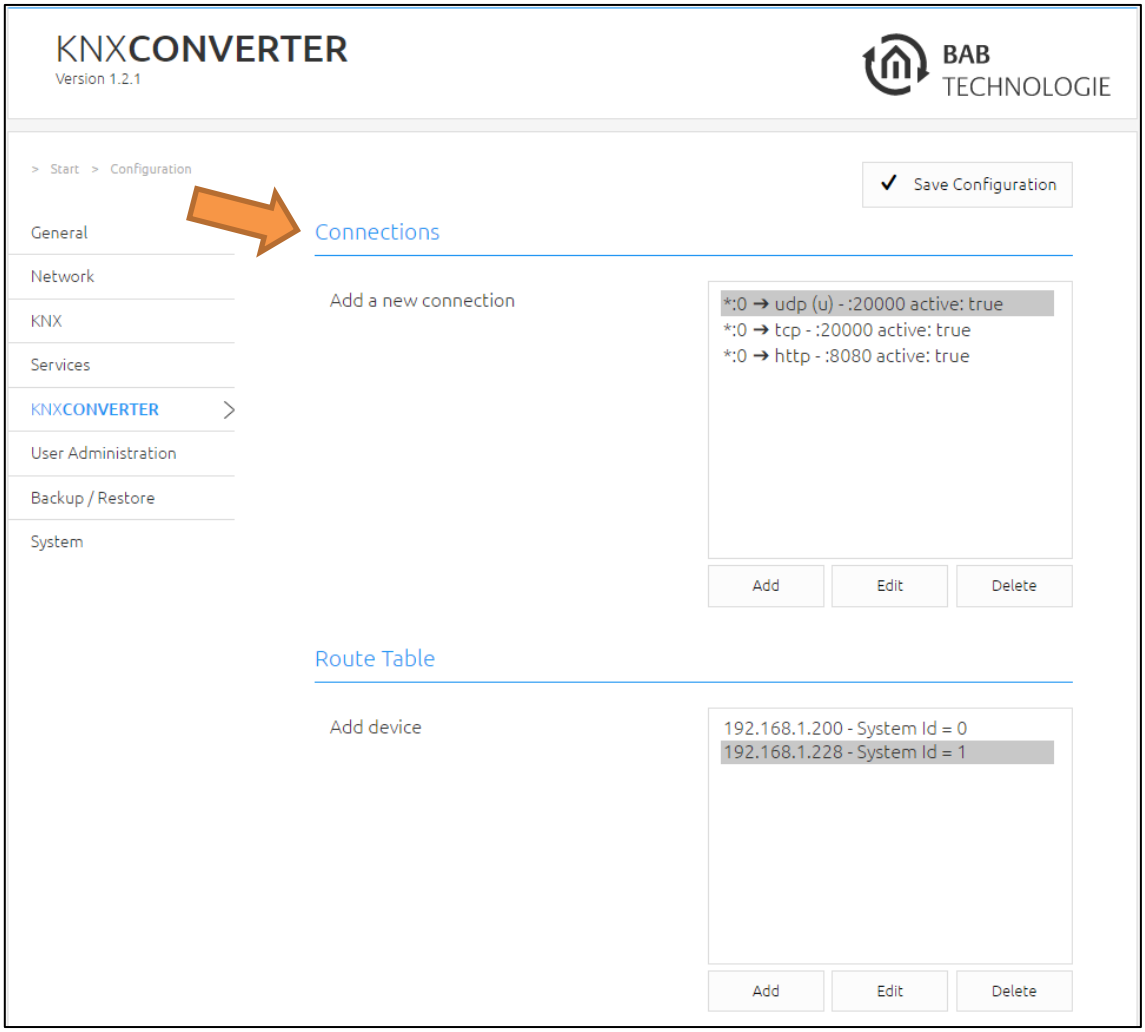
CONNECTION

KNX**CONVERTER** contains the server side. Servers are dynamically created according to clients configured by the user. A communication between an internal server and a client defined by the user is called "connection".

Note: You can configure until 50 connections.

4.2.1.1 DEFAULT CONNECTIONS

In the first place, a UDP and a TCP default connections are pre-configured. Connections are configured in the web interface; go to "Configuration" -> "KNX**CONVERTER**". There stands the "Connections" field.



A connection is displayed that way:
[client's IP address/hostname]:[client's port] -> [protocol] ([cast]) - :[server's port] active = [true/false]

Character "*" (star) means "every IP addresses/hostname" and port "0" (zero) means "every ports". "cast" is only available for UDP:

- "u" for unicast
- "m" for multicast
- "b" for broadcast

Therefore:

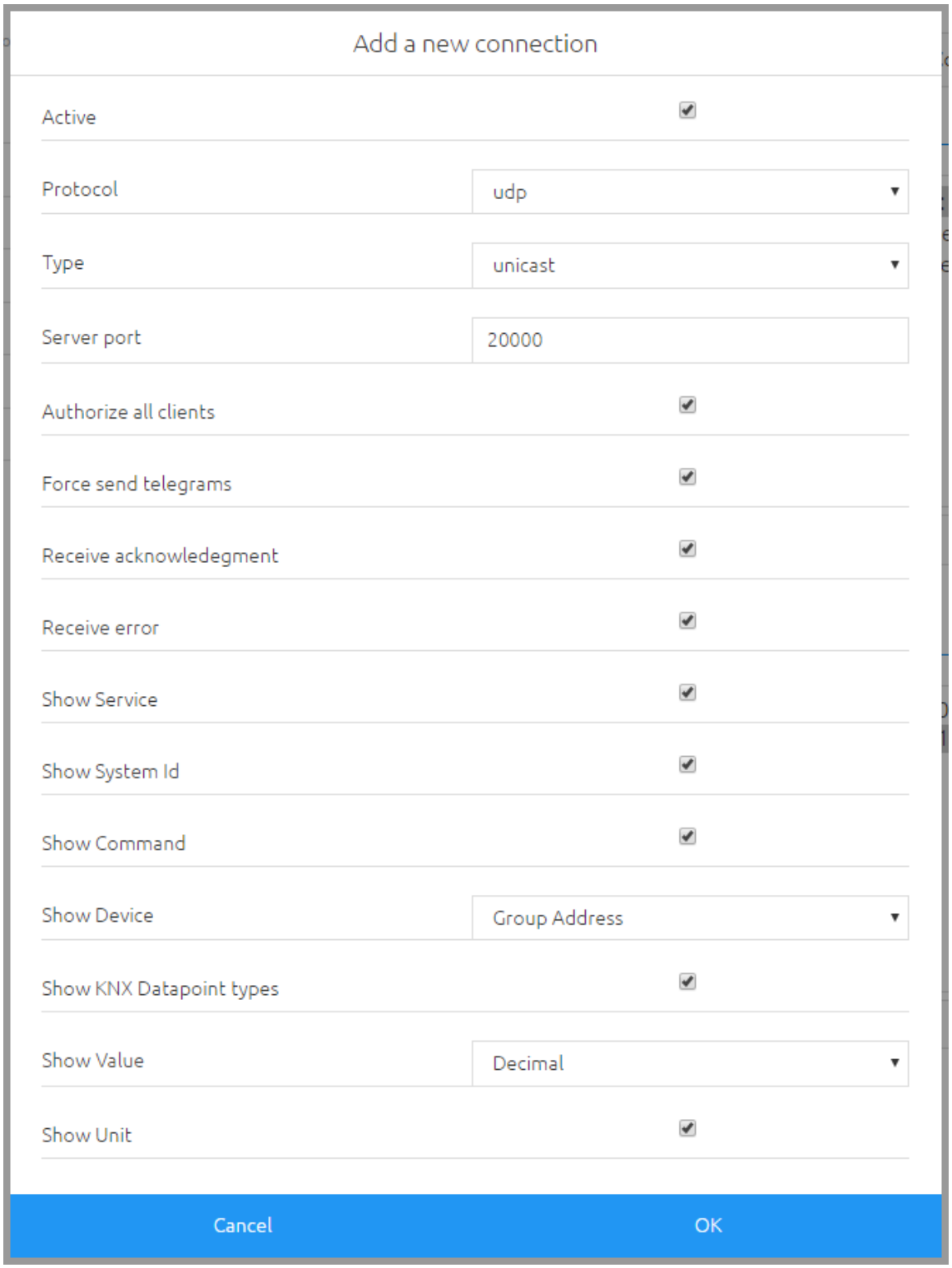
- “*:0 -> udp (u) – 20000”
  means that every clients can send messages to the UDP unicast server on port 20000.
- “*:0 -> tcp – 20000”
  means that every client can connect to the TCP server on port 20000.

Thus, thanks to these pre-configured connections, extra configuration might be not necessary. Any clients is able to communicate with KNX**CONVERTER** via TCP and/or UDP on port 20000.

Attention!
It also means that anybody having access to your network is easily able to control your KNX installation (door opening, alarms ...). Ensure your network is secured and/or configure KNX CONVERTER connections for more security.

4.2.1.2 CONFIGURE CONNECTIONS

Under the menu entry “KNX**CONVERTER**” in the “Connections” field it is possible to add, edit or delete connections. According to this configuration, internal TCP, UDP and HTTP servers will be dynamically added, edited or deleted.
To add a new connection, click on “Add” (This window contains other fields, they will be explained later, see: "Connection configuration"):



ACTIVE

It allows you to enable or disable the connection. If the connection is disabled the client linked to that connection will not be able to connect and send/receive messages from the server.

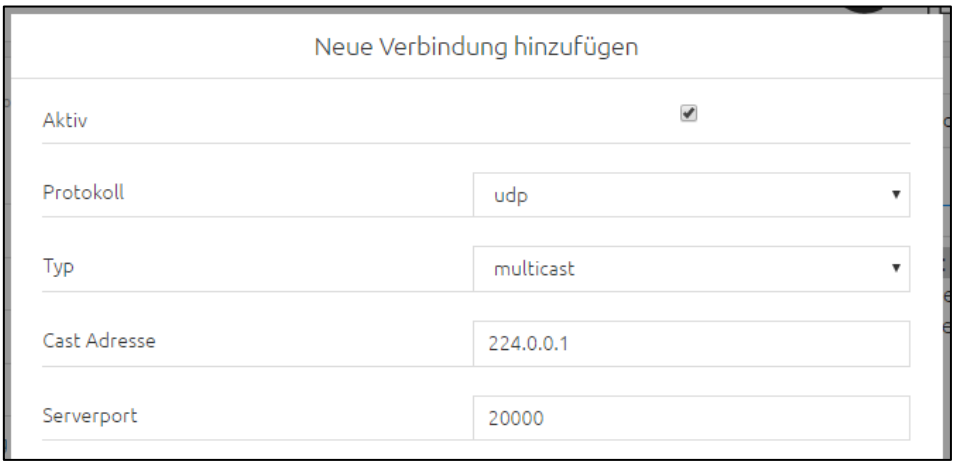
PROTOCOL

It allows you to choose the protocol for the client-server connection. UDP, TCP and HTTP are available so far.

TYPE

Type is the type of UDP connection: unicast, multicast and broadcast. Therefore this menu only appears when protocol UDP is selected.

If multicast or broadcast is selected, an additional menu called “Cast address” appears. You enter there the multicast or broadcast address. The default is 224.0.0.1 for multicast and 255.255.255.255 for broadcast.



SERVER PORT

It allows you to choose on which port the server will open a socket. The default port is 20000 for UDP and TCP. For HTTP the port is 8080, but it cannot be changed. The default port might be kept so that the new connection will be interpreted as a new permission to connect and send/receive messages to the server. Therefore it will limit the number of opened socket especially for UDP protocol.

AUTHORIZED EVERY CLIENTS

It allows you to configure the server as accepting connection and sent/received messages from every client. This menu disappears for UDP multicast and broadcast because every clients joining the multicast address or listening to the broadcast address are authorized clients anyway. For UDP unicast ant other protocols, uncheck the menu so that new configuration appears.

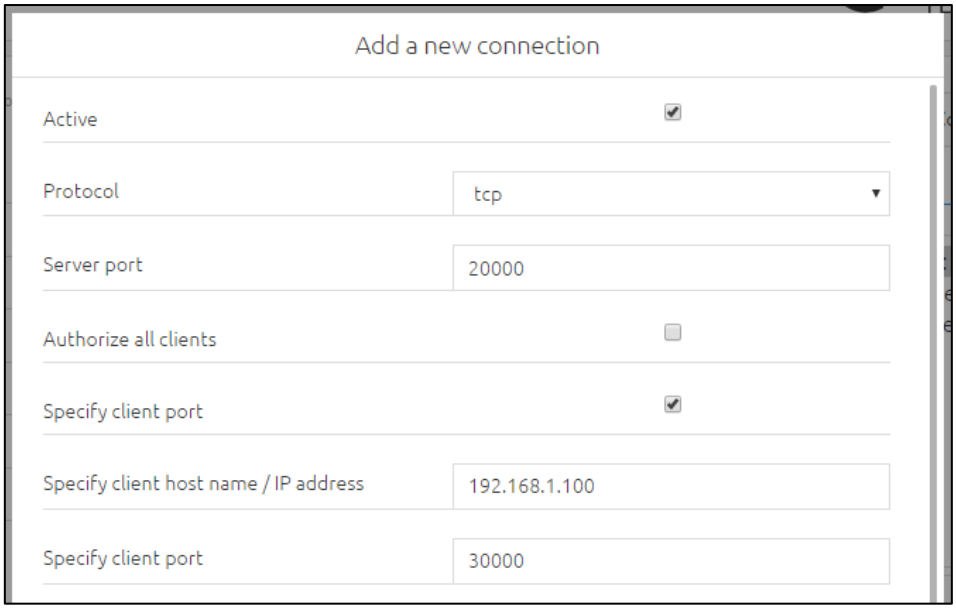
SPECIFY CLIENT'S HOSTNAME / IP ADDRESS AND SPECIFY CLIENT'S PORT

As soon as you uncheck "Authorized every clients" for TCP protocol for instance, "Specify client's port" checkbox and "Specify client's Hostname / IP Address" appear.

You can now specify which Hostname or IP address is allowed to connect and send/receive messages to/from the server. Thus, it allows you to give permission to one special machine, to be able to communicate with KNX**CONVERTER** whereas the others are not.

In addition, if you check "Specify client's port", client's port setting appears. Thus you can specify which port on the client address is allowed to connect and send/receive messages to/from the server.

Therefore you can have for example two clients on the same machine (on two different ports). One is authorized to communicate with KNX**CONVERTER** whereas the other one is not.



PROTOCOL

KNX**CONVERTER** uses an easy ASCII protocol based on an ASCII string made of words separated by spaces and finished by a Line Feed character (character **LF** in the ASCII table). The ASCII string is not case sensitive and it is extra spaces safe.

See below the main structure of an ASCII string:

SERVICE SYSTEM_ID COMMAND DEVICE DATATYPE VALUE

4.2.1.3 SERVICE

Services represent KNX SERVICE, ROUTING and TWISTED_PAIR services are implemented so far.

TWISTED PAIR

TWISTED_PAIR service allows to send KNX telegrams on the local KNX bus. Below are every ways to defined TWISTED_PAIR as the service used to send KNX telegrams:

- Not specify **service** in the ASCII string will set TWISTED_PAIR as the service used (If the default service is TWISTED_PAIR, see: "Service").
- “twisted_pair”
- “tp”
- “knx”
- Any string (without space) containing “twisted” and “pair”. For example: “knx-twisted-pair”

ROUTING

ROUTING service allows to send KNX telegrams over the IP network. Below are every ways to defined ROUTING as the service used to send KNX telegrams:

- Not specify **service** in the ASCII string will set ROUTING as the service used (If the default service is ROUTING, see: "Service").
- “routing”
- “knxnet/ip”
- Any string (without space) containing “routing”. For example: “knx-routing”

4.2.1.4 SYSTEM ID

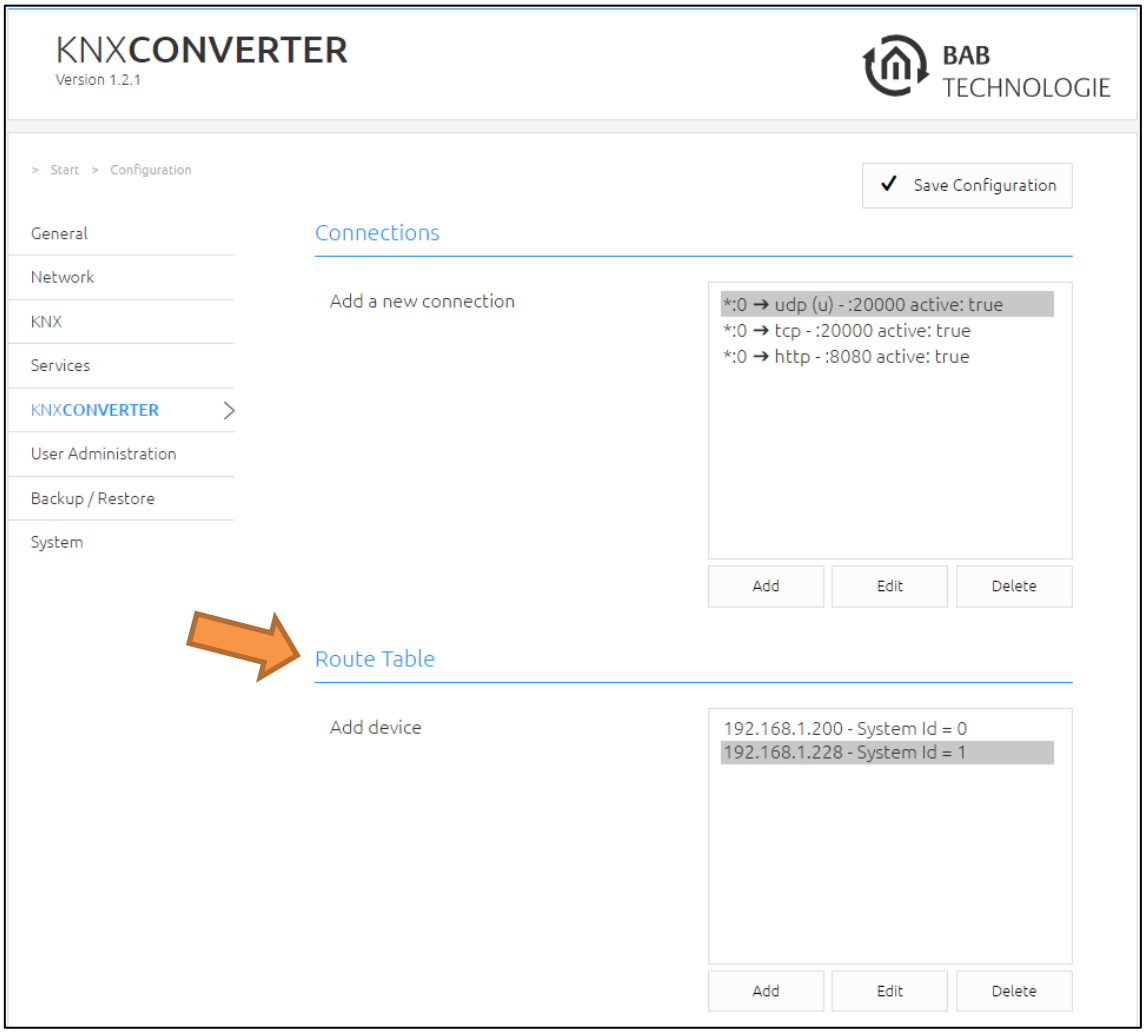
SYSTEM_ID is one special ID assigned to one KNX**CONVERTER**. Indeed, a big KNX installation may have more than one KNX**CONVERTER**. KNX**CONVERTER** devices are able to communicate each other in order to route received ASCII string messages if those do not belong to them. Each KNX**CONVERTER** are aware of other KNX**CONVERTER** thanks to a shared route table containing the list of available system IDs.

For example if your installation contains two KNX**CONVERTER**:

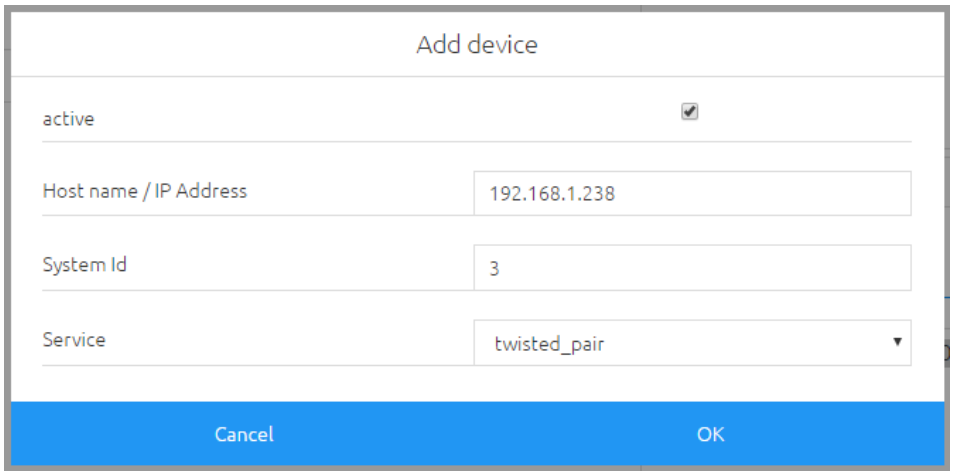
1. 192.168.1.228 – System Id = 0
2. 192.168.1.229 – System Id = 1

An ASCII string containing the system ID "1" is sent to the KNX**CONVERTER** with address 192.168.1.228 (its system ID is "0"). KNX**CONVERTER** with address 192.168.1.228 knows that this ASCII string does not belong to him and will search in the route table to which KNX**CONVERTER** this ASCII string belongs to. It will then try to re-send the ASCII string to the right KNX**CONVERTER**.

The route table is defined in the web interface. Go to to "Configuration" -> "KNX**CONVERTER**". In the "Route Table" field, you can see the list of available System ID.



An entry is automatically created with the address of the KNX**CONVERTER** and the System ID "0". Click on "Add" to add a new device.



ACTIVE

It allows you to enable or disable the device. If one KNX**CONVERTER** is disconnected, disable the entry in the route table or delete it.

HOSTNAME / IP ADDRESS

Enter the hostname or IP address of the KNX**CONVERTER**.

SYSTEM ID

Enter the System ID of the KNX**CONVERTER**.

SERVICE

Enter the default service of the KNX**CONVERTER**. If there is no **service** in the ASCII string, the KNX telegram will be send via the default service.

Once this configuration saved on one KNX**CONVERTER**, the route table will be send to every KNX**CONVERTER** via a multicast message. Therefore, the route table needs to be configuring only once.

If the **system id** is not specified in the ASCII string, the default one will be "0".

IMPORTANT NOTE: From the moment this configuration is saved on a KNX**CONVERTER**, it will transfer the "route table" to each KNX CONVERTER in the list. Therefore it is necessary to configure the "route table" in one KNX**CONVERTER**.

COMMAND

COMMAND allows you to specify if you want to send a "write" or "read" KNX telegram. For example if you want to switch a lamp on or off, you will send a "write" telegram. If you want to read the value of a temperature sensor, you will send a "read" telegram. You will then receive a telegram from this temperature sensor containing the value of the temperature.

Possible COMMAND:

- "write"
- "read"

DEVICE

Device allows you to specify to which KNX Group Address or KNX Physical Address (destination) you want to send the KNX telegram.

Example of device addresses:

- 1/1/1
- 5.2.3

If an ETS project has been imported, you can directly use names linked to the group address that you have configured in ETS.

For example, the name of group address 1/1/1 is defined as “lamp1” in ETS project. You can write “lamp1” instead of 1/1/1.

If this name contains spaces, you have to replace them with underscore character “_”. Remember that the protocol is not case sensitive therefore “lamp1” and “LAMP1” are the same.

DATATYPE

DATATYPE represents the KNX Data point Type. For example type “1” and subtype “10” represents a one bit value with unit “start/stop”. It helps to interpret KNX data as a real value or the other way around.

These are every ways to define a datatype:

- dpt-[type]-[subtype] for example “dpt-1-10”
- [type]-[subtype] for example “1-10”

If an ETS project has been imported, KNX**CONVERTER** will automatically get the datatype that you have configured in ETS. Therefore, you do not have to define it in the ASCII string.

Define the datatype directly in the ASCII string might be dangerous if the datatype is totally wrong. This behaviour is enabled by default but for each connection you are able to disable it (see: "Force send telegrams").

VALUE

VALUE is of course necessary only if the COMMAND is “write”. This value will be interpreted according to the datatype.

For few of one bit datatypes, default values are defined for “1” and “0”:

- dpt-1-8: “up” and “down”
- dpt-1-9: “open” and “close”
- dpt-1-10: “start” and “stop”
- dpt-1-100: “heating” and “cooling”
- “on” and “off”

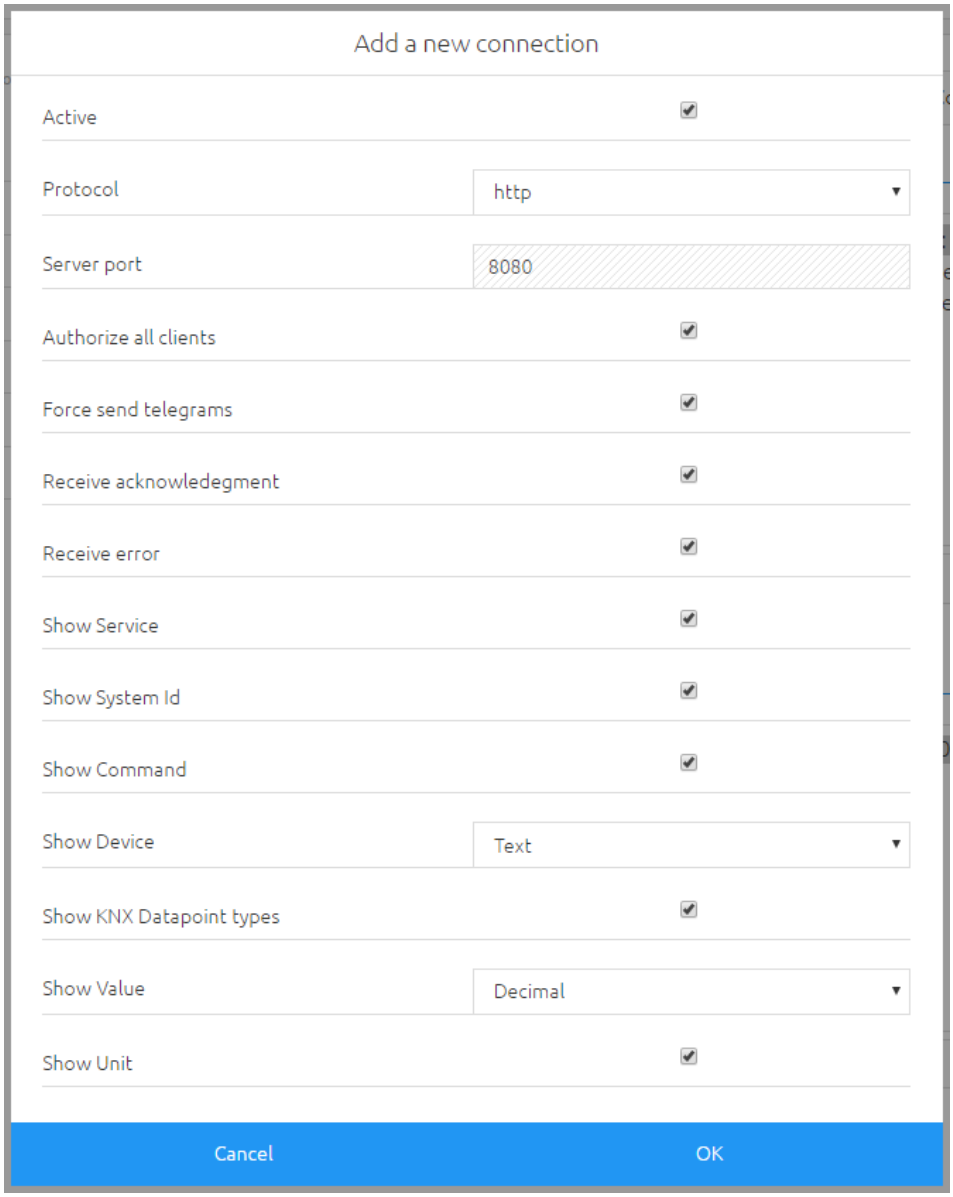
STATE TABLE

Each time KNX**CONVERTER** receives a “write” KNX telegram or ASCII string, it writes the value sent in a state table. When it receives a “read” ASCII string, it checks first if the group/physical address is present in the state table. If it is, it returns the value present in the state table. Otherwise, it sends a “read” KNX telegram on the KNX bus.

This process allows the user to ask for the state of any group/physical address at any moment.

CONNECTION CONFIGURATION

Connections have extra configuration directly linked to the KNX**CONVERTER** protocol. Go back to "Configuration" -> "KNX**CONVERTER**". In the "Connections" field edit the default UDP connection for instance.



4.2.1.5 FORCE SEND TELEGRAMS

If this field is checked, it will cause extra behaviours:

- KNX**CONVERTER** can be use without importing an ETS project. It will try to get the datatype from the ASCII string.
- KNX**CONVERTER** can use an ETS project where datatypes are not configured. It will try to get the datatype from the ASCII string.
- If **DEVICE** is the name linked to a group address and the same name is used for more than one group address, a telegram will be sent to every group addresses having the same name.

EXAMPLE: For example if group address 1/1/1 has the name “lamp1” and 1/1/2 has the name “LAMP1”. According to the protocol (not case sensitive), they have the same name. Therefore the same telegram will be sent to group addresses 1/1/1 and 1/1/2.

4.2.1.6 RECEIVE ACKNOWLEDGMENT

If this field is checked, after each successful ASCII string sent, you will receive an acknowledgment JSON string.
Structure of the acknowledgment string:

{"type": "ack","command": "[ASCII string sent]"}

The “ASCII string sent” might be not the exact string you have sent. Indeed the acknowledgment contains the interpreted ASCII string.

For example:
ASCII string sent: “write lamp1 stop”
Ack received: {"type": "ack","command": "twisted_pair 0 write lamp1 dpt-1-10 stop"}

4.2.1.7 RECEIVE ERROR

If this field is checked, you will receive an error JSON string in case of error. You will receive an error if the command sent is wrong. You might also receive KNX errors, such as disconnected KNX cable error.
Structure of the error string:

{"type": "error","command": "[ASCII string sent]","message": "[error message]"}

For example:

1. {"type": "error","message": "KNX bus: EIB bus could be disconnected."}
2. {"type": "error","command": "twisted_pair 0 write scene dpt-1-10 start","message": "Bad knxconverter command. Cannot find a correct destination address."}

4.2.1.8 RECEIVE TELEGRAM

If a KNX telegram is received, you will receive a “receive” JSON string.
Structure of the “receive” string:

{"type": "receive","command": "[command]"}

For example:

1. {"type": "receive","command": "twisted_pair 0 write shutter1 dpt-1-9 close open/close"}

4.2.1.9 DISPLAY SERVICE

If this field is checked, when a KNX telegram is received, translated into an ASCII string and sent to the client, the SERVICE will be present in the ASCII string.

4.2.1.10 DISPLAY SYSTEM ID

If this field is checked, when a KNX telegram is received, translated into an ASCII string and sent to the client, the SYSTEM_ID will be present in the ASCII string.

4.2.1.11 DISPLAY COMMAND

If this field is checked, when a KNX telegram is received, translated into an ASCII string and sent to the client, the COMMAND will be present in the ASCII string.

4.2.1.12 DISPLAY DEVICE

When a KNX telegram is received, translated into an ASCII string and sent to the client, the DEVICE will be present in the ASCII string as a group address or a text (name linked to the group address). If “none”, DEVICE will not appear.

4.2.1.13 DISPLAY KNX DATAPOINT TYPES

If this field is checked, when a KNX telegram is received, translated into an ASCII string and sent to the client, the DATATYPE will be present in the ASCII string.

4.2.1.14 DISPLAY VALUE

When a KNX telegram is received, translated into an ASCII string and sent to the client, the VALUE will be present in the ASCII string as a decimal or a text (“start”, “stop” ...). If “none”, VALUE will not appear.

4.2.1.15 DISPLAY UNIT

If this field is checked, when a KNX telegram is received, translated into an ASCII string and sent to the client, the **unit** will be present in the ASCII string. This unit is found in the datatype details.
EXAMPLE: For example datatype dpt-5-3 has the unit “angle (degrees)”.