ELATEC

RFID Systems



TCPConv

Technical Manual

Doc.-Rev. 1.01

Content

1. OVERVIEW 3

2. CONNECTORS, CONTROLS, LEDS 3

3. OPERATING TCPCONV 5

3.1 SIMPLE SCENARIO 5
3.2 TYPICAL SCENARIO 6

4. PORTS 7

4.1 RS232 PORT 7
4.2 USB PORT 7

5. ADMINISTRATION OF TCPCONV 8

5.1 REQUIREMENTS FOR TCCONFIG 8
5.2 INSTALLATION OF TCCONFIG 8
5.3 STARTING TCCONFIG 9
5.4 LOGGING ON TO TCPCONV 10
5.5 CONFIGURING TCPCONV 11
5.5.1 Network Configuration 12
5.5.2 RS232 Configuration 12
5.5.3 USB Configuration 13
5.5.4 Configuring a TCP Link 14
5.6 RESTARTING TCPCONV 16
5.7 CHANGING LOG-ON INFORMATION 16
5.8 TESTING TCPCONV 16
5.9 UPDATING THE FIRMWARE OF TCPCONV 18

6. FIRMWARE HISTORY 19

7. TECHNICAL DATA 20

8. REGULATORY INFORMATION 21

8.1 CE DECLARATION OF CONFORMITY 21

9. TRADEMARKS 21

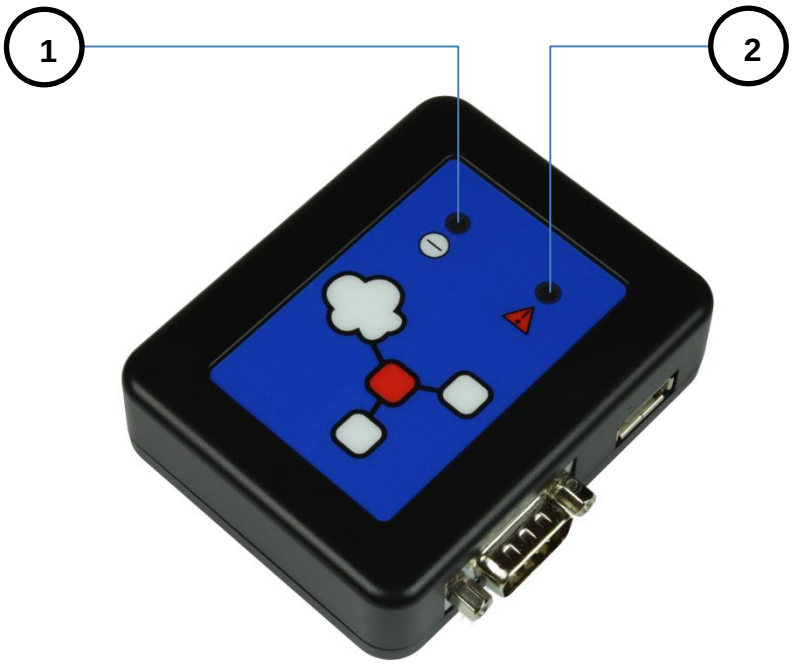
1. Overview

TCPConv is a device, which enables the connection of a USB or RS232 device to a local area network (LAN). Data can be transferred between device and host via LAN/WAN. This enables applications, where peripheral devices such as RFID transponder readers should be controlled via long distances.

TCPConv has one RS232 and one USB port. Both ports can be operated at the same time and independent of each other.

2. Connectors, Controls, LEDs

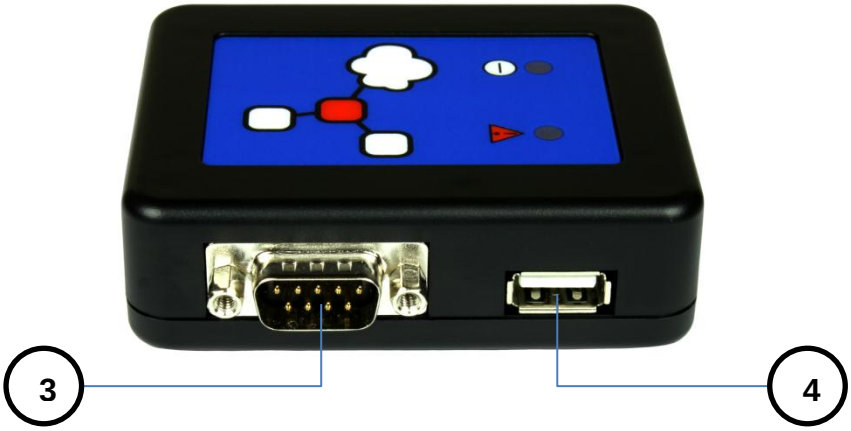
Following LEDs are located at the top side of TCPConv:



(1) Green LED
This LED is turned on as soon as power is supplied to TCPConv via a DC power supply. The green LED flickers (= turned off for a short moment) as soon as data is transferred via TCPConv.

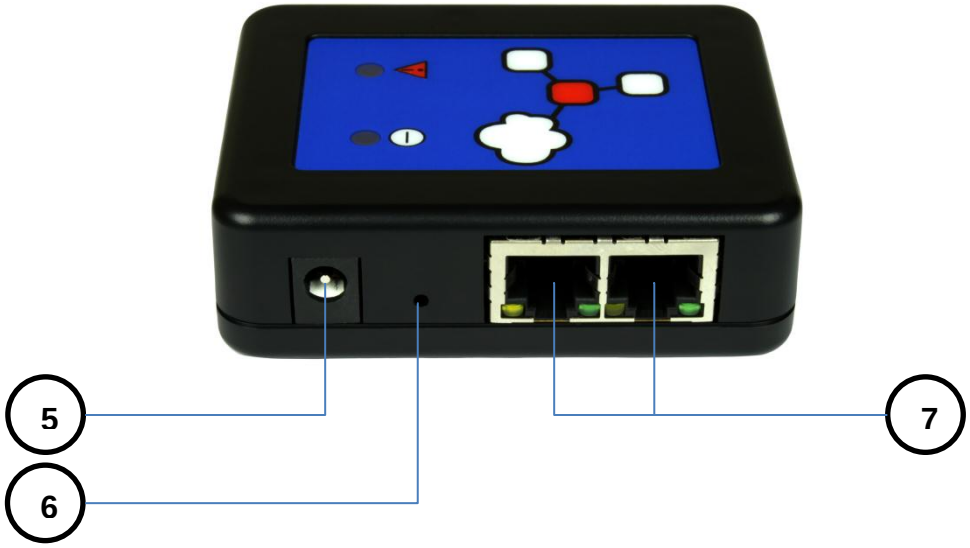
(2) Red LED
This LED is normally off. As soon as an error occurs, this LED flashes (= turned on for a short moment). There are following error conditions:

a. TCPConv is not able to establish a TCP/IP connection to a configured server (please also see detailed description regarding configuration of TCP/IP server connections)
b. TCP/IP traffic was not able to be delivered to a destination address due to communication timeout.



(3) RS232 Port
This port allows connection of RS232 device. The connected RS232 device may be self-powered or powered via TCPConv itself. This requires a RS232 device which can be powered with 5V at pin 9 of the RS232 port. See detailed description of the RS232 port.

(4) USB Port
This port allows connection of USB devices. In order to operate USB devices, the USB device must meet specific requirements regarding supported communication protocol. See detailed description of the USB port.

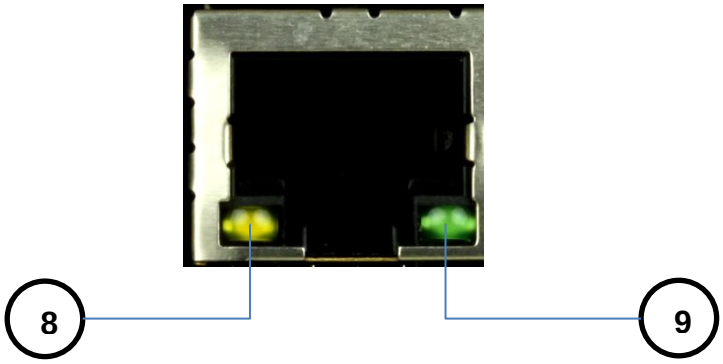


(5) DC power supply
In order to operate TCPConv, it must be supplied with appropriate voltage. Elatec offers appropriate power supplies as optional accessory.

(6) Reset button
TCPConv can restarted with this push button. A restart is identical to a power cycle (= turning on and off the power supply). **In order to restore original factory configuration of TCPConv, push the reset button for at least 5 seconds.**

(7) Ethernet ports
The two Ethernet ports do connect directly to a Ethernet switch, which is integrated into TCPConv.

Each of the two Ethernet ports is equipped with two LEDs:



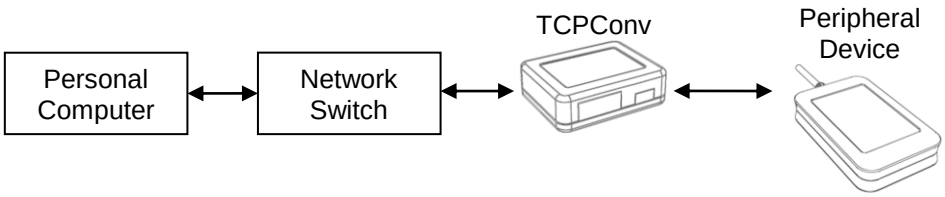
(8) Yellow LED
This LED indicates the link speed:
a. If the LED is turned on, the current link speed is 100Mbit/s.
b. If the LED is turned off, the current link speed is 10Mbit/s.

(9) Green LED
This is the combined LED indicating a link and carrier sense signal.

3. Operating TCPConv

3.1 Simple Scenario

A simple scenario, where a TCPConv can be operated or tested, looks as follows:



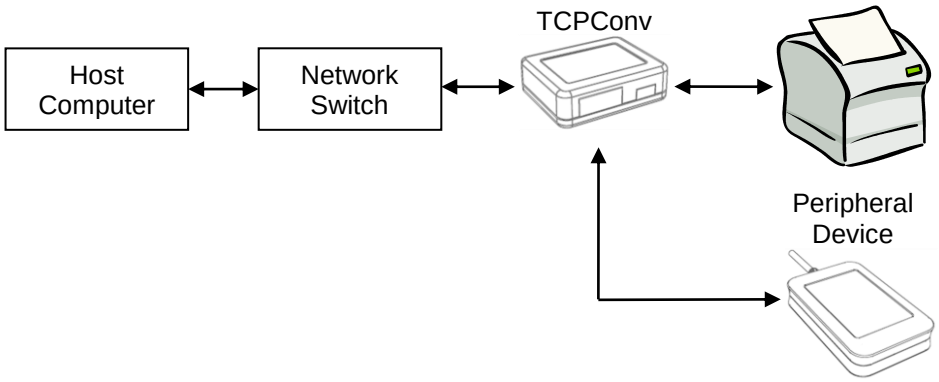
This simple scenario operates a personal computer (“PC”, “Computer”), which is connected via Ethernet and a network switch to TCPConv. An Elatec TWN3 RFID reader is connected to the TCPConv via RS232 or USB.

In this scenario, an ID, which is read by the TWN3 RFID reader, is sent via TCPConv to the personal computer.

In order to receive and operate the received data on the personal computer, it is required to run an appropriate application, which is able to connect to the LAN. For testing, this could be TCConfig (“TCPConv Configuration Program”), which allows running a simple TCP/IP server or client.

3.2 Typical Scenario

A typical scenario, where a TCPConv is operated looks a follows:



This scenario is showing a typical application for TCPConv. It shows the topology for a RFID-based printing solution:

An ID is read via a peripheral device, which is connected to TCPConv (either RS232 or USB). This ID is sent via TCPConv and the LAN to the host computer. The host is evaluating this ID and depending on the result releasing and sending a print job to the printer. TCPConv allows placing the RFID reader nearby the printer even if the printer itself has no possibilities to connect a RFID reader. Furthermore and due to its built-in 2-port network switch TCPConv allows connecting the peripheral device without routing an additional LAN cable from the printer to the network switch.

4. Ports

TCPConv has one RS232 and one USB port. Both ports can be operated at the same time and independent of each other.

4.1 RS232 Port

The RS232 port allows connection of many different peripheral devices such as RFID transponder readers. The communication parameters can be configured via TCConfig. The pin out is identical to a normal PC RS232 port except pin 9, which is reserved for special use. The pin assignment is as follows:

Pin	Signal
1	DCD
2	RXD
3	TXD
4	DTR
5	Device Ground
6	DSR
7	RTS
8	CTS
9	+5V Output for supplying connected devices.
Frame	Device Shield

4.2 USB Port

The USB port allows connection of specific USB devices. Firmware V1.04 of TCPConv is able to operate following USB devices:

Manufacturer	Device Type	Function
Elatec	TWN3	HID keyboard emulation
Elatec	TWN3	Virtual COM port (intelligent or transparent mode)
-	USB Keyboard	USB HID keyboards or USB devices emulating a HID keyboard

Please contact Elatec for support of specific USB devices.

5. Administration of TCPConv

In order to operate TCPConv in a specific network environment, an appropriate configuration of the device is necessary.

For the configuration of TCPConv a program is delivered as part of the developer pack for TCPConv. The program is called TCConfig.

5.1 Requirements for TCConfig

TCConfig has following requirements for proper operation:

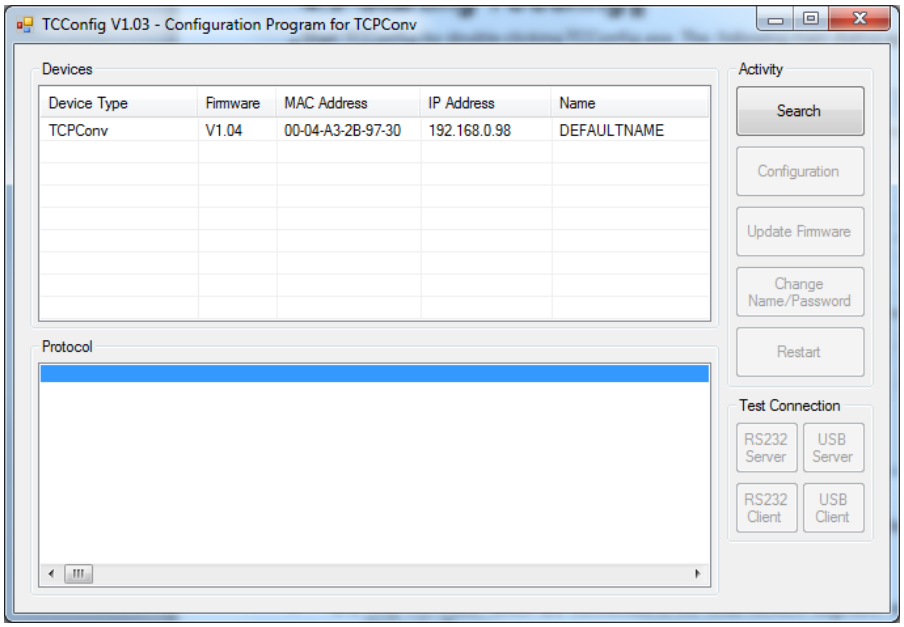
- PC with operating system Microsoft Windows XP, Windows Vista or Windows 7.
- .NET Framework 3.5
- Proper configured TCP/IP network connection

5.2 Installation of TCConfig

TCConfig does not require to be installed. It consists of the single file TCConfig.exe. This executable is part of the developer pack for TCConfig. Normally you simply would unpack the developer pack into an empty directory on your hard disk.

5.3 Starting TCConfig

Start TCConfig by double clicking TCConfig.exe. The following main dialog appears:



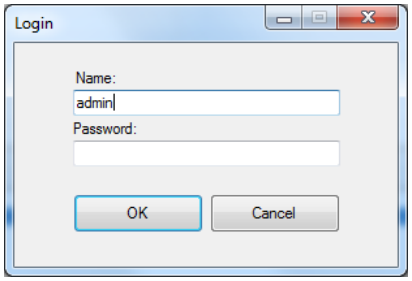
If one or more TCPConv are connected to the network, the devices will be displayed in the list of devices.

Please note:

- Only TCPConv, which are connected to the local network segment, will be detected by TCConfig.
- Therefore, only TCPConv, which are connected to the local network, can be configured with TCConfig.
- TCConfig is searching TCPConv via UDP broadcast. Even TCPConv, which are not configured properly, will be found and displayed.

5.4 Logging On to TCPConv

On order to do any configuration of TCPConv, the administrator has to specify a name and a password. Name and password can be configured. The default log-on information is name “admin” leaving password empty.

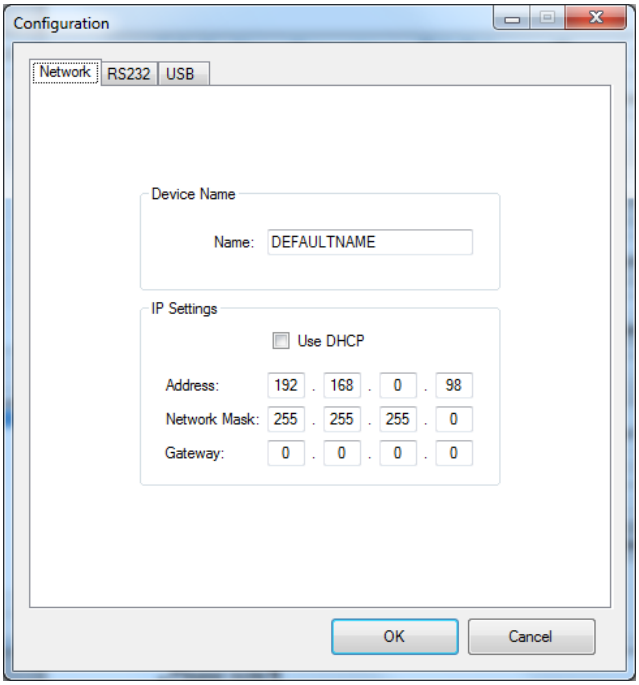


Please note:

TCPConv will delete log-on information after 5 minutes of inactivity. This means, after 5 minutes of inactivity, the administrator has to specify log-on information again.

5.5 Configuring TCPConv

In order to change the configuration of TCPConv, in the main dialog of TCConfig select the appropriate device in the list of devices and click the button “Configuration”. After a successful log on, the following dialog appears:



Please note:

In order to finally make the new configuration working, it is necessary to

- Close the configuration dialog with the button “OK”. The “Cancel” button will discard all made changes.
- After closing the configuration button with the button “OK”. The new configuration is written to the selected TCPConv, but TCPConv is still working with the old configuration. The new configuration will take an effect as soon as the device is restarted. There are three ways to restart the device:
    1) A power cycle (turning off and on the power of TCPConv). In order to display up-to-date information within TCConfig, the button “Search” should be clicked.
    2) Pressing the reset button of TCPConv. In order to display up-to-date information within TCConfig, the button “Search” should be clicked.
    3) Clicking the button “Restart”. This is the simplest and therefore preferred way of restarting TCPConv.

5.5.1 Network Configuration

Please select the tab folder “Network” in order to change the network settings of TCPConv.

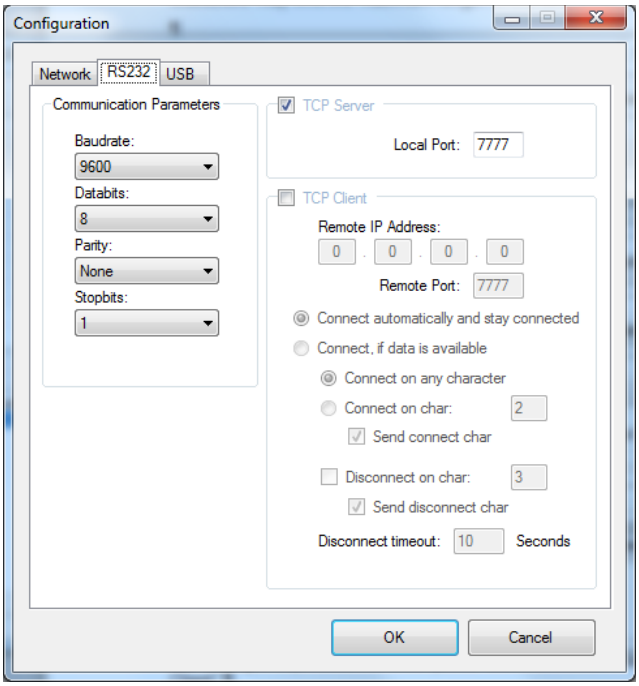
The default network settings of TCPConv are:

Setting	Default Value
Device Name	DEFAULTNAME
DHCP	Off
IP-Address	192.168.0.98
Network Mask	255.255.255.0
Gateway	0.0.0.0

In order to better distinguish different TCPConvs in a network, a name (“Device Name”) can be assigned to the device. This name is displayed in the list of devices in the main dialog for each device which is found by TCConfig. There is no further meaning to this device name. The maximum length of the device name is 16 bytes. The name is internally stored in UTF-8 format. This means, that special characters may limit the maximum length of the device name to less than 16 characters.

5.5.2 RS232 Configuration

Please select the tab folder “RS232” in order to change the settings for the RS232 port of TCPConv.



The dialog is separated into three parts, “Communication Parameters”, “TCP Server” and “TCP Client”.

The sections “TCP Server” and “TCP Client” are identical for the RS232 and USB port. Therefore this two sections are explained separately later in this document.

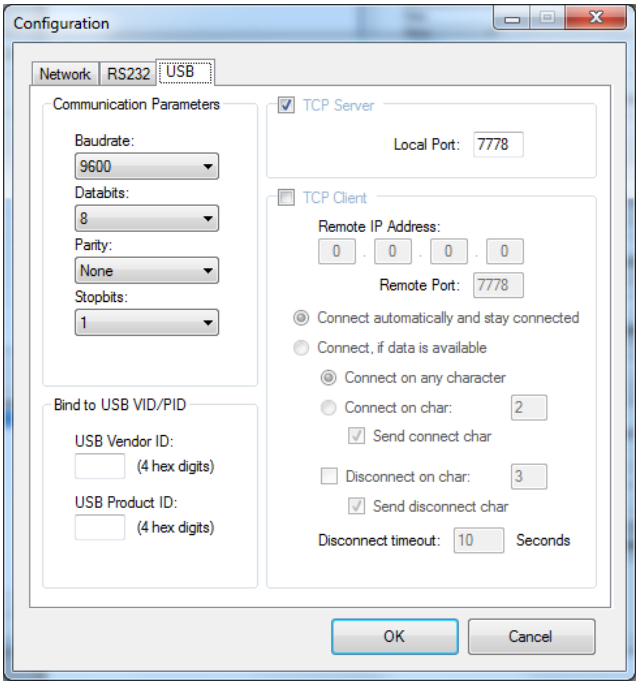
5.5.2.1 RS232 Communication Parameters

These are the default and possible RS232 communication parameters:

Parameter	Default Value	Possible Values
Baud rate	9600 Baud	300 Baud, 600 Baud, 1200 Baud, 2400 Baud, 4800 Baud, 9600 Baud, 19200 Baud, 38400 Baud, 57600 Baud, 115200 Baud
Data bits	8	7 or 8
Parity	None	None, Even or Odd
Stop bits	1	1 or 2

5.5.3 USB Configuration

Please select the tab folder “USB” in order to change the settings for the USB port of TCPConv.



5.5.3.1 USB Communication Parameters

These are the default and possible USB communication parameters:

Parameter	Default Value	Possible Values
Baud rate	9600 Baud	300 Baud, 600 Baud, 1200 Baud, 2400 Baud, 4800 Baud, 9600 Baud, 19200 Baud, 38400 Baud, 57600 Baud, 115200 Baud
Data bits	8	7 or 8
Parity	None	None, Even or Odd
Stop bits	1	1 or 2

Please note:

- The USB communication parameters only have an influence to appropriate USB devices such as USB/serial converter. Currently, no such devices are supported by TCPConv. Therefore, the USB communication parameters are reserved for future use.
- Elatec's TWN3 family of USB RFID transponder readers is operating independent of the settings above.

5.5.3.2 Binding USB Devices

TCPConv allows accepting USB devices with specific product ID and vendor ID only. In order to do so, specify according USB product and vendor ID in hexadecimal digits in the dialog. Both product and vendor ID must be specified. If only product or vendor ID is specified, the given information is refused and any USB device will be accepted.

5.5.4 Configuring a TCP Link

Before a link can be established between TCPConv and a host, the type of connection has to be determined. Generally spoken a TCP connection is always initiated by a client. The connection is always established against a server. TCPConv can be configured to act as a client or a server.

Link initiated by	TCPConv must be configured as	Host acts as
Host	TCP Client	TCP Server
TCPConv	TCP Server	TCP Client

Please note:

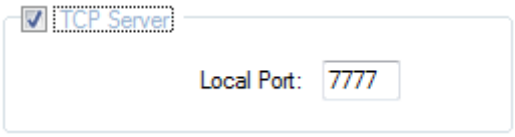
- If a port (RS232 or USB) acts as client or server can be configured for both ports and independent of each other.
- It is possible to configure both RS232 and USB to act as a client, which initiate a connection to identical TCP/IP address and TCP port number.

5.5.4.1 Configuring a TCP Server

By default, TCPConv is configured as TCP server. On the side of TCPConv, this is the easier way to configure the link, because only the appropriate port has to be set up. Depending on the RS232 or USB interface of TCPConv, the default ports are:

Interface	Default TCP Port
RS232	7777
USB	7778

In order to activate operation as TCP server, click the checkbox “TCP Server” in the appropriate tab folder (“V24” or “USB”)



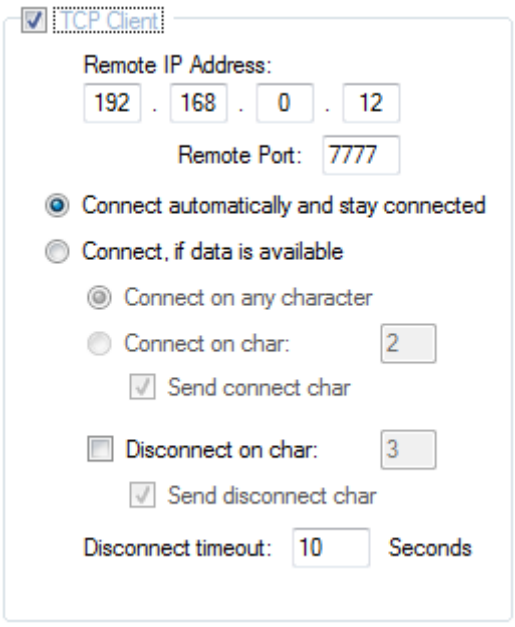
Furthermore, the appropriate TCP port must be configured.

5.5.4.2 Configuring a TCP Client

In order to activate operation as TCP client, click the checkbox “TCP Client” in the appropriate tab folder (“V24” or “USB”). Furthermore, some more information has to be enteredIn order to configure a TCP client, some more information is required:

- Remote IP address and port of the TCP server TCPConv should connect to
- The way in which a connection should be initiated.

All these information can be entered in the dialog field as shown below:



Please note:

- It is possible to turn off both TCP Client and TCP Server functionality of a selected port. In order to do so, click the checkbox of the currently configured functionality (“TCP Client” or “TCP Server”). Finally, neither the checkbox “TCP Client” nor “TCP Server” is activated and therefore, this port is “turned off”.

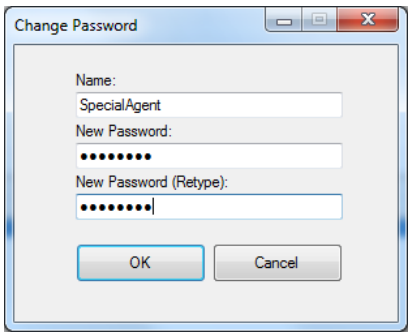
5.6 Restarting TCPConv

In order to take effect of any changes having been made to the configuration of TCPConv, it must be restarted. In order to restart TCPConv, there are two possibilities:

- Press the button “Restart” in the main dialog of TCConfig
- Press the reset button of TCPConv

5.7 Changing Log-On Information

In order to change log-on information, click button “Change Name/Password” in the main dialog. This will open another dialog, where appropriate information can be entered. The password must be entered twice and identical in order to be accepted as a valid password.



5.8 Testing TCPConv

The configuration program TCConfig offers an easy way for testing the functionality of TCPConv:

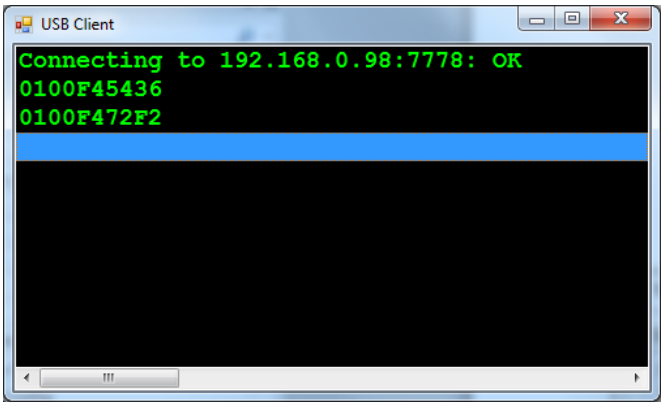
As soon as a device is selected in the main dialog of TCConfig, the configuration of the device is evaluated. Depending on the configuration of the selected TCPConv, the appropriate buttons are enabled in the main dialog.

The example below shows the default setup of a TCPConv: Both interface (RS232 and USB) are configured as TCP server. Therefore, the buttons “V24 Client” and “USB Client” are enabled.

It is now possible to establish a link between TCConfig and TCPConv simply by clicking one of the two buttons depending on which of the two interfaces of TCPConv should be tested.



As soon as a button is clicked, a terminal window appears, which displays sent and received characters. In the example below, the button “USB Client” has been clicked. This USB client initiates a link to the USB interface of TCPConv.



In the first line of the screen show above, the connection to the server has been logged. The two following lines are showing transponder IDs, which have been sent from a TWN3 transponder reader via the USB interface of TCPConv to this terminal window of TCConfig.

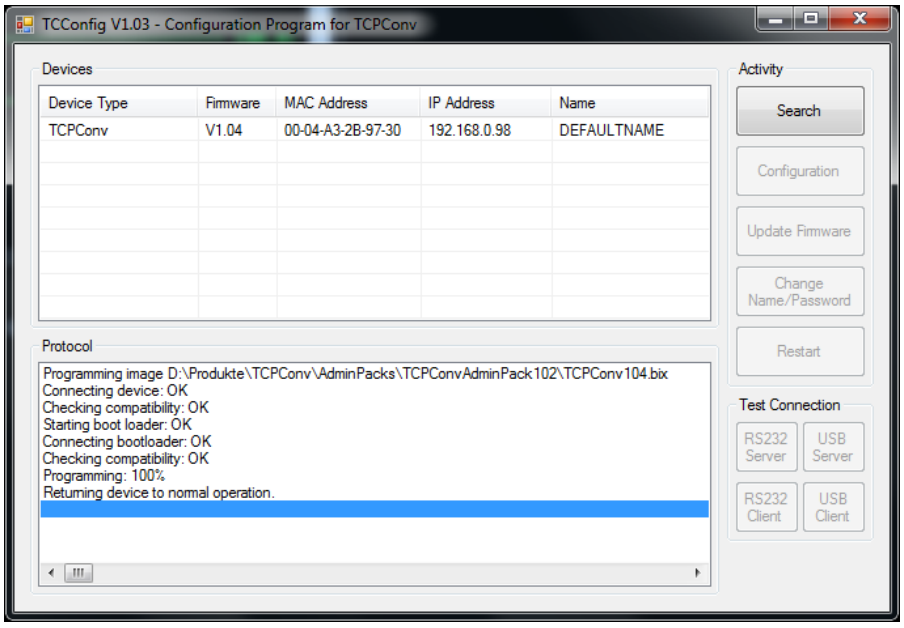
Please note:

- It is possible to open a terminal window for each of the two ports of TCPConv at the same time.
- Testing of a connection between TCPConv and TCConfig requires a proper setup network connection.
- Testing with TCConfig is only possible, if both TCConfig and TCPConv reside in the same subnet. Otherwise TCConfig is not able to detect the TCPConv in the network.
- The terminal window can display ASCII data only. If control characters are received, a '?' is displayed instead.
- ASCII data can be sent to the connected device by simply hitting the appropriate keys in the terminal window.

5.9 Updating the Firmware of TCPConv

TCConfig offers the possibility of updating the firmware. This can be achieved with the following steps:

1) In the main dialog of TCConfig select one of the listed TCPConv.
2) As soon as a device is selected, the button “Update Firmware” will be enabled. Click this button.
3) A dialog is opened, where you can select the appropriate firmware image. Firmware images for TCPConv have the extension “.bix”.
4) After accepting the firmware image in the file dialog with the button “OK”, the firmware will be programmed immediately. The programming progress is shown in the protocol section of the main dialog.



Please note:

- If there is any interruption of the programming process (loss of power, system crash) it is possible to repeat the programming sequence. In this situation, TCPConv will be detected and displayed by TCConfig as “TCPConv (Bootloader)”.

6. Firmware History

Version	Changes
V1.01	• Initial release
V1.02	• USB device Elatec TWN3 configured in keyboard emulation is supported • Status LEDs do blink instead being turned off for a long time. This gives a better usage experience.
V1.03	• Hotfix for handling big Ethernet frames
V1.04	• Configuration is protected by log-on information • Possibility for connection of any USB device, which emulates a HID keyboard • Bind USB devices with specific vendor and product ID

7. Technical Data

Section	Parameter	Value
Housing	**Material**	ABS V0
	Dimensions	82mm x 65mm x 25mm
Power	**Power Supply**	External wall plug 5V
	Supply Current	300mA (max., no external load), up to 800mA
Environment	**Temperature Range**	0°C to 50°C
	Humidity	10% to 90%, none condensing
Ethernet Switch	**Transfer Rate**	10/100Mbit/s
	Other Features	Auto MDI/MDIX
USB	**Type**	USB Host
	Supported Devices	Elatec TWN3 transponder readers and HID keyboards Please contact Elatec for your specific device!
	Maximum Current	500mA
RS232	**Baudrate**	Configurable 300, 600, 1200, 2400, 4800, 9600, 19200, 38400, 57600 or 115200 Baud
	Databits	7 or 8 Bits
	Parity	None, even or odd parity
	Stop bits	1 or 2 stop bits
Connections	**Ethernet**	2 x RJ45, 10/100BaseT
	USB	1 x USB-A receptacle
	RS232	1 x DSUB 9pos
	Power	For plug 5.5mm/2.1mm
LAN Communication	**Protocols**	TCP, IPV4 (IPV6 on request), DHCP, ARP, PING
	Modes of Operation	TCP Server: Device is connected by a TCP client. TCP Client: Device connects automatically to a specified TCP server. Connection may be triggered by incoming flow of data on either the USB or RS232 port.

Disclaimer:

Elatec preserves the right to change technical data at any time and without notice.

8. Regulatory Information

8.1 CE Declaration of Conformity

This product complies to the following standards:

- DIN EN 55022: 2007-04 Class B
- DIN EN 55024: 2003-10
    - DIN EN 61000-4-2: 1996-03
    - DIN EN 61000-4-3: 1996-03
    - DIN EN 61000-4-4: 1996-03
    - DIN EN 61000-4-5: 1996-09
    - DIN EN 61000-4-6: 1997-04
    - DIN EN 61000-4-8: 1994-05
    - DIN EN 61000-4-11: 1995-04
- DIN EN 61000-3-2: 2006-10
- DIN EN 61000-3-3: 2006-06

9. Trademarks

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