TCPConv 2

Technical Manual

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Elatec GmbH

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1. Introduction

This document describes all features and the usage of the hardware TCPConv 2. TCPConv 2 is equipped with two USB- and RS232-interface into your local area network (LAN). The purpose of this hardware is to convert USB or RS232 to Ethernet, in order to provide RS232 or USB devices an extra Ethernet connection.

1.1. Typical Scenario

A typical application is the extension of a network device (i.e. a network printer), by a local peripheral device.

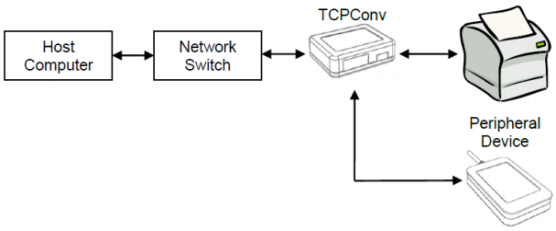

Figure 1.1.: Typical Connection with TCPConv 2, reader and printer

1.2. Important Features

The main feature of TCPConv 2 is that it has the same IP as the printer connected, which saves a lot of IP resources. This makes TCPConv can be easily integrated into existing network environments, without managing the extra IP addresses.

The behaviour of TCPConv 2 can be configured via web front-end. Depending on the configuration, it can be a TCP/IP server or client on ports specified by the user.

Except very few ports necessary to configure the TCPConv 2, it is transparent between printers and local network. Therefore, it is still convenient to configure the printers, as if TCPConv 2 were not connected in between.

1.3. Software Release History

Version	Added Features
SB1.00/STD1.00.02	Initial release
STD1.1.0.0	Improved TCP client behavior
STD1.1.0.2	Log of the application can be viewed via web-frontend
STD1.1.0.4	The hostname of a device can be changed via web-frontend

2. Hardware Setup

2.1. Connect the network cables

There are two Ethernet ports on the TCPConv 2, **Host** port is used to connect TCPConv 2 to local network and **Printer** port is used to connect printer to TCPConv 2.

2.2. Plug in the Reader

The user can plug in USB reader directly to the TCPConv 2. Currently HID and CDC devices are supported.

TCPConv 2 can also provide 750mA current from Pin 9 of its RS232 interface. It is undesired that the RS232 reader is powered by an extra power supply besides TCPConv 2, because it may potentially damage the TCPConv 2, as well as the external power supply.

Figure 2.1.: RS232 cable with power supply. Please leave the power supply unconnected!

2.3. Power up the TCPConv 2

After the TCPConv 2 is powered up, one can see the status of it via the information LEDs.

There are 4 LEDs on device and several states of the device can be detected based on combination of LED signals.

- Power LED is ON when power supply is connected.
- Busy LED is red means device is initializing.
- Ready LED is green means device is in normal operation.
- Ready LED is green and Error LED is red means something is wrong, for instance TCPConv cannot get an IP address.

2.4. Network Settings of TCPConv

2.4.1. Finding the Devices

2.4.1.1. Requirements

1. TC2Config software application
2. Microsoft .Net Framework version 3.5 or higher
3. UDP Port 7001 is available

2.4.1.2. Start TC2Config

T2Config is a tool which can find all the TCPConv 2 in the local network. By double clicking the application one can see the following interface:

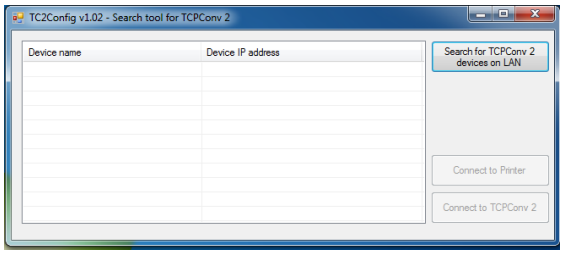

Figure 2.2.: Interface of TC2Config

To start the search one can simply push the button:

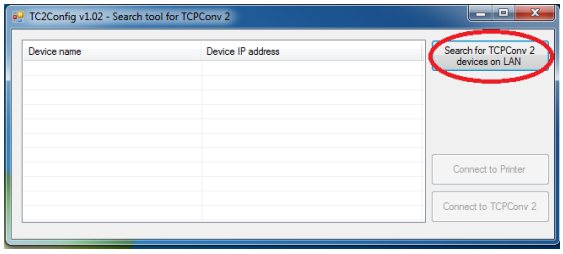

Figure 2.3.: Search for TCPConv

If there are some TCPConv in the network, after a while one can see the whole list:

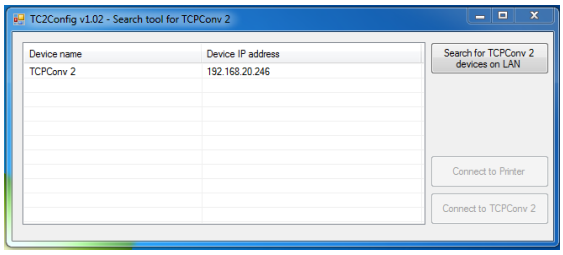

Figure 2.4.: One TCPConv is found

If the printer connected to the selected TCPConv has web front-end on port 80, one can visit this page by pushing the button “Connect to Printer”

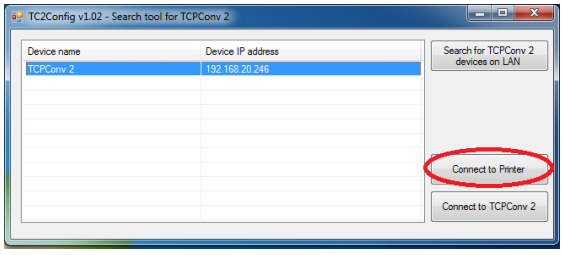

Figure 2.5.: Visit the web front-end of the printer connected

2.4.2. Configure TCPConv and Printer

In order to reduce the work in network administration, it is recommended to do the following configurations.

In this example, we assume that the network is 192.168.1.1 and the printer has IP address of 192.168.1.10.

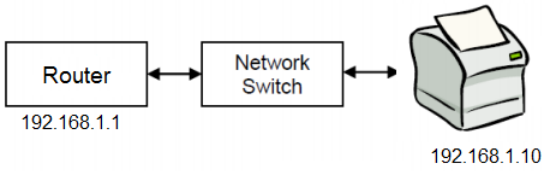

Figure 2.6.: Network Settings without TCPConv

Now a TCPConv is installed between the switch and the printer. The TCPConv 2 should now be 192.168.1.10 whereas the printer is located in the private network of TCPConv. The detailed steps of configuration via web front-end can also be found in Chapter 3.

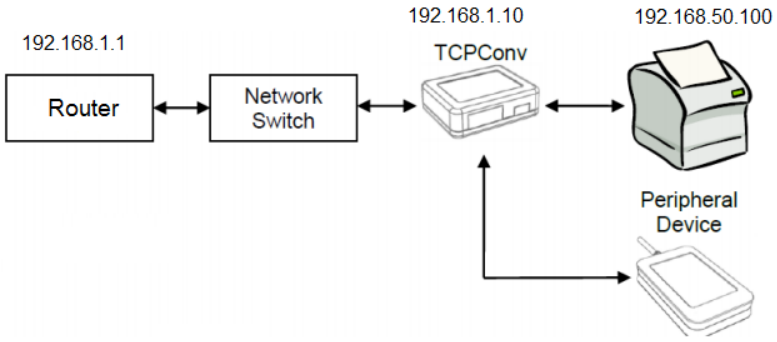

Figure 2.7.: Network Settings for TCPConv and Printer. Note the TCPConv takes the IP address that the Printer had.

Figure 2.8.: Sample Network Configuration of TCPConv

3. Configuration with Web Frontend

3.1. Interface Setup

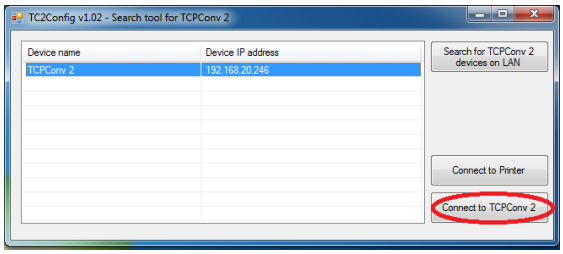

Figure 3.1.: Visit the web front-end of the selected TCPConv 2

By clicking “Connect to TCPConv” while one device is selected, or by typing <ip of a TCP-Conv 2>:81 in the browser, one can see the homepage of the TCPConv

By clicking “Setup” in Figure 3.2 and typing in the user name and password, one can change the configurations. By default, both user name and password are “admin”(without the quotation mark).

The actual settings are displayed on this page. One can for instance configure the TCPConv to use a static IP address or configure it as TCP Server for USB communication. After submitting the changes by pushing “Save and Reboot”, TCPConv 2 will apply the changes and reboot itself.

3.1.1. Network Settings

3.1.1.1. Hostname Setting

One can configure the hostname of a TCPConv 2. If the device uses DHCP, this configured hostname will be sent to the DHCP server. In order to reach the device via hostname, it is necessary that the hostname is also registered in DNS server.

Please make sure a valid hostname is given, otherwise TCPConv 2 will ignore the submit.

Figure 3.2.: Homepage of a TCPConv. Note 192.168.20.246 is also the IP address of this TCPConv 2

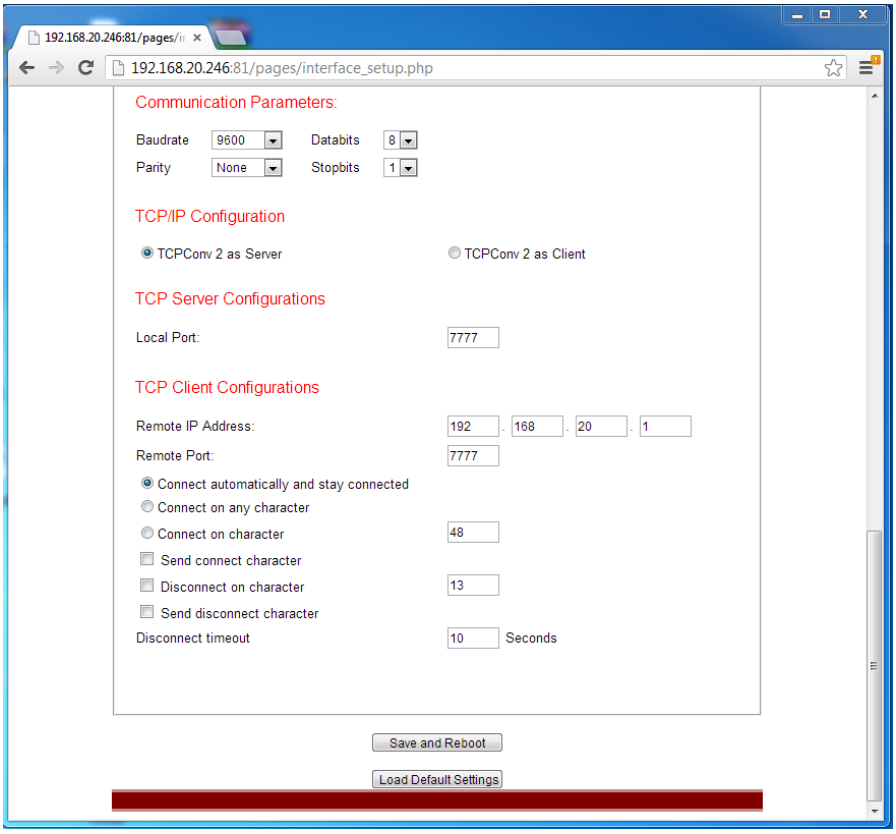

Figure 3.3.: Page Interface Setup for TCPConv 2

Hostnames are composed of series of labels concatenated with dots, as are all domain names. For example, “tcpconv.local” is a hostname. Each label must be between 1 and 63 characters long, and the entire hostname (including the delimiting dots) has a maximum of 255 characters. The Internet standards (Request for Comments) for protocols mandate that component hostname labels may contain only the ASCII letters ’a’ through ’z’ (in a case-insensitive manner), the digits ’0’ through ’9’, and the hyphen (’-’). (RFC 1123) permitted hostname labels to start with digits. No other symbols, punctuation characters, or white space are permitted.

For German language, this means umlauts (ä, Ä, ö, Ö, ü Ö,) and ß are not allowed in hostname.

3.1.1.2. DHCP Setting

One can also activate or deactivate the DHCP on a TCPConv 2 device. A static IP assignment is also possible. If the device fails to get an IP address from DHCP server for some reason, it will use 192.168.1.1 as default IP address.

3.1.2. USB Settings

Currently TCPConv 2 is able to handle HID and CDC readers. For CDC reader, one can configure the communication parameters like baudrate, data bits, stop bits etc.

If the TCPConv 2 is configured as server, it is undesired that server port for USB and for RS232 are the same, because USB server and RS232 server are two different processes.

In the client section, one can configure when the client should be connected. If one wants to specify the connect char, one should type in the decimal ASCII code for the character. This rule also applies for “Disconnect on char”. In Figure 3.4 for example, TCPConv 2 configured in this way will be connected to the server, when the reader sends “0” to TCPConv 2 and it will be disconnected when it receives carriage return from the reader.

3.1.3. RS232 Settings

The RS232 settings are quite similar to USB settings, as mentioned in last section. Currently only server function is supported.

3.1.4. Load Default Settings

By pushing “Load Default Settings” one can view the default settings saved in database on TCPConv. Note that this doesn’t mean the settings are applied, in order to apply the

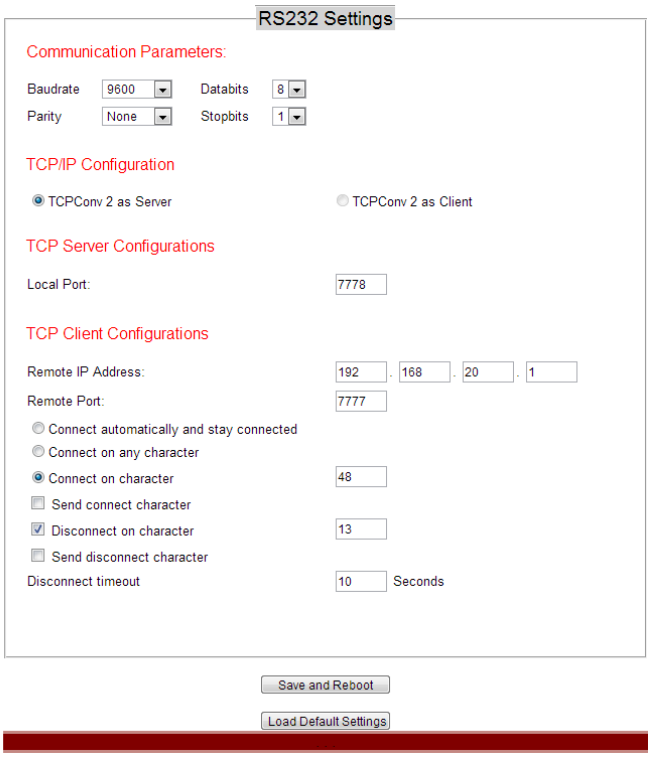

Figure 3.4.: Page Interface Setup for TCPConv 2

changes, one needs to push “Save and Reboot”.

3.2. Change Password

As an administrator one can change the password of the TCPConv. This can be done by pushing the “Password” tab in Fig 3.2.

It is worthy of being mentioned that only the password is allowed to be changed here for security reasons.

3.3. Check Status

One can check the running status of TCPConv 2 by clicking “Status”. The status includes version, printer and USB.

3.3.1. Version

Status	Comment
Kernel	Linux kernel version, for instance 2.6.35.3-571-gcca29a0-00017- g2311310
Boot Stream	Version of the Boot Stream
File System	Version of the File System

3.3.2. Printer

Status	Comment
Internal IP	Must be in a different network than the TCPConv
Status	If there is a printer connected or not

3.3.3. USB

From section USB one can see what kind of USB reader is connected.

Status	Comment
CDC Reader connected	
HID Keyboard reader connected	
USB disconnected	Check if the USB reader is connected, also make sure they are CDC or HID Keyboard Readers

3.4. Download Manual

This Manual can also be downloaded under “Help”.

4. Change the Software on TCPConv via USB Stick

For the configurations mentioned in 3, it is necessary that TCPConv 2 always has a web front-end accessible by the user. This may not be the case when for example the network interface on TCPConv 2 is mistakenly configured or an application without web front-end is for some reason running on TCPConv 2.

Under such circumstances, one can change the software on TCPConv 2 via a USB Stick with correct software. Here the word “software” can refer to a Linux kernel, a whole Debian File System, or an application.

4.1. Prepare the USB Stick

The USB Stick should use FAT format, NTFS is not yet supported. It is also desired that the USB Stick had only one partition. In the coming versions, USB Stick with NTFS and/or more partitions will also be supported.

The image files can be found under Image of TCPConv2DevPack.

4.2. Power up TCPConv with USB Stick plugged

If the USB Stick plugged has a correct certificate and a correct signature, TCPConv will execute the main.sh script.

The whole operation could take quite a while when for example the whole File System must be uploaded to TCPConv. After the script is executed, TCPConv will make a beep and blink its information LEDs.

5. Diagnose and repair the TCPConv 2

5.1. Basic Checks

In normal operation only Power and Ready LEDs are on(both green). Otherwise please first make the following checks:

1. If the TCPConv is powered up
2. If the network cables are correctly connected. “Printer” to printer and “Host” to local network
3. If the Printer is powered up
4. Check if TCPConv can be found by TC2Config Tool
5. Check if the printer uses DHCP to get an IP address
6. Check if the printer uses correct static IP. Normally 192.168.50.100, but 192.168.60.100 in a 192.168.50.x network

5.2. If a TCPConv 2 is no more reachable by TC2Config Tool

Please first do the basic checks as described in the last section, before doing the following steps.

The **Printer** port of the TCPConv has always a static IP configured. By default it is 192.168.50.1.

- Connect your PC to Printer port.
- Apply following TCP/IP settings IP address: 192.168.50.100

  Netmask: 255.255.255.0

  Gateway: 192.168.50.1

  Connect to 192.168.50.1:81 via browser and Login screen will appear:
- If there is no connection, apply

  IP address: 192.168.60.100

  Netmask: 255.255.255.0

Gateway: 192.168.60.1

Connect to 192.168.60.1:81 via browser

- Type in the Username and password
- Fulfil the configuration as explained in 3
- Disconnect PC from Printer port
- Use the normal Hardware Setup

5.3. If a TCPConv 2 is unable to forward data from reader to TCP/IP connection

This may be because the TCPConv has a wrong configuration. Under Help->Log file one is able to see the error log: In Figure 5.1, the TCPConv 2 has no route to the configured server

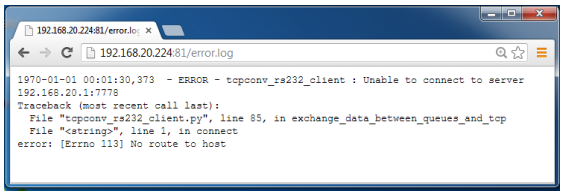

Figure 5.1.: Sample error log of TCPConv 2

192.168.20.1:7778, as displayed in the browser. Further tracebacks are also be viewed, which may help the developers to find the bugs as soon as possible.

It is worthy of being mentioned that this log won't be saved to flash. Therefore, it will be lost once the TCPConv is rebooted.

5.4. If a TCPConv works fine, but the printer doesn't

Please first do the basic checks as described in the last section, before doing the following steps. Meanwhile, please also make sure that the printer itself works fine if it is directly connected to the local network without a TCPConv 2 in between.

The reason for this can the following:

- The printer uses the same TCP port that TCPConv uses.

  This will be a problem because they share the same IP address. If this is the case, please go to the Interface Setup page and configure the TCPConv 2.

- The printer itself has problems to print, for instance no paper, no ink.

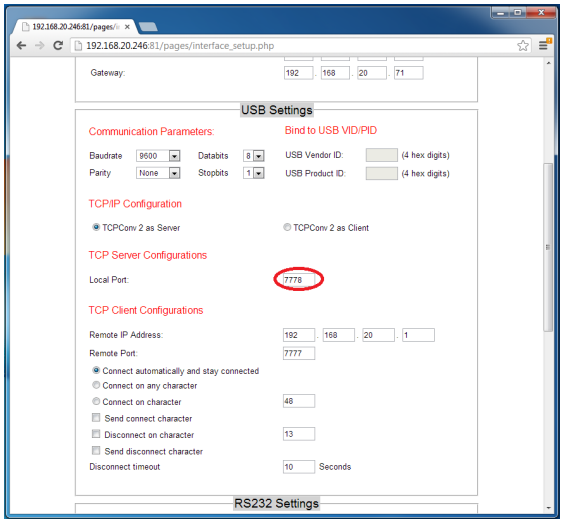

Figure 5.2.: Modify the local port for USB communication

5.5. Else ...

Please contact support-rfid@elatec.com for an image. Copy the image to the root directory of USB Flash, plug in the USB Flash to the TCPConv 2 and then reboot the TCPConv 2.

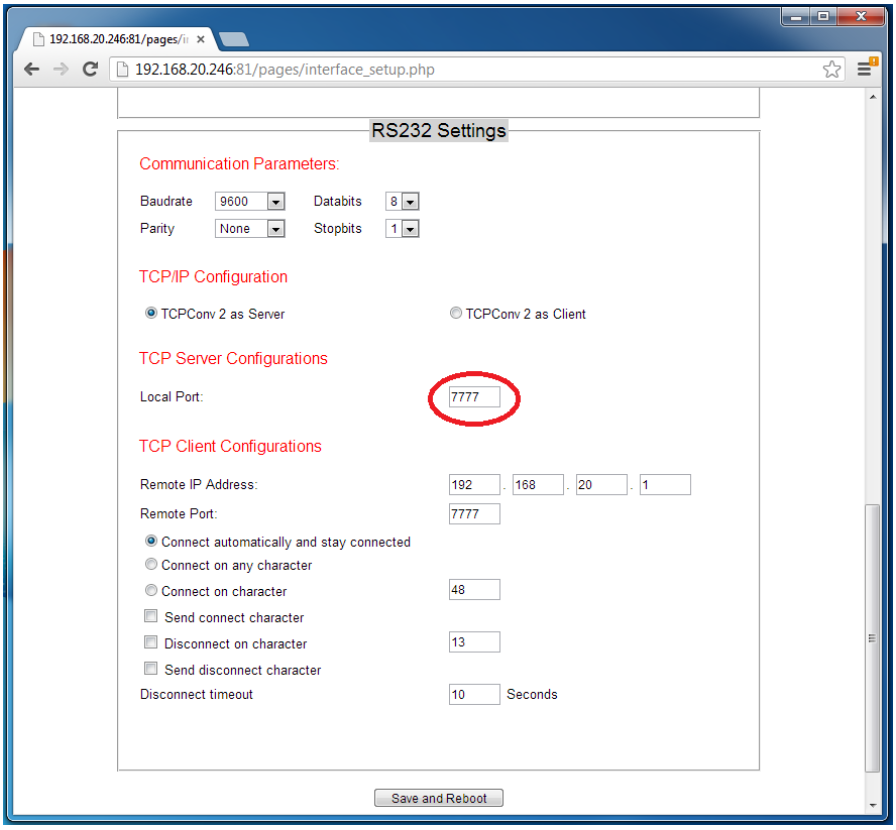

Figure 5.3.: Modify the local port for RS232 communication

A. FCC Notice

NOTICE

This device complies with Part 15 of the FCC Rules.

Operation is subject to the following two conditions:

1. this device may not cause harmful interference, and
2. this device must accept any interference received, including interference that may cause undesired operation.

NOTICE

Changes or modifications made to this equipment not expressly approved by Manufacturer may void the FCC authorization to operate this equipment.

NOTE

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.

- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

Consult the dealer or an experienced radio/TV technician for help.