WLX

802.11 a/b/g/h

WLAN-Bridge
Serial Client Adapter

Manual

Content

Pictures

List of tables

System Overview

The WLX is intended to connect devices with Ethernet or serial interfaces to a Wireless Local Area Network (WLAN) corresponding to the 802.11 a/b/g standard.

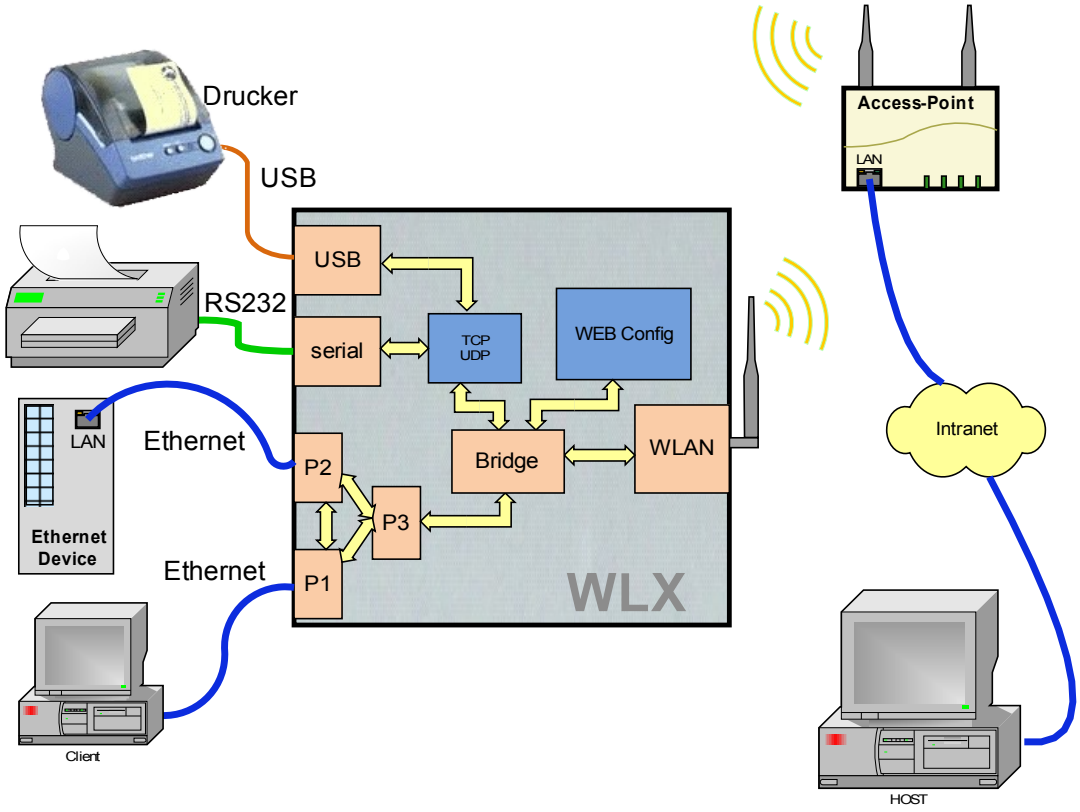

Illustration 1: System overview

The WLX can receive and transmit data via 2 Ethernet LAN ports and can transfer this data via a WLAN Interface to a matching WLAN access point that is connected to a stationary LAN.
The WLX can also receive and transmit data via a serial port. This data can be exchanged via a TCP- or UDP-Socket with other devices by using the LAN or WLAN interfaces of the WLX.
The WLX needs many parameters to handle all the different interfaces. The WLX supports a Web interface to configure all these parameters. In addition a further interface is available to locate, configure, upgrade and to monitor the WLX. This interface is used by the UCP-Config-Program.

Block schematic

The following picture shows the function groups of the WLX module.

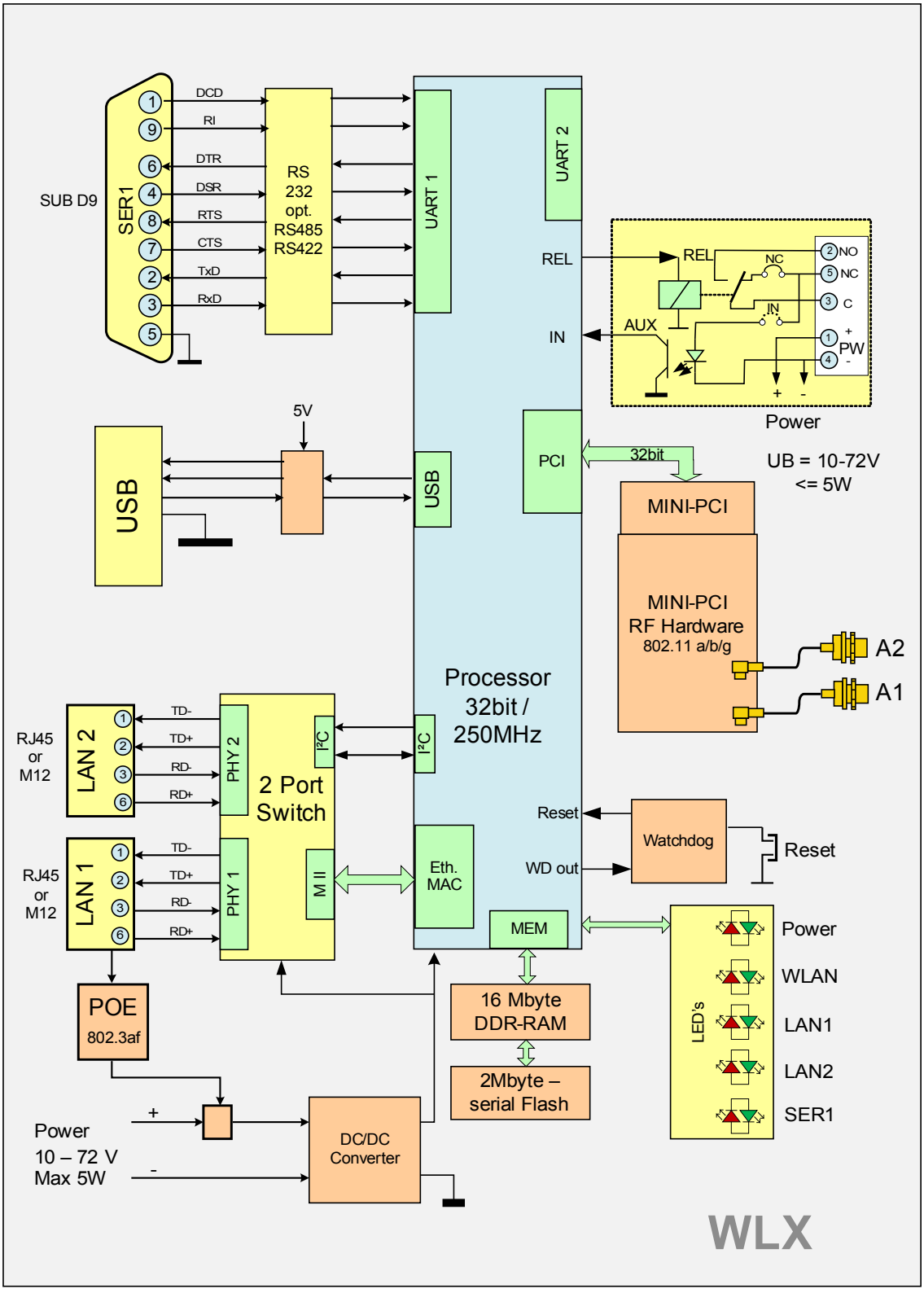

Illustration 2: Block schematic

The main component of the WLX is a 32bit network processor that controls all the different functions.

The interfaces are:

1. Mini-PCI-Socket
2. Two Ethernet-Interfaces 10/100 MBit + auto MDI (auto crossover function)
3. 1 serial interface with 6 status lines
4. Relay switch an optional an AUX input with optocouple

The Ethernet ports have RJ45 plugs. Because of the auto MDI functionality the WLX can be attached to a HUB or the LAN port of a computer with standard patch cables. The WLX recognizes the cable polarity and automatically connects the right signal lines.

The serial port is connected via a 9 pin female D-SUB connector. The pin allocation makes it possible to connect to a computer COM port with a 1 to 1 serial cable. The exact pin allocation is shown in Illustration 3 below.

The WLX can be powered by a supply with a voltage between 10 – 72V. The typical power consumption is 4.0 Watt.

Connections to the WLX

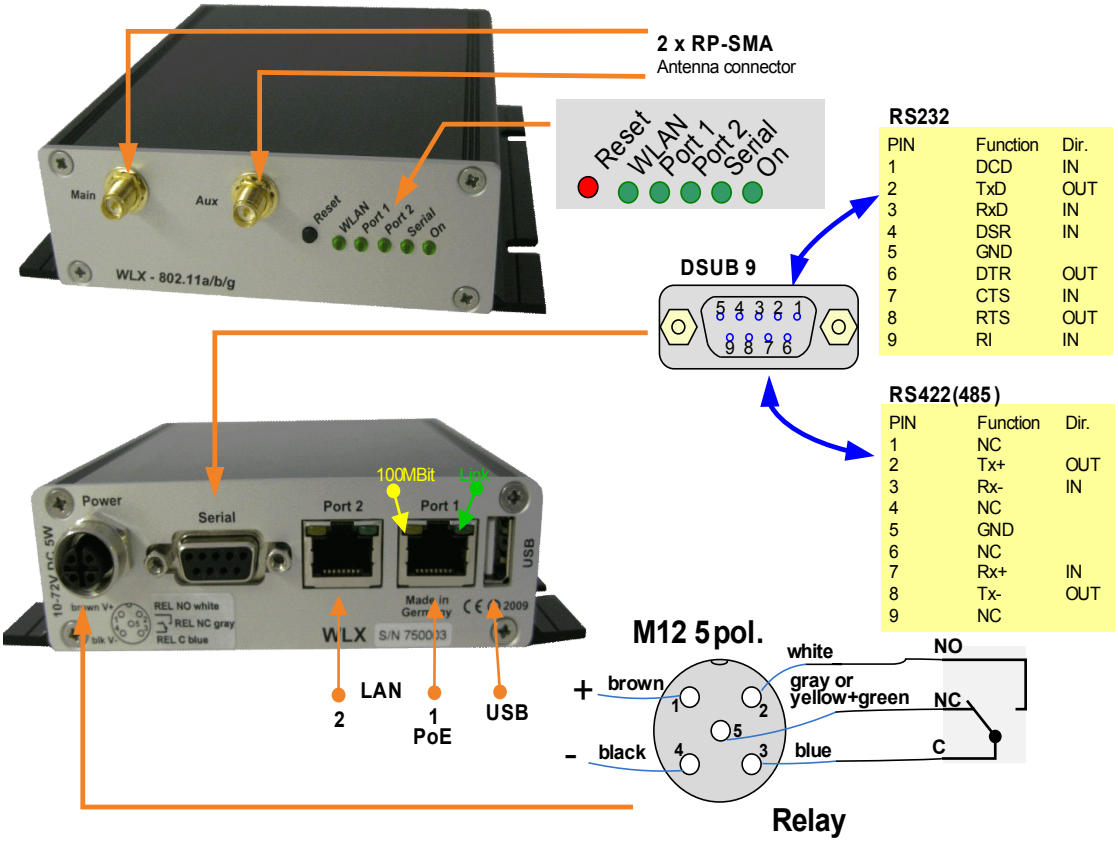

Illustration 3: Connectors and LED's at the WLX

The picture shows the WLX in a standard configuration with 2 LAN ports (RJ45) and an M12 plug to connect the power supply and the relay.

The meaning of the LED's

The 5 LED's at the front side show the operating status of the WLX. All lamps are 2 color red and green shining LED's. If both LED's are on, the lamp is shining orange.

LED	Function	
On	**off:** **green**: **orange green blinking**	on power supply power supply OK WLX ready for service
WLAN	**Red blinking** **steady green** **green + orange blinking**	searching for RF-connection (scanning) or doing the authentication. found a suitable Access-Point and established a connection RF activity (receive or transmit)
Port 1 **Port 2**	**off:** **green**:	no device connected to the LAN port. an Ethernet device is connected to the LAN port. Blinking shortly signals activity.
Serial	**steady off:** **green:**	no communication partner is connected to the WLX A communication partner is connected to the WLX. When data is transmitted or received via the serial port the LED is switch off shortly.

Table 1: LED Function

Technical features

Processor	Type	32bit network processor 250MHz clock
	Memory	2MByte Flash 16MByte DRAM
Interfaces	Ethernet	2 x 10/100 Mbps Fast Ethernet Auto MDI/MDIX thereof 1 x with PoE (LAN Port 1)
	Serial 1	RS232 with handshake signals RTS, CTS, DSR, DTR,DCD (input), RI (input) optional RS485, RS422
	Mini-PCI	qualified to drive RF-Cards the Chipsets from Atheros (AR5112, AR5113,AR5414)
	Relay	Relay change-over contact can be switch via WLAN or LAN
	AUX-Input (optional)	Signal input (24V, galv. separated)
Antenna connectors	Main	Standard: RP-SMA Optional: SMA, TNC, RP-TNC
	Aux	Like „Main“
LED's	5 LED’s	- Power - WLAN (wireless) - Port 1 (LAN) - Port 2 (LAN) - Serial (RS232)
Power Supply	Connector	Hirschmann M12-5pol-Connector
	Consumption	< 4,0W (typ.) =< 5W (max.)
	Voltage range	10-72V
Operating temp. range		0-60°C
Dimensions	Board	120x100x20mm
	Case	Standard: 125x105x35mm
	Weight	ca. 450g

Table 2: Technical features

WLAN – Interface

Security	IEEE 802.11i WPA(2) (Wifi Protected Access) (PSK/TKIP), WEP 64/128, IEEE 802.1x (EAP-PEAP, EAP-TLS, EAP-TTLS, LEAP Supplicant)
Data rates	802.11b 11, 5,5, 2 & 1 MBit/Sek. 802.11g 54, 48, 36, 24, 18, 12, 9, 6 MBit/Sek. 802.11a 54, 48, 36, 24, 18, 12, 9, 6 MBit/Sek.
Frequencies	ISM-Band: 2.400 MHz bis 2.483 MHz U-NII Band: 5.150 MHz bis 5.350 MHz (ETSI, RegTP Indoor) 5.470 MHz bis 5.725 MHz (ETSI, RegTP Outdoor)
channels	802.11b/g: ETSI: 1-13, (3 non overlapping) 802.11a: ETSI: 19 non overlapping (5.150-5.320 & 5.500-5.700 MHz)
transmit power level	802.11b/g: 18dBm peak 802.11a: 18 or 17dBm

Table 3: WLAN interface features

First Time Setup

To set up the WLX it has to be connected with a patch cable to the Ethernet interface of a computer. After applying power, the green “Link LED“ on the RJ45 connector shines when a link is detected. The yellow “100 MBit” LED indicates a 100 MBit connection.
The “Port 1 or 2” LED on the front panel shines green when a connection has been established via the Ethernet.
The “WLAN” LED on the front panel will be blinking red because usually no suitable WLAN is recognized.

The UCP-Config Program

To do the „first time setup“ the WLX has to be connected via the LAN-Interface to the computer (PC) that runs the UCP-Config-Program

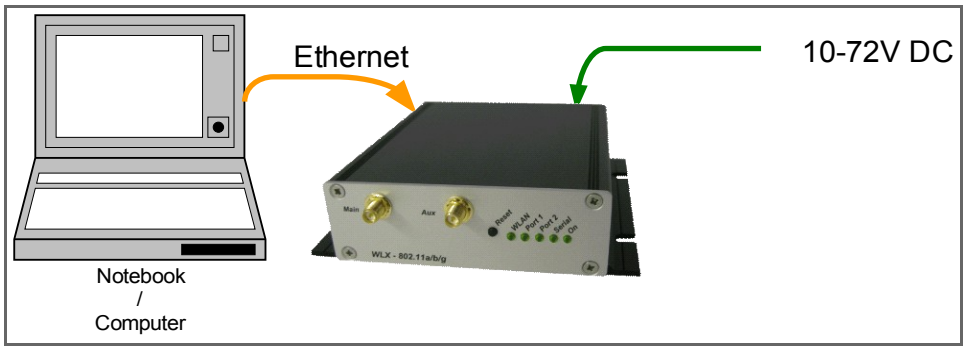

Illustration 4: arrangement to configure the WLX

You have to observe:

- The connected PC should have a fixed IP address. (no DHCP)

- The LAN-Interface at the PC must be detected as connected. Check the parameter of the LAN-Interface with the „ipconfig“-command.

- If the LAN-Interface of the PC is correctly recognized then press the „refresh“-button of the UCP-config-program.
- An active firewall could prevent the communication to the WLX.

After the start the UCP-Config-Program ascertained all network interfaces that are active at the PC. After this the UCP-Config-Program sends broadcast UDP requests to all these interfaces. The registered answers of the WLX devices are shown in a list.

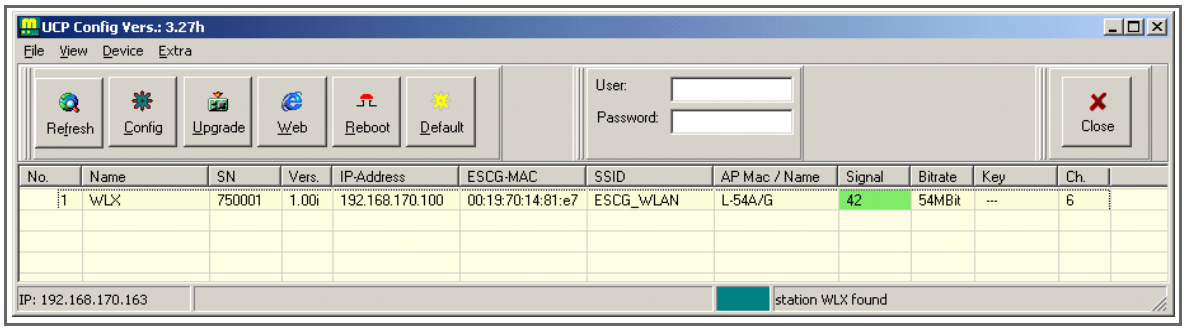

Illustration 5: UCP-Config-Screenshot

All located WLX devices are shown in a list with their station names, firmware versions and addresses. The WLAN connection is also shown with a signal quality value.
The value can be interpreted as follows:

Signal >= 40 → connection very good
Signal >= 30 → connection good
Signal >= 20 → connection is OK, but the WLX starts to search for better AP’s.
Signal < 20 → connection restricted, the bit rates will be lowered.

Reset to factory default

The factory default settings can be restored by pressing the reset button located on the front panel for a period of more than 10 Seconds. While the reset button is pressed, the “ON”-LED blinks orange more faster. When the WLX does a restart the default settings are configured. Now the reset button can be released.

Main factory default values:

Device Name: „WLX“
SSID = „ESCG_WLAN“
WEP = OFF
WPA = OFF
802.1x = OFF
802.1x user: „“ (empty)
802.1x password: „“ (empty)
MODE= 802.11b/g

IP = 192.168.170.100
Netmask = „255.255.255.0“
Gateway = 192.168.170.249

user = „“ (empty)
password = „“ (empty)

SER1: inactive

WEB interface

Info Page

After getting a connection with a WEB browser to the WLX, a WEB page of the WLX is shown that gives status information to the user.

Bridge Information

Info	Note
Serial Number	Serial number of the device
Up-time	This is the time the device is running since power up or since the last reset.
UTC-Time	This is the internal daytime of the device. At start-up this time is set to 01.01.2000 00:00:00 o'clock. If the IP address of a time server is configured the device try's to get the daytime from there. The daytime is used for syslog messages.
Bridge Name	This name is configured at the Admin page. The name is shown in the config program in the first column.
MAC Address	This is the MAC address that the device uses for communication via the WLAN. Normally this MAC address is taken from the build in RF-unit. The user can configure (see advanced) different modes to use other MAC addresses (cloning).
Firmware-Version	
Hardware-Version	

IP – Info

Info	Note
DHCP	The device can use a static IP address or can get a IP address from an DHCP server. This can be configured on the Admin page.
IP	This is the IP address the device actually use.
Subnet mask	
Gateway	IP address of the gateway.

WLAN Info

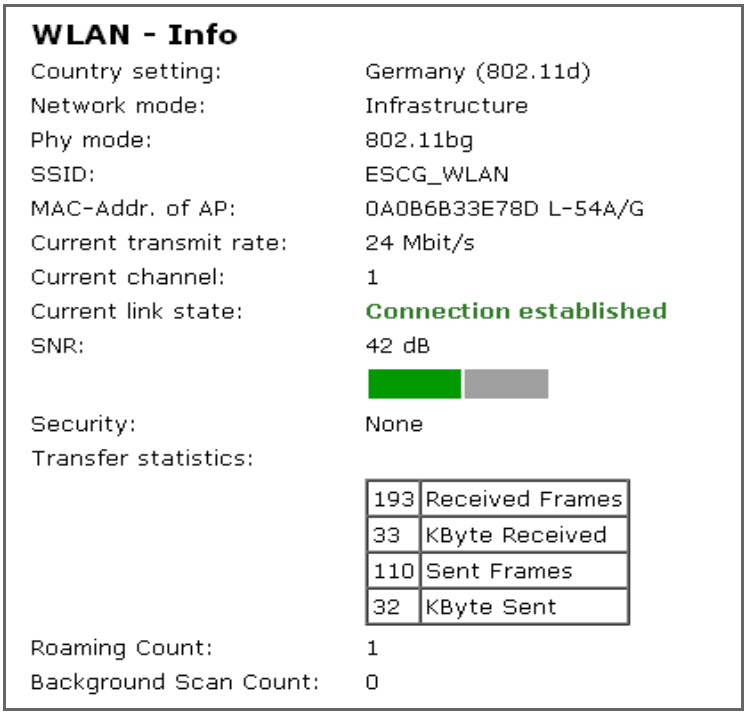

Illustration 6: WLAN - Info

Info	Note
Country setting	Because there are country depending rules to use WLAN the user has to select the country where the device will operate. If the Option IEEE802.11d (see wireless page) is active, the country specific settings will be received from the AP (if possible). If the device received this information, the country setting is marked with „(802.11d)“
Network mode	2 Modes are supported: Infrastructure → The device will connect to APs Adhoc → The device will work in a point to point network.
Phy mode	The following modes are supported: 802.11 bg → 2.4GHz band with 11 or 54MBit max. 802.11 g → 2.4GHz with 54MBit max. 802.11 b → 2.4GHz with 11MBit max. 802.11 a → 5GHz with 54MBit max.
SSID	This is the „*Service Set Identifier“,* that's the name of the wireless network.
MAC-Addr. of AP	If the device is connected to an access-point the MAC address of this access-point is shown here.
Current transmit rate	This is the actual used transmit rate that the WLAN card uses to transfer data.
Current channel	The used channel is given by the access-point.
Current link state	When the connection to the access-point is completed the status info „**Connection established** „ is shown. A status message with red letters signals an unconnected status.
SNR	SNR shows the „signal noise ratio“. The value can be interpreted by the following rules:

<table>
<tr><td></td><td>
<table>
<tr><th>SNR</th><th>State</th></tr>
<tr><td>>= 40</td><td>very good radio reception</td></tr>
<tr><td>>= 30</td><td>good radio reception</td></tr>
<tr><td>>= 20</td><td>good radio reception but depending on the configuration the device starts to scan other channels for „better“ access-points.</td></tr>
<tr><td>>= 10</td><td>poor radio reception, the transmit rates will be lowered. the device will scan other channels to find „better“ access-points.</td></tr>
<tr><td>< 10</td><td>very poor radio reception, the data throughput will be lowered.</td></tr>
</table>
.
</td></tr>
<tr><td>Security</td><td>The used security method is shown.
• None
• WEP
• WPA(2)
• EAP-PEAP (TTLS,TLS,LEAP)</td></tr>
<tr><td>Transfer statistics</td><td>This table shows some statistical values of the transceiver module.</td></tr>
<tr><td>Roaming Count</td><td>This value tells the number of roaming cycles since the last reset.</td></tr>
<tr><td>Background Scan Count</td><td>If the radio reception is getting worse the device scans other channels for better reachable access-points. The number of scan cycles are shown here.</td></tr>
<tr><td></td><td></td></tr>
</table>

LAN – Info

In this section the actual status of the both LAN ports is shown.

Port 1 (2)	• Down → no LAN cable is connected or the LAN Client is not switched on. • 10 or 100MBit → transmission speed • full or half duplex → simultaneous send and receive on or off.
MAC Table Entry	Table of the registered MAC addresses of client devices at the LAN port.

Serial – Info

In this section the actual configuration and status of the serial port is shown

Serial 1	Information from the serial interface: - if the interface is configured active, additional status information are displayed. **Serial - Info** Serial 1 Active Connection Tcp Server waiting for client connection. (11 min) Serial Signals DCD DSR CTS RTS DTR RI DCD, DSR, CTS + RI are input signals for the device. RTS + DTR are output-signals Green letters marks active signals. Black letters marks inactive signals.

IO - Info (optional)

In this section the actual configuration and status of the output (relay) and input port is shown

<table>
<tr><td>Relay</td><td>Configuration and status of the output port

<table><tr><td>Mode</td><td>Function</td></tr><tr><td>Disabled</td><td>Port not active</td></tr><tr><td>TCP (UDP)</td><td>The relay module opens a TCP (UDP) – socket and waits for data that controls the relay.</td></tr><tr><td>Internal</td><td>The relay is controlled by the AUX-Input.</td></tr><tr><td>Serial trigger</td><td>The relay become active when data is transmitted via the serial port.</td></tr></table></td></tr>
<tr><td>AUX-Input</td><td>Configuration and status of the AUX-Input port

<table><tr><td>Mode</td><td>Function</td></tr><tr><td>Disabled</td><td>Port not active</td></tr><tr><td>UDP</td><td>The status of the input signal is transmitted via an UDP socket to the configured host.</td></tr><tr><td>Relay ON/OFF</td><td>The input signal switches the internal relay.</td></tr><tr><td>Relay toggle</td><td>With every activation of the input signal the relay will be toggled.</td></tr></table></td></tr>
</table>

USB – Info

In this section the actual status of the USB port is shown.

<table>
<tr><td>State</td><td colspan="2">If an USB memory stick is connected to the WLX USB Port the following status is shown.
USB - Info
State Mounted USB mass storage
Debug logging to USB active

If a USB memory is detected, debug information will be stored in a file on the USB memory stick.</td></tr>
<tr><td>State</td><td>status of the USB Ports</td><td>If an USB memory stick is connected to the WLX USB Port the following status is shown.
USB - Info
State Mounted USB mass storage
Debug logging to USB active

If a USB memory is detected, debug information will be stored in a file on the USB memory stick.

IIf an USB printer is connected to the WLX USB Port the following status is shown.</td></tr>
</table>

USB - Info

Detected USB-Printer

Num	Printer URI	Job Count	Printed Bytes	Last Job
1)	/printers/USB_PRINTER	1	15KB	C: mpDoku1.txt

Printer URI is the address of the printer.
Job Count counts the number of printed jobs
Printed Bytes shows the amount of bytes that are transferred to the USB-Printer
Last Job shows the name of the last job.

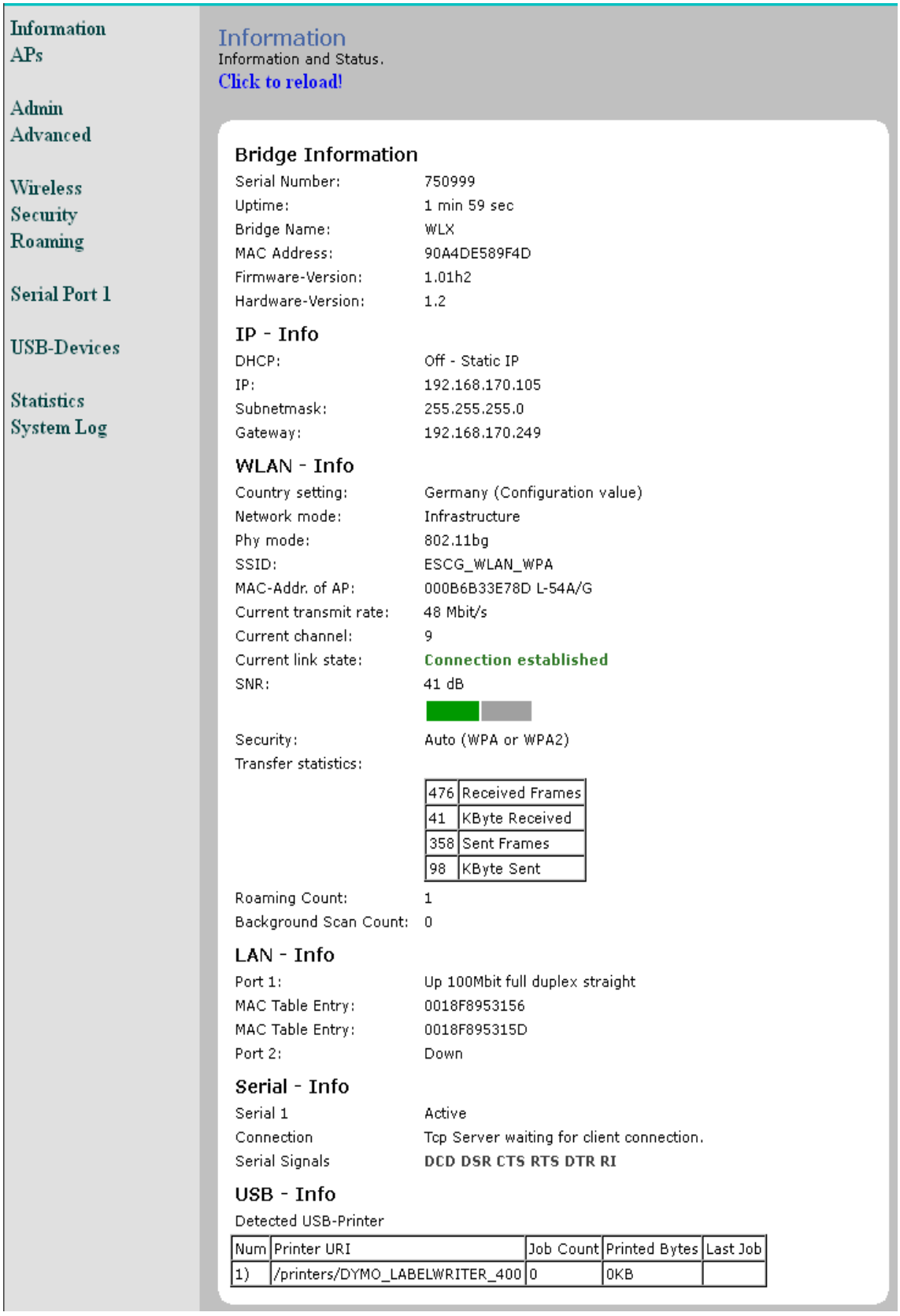

Illustration 7: Screenshot of the info page

The other pages of the WEB interface are for parameter settings and further status information of the device. The settings are explained on the WEB pages.