Systeme Helmholz®
compatible with you

NETLink WLAN

Ethernet Gateway for PPI/MPI/PROFIBUS

700-882-MPI21

User Manual

Edition 2 / 25.05.09

HW 1, FW 2.10 and higher

Order number of manual: 900-882-MPI21/en

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Note:

We have checked the content of this manual for conformity with the hardware and software described. Nevertheless, because deviations cannot be ruled out, we cannot accept any liability for complete conformity. The information in this manual is regularly updated. When using purchased products, please heed the latest version of the manual, which can be viewed in the Internet at www.helmholz.de, from where it can also be downloaded.

Our customers are important to us. We are always glad to receive suggestions for improvement and ideas.

Revision history of this document:

Edition	Date	Revision
1	22.04.2009	First Edition
2	25.05.2009	Lower modifications at chapter 3,4,7 and 9

Contents

1 Safety Information

For your own safety and for the safety of others, always heed the safety information given here. The safety information indicates possible hazards and provides information about how you can avoid hazardous situations.

The following symbols are used in this manual.

Caution, indicates hazards and sources of error

Gives information

Hazard, general or specific

*Danger of **electric shock***

1.1 General

NETLink WLAN is only used as part of a complete system.

The operator of a machine system is responsible for observing all safety and accident prevention regulations applicable to the application in question.

During configuration, safety and accident prevention rules specific to the application must be observed.

Emergency OFF facilities according to EN 60204 / IEC 204 must remain active in all modes of the machine system. The system must not enter an undefined restart.

Faults occurring in the machine system that can cause damage to property or injury to persons must be prevented by additional external equipment. Such equipment must also ensure entry into a safe state in the event of a fault. Such equipment includes electromechanical safety buttons, mechanical interlocks, etc. (see EN 954-1, risk estimation).

Never execute or initiate safety-related functions using an operator terminal.

1.2 Restriction of access

Only authorized persons must have access to the modules!

The modules are open equipment and must only be installed in electrical equipment rooms, cabinets, or housings. Access to the electrical equipment rooms, barriers, or housings must only be possible using a tool or key and only permitted to personnel having received instruction or authorization.

1.3 Information for the user

During configuration, safety and accident prevention rules specific to the application must be observed.

This manual is addressed to anyone wishing to configure, use, or install NETLink WLAN.

The manual tells the user how to operate NETLink WLAN and explains the signaling functions. It provides the installing technician with all the necessary data.

NETLink WLAN is exclusively for use with a S7-200 and S7-300/S7-400 programmable controller from Siemens.

NETLink WLAN is for use within a complete system only. For that reason, the configuring engineer, user, and installing technician must observe the standards, safety and accident prevention rules applicable in the particular application. The operator of the automation system is responsible for observing these rules.

1.4 Use as intended

NETLink WLAN must only be used as a communication and signaling system as described in the manual.

1.5 Avoiding use not as intended!

Make sure in the software that uncontrolled restarts cannot occur.

Safety-related functions must not be controlled via NETLink WLAN alone. Make sure in the software that uncontrolled restarts cannot occur.

2 Installation and Mounting

Before you start installation work, all system components must be disconnected from their power source.

Installation and mounting must be effected in compliance with VDE 0100 / IEC 364. Because it is an IP20 module, you must install it in a cabinet.

A maximum ambient temperature of 60 ºC must be ensured for reliable operation.

2.1 Mounting orientation

NETLink WLAN can be installed in any position.

2.2 Minimum clearance

Minimum clearances must be observed because

- Then it is possible to insert and remove NETLink WLAN without having to remove other system components.
- There is enough space to connect existing interfaces and other contacts using standard commercial type accessories.
- There is room for any necessary cable routing.

For NETLink WLAN, a minimum clearance of 60 mm must be left above and below and 10 mm at the sides.

2.3 Installing the module

A wall/DIN rail bracket is available as an accessory for mounting on flat surfaces or on DIN rails. Wall/DIN rail bracket and NETLink WLAN are separable without tools.

The available accessories are listed in Section 3.5 with the corresponding order numbers.

3 System Overview

3.1 Application and function description

NETLink WLAN is a gateway between a TCP network and a PPI, MPI, or PROFIBUS network.

Two protocols are available at the TCP end for exchange of useful data with the automation system (multi-protocol operation):

- One is a proprietary protocol that is used to connect to the proprietary NETLink-S7-NET driver
- The other is the S7-TCP/IP protocol often used by visualization system manufacturers which is known as *'RFC1006'* or *'ISO on top of TCP'*.

Up to 16 TCP connections (10 Mbps or 100 Mbps or 802.11 b/g) and up to 32 PPI/MPI/PROFIBUS connections (9.6 kbps to 12 Mbps) can be used simultaneously.

On the WLAN side NETLink WLAN can be regarded as station. The adapter can establish a connection to an access point via the so called "Infrastructure Mode". In addition it is possible to establish a direct connection to a PG/PC using the so called "AdHoc Mode". NETLink WLAN supports WLAN standards 802.11 b/g. Therefore, data rates of up to 54 Mbps are possible.

On both the TCP and the field bus sides, the baud rate used can be determined automatically (auto negotiation or autobaud)

NETLink WLAN can draw the necessary power supply either from the bus interface of the programmable controller or via an external power supply.

The connecting cable used to link NETLink WLAN with the programmable controller is 1.2 meters long and active. Because it is active, no spur lines are required which could interfere with the bus.

The use of the NETLink-S7-NET driver makes it possible to use NETLink WLAN as the following at the PC end

- Programming adapter,
- Teleservice unit, or
- Operator control and monitoring unit

The RFC1006 interface also enables you to use third-party software that supports this protocol to communicate with S7-300/S7-400 systems.

NETLink WLAN can be connected to the PC via switch, hub, access point, directly via AdHoc or directly via LAN cable in both cases.

3.2 Connections

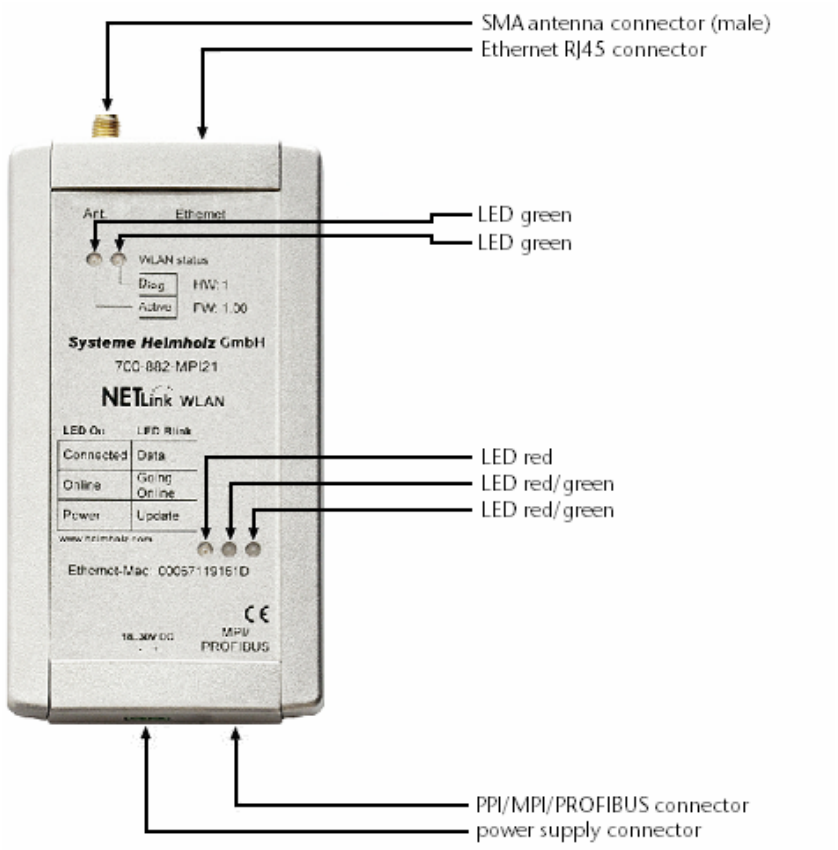
NETLink WLAN has the following connections:

The NETLink has the IP address 192.168.4.49 on delivery from the factory.

- RJ45 socket for connecting the unit to a commercial type switch or hub using a standard CAT5 TCP or Crossover-Cable.
- SMA socket for connection to a customary WLAN antenna (for accessories, see Section 3.5).
- Power supply socket for 24 V DC power supply.
  This power supply option can be used, if the programmable controller used does not provide any or only insufficient power on the bus connector.
- Bus connector with programming unit socket, switchable terminating resistor, and 1.2 m connecting cable.
  The programming unit socket of the bus connector allows further bus nodes to be plugged in.
  The terminating resistor must be connected (ON) if NETLink WLAN is at the beginning or end of a bus segment. If this is not the case, the switch position must be OFF.
  The 1.2 m connecting cable is an 'active cable'. This means there is no spur line, which avoids interference on the bus at high baud rates.

3.3 LED displays and Connectors

NETLink WLAN has five LEDs, including two two-color LEDs, to indicate its operating status.



The two LEDs located on the RJ45 socket indicate by their status, the state of the LAN that is connected to NETLink WLAN.

LINK LED (green)		ACTIVE LED (yellow)	
Status	**Description**	**Status**	**Description**
OFF	Not connected	**OFF**	No activity on the network
ON	Connected	**ON**	Activity on the network
BLINK		**BLINK**	Activity on the network

The two LEDs on the top of NETLink WLAN indicate the operating status of the WLAN connection:

DIAG LED (yellow)		ACTIVE LED (green)	
Status	**Description**	**Status**	**Description**
OFF	No Errors (WLAN)	**OFF**	No WLAN connection
ON	NETLink damaged	**ON/BLINK**	Connection established
BLINK	Read/write Configuration	**BLINK**	Try to attemp a WLAN connection

The three LEDs (two two-color LEDs) on the top of NETLink WLAN indicate the operating status of the device itself:

LED status for operating status	Power LED (green)	Active LED (green)	Active LED (red)	Connect LED (green)	Connect LED (red)
Ready for operation	ON				
Try to log on to the PPI/MPI/PROFIBUS	ON	BLINK			
Actively logged on to the PPI/MPI/PROFIBUS	ON	ON			
Active connection with a programmable controller	ON	ON		ON	
Data exchange with a programmable controller	ON	ON		BLINK	
Transferring firmware update	BLINK		BLINK		BLINK
Storing firmware update	ON		ON		ON
Exception at bus end	ON				BLINK
Exception at PC end	ON		BLINK		

3.4 Items supplied

The NETLink has the IP address 192.168.4.49 on delivery from the factory.

The scope of supply of NETLink WLAN includes:

- NETLink WLAN ready to run
- CAT5 TCP cable (straight) with a length of 3 meters
- CD with NETLink-S7-NET driver, additional info's
- Manual (German/English)

3.5 Accessories

3.5.1 Manuals

Manual, German	900-882-MPI21/de
Manual, English	900-882-MPI21/en

3.5.2 Software

S7/S5 OPC server with USB dongle	800-880-OPC20

3.5.3 Other accessories

DIN mounting rail bracket	700-751-HSH01
Power supply adapter with plug Input: 100-240 V AC / 47-63 Hz / 400 mA Output: 24 V DC / 625 mA	700-751-SNT01

3.5.4 WLAN antenna/antenna cable

2,4 GHz 5 dBi Magnet base antenna (1m cable)		700-889-ANT01
2,4 GHz 8 dBi Omni antenna (Cable see below)		700-889-ANT02
2,4 GHz 8 dBi Panel antenna (Cable see below)		700-889-ANT03
Antenna cable, 3 m; 1,7 dB	Ø 2,5 mm	700-889-ANK01
Antenna cable, 5 m; 2,8 dB	Ø 2,5 mm	700-889-ANK02
Antenna cable, 6 m; 1,4 dB	Ø 10 mm	700-889-ANK03
Antenna cable, 10 m; 2,3 dB	Ø 10 mm	700-889-ANK04

4 Installation of the driver software

With installation of the NETLink-S7-NET driver for NETLink WLAN, it is easy to access controllers with a PPI, MPI, or PROFIBUS interface from the PC via TCP/IP.

4.1 Introduction

The NETLink-S7-NET driver is inserted in the PG/PC interface of an existing Simatic application and can then be used from most Simatic engineering tools (STEP7, ProTool, WinCC, etc.).

Access is possible to any controllers of the Simatic S7-200, S7-300, or S7-400 series via NETLink WLAN.

4.2 System requirements

A PC with a 32-bit Windows operating system is required to operate the NETLink-S7-NET driver at the PU end. The Windows XP (SP3) and Windows Vista operating systems can be used.

A further requirement is the existence of a Simatic engineering tools, such as STEP7, Version 5.1 and higher or STEP7-Micro/Win Version 4.0 and higher, which ensures that the PG/PC interface is installed on the computer.

Installation under Windows 2000 and 64-bit operating systems is possible but is not supported by the technical support team of Systeme Helmholz GmbH. Please pay attention to the requirements of the Simatic package used.

A functioning network link using TCP/IP must have been set up on the PCs that are used. The network configuration of the PC must be known. You can use normal commercial type network cards or WLAN adapters. You can use Crossover- or 1:1-Cables for the cable bonded connection.

To maximize performance, 100 Mbps network cards and switches should be used in the local area network. Of course, you can also use 10 Mbps network cards and hubs but that would slow down status operation. It is also possible to establish a connection via WLAN 802.11 b/g (11 / 54 Mbps). The performance of the WLAN connection depends on several factors, for example the distance to the WLAN device and obstructions. For this see VDI/VDE 2185.

4.3 Running the installation setup

Administration rights are required for installation.

After you have inserted the installation CD, user guidance starts automatically, allowing the user to start the setup routine of the NETLink-S7-NET driver.

If the user guidance does not start automatically, the setup file can be launched manually in directory '*CD drive:\Driver*'.

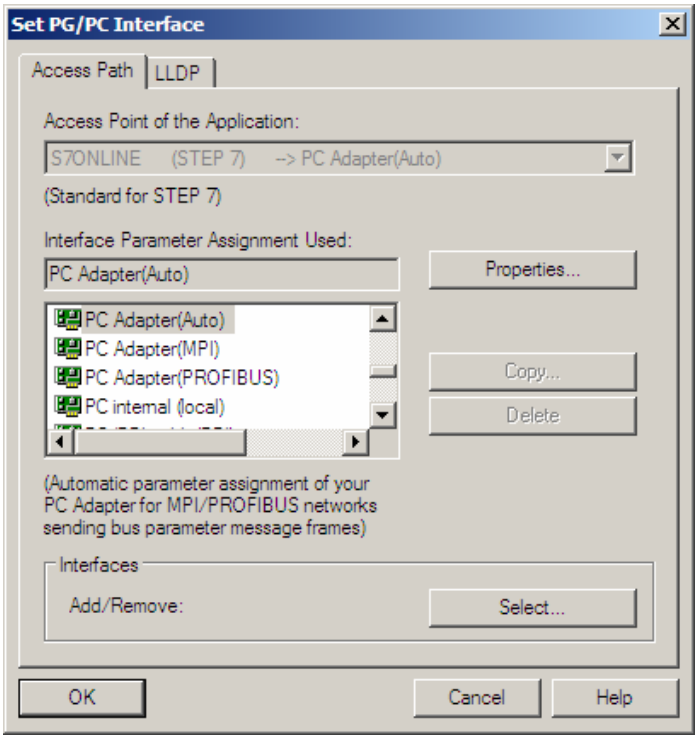
If necessary, you can download the latest NETLink-S7-NET driver from our homepage (http://www.helmholz.de).

Please note that for installation you have to log on as an administrator under the 32-bit Windows operating systems because the setup program has to make entries in the Windows registry.

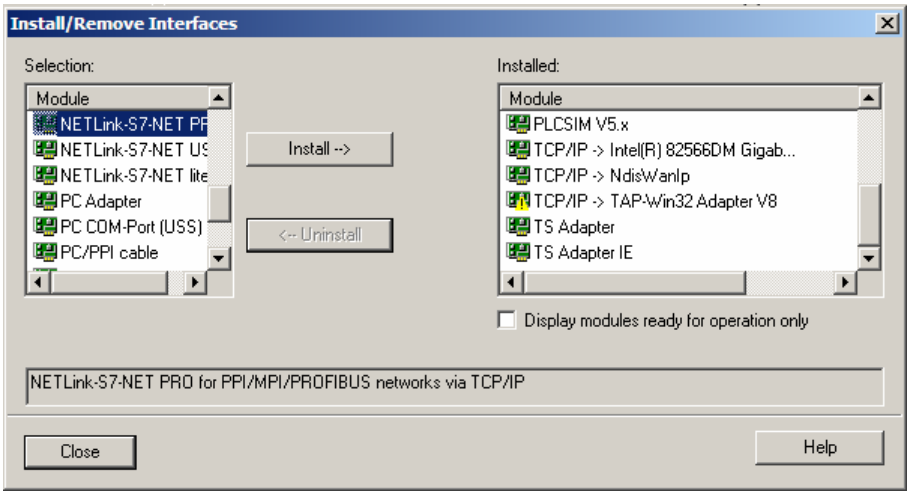
4.3.1 Adding the interface to the PG/PC interface

After initial installation, the new interface parameter set '*NETLink-S7-NET*' has to be set up. Administrator rights are necessary for this.

After you have started '*Set PG/PC Interface*' in the Control Panel, click the '*Select...*' button there.



This opens the '*Install/uninstall interface*' dialog box.

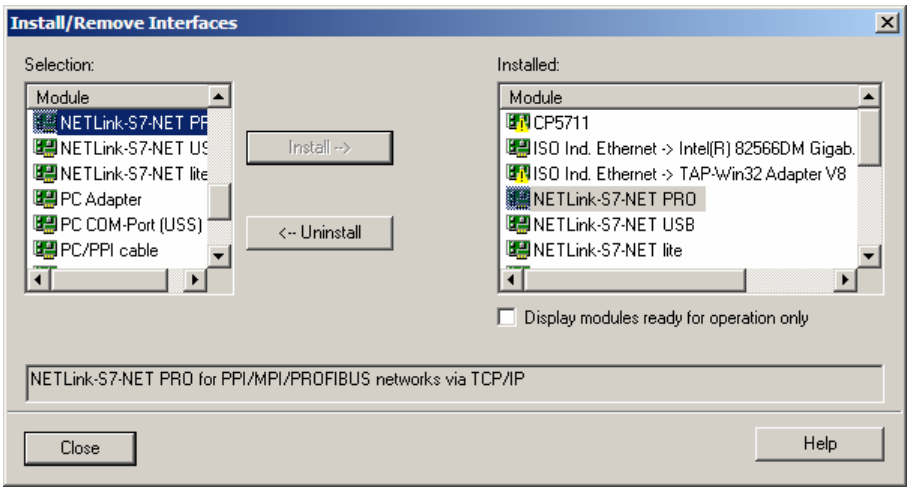


After you have selected the entry '*NETLink-S7-NET PRO*' from the left-hand list, click the '*Install-->*' button.

NETLink WLAN has now been added to the selection list where you can select it later.

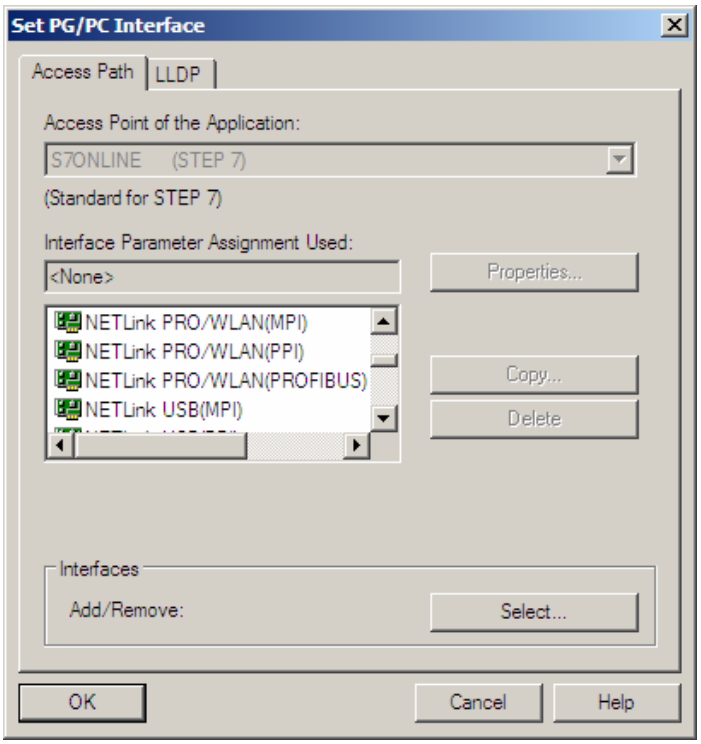
After answering the query “NETLink-S7-NET PRO” will appear in the right-hand list with the interfaces already installed.

In order to select the access path in the dialog box “Set PG/PC Interface” the window is being closed.



4.3.2 Selecting the required interface parameterization

The selection list for the interface parameter sets now contains an additional three items for NETLink WLAN.



All relevant settings of a NETLink-S7-NET driver can be made via the "*Properties*" access field. With the button ‘*Diagnostics...*’ it is possible to show the nodes connected to the bus and the parameters the bus is working with. These fields are explained in Section 5.

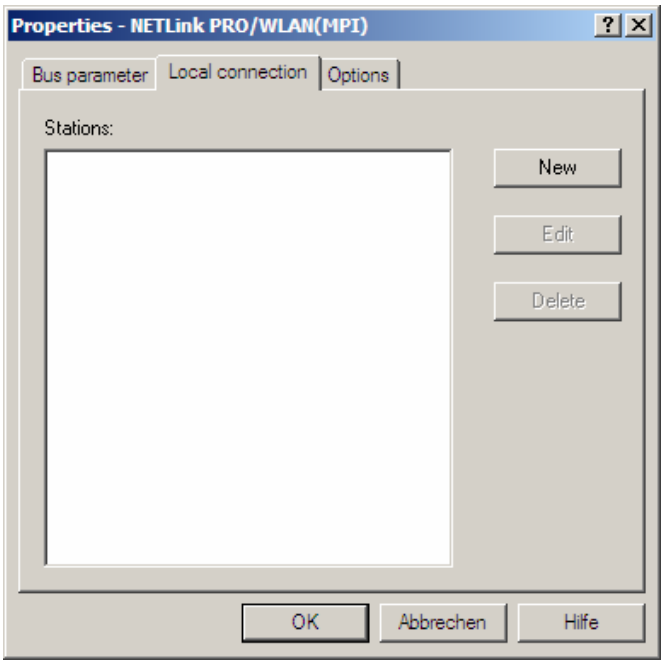
5 Configuration via the NETLink-S7-NET driver

Once a NETLink WLAN has been selected in the '*Set PG/PC Interface*' window, it is possible to specify this access path more precisely with the '*Properties…*' button.

With the functionality behind the button '*Diagnostics...*' that appears when NETLink WLAN is selected it is possible to read the bus configuration and scan connected nodes.

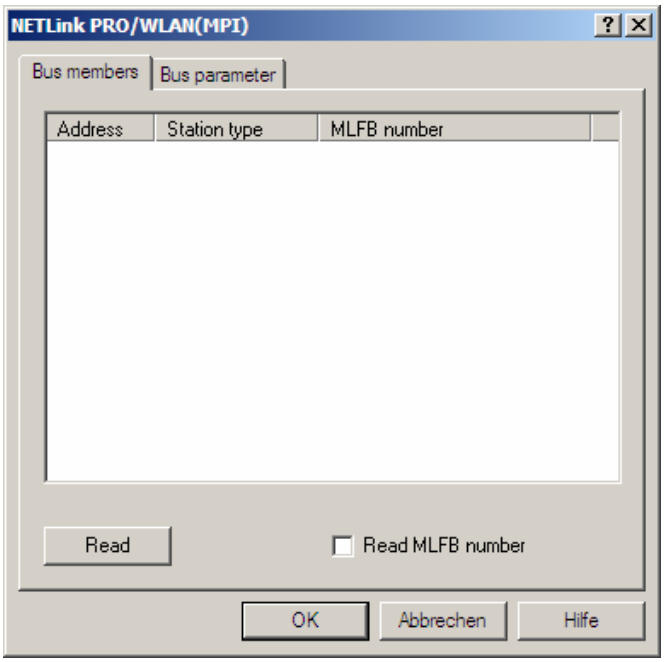
The properties of the access path NETLink WLAN(xyz) are divided into three subareas as follows:

- Local connection (TCP configuration)
  Here, you set the IP address via which the required connection with the programmable controller will be established.
  NETLink WLAN hardware can also be parameterized in this window.
- Bus settings
  Here it is possible to state the bus configuration (e.g. station address) with which NETLink WLAN will enter the bus system.
- Options
  Here it is possible to change the language of the NETLink-S7-NET driver and to read out the version information of the driver.



Two functionalities are implemented for diagnostics at the connected bus:

- Bus members
  A list of all active and passive nodes connected to the bus will be displayed. By request the order numbers (MLFBs) will be displayed also if this functionality is available by the nodes.
- Bus parameters
  If possible, a list of all available bus parameters will be displayed.



5.1 Properties

5.1.1 Local connection (TCP parameterization)

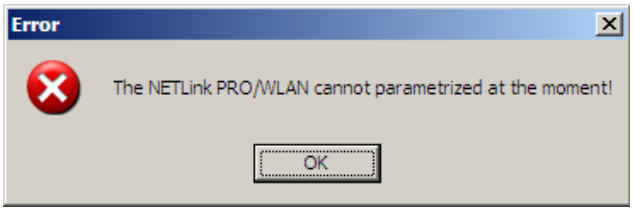
There are three basic ways of parameterizing NETLink WLAN at the TCP end:

- Parameterization via '*Set PG/PC interface*'
  Existing stations can be reparameterized using the '*Change*' button.
- Parameterization via the parameterization tool, *NETLink PRO,WLAN configuration*' (see Section 6).
- Parameterization via the web interface of NETLink WLAN (see Section 7.3).

If NETLink WLAN is configured via the NETLink-S7-NET driver, the following points must be considered:

- If NETLink WLAN is active on the bus when reparameterization is required (e.g. a variable table or block is being viewed), reparameterization is not performed.

The ensuing reset would interrupt NETLink WLAN link

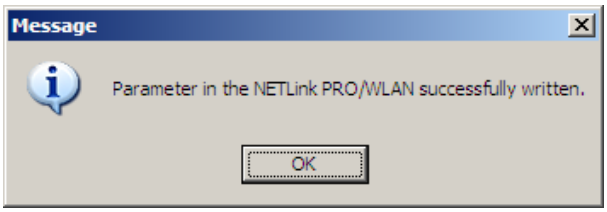


- NETLink WLAN can be protected against unauthorized reparameterization via a password (default password: “admin”). If an attempt is made to save a parameter set with an incorrect password, the following messages is displayed:

The password query must be answered correctly and confirmed with OK.

- If the password is correct during parameterization, the new parameter set will be saved and the following message displayed:

The default password is ‘admin’.



Rebooting can take up to 15 seconds.

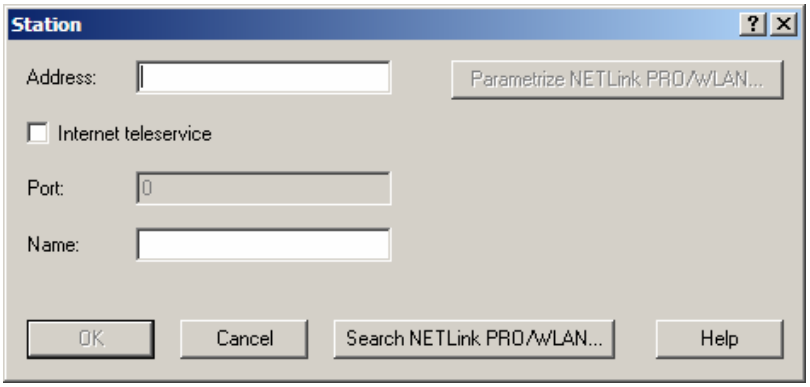
NETLink WLAN is now restarted. This can take up to 40 seconds.

5.1.2 Creating a station

To be able to access a NETLink WLAN with the NETLink-S7-NET driver, a station must be set up first. This station is virtual and is not stored in NETLink WLAN – it permits easier differentiation if two or more NETLink WLANs are used.

The ‘*New*’ button takes you to an input dialog box in which you can store the known IP address of an existing NETLink WLAN and any name for easier assignment.

NETLink WLAN has the IP address 192.168.4.49 on delivery from the factory.



If NAT/PAT is used, a port can be defined if ‘Internet teleservice’ is selected.

Is the desired NETLink WLAN behind a router (e.g. internet teleservice), the network administrator is able to configure the router in a way that all TCP/IP packets going to a specific port of the

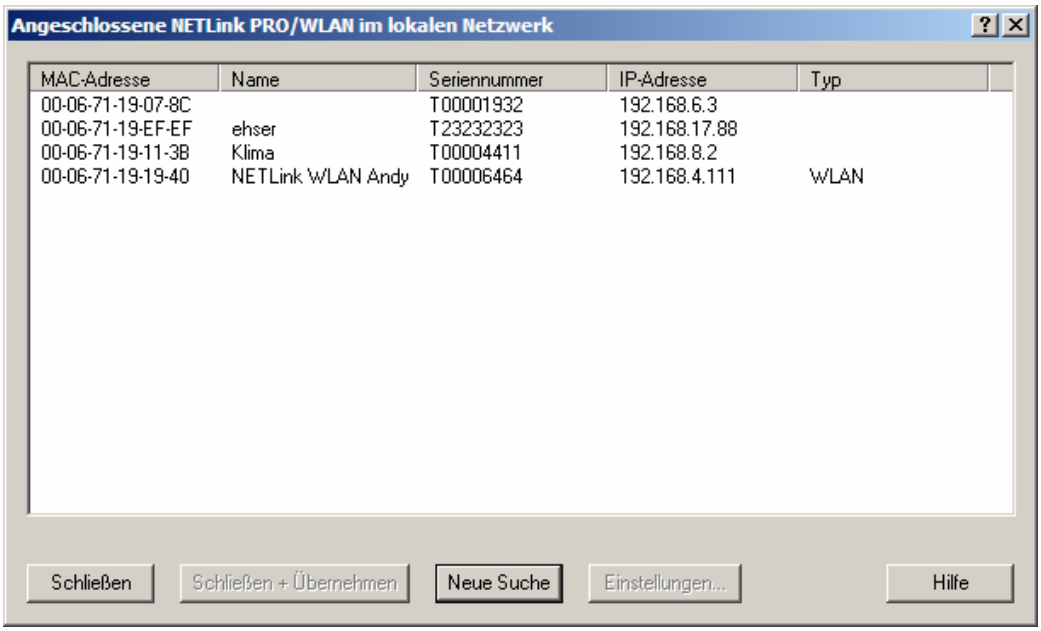
router are forwarded to a specific NETLink WLAN behind the router.

Using this functionality makes it possible to communicate to more than one NETLink WLAN behind a router, if each station gets a specific port configuration.

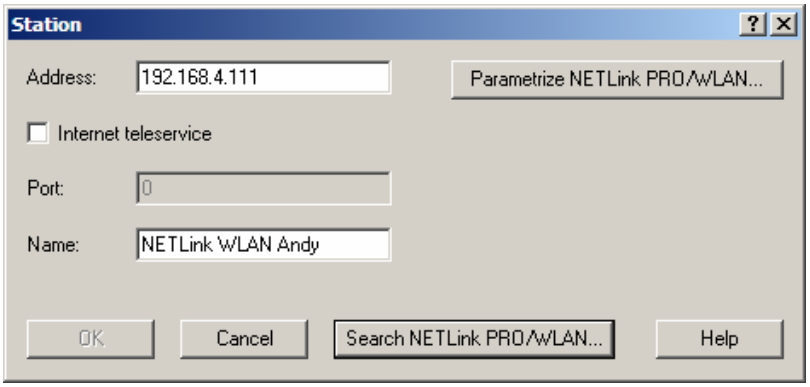
Is NETLink WLAN connected to the local network or is it not behind a distant router, the '*Internet teleservice*' option must be deselected.

'*OK*' stores this station, which can now be used.

It is easier to search for an existing NETLink WLAN in the local area network. Just click the '*Search NETLink PRO/WLAN…*' button.

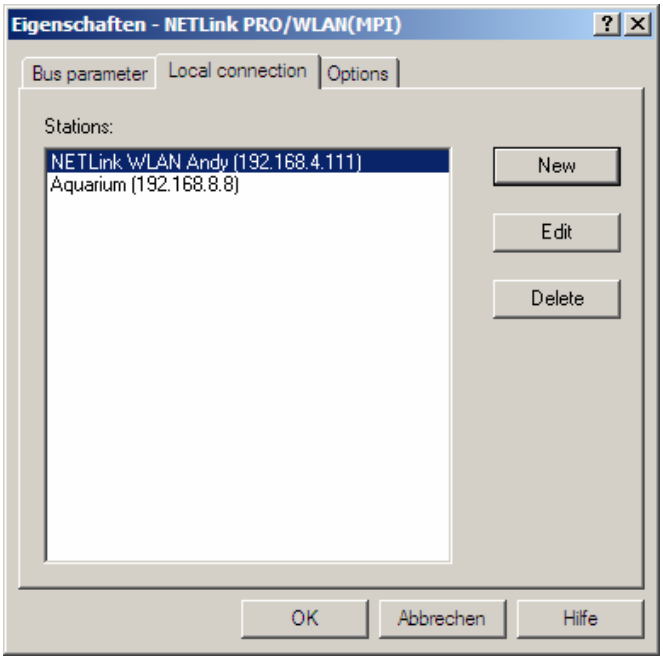


If you now select the required NETLink WLAN and click the '*Close + Get*' button, the following dialog box will appear again:



This station can also be saved with '*OK*' and is then available.

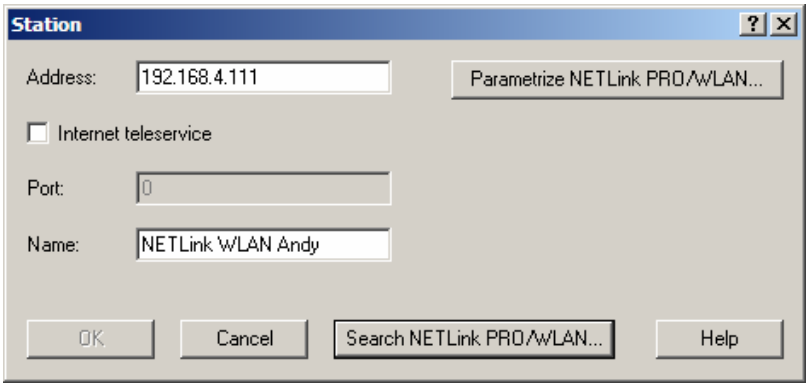
If you do not want the name that is stored in NETLink WLAN to be the same as the station name, you can overwrite the station name (e.g. replacing the name '*NETLink WLAN Andy*' with the name '*Workshop*' in the example below).



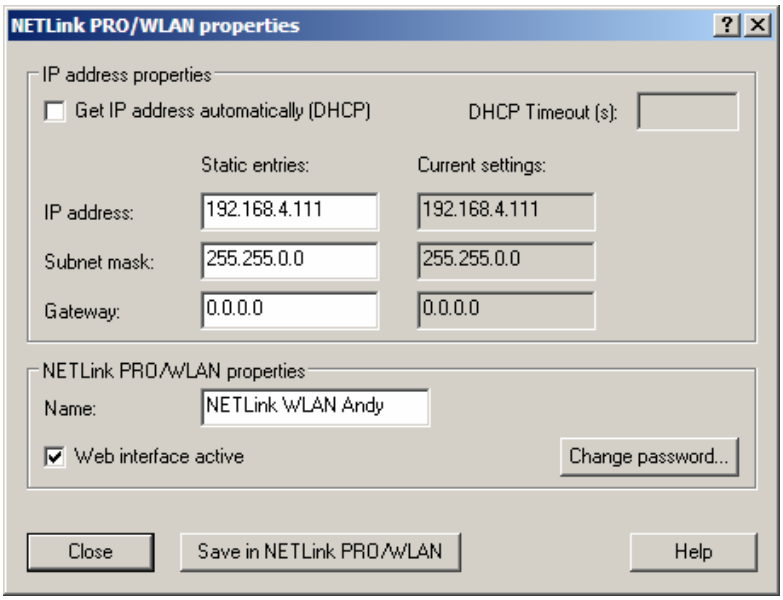
This completes parameterization of the driver.

It may now be necessary to adapt NETLink WLAN to the situation in the existing TCP/IP network.

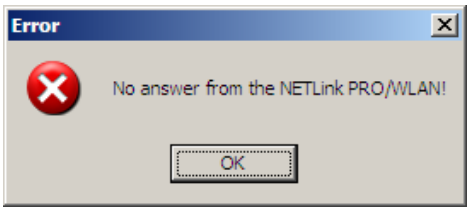
To change the TCP parameters, select the station in question and open the following dialog box with the '*Change*' button.



The '*Parametrize NETLink PRO/WLAN…*' button takes you to a new input form that already contains the current parameters of NETLink WLAN:



If no NETLink WLAN can be accessed via the stated IP address, the following message will appear:



This message can have three causes:

- There is no NETLink WLAN with the stated IP address (e.g. the device has not yet been switched on or is still booting).
- The IP configuration of the computer used does not match the IP configuration of the stated NETLink WLAN (e.g. different subnet mask settings).
- If WLAN functions are used NETLink WLAN might be outside of a WLAN radio network.

From the parameterization form shown, it can be seen that not only static IP address allocation but also IP parameter assignment via DHCP (Dynamic Host Configuration Protocol) is possible.

Both options are now explained in more detail.

Further configuration options are described in Section 5.1.5.

5.1.3 Operation without DHCP

If NETLink WLAN is used in a network without a DHCP server (or you want NETLink WLAN to work with the same IP address on the network despite the presence of a DHCP server) the required IP parameters are stored in the input forms for '*Static parameters*'.

In this case, the checkmark is not set in the field '*Get IP address automatically (DHCP)*'.

Clicking the '*Save in NETLink POR/WLAN*' button saves the parameters in NETLink WLAN.

5.1.4 Using DHCP

To have NETLink WLAN receive its IP parameters automatically via DHCP, set a checkmark in the field '*Get IP address automatically (DHCP)*'.

This enables the '*DHCP Timeout (s)*' input field. Enter the maximum waiting time here. If NETLink WLAN does not receive any parameters from the DHCP server within this time, it will use the stored static parameters to ensure that the device is accessible in the network and can be reparameterized if necessary.

Times shorter than 30 seconds are replaced by the default value (30 seconds) because most DHCP servers require 12 to 20 seconds to assign valid parameter sets.

Clicking the '*Save in NETLink PRO/WLAN*' button saves the parameters in NETLink WLAN.

DHCP has the drawback that a NETLink WLAN parameterized by this method could theoretically be assigned a different IP address from the DHCP every time it is switched on.

The system administrator responsible for the DHCP server can counter this informing the DHCP server of the MAC address of NETLink WLAN. However, this is additional work for the system administrator.

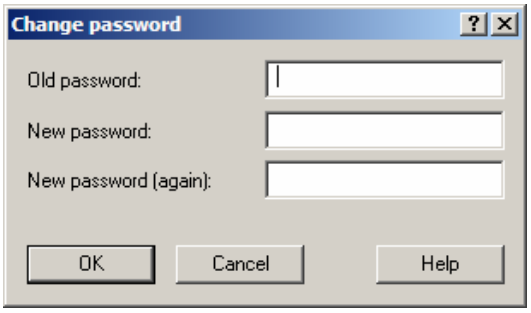
5.1.5 Additional features

The '*NETLink PRO/WLAN properties*' input form contains a '*NETLink WLAN properties*' group box with further options that are explained here:

- Name:
  Here NETLink WLAN can be assigned a name for an easier identification when it is shown in the search window. The name is stored in the device.
  The name may designate the location (e.g. conveyor HG1), the user (e.g. Mr. Example), or anything else (e.g. workshop).

The default password is 'admin'.

- Changing the password:
  Here you can change the current password.
  A reconfiguration of NETLink WLAN is only possible with the proper password. This applies to parameterization both via the driver and via the web interface.



- Web interface active:
  If there is a checkmark in this checkbox, the parameterization of NETLink WLAN can be viewed and changed, if necessary, in any standard Browser (e.g. IE, Firefox, Opera …) as long as the set password (if one has been set) is known.
  Section 7 provides more detailed information about what you can do with the web interface.

Here too, clicking the '*Save in NETLink PRO/WLAN*' button saves the parameters in NETLink WLAN.

5.2 Using NETLink WLAN for teleservice

If you want to use NETLink WLAN for teleservice, you should consult the network administrators of both the locations involved.

There are various ways of implementing teleservice via a WAN (wide area network). Here are some suggestions:

- Assignment of a separate, unique IP address with direct access to the network (WAN).
  Advantage: Quick to implement.
  No intervention by the administrator required
  Disadvantage: Few globally available addresses exist,
  A separate network with direct WAN access is required, Security

- Use behind a router by means of NAT/PAT
  Advantage: Can be integrated into existing infrastructures.
  Administrator can ensure that it is not visible/usable from outside.
  Disadvantage: Network administrators must parameterize routers and firewalls between the communicating nodes.

- Use of a dial-up router (e.g. NETlink Router)
  Advantage: relatively simple to implement if a phone connection is available.
  Disadvantage: Loss of performance, additional costs due to phone charges, IP address can only be queried remotely via DynDNS services.
- Use of WLAN functions via access point
  Advantage: Relatively easy to realize if a suitable WLAN access device is available.
  Disadvantage: Loss of performance due to restricted WLAN data rates; low security if no appropriate encoding measures are taken.

5.3 Bus settings

NETLink WLAN can be operated on three different bus systems: PPI, MPI, and PROFIBUS.

From NETLink WLAN user's viewpoint, the three bus systems only differentiates by the transmission rates that can be selected and the additional options which are explained here.

The bus configuration is passed to NETLink WLAN during the runtime of the NETLink-S7-NET driver and is not stored in the device (exception: enabling the RFC1006 functionality, see Section 8).

It is possible to use NETLink WLAN without specifying bus-related information. NETLink WLAN then automatically ascertains the bus parameters and can be operated on different programmable controllers, possible, with different transmission rates without switching over the NETLink-S7-NET driver.

This autobaud function is supported if the '*Cyclic distribution of the bus parameters*' function is activated in the participating programmable controller. Usually this functionality is not available at S7-200 systems.

CPUs still exist, usually older types, that do not support cyclic distribution of bus parameters. The autobaud functionality cannot be used on these CPUs.

5.3.1 MPI configuration

The MPI configuration contains station and network-related settings.

The most important setting concerning bus configuration is assignment of the station address. This refers to the address NETLink WLAN will have on the bus when it goes online.

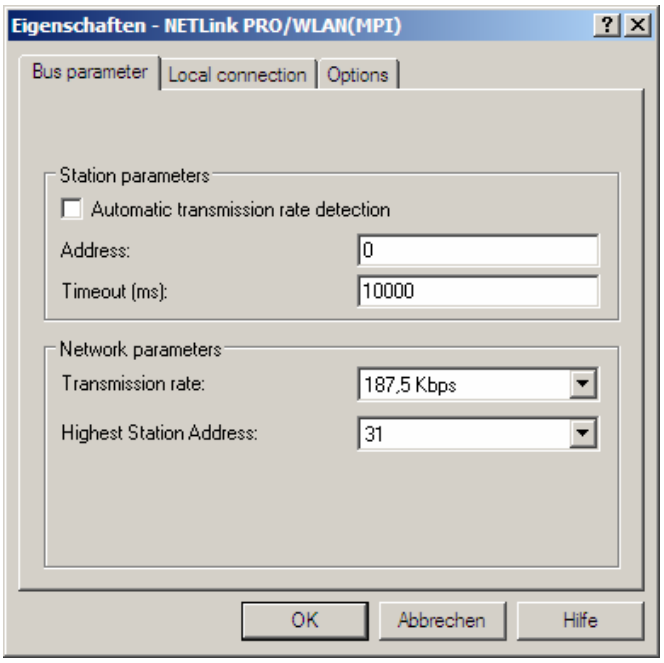
The station address can have any value from '*0*' and '*126*' if the selected address is lower than or equal to the highest station address (HSA).

Example: HSA = 31

Any value between '*0*' and '*31*' can be specified for the station address if this address does not yet exist on the bus.

The local timeout of the NETLink-S7-NET driver can be parameterized in the station-related settings. If the driver does not receive a response to a request within the set timeout, a communication error is signaled to the Simatic application.

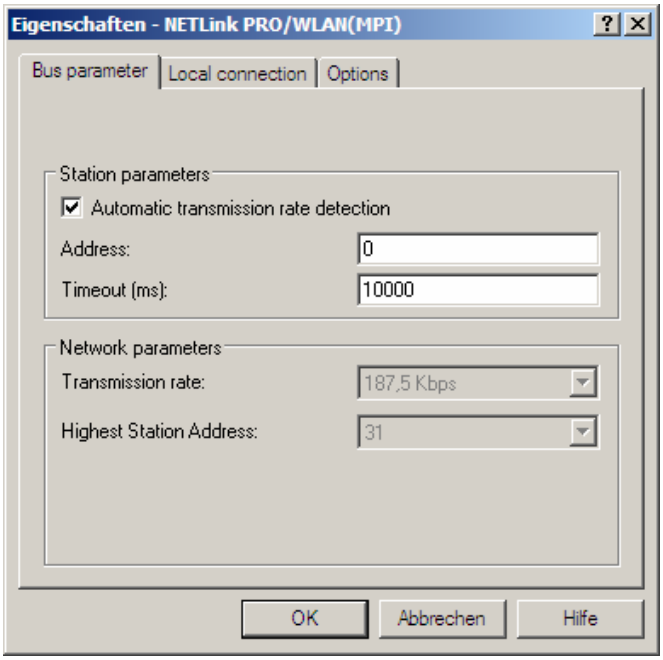
In the network-related settings, the transmission rate must be selected, as must the HSA of the programmable controller to be addressed.



To simplify configuration, the '*No baud rate detection*' function can be selected in the station-related settings.

This causes NETLink WLAN with the preset station address to ascertain the baud rate and associated bus parameters itself.

If this function is required, no manual setting of the network-related parameters is possible.



Use of the autobaud function does not impair the functionality, but initialization of a connection takes longer because the online parameters have to be ascertained.

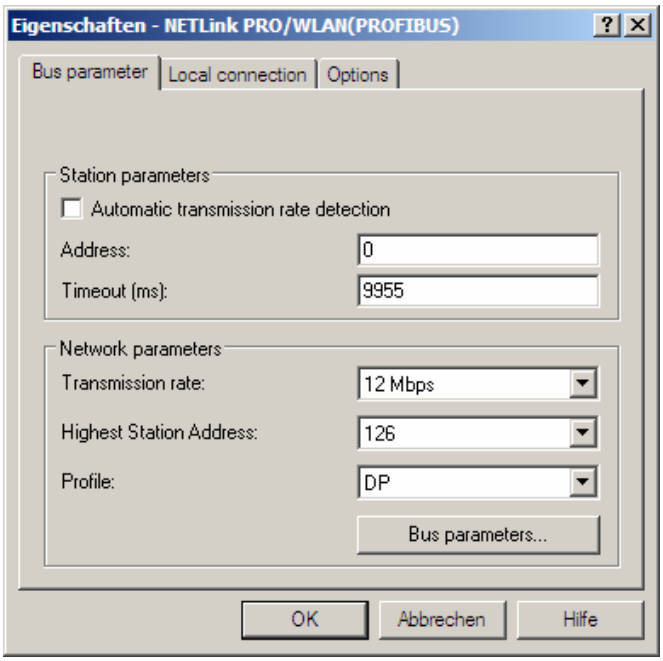
Some older Siemens CPUs do not support the autobaud function on the MPI. Also PPI systems are usually not able to support autobaud functionality.

It is also possible that the autobaud function may not function reliably at transmission rates slower than or equal to 19.2 Kbps or with increased use of communication via global data exchange, because the relevant telegram is transmitted more irregularly by the CPUs. In these cases, it is better to avoid automatic detection of the bus parameters.

5.3.2 PROFIBUS configuration

Basically, the same applies to PROFIBUS configuration as to MPI configuration. However, the network-related parameters are more extensive.

In addition to the parameters transmission rate and highest station address mentioned in Section 5.3.1, PROFIBUS also has parameter field for selecting the bus profile and bus parameters:



Profile:

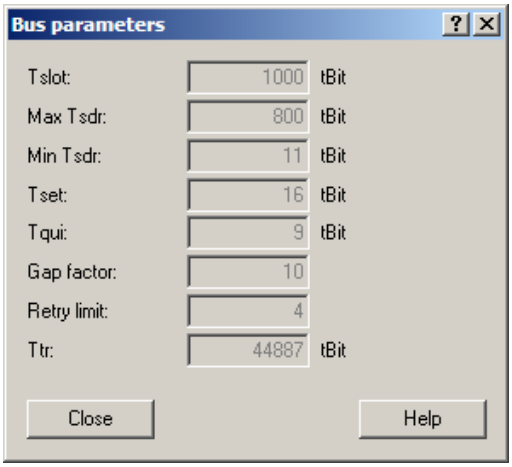
PROFIBUS offers usually the profiles *DP*, *Standard* und *User defined*.

You need to select the profile that is already used in the programmable controller.

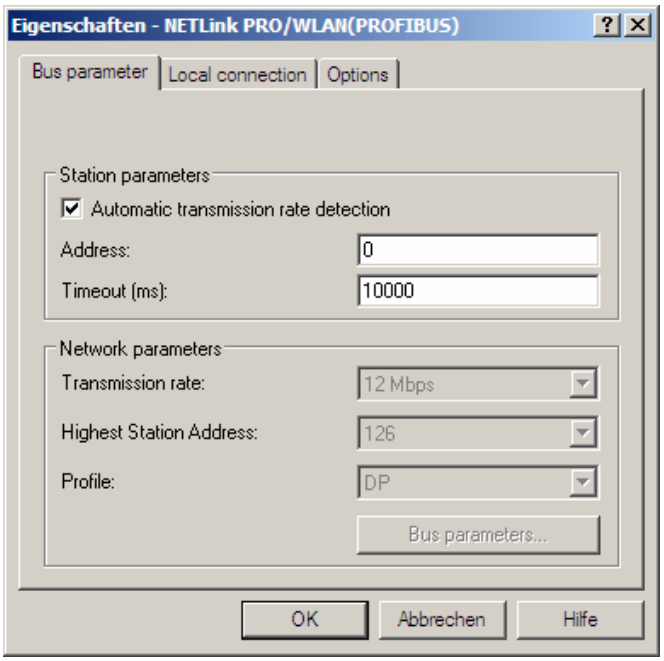
Bus parameters:

Unlike the MPI bus profile, the bus parameters for PROFIBUS are not constant and change with the type and number of PROFIBUS stations used.

Always set the PROFIBUS parameters according to the settings in the currently used programmable controller (see current STEP7 project).

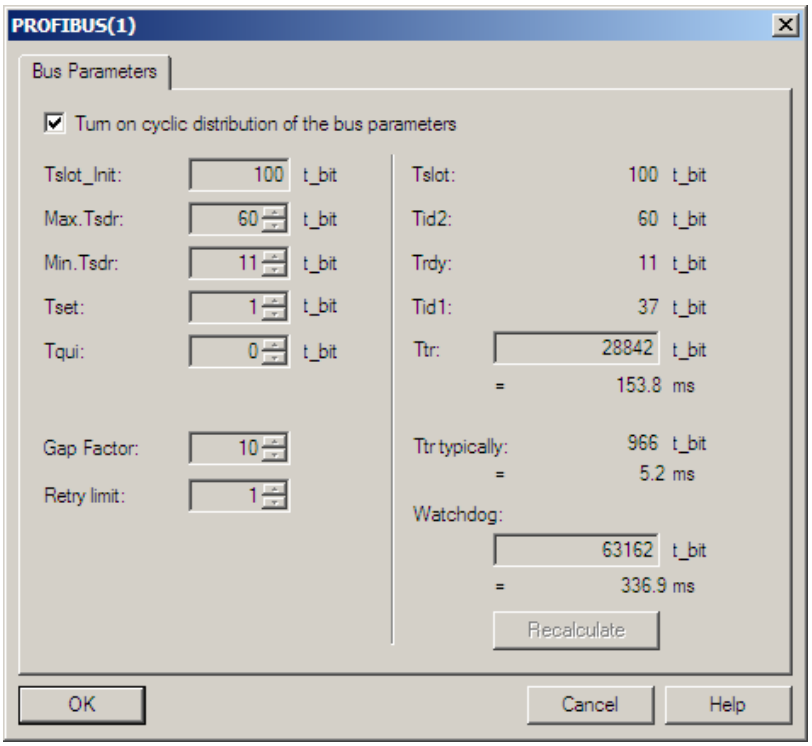


In order to avoid these partially complicated steps it is especially in the case of PROFIBUS useful to use the autobaud function, because it then automatically ascertains the bus parameters.



When working with PROFIBUS, please note that the autobaud function can only be used if the *'Cyclic distribution of the bus parameters'* function is activated in the programmable controller used.

The following screenshot of the hardware configuration of a randomly chosen PROFIBUS CPU shows where to find the switch for cyclic distribution of the bus parameters.



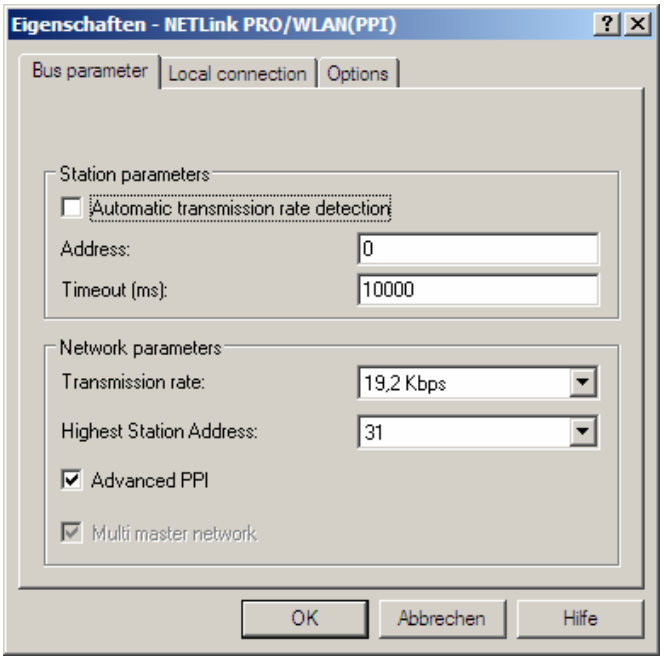
5.3.3 PPI configuration

Basically, the same applies to PPI configuration as to MPI configuration. However, you should note that the default parameters of a PPI bus do not allow an automatic determination of the bus parameters.

In addition to the parameters transmission rate and highest station address mentioned in Section 5.3.1 PPI also has a parameter field for selecting the bus profile '*Advanced PPI*':

!

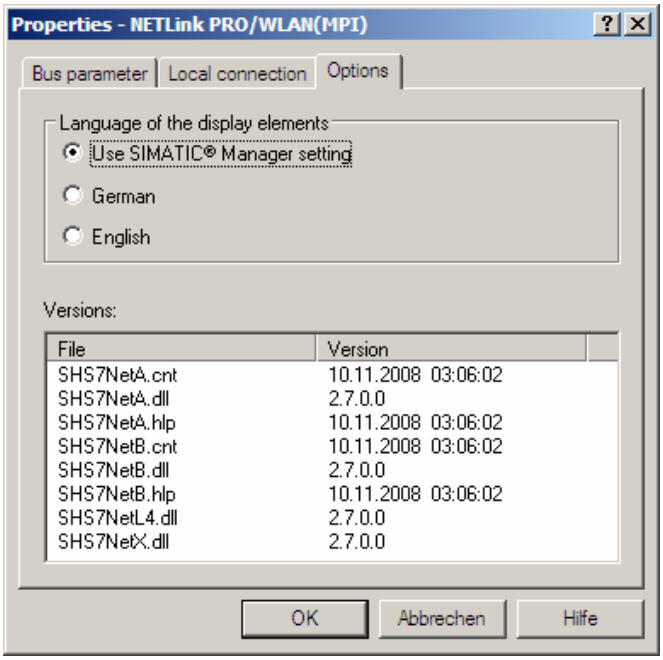
Normally the baud rate can not be detected automatically at PPI systems.



According to todays state of knowledge all S7-200 CPUs of the product line 22x support the protocol version '*Advanced PPI*'. It is recommended to use the preset '*Advanced PPI*' if possible.

5.3.4 Options of the driver

The options of the NETLink-S7-NET driver offer the possibility to set the language of the output and help texts of the driver as well as to read the version numbers of the driver files used.



5.3.5 Language setting of the display elements

The languages German and English are currently available.

After switching over the language, the setting window must be opened again to apply the changes.

5.3.6 Version information

The names and version number of all driver files are listed here.

If support is needed, this data is used to obtain information about the components used quickly and effectively.

5.4 Diagnostics

For rudimentary diagnostics of the connected bus two sub functions are available:

- Display bus nodes
- Display bus parameters

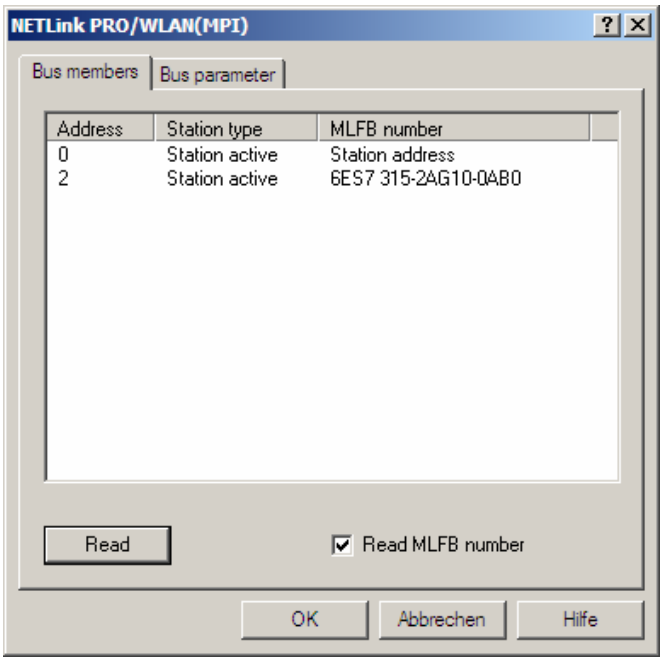
Before the diagnostics functionality can be used, a valid station must be created and a plausible bus configuration set.

5.4.1 Bus members

A list of all available nodes at the bus will be generated by clicking the button '*Read*'.

By ticking the check box '*Read MLFB number*' the order numbers of all connected devices will be displayed as well, as long as this function is supported by the connected devices.

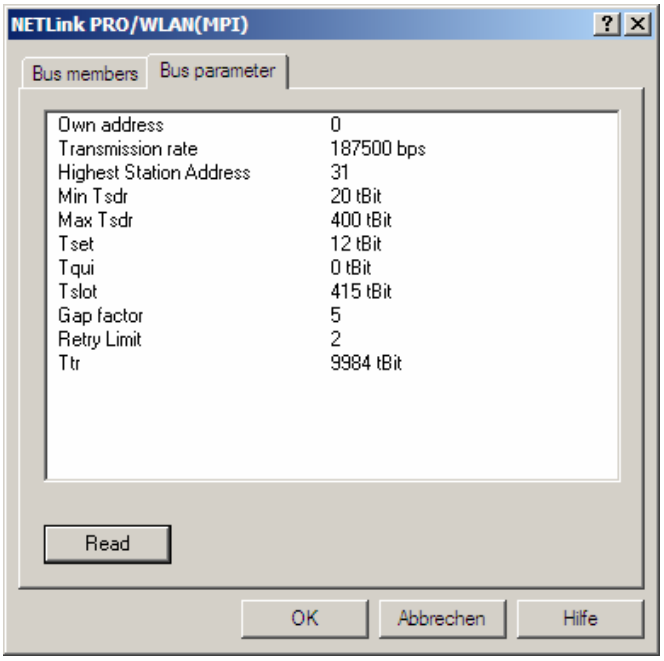
The possibility to detect all connected nodes depends on the parameterization of the PG/PC Interface. It is recommended to enable autobaud functionality at MPI and PROFIBUS.



5.4.2 Bus parameters

If it is possible a list of all bus parameters will be displayed by clicking the button '*Read*'.

The possibility to detect the bus parameters depends on the parameterization of the PG/PC interface. It is recommended to enable autobaud functionality at MPI and PROFIBUS.



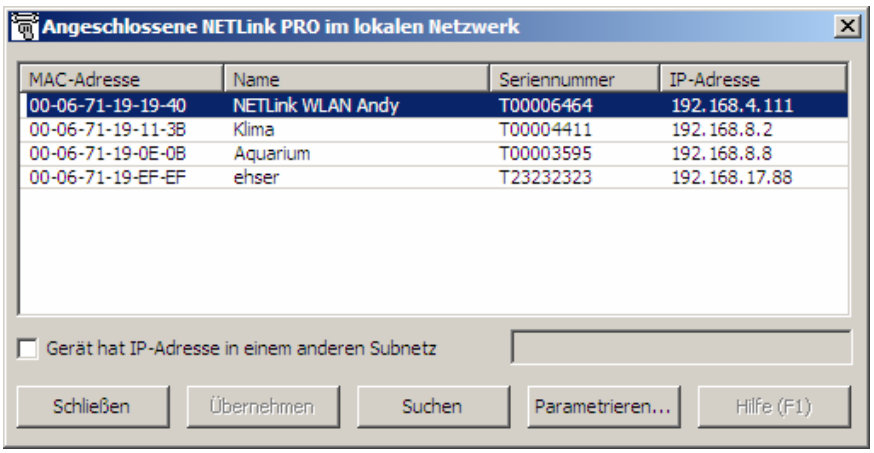
6 Configuration via the configuration tool '*NETLink PRO,WLAN configuration*'

If the Simatic engineering tool that installed the PG/PC interface is not available on the parameterization computer it is possible to configure NETLink WLAN via the integrated web interface (s. 7.3) or via the separate configuration tool.

The tool is available under '*Start/Programs/Systeme Helmholz/NETLink-S7-NET/NETLink PRO,WLAN Configuration*' after the installation of the NETLink-S7-NET driver.

After a call of this program the net will be searched for available NETLink WLAN adapters. The result is shown in the following screen:

The NETLink has the IP address 192.168.4.49 on delivery from the factory.



After choosing a NETLink WLAN out of the provided list it is possible to configure the device after clicking '*Parametrize…*' as described in Section 5

7 Possibilities of the web interface

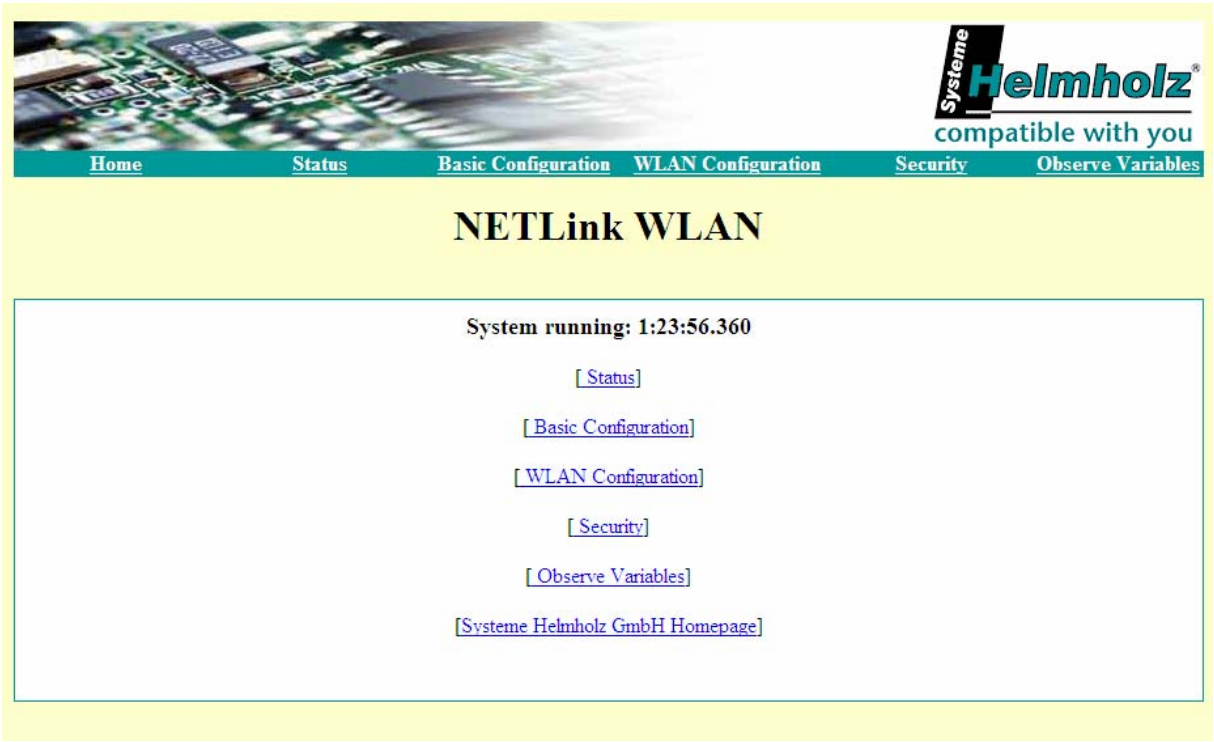
If not deactivated by the user, the web interface of NETLink WLAN can be opened with any standard browser (e.g., Internet Explorer, Firefox, Opera, etc.).

The web interface is intended to support the user intuitively with information and configuration tasks.

The NETLink has the IP address 192.168.4.49 on delivery from the factory.

7.1 Home page

The home page, which is located at '*http://<ip-address>*', is a basic address and navigation starting point for the user.

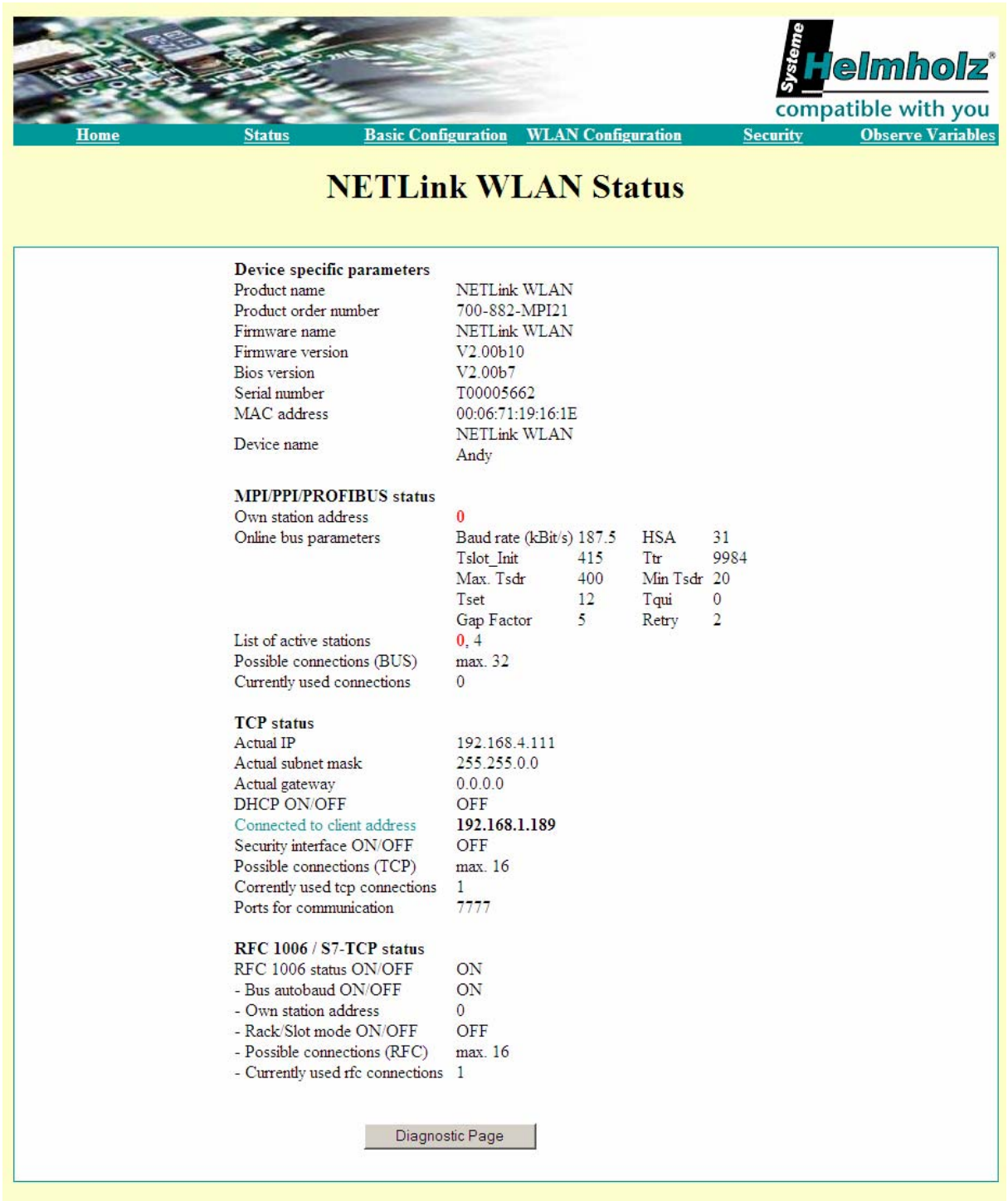


From this page you can go to the status page, to the configuration page, to the security page and, if the computer is connected to the Internet, to the web site of Systeme Helmholz GmbH.

The page also shows the contact data, such as postal address, phone and fax number, e-mail and web address.

7.2 Status page

The status page, accessible via a link on the home page, provides the user with information without allowing unauthorized reconfiguration of NETLink WLAN.



The page provides general information (e.g. firmware version, number of possible connections, etc.), and specific information (baud rate, active stations, DHCP status, etc.) that could be useful when troubleshooting.

All displayed elements are shown below in the form of a table.

Depending on the configuration only the relevant contents are displayed. For example, it does not make sense to indicate the RFC1006 options, if the RFC functionality is deactivated.

Device-specific parameters:

Product name	NETLink WLAN
Product order number	700-881-MPI11/700-881-MPI12
Firmware name	NETLink WLAN
Firmware version	z.B. V2.10
BIOS version	z.B. V2.10
Serial number	e.g. T00006464
MAC address	e.g. 00:06:71:19:00:3E
Device name	This shows the freely selectable name of NETLink WLAN, if a name has been assigned.

Bus-specific parameters:

Station address	If NETLink WLAN is active on the bus, this is the device's own station address.
Bus parameters	If NETLink WLAN is active on the bus, this is the explanation of the bus parameter set; this is transmitted by a CPU.
List of active stations	If NETLink WLAN is active on the bus, this is the list of the stations that are currently active. The device's own address is shown in red.
Possible connections (BUS)	Maximum number of possible simultaneous bus connections.
Sum of used bus connections	If NETLink WLAN has opened at least one bus connection, the exact count of open connections will be displayed.

TCP-specific parameters:

IP address	The currently used IP address of NETLink WLAN is shown (e.g. 192.168.4.54).
Subnet mask	The currently used subnet mask of NETLink WLAN is shown (e.g. 255.255.255.0).
Gateway	The currently used standard gateway of NETLink WLAN is shown (e.g. 192.168.4.33).
DHCP ON/OFF	Shows whether the DHCP is activated or not (ON or OFF).
- DHCP Timeout	The time (in seconds) for which a DHCP configuration waits.
- Configured via DHCP	If DHCP is ON, these states whether DHCP was successful or whether the currently parameterized default IP address is being used.
Possible connections (TCP)	Maximum number of possible simultaneous IP connections (currently 4).
Sum of used TCP connections	If NETLink WLAN has opened at least one TCP or RFC1006, the exact count of open TCP connections will be displayed.
Ports for communication	Port accessible for PC/PC interface via NETLink WLAN

RFC1006-specific parameters:

RFC 1006 status	Shows whether the RFC1006 is activated or not (ON or OFF). If RFC1006 was enabled (ON), further parameters are visible.
- Bus autobaud ON/OFF	Shows whether the bus parameters of the bus system are to be determined automatically (ON) or whether to go online with the stored parameters (OFF).
- Own station address	Indicates the local station address. This is the address with which NETLink WLAN will participate in the bus cycle.
- Stored bus parameters	This indicates the stored bus parameters with which NETLink WLAN attempts to go online if RFC1006 is enabled when autobaud is OFF.
- Rack/slot mode	Indicates whether R/S mode (ON) or addressed mode (OFF) is used (for details, see Section 8.2).
- Fixed destination address for R/S mode	If R/S mode is activated, all incoming RFC1006 requests are routed to the bus address parameterized here.
- Max. possible IP links (RFC)	Maximum number of possible simultaneous IP connections for RFC1006 communication.
Sum of used RFC connections	If NETLink WLAN has opened at least one TCP or RFC1006, the exact count of open RFC1006 connections will be displayed.

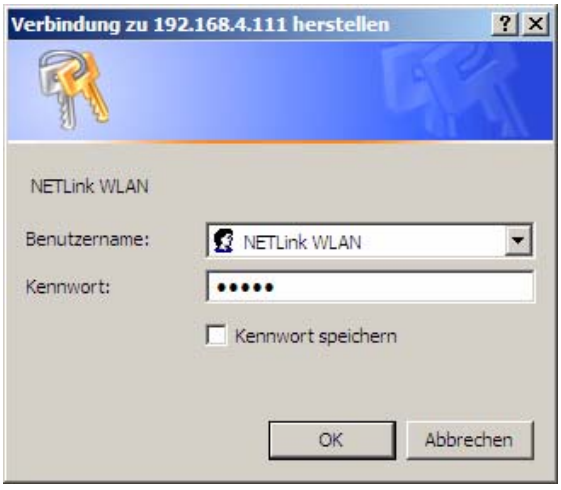
7.3 Configuration page

The configuration page that is accessible via a link on the home page serves as a configuration interface for the user.

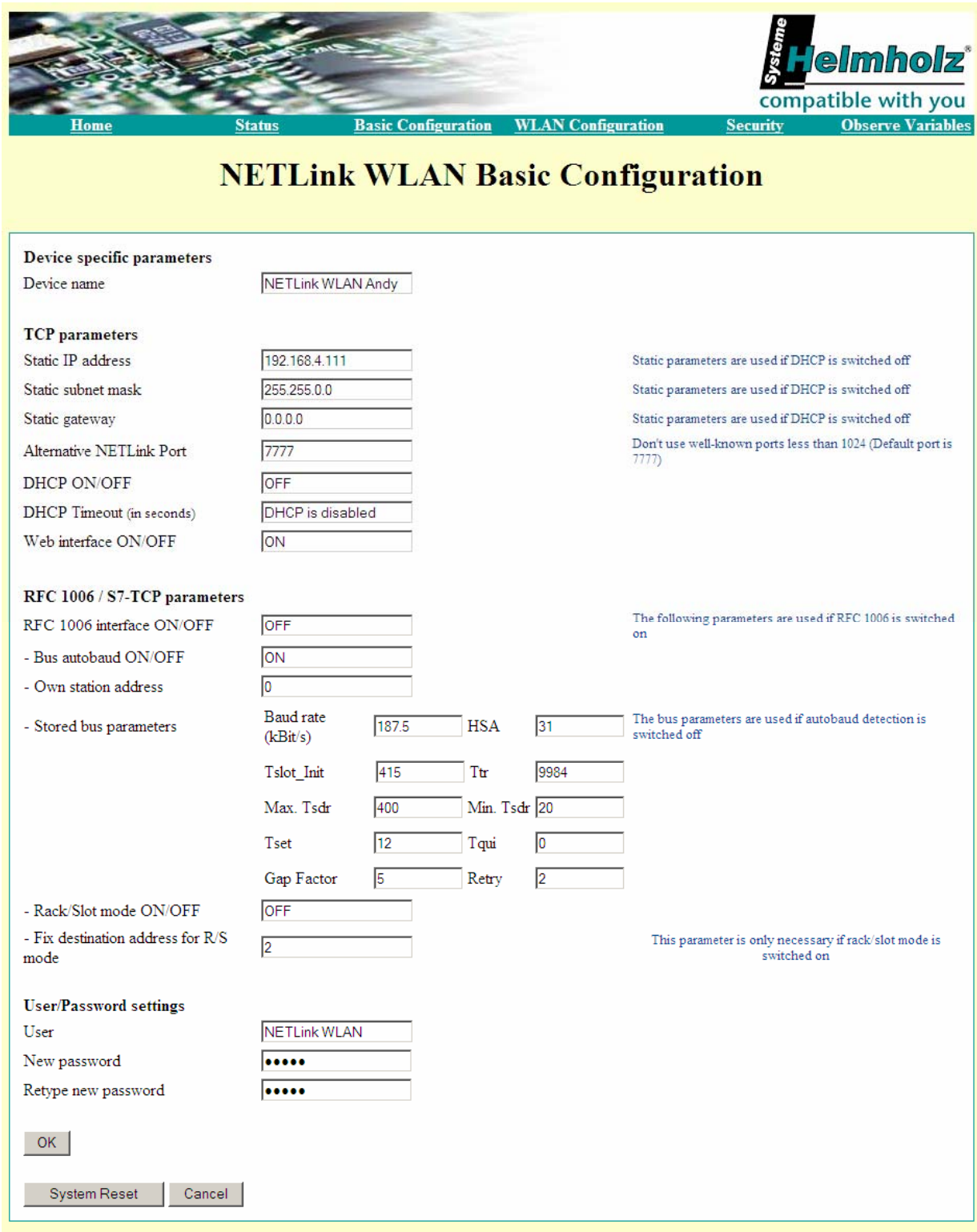
The default user name is "NETLink WLAN".

The default password is 'admin'.

Before this page opens, it is necessary to enter the device name (default: *NETLink WLAN* if no customized user name has been set) and the password (default: *admin* if no customized password has been set).



The entry for the security query is case-sensitive, that is, upper and lower case must be correct.



After the security query has been answered correctly, you have write access to all parameters that can be configured via the driver interface of the NETLink-S7-NET driver.

The RFC1006 functionality can also be enabled and parameterized here.

For details of RFC1006 parameterization, see Section 8.

Device-specific parameters:

Device name	Name consisting of max. 20 alphanumeric characters

TCP parameters:

Static IP address	IP address that is used if DHCP is deactivated or the DHCP timeout elapses.
Static subnet mask	Subnet mask that is used if DHCP is deactivated or the DHCP timeout elapses.
Static gateway	Gateway that is used if DHCP is deactivated or the DHCP timeout elapses.
Alternative NETLink Port	In addition to the standard port, a further freely selectable port can be stored here in the NETLink (on FW 1.50 and higher).
DHCP ON/OFF	ON or OFF
DHCP Timeout (in seconds)	30 to 65535 seconds At 65535, the timeout is deactivated. In this case, there is no fallback mechanism, i.e. it is essential that a DHCP server is accessible!
Web interface ON/OFF	Web interface is ON or OFF

RFC1006 parameters:

RFC1006 interface	ON or OFF The following parameters only has a meaning if the RFC1006 interface is switched on (ON).
- Bus autobaud	Determine bus parameters of the bus system automatically (ON) or go online with the stored parameters (OFF).
- Own station address	This is the address with which NETLink WLAN will participate in the bus cycle.
- Stored bus parameters	If autobaud is OFF, the bus parameters stated here are used to go online.
- Rack/slot mode	Indicates whether R/S mode (ON) or addressed mode (OFF) is used (for details, see Section 8.2).
- Fixed destination address for R/S mode	If R/S mode is activated, all incoming RFC1006 requests are routed to the bus address parameterized here.

Password settings:

User	User name that is necessary for log on to security relevant pages of NETLink WLAN
New password	Password with up to eight characters
Retype new password	The password with up to eight characters must be entered a second time

After you have made changes, clicking the '*Cancel*' button will discard your changes again.

If you click the '*OK*' button, the inputs are checked for plausibility. If applicable you are shown which inputs are incorrect and what correct input would look like at this point.

Rebooting can take up to 40 seconds.

If all entries are consistent, the changes are displayed again as they will now be stored in NETLink WLAN when you click the '*OK*' button again.

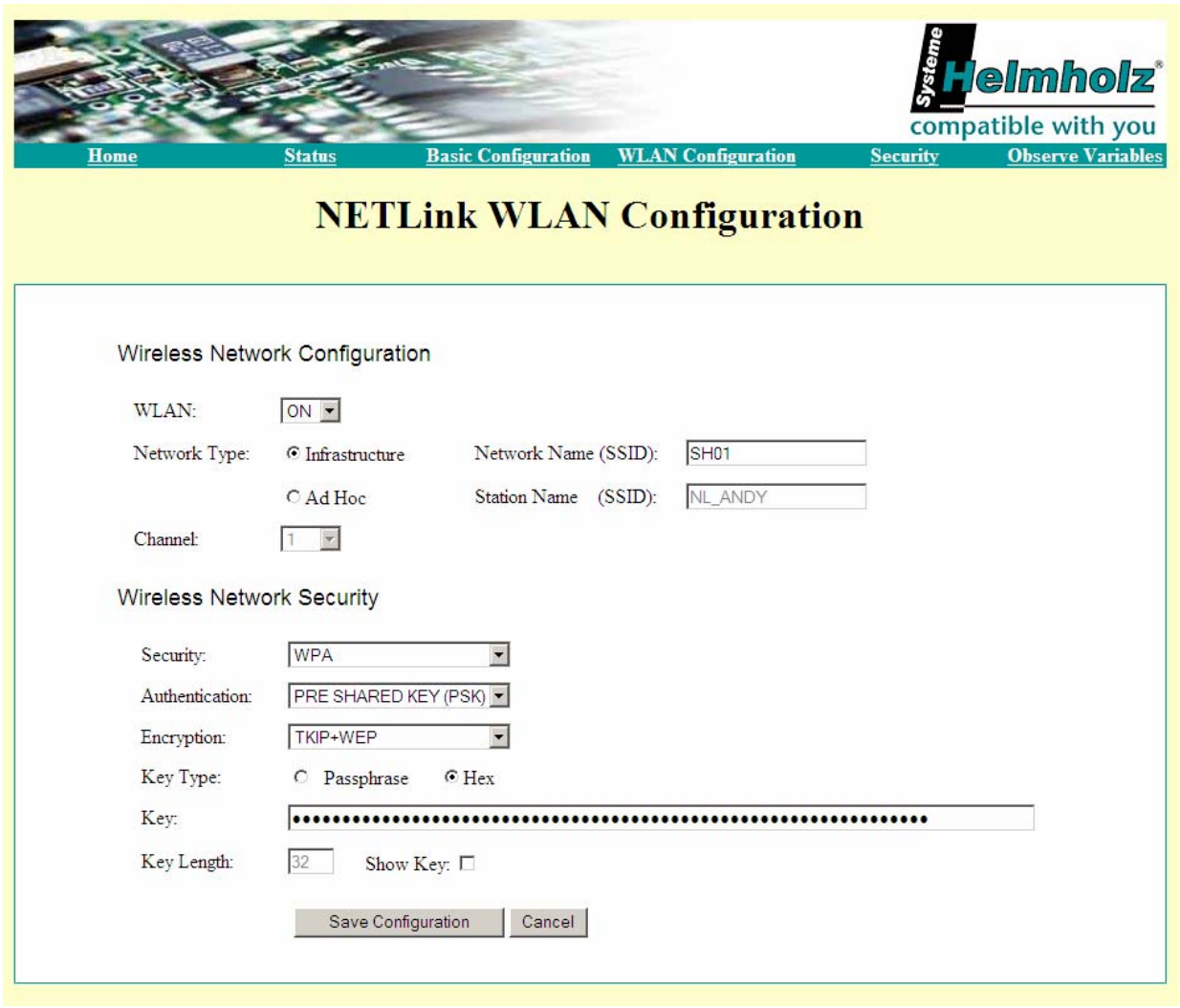
After the changed parameterization data have been stored, NETLink WLAN is restarted to activate the desired configuration.

In addition a user name used to log on security specific pages of NETLink WLAN can be stored in NETLink WAN via the configuration interface.

7.4 WLAN configuration page

The WLAN configuration page is accessible via a link on the home page. The user can use it as configuration interface for all settings relevant for WLAN.

After the security query has been answered correctly, you have write access to all parameters implemented for the WLAN configuration.



Wireless Network Configuration:

WLAN	WLAN functions ON and OFF respectively.
Infrastructure	Option comes into action when NETLink WLAN is supposed to log on to an access point.
- Network name (SSID)	SSID of access points (1-32 digits)
Ad Hoc	Options come into action when NETLink WLAN is supposed to log on directly to a WLAN module.
- Station Name	Station name of NETLink WLAN in the ad hoc mode.
Channel	Channel on which NETLink WLAN sends in the ad hoc mode. The channel can be chosen freely from 1 to 13. Only 11 channels are available in the USA!

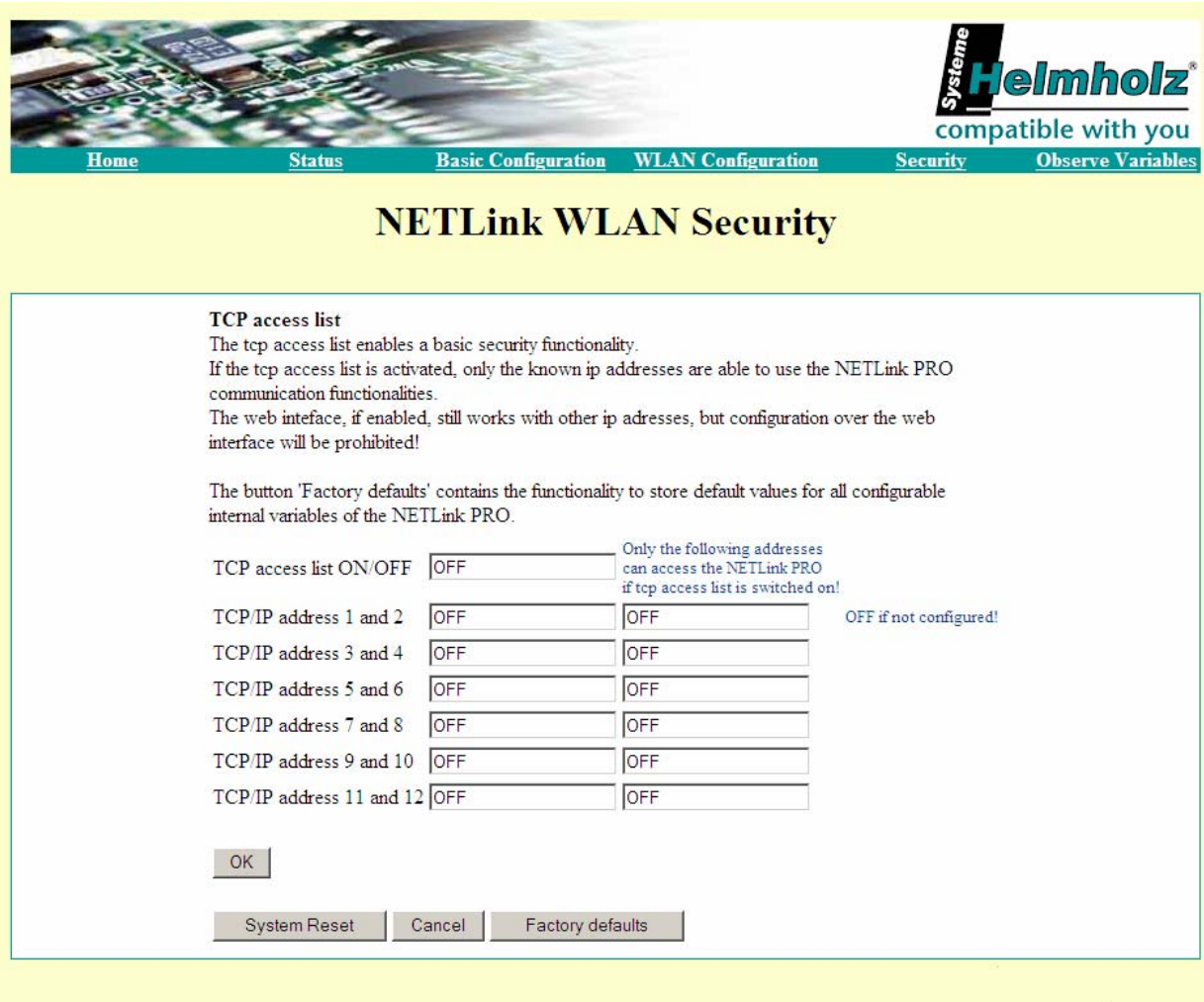
Wireless Network Security:

Security	Here you can chose the security standard WEP / WPA or WPA 2.
- NONE	No encoding (insecure).
- WEP	Data is encoded according to WEP standard (relatively insecure).
- WPA	Data is encoded according to WPA standard (medium security).
- WPA2/802.11i	Data is encoded according to WPA2 standard (highest security).
Authentication	Here you can set the type of client authentication in the WEP security standard. Shared or Open/None (Recommendation: OPEN/NONE)
Encryption	Here you can set the type of encoding. WEP: 64/128 BIT WPA: TKIP / TKIP + WEP WPA2: - AES - AES + TKIP - AES + WEP - TKIP - TKIP + WEP
Key type	Here you can chose passphrase or HEX depending on the type of encoding.
Key	Here you can enter the key depending on the type of decoding. WEP 64 Bit (HEX): 10 Characters WEP 128 Bit (HEX): 26 Characters WPA (HEX): 64 Characters WPA (PASSPHRASE): 1-63 Characters WPA2 (HEX): 64 Characters WPA2 (PASSPHRASE): 1-63 Characters
Key length	Shows the Key length in Bytes
Show key	Allows to directly display the key

7.5 Security page

The security page, accessible via a link on the home page, is a configuration interface for all security specific settings.

After the security query has been answered correctly, you have write access to all parameters implemented for TCP security.



When you activate the TCP access list by entering ‘ON’ only TCP connections of those stations which are enabled in the tables ‘TCP address 1’ to ‘TCP address 12’ (white list) can be established to NETLink WLAN.

Enter the IP address you want to enable according to the pattern ‚*192.168.4.36*’. If you wish to delete an enabling do so by entering ‘OFF’.

TCP/IP addresses without a valid enabling have only read access to the web interface. Use of PPI, MPI or PROFIBUS functionality is not possible. The configuration of NETLink WLAN is prohibited as well.

Parameter of the TCP/IP access list:

TCP access list ON/OFF	Switching-on or switching-off of TCP access list functionality.
TCP/IP address 1 and 2	First and second IP address NETLink WLAN is allowed to access.
TCP/IP address 3 and 4	Third and forth IP address NETLink WLAN is allowed to access.
TCP/IP address 5 and 6	Fifth and sixth IP address NETLink WLAN is allowed to access.
TCP/IP address 7 and 8	Seventh and eighth IP address NETLink WLAN is allowed to access.
TCP/IP address 9 and 10	Ninth and tenth IP address NETLink WLAN is allowed to access.
TCP/IP address 11 and 12	Eleventh and twelfth IP address NETLink WLAN is allowed to access.

Please regard the particularities, if you use Proxy-servers.

Attention: If you want to prevent unauthorized persons from accessing, do not include possible available proxy servers in firm networks. If you do, safe usage of NETLink WLAN is only restrictedly possible.

After you have entered changes, clicking the '*Cancel*' button will discard your changes again.

If you click the '*OK*' button, the inputs are checked for plausibility. If applicable you are shown which inputs are incorrect and what correct input would look like at this point.

If all entries are consistent, the changes are displayed again as they will now be stored in NETLink WLAN when you click the '*OK*' button again.

Rebooting can take up to 40 seconds.

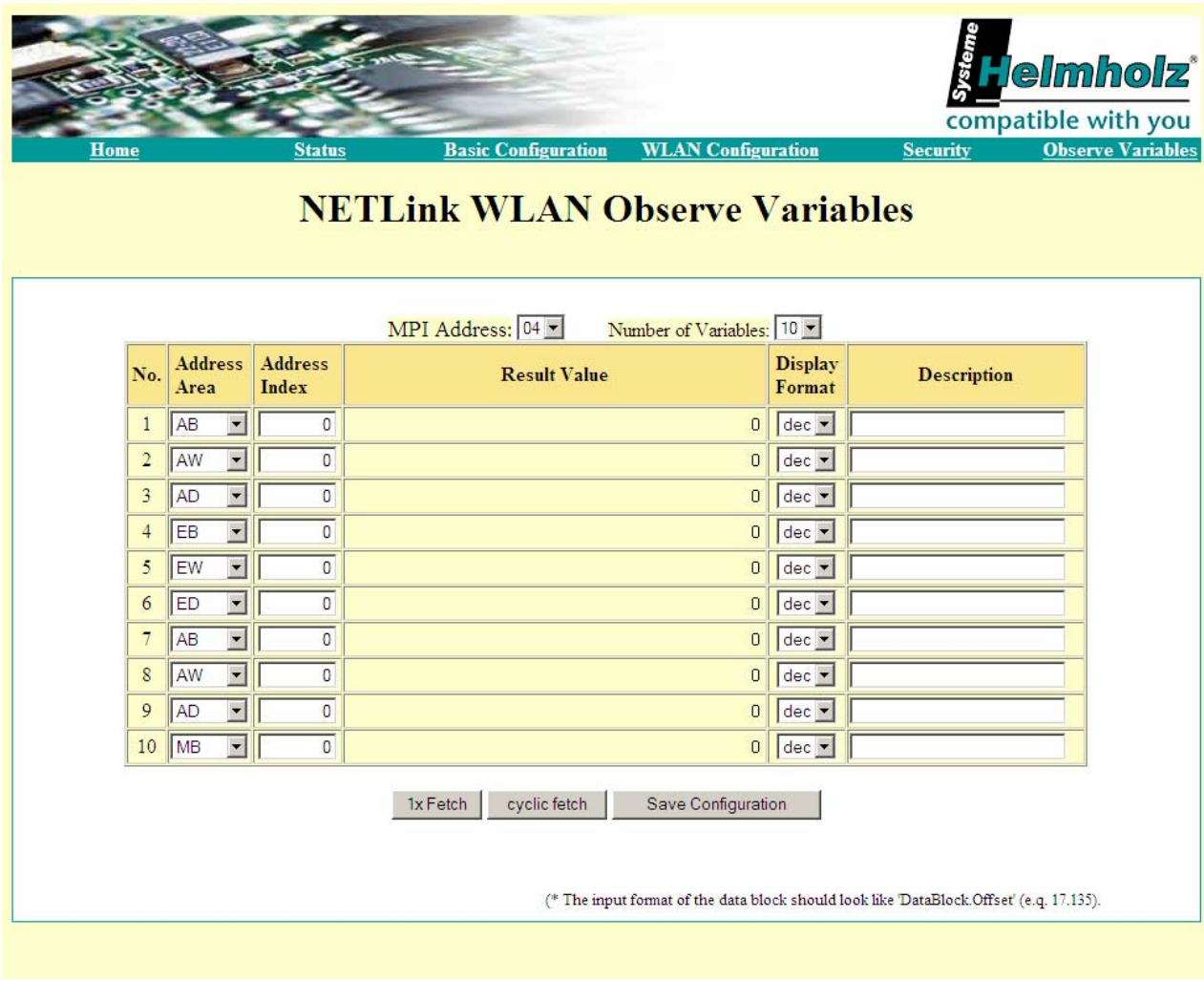
After the new parameterization data have been stored, NETLink WLAN is restarted to activate the new configuration.

It is also possible to reboot NETLink WLAN remotely via the security interface, if required. This is done by clicking the '*System Reset*' button.

With the button '*Factory defaults*' it is possible to restore all parameters to the delivery state of NETLink WLAN. All user defined configurations will be deleted by this function.

7.6 Observing variables

In addition to the “observe variables” functions of the Simatic Engineering tools NETLink WLAN provides the function “observe variables” on the web interface:



The operating menu can be accessed via the ‘*Observe Variables*’ link. These functions are supported in RFC 1006 mode. Section 8.1 describes how to activate this.

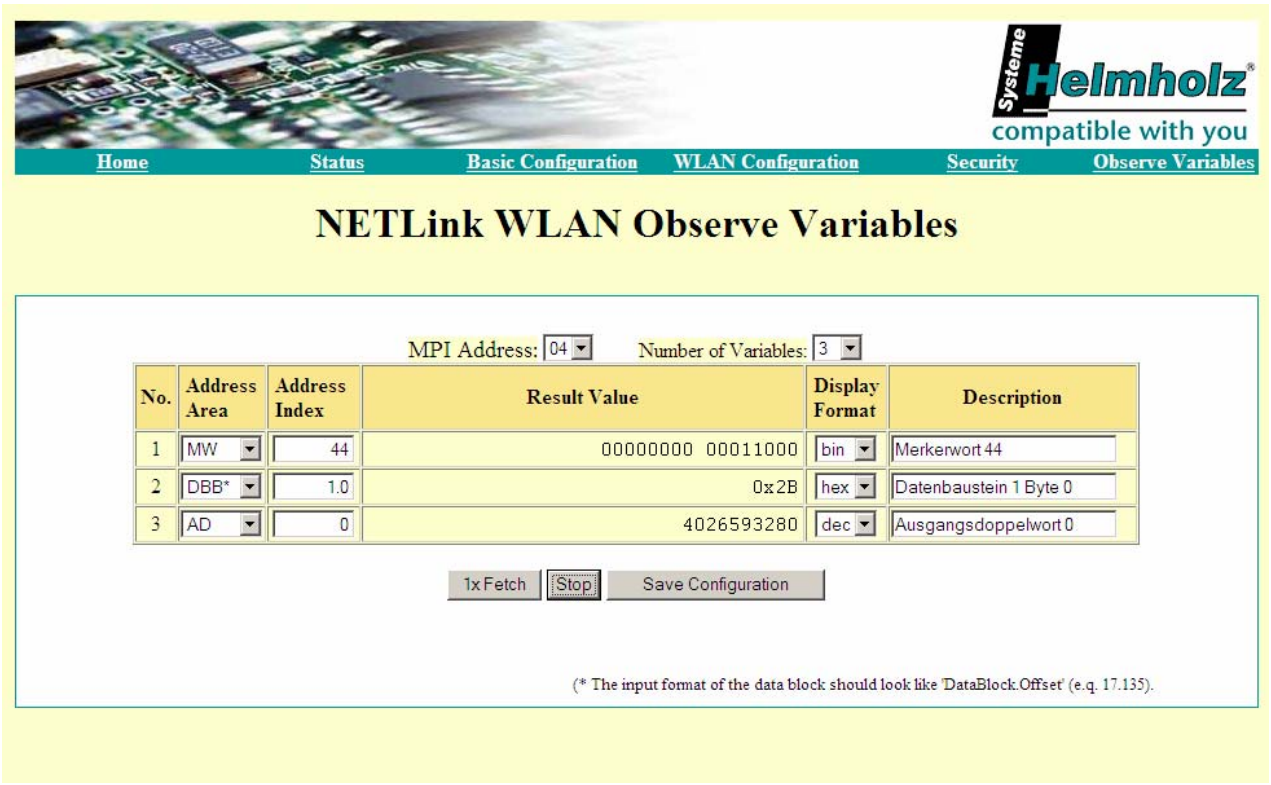
Setting parameters of the observe variables function:

MPI Address	An active MPI/PB address is selected using the dropdown menu.
Number of Variables	The number of variables to be observed can be selected from 1 to 10 for a clearer view.
No.	Consecutive numbering.
Address Area	The following viewable items are supported: OB, OW, OD, IB, IW, ID, MB, MW, MD, DBB, DBW, DBD, counter, and timer.
Address Index*	Address of the bytes to be displayed. * On the case of data blocks with the nomenclature “Datablock.Offset”
Result Value	If one of the buttons is pressed, the output value will be displayed here
Display Format	The possible display formats are: decimal, hexadecimal, or binary
Description	Freely selectable description (max. 32 chars)

To display the desired values, you can use the '*1x fetch*' button for a single value update or '*cyclic fetch*' for a permanent online query.

With '*Save Configuration*', it is possible to store the screen form you have created with all the variables and their descriptions in NETLink WLAN.

An example of display of various variables:

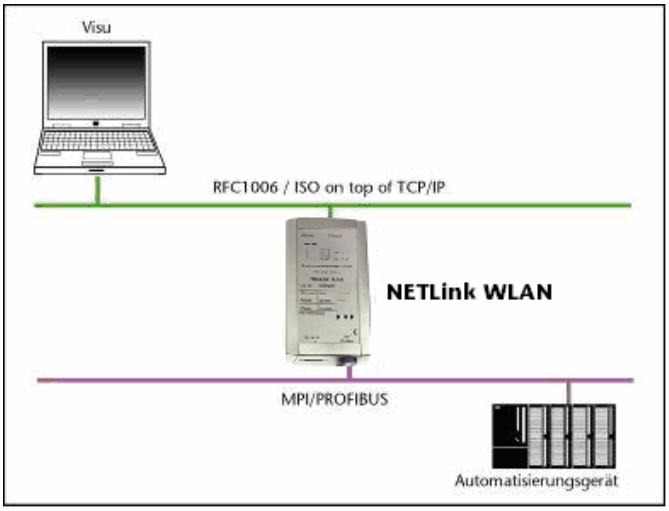


The value update is currently permanently set to 0.5 seconds. Even if multiple stations access this function from the TCP/IP end, only one connection resource is ever assigned in NETLink WLAN. Moreover, data exchange via MPI/PB and/or RFC 1006, the '*Observe Variables*' action has the lowest priority. The update time in the Web interface therefore depends on the concurrent bus load.

8 Using the RFC1006 option (S7-TCP/IP)

As an additional option, NETLink WLAN can implement the RFC1006 protocol (also known as S7-TCP/IP or as ISO on top of TCP). This functionality can be enabled and parameterized via the Web interface of NETLink WLAN.

Because many visualization system manufacturers have implemented this protocol to ensure a connection to Simatic controllers via TCP-CPs from Siemens (e.g. CP343 or CP443), NETLink WLAN with RFC1006 is a lower-cost alternative to communication with these visualization systems.



Please note that the RFC1006 functionality is not accessible with S7-200 systems connected to NETLink WLAN.

! *The usage of RFC1006 at S7-200 systems is not possible.*

The following software packages with RFC1006 support have so far been tested in conjunction with NETLink WLAN:

- WinCC V6.0/V7.0 (Siemens AG)
- WinCC flexible 2005/2007/2008 (Siemens AG)
- ZenOn V6.2 (COPA-DATA)
- PROCON-Win V3.2 (GTI Control)
- S7-OPC Server, V3.1 and higher (Systeme Helmholz GmbH)
- AGLink V4.0 (DELTALOGIC Automatisierungstechnik GmbH)
- INAT-OPC-Server (INAT GmbH)
- WinCE 5.0 Terminal TP21AS (Sütron Electronic GmbH)
- KEPserverEx V4.0 (KEPware Inc.)
- InTouch V9.5 (Wonderware GmbH)

8.1 Configuration of the RFC1006 interface

The configuration page of the Web interface, accessible via a link on the home page, is a configuration interface for the user (see Section 7.3).

The option *'RFC 1006 interface ON/OFF'* activates or deactivates the RFC1006 interface.

The possible options are:

- ON: The RFC1006 functionality is enabled and can be used, taking further configuration into account.
- OFF: The RFC1006 functionality is deactivated.

If the RFC1006 functionality is activated, the options described below must be taken into account and parameterized as required and desired.

If RFC1006 functionality is deactivated, the following parameters will have no influence on the functioning of NETLink WLAN. However, if an attempt is made to communicate with NETLink WLAN via RFC1006, the service will be denied.

Rebooting can take up to 40 seconds.

After the configuration has been saved and NETLink WLAN has been rebooted, the current settings will be shown clearly and easily on the status page of the Web interface.

8.1.1 Autobaud ON/OFF

With the option *'Bus autobaud ON/OFF'* you preset whether after a power cycle NETLink WLAN will search for the bus parameters with which it will then go online or whether the stored bus parameters will be used (see Section 8.1.3).

The possible options are:

- ON: NETLink WLAN attempts to determine the correct bus parameters and goes onto the bus with them.
- OFF: NETLink WLAN goes onto the bus with the parameters that are stated under *'Stored bus parameters'*.

8.1.2 Own (local) station address

The *'Own station address'* option indicates the bus address with which NETLink WLAN will log on to the bus.

The value for the station address must not have any value in the range 0 through 126. The only precondition for this is that the selected address is not larger than the HAS (highest station address) and is not already being used for another device on the bus.

8.1.3 Storage of specified bus parameters

If the *'Bus autobaud ON/OFF'* option has been deactivated (OFF), the parameter fields of the sub item *'Stored bus parameters'* must be configured carefully.

When parameterizing, please note that all parameters for PROFIBUS are interdependent. That is, if a parameter, e.g. the baud rate, is changed, all the other parameters usually also change.

For MPI, on the other hand, all parameters besides the baud rate are fixed. That is, if an MPI connection of increased from, say, from 187.5 Kbps to 12000 Kbps, all other parameters can/must remain unchanged.

The following parameters must be taken into account:

- Baud rate: The required baud rate is entered in Kbps. That is, for example, *'187.5'* or *'12000'*. The possible values are: 9.6; 19.2; 45.45; 93.75; 187.5; 500; 1500; 3000; 6000, and 12,000.
- HSA The highest station address is entered here. For MPI generally *'31'* and for PROFIBUS *'126'*. However, any values can be used that are not equal to the default values.
- TSlot_Init This value is always '415' for MPI – whatever the baud rate. For PROFIBUS the appropriate value should be read from the PROFIBUS project.
- Ttr This value is always '9984' for MPI – whatever the baud rate. For PROFIBUS the appropriate value should be read from the PROFIBUS project.
- Max. Tsdr This value is always '400' for MPI – whatever the baud rate. For PROFIBUS the appropriate value should be read from the PROFIBUS project.
- Min. Tsdr This value is always '20' for MPI – whatever the baud rate. For PROFIBUS the appropriate value should be read from the PROFIBUS project.
- Tset This value is always '12' for MPI – whatever the baud rate. For PROFIBUS the appropriate value should be read from the PROFIBUS project.
- Tqui This value is always '0' for MPI – whatever the baud rate. For PROFIBUS the appropriate value should be read from the PROFIBUS project.
- Gap This value is always '5' for MPI – whatever the baud rate. For PROFIBUS the appropriate value should be read from the PROFIBUS project.

- Retry — This value is always '2' for MPI – whatever the baud rate. For PROFIBUS the appropriate value should be read from the PROFIBUS project.

Incorrect bus parameters can interfere with the bus considerably!

Please note that under unfavorable circumstances an incorrectly parameterized NETLink WLAN can interfere with the bus to the extent that regular bus operation is no longer possible.

For this reason, autobaud functionality is provided to ensure the correct parameters are used, provided that the CPU supports this functionality.

8.2 Addressing (rack/slot mode ON/OFF)

RFC1006 connections are virtual point-to-point links, that is, links from the PC to the programmable controller (possible branching within the programmable controller is handled by the CPU => Routing).

Because NETLink WLAN is a point-to-multipoint communication adapter ('PC to NETLink WLAN' on the one hand and 'NETLink WLAN to many bus stations' on the other hand), it was necessary to implement different addressing methods to permit all communication variations.

The addressing methods are *'Addressed Mode'* (see Section 8.2.1) and *'Rack/Slot Mode'* (see Section 8.2.2).

These two addressing methods, which are mutually exclusive, permit most types of communication that are also possible via the NETLink-S7-NET.

8.2.1 Addressed mode

If different CPUs are to be accessed on the same MPI/PROFIBUS via RFC1006, addressed mode is suitable.

If this mode is used, the following setting must be parameterized on the configuration page of the Web interface.

- *‚Rack/slot mode'* must be deactivated (OFF)
  ⇨ Addressed Mode is active

The destination address now has to be entered in the RFC1006 driver of the Windows application (e.g. WinCC, see Section 8.3.1) instead of the rack and slot.

Please note that the rack and slot together fill only one byte which is divided as follows:

- Rack fills the upper three bits (11100000_{bin} for Rack 7, Slot 0)
- Slot fills the lower five bits (00011111_{bin} for Rack 0, Slot 31)

If you now want to communicate with destination address 2, the following has to be entered:

Rack 0, Slot 2.

If you want to communicate with destination address 49, on the other hand, the following has to be set:

Rack 1, Slot 17.

Section 11.3.1 contains a table were you can read off already converted values for the rack and slot.

There are also parameterization tools that do not provide fields with names like rack and slot. These tools normally have a parameterization field with a name such as Remote TSAP that is usually two bytes long and in hex format. This field, in which only the lower byte is of interest, is parameterized as follows:

If you want to communicate with destination address 2, the following has to be entered:

Remote TSAP 0202_{hex}.

If you want to communicate with destination address 49, on the other hand, the following has to be set:

Remote TSAP 0231_{hex}.

Section 11.3.1 contains a table were you can read off already converted values for the Remote TSAP.

The formula *Rack * 32 + Slot = Address* can be used for simplicity.

8.2.2 Rack/slot mode

In rack/slot mode, it is possible to access specific modules of the automation system.

This is achieved by only communicating directly with one, preparameterized station. This station routes the data packets not intended for it to the required rack/slot and routes the response back to NETLink WLAN.

This makes it possible, for example, to communicate in S7-400 systems with more than one CPU on a rack (⇨Multicomputing) without having to attach further CPUs to the bus.

To use this functionality, it is necessary to parameterize the following on the configuration page of the Web interface:

- *‚Rack/slot mode'* must be enabled (ON)
- For *'Fix destination address for R/S mode'*, the address of the required communication partner must be entered.

No special aspects have to be observed in the visualization system. The settings for the rack and slot or remote TSAP must be made as the described for the specific visualization system.

Section 8.3.2 explains addressed mode using WinCC as an example.

8.3 Example of configuration for WinCC V7.0

The basic parameterization of RFC1006 connections in visualization systems is explained here using the example of the WinCC V7.0 tool from Siemens AG.

It is assumed you are familiar with the development environment of WinCC, so that only points relating specifically to the connection need to be mentioned.

Because it is the Windows RFC1006 driver that is parameterized, all elements you will see in the WinCC example can also be found in similar form on other visualization systems/OPC servers that support RFC1006.

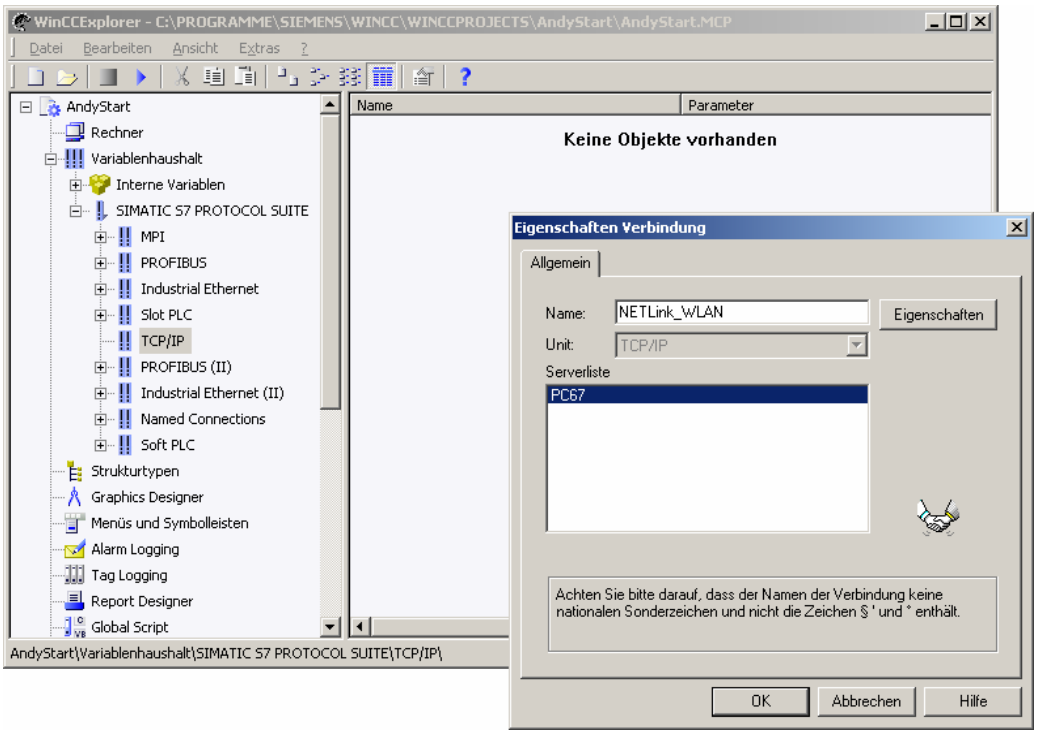
To explain the special aspects of communication with NETLink WLAN, the same connection is explained once for addressed mode (see Section 8.3.1) and again in rack/slot mode (see Section 8.3.2).

8.3.1 Using addressed mode

For the basics of addressed mode at NETLink WLAN end, see Section 8.2.1.

To parameterize a RFC1006 link in a WinCC project, a new TCP/IP link must first be created in the *'SIMATIC S7 PROTOCOL SUITE'*.

Here, this connection is called *'NETLink_WLAN'*.

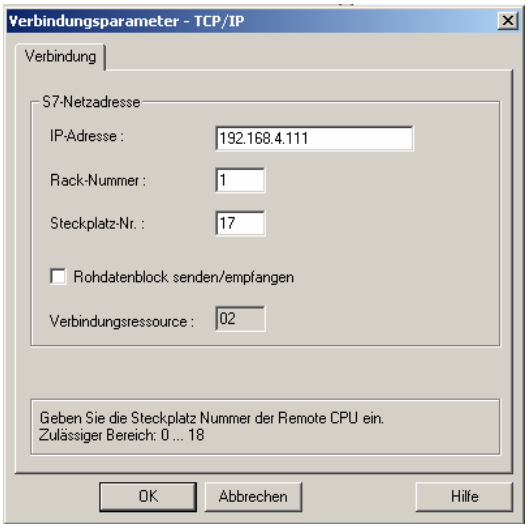


A click on '*Properties*' takes us to a setting form in which the IP address of NETLink WLAN and the rack/slot combination of the destination have to be entered.

In this case, NETLink WLAN has the IP address 192.168.4.111.

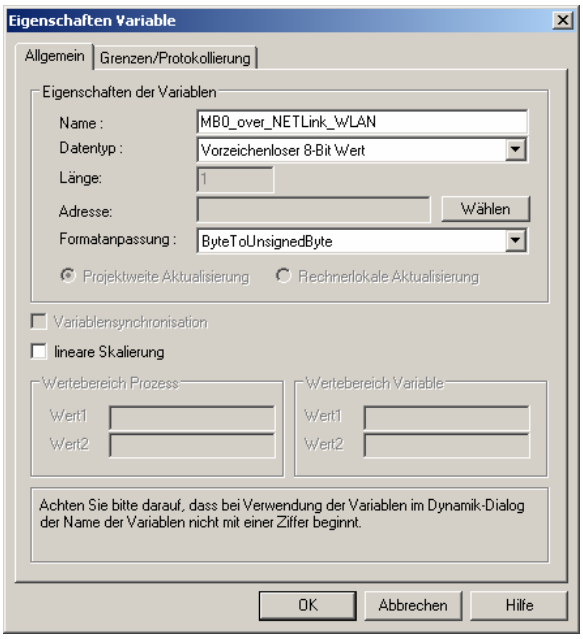
The NETLink has the IP address 192.168.4.49 on delivery from the factory.

The destination CPU with which we want to communicate has the PROFIBUS address 49. Because addressed mode is to be used, we can read off the correct value for the rack and slot from the table in Section 11.3.1.



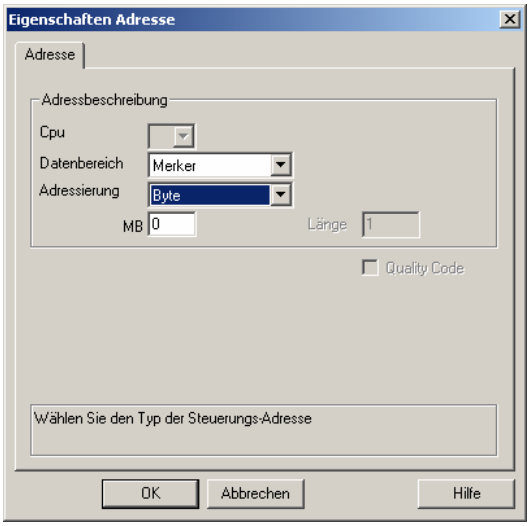
Under this connection we have just configured, we now have to create a variable.

This is done by right-clicking to open the context menu of the new connection and selecting *'New variable…'*.

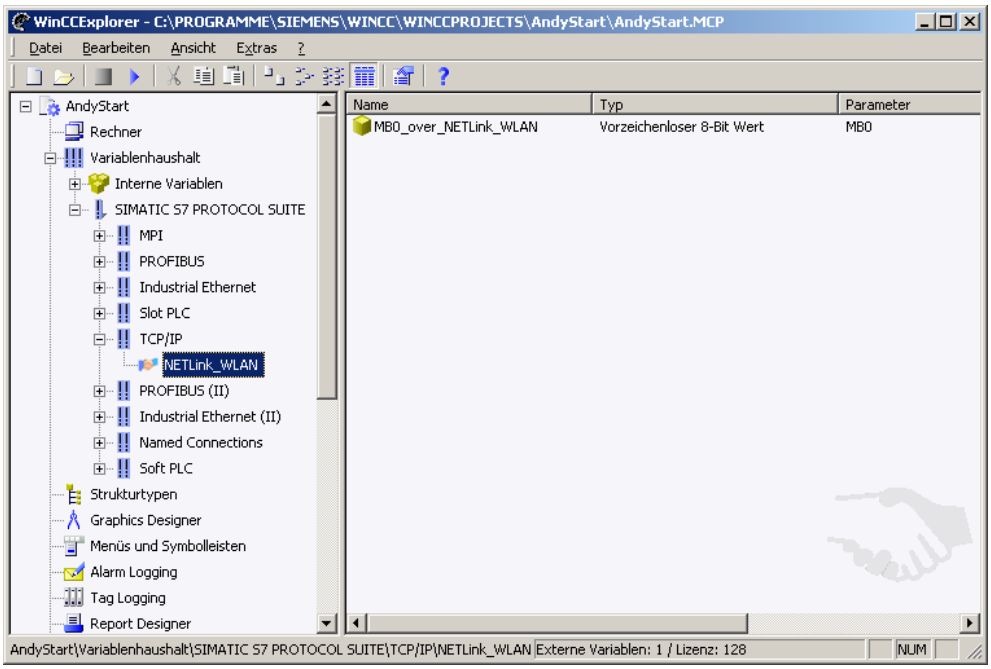


In the properties window of the variable that was named *'MB0_over_NETLink_WLAN'* in this case, we can now select the type of variable by clicking the *'Select'* button.

Marker byte 0 is configured here.



The following screenshot shows that a variable named *'MB0_over_NETLink_WLAN'* now exists under the *'NET-Link_WLAN'* connection.



If this variable is now included in the initial screen of the WinCC project, for example, a connection will be established to the CPU with address 49 via NETLink WLAN to read or write marker byte 0 from this address.

Further variables of different types can, of course, be created and used according to the same scheme.

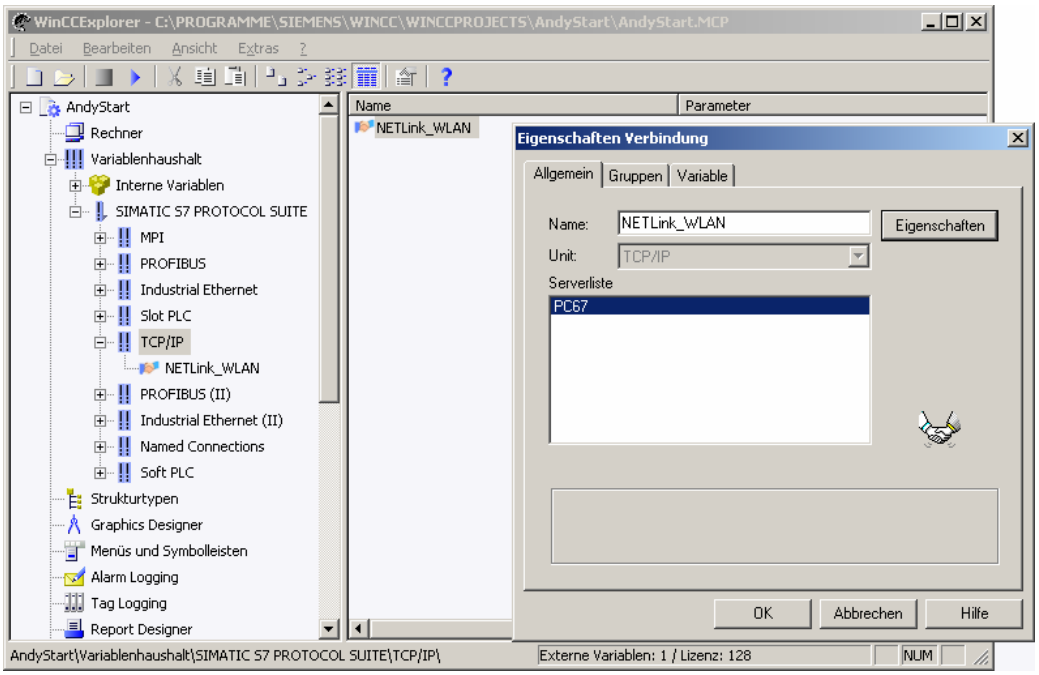
It is also possible to create additional TCP/IP connections in order to communicate not only with the CPU with bus address 49 but also with other CPUs.

8.3.2 Use of rack/slot mode

For the basics of rack/slot mode at NETLink WLAN end, see Section 8.2.2.

To parameterize a RFC1006 link in WinCC, a new TCP/IP link must first be created in the *'SIMATIC S7 PROTOCOL SUITE'*.

Here, this connection is called *'NETLink_WLAN'*.



A click on '*Properties*' takes us to a setting form in which the IP address of NETLink WLAN and the rack/slot combination of the destination have to be entered.

In this case, NETLink WLAN has the IP address 192.168.4.111.

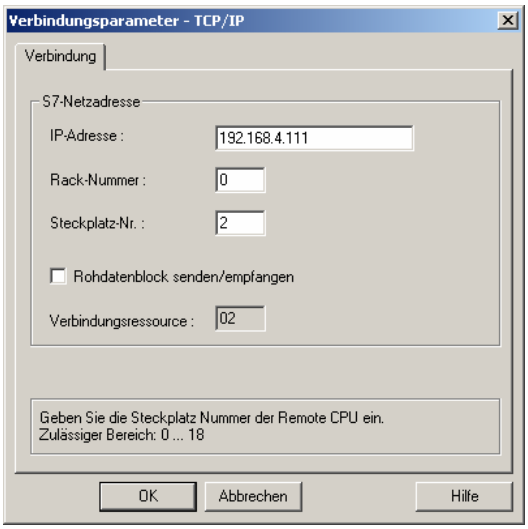
The destination CPU with which we want to communicate is in Rack 0 on Slot. Because rack/slot mode we are going to use, WinCC does not have to announce the CPU address. Instead, the real values for rack and slot are specified, in this case rack 0 and slot 2.

Please note that the destination address, 49 in this case, must now be announced to NETLink WLAN via the Web interface.

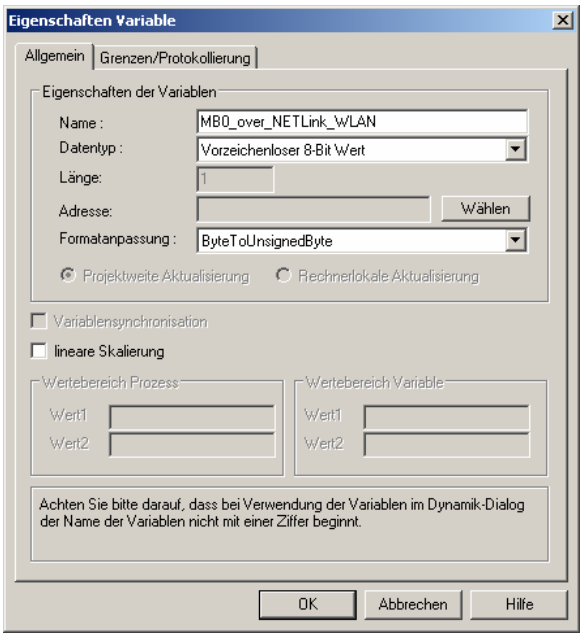
The NETLink has the IP address 192.168.4.49 on delivery from the factory.

!

Remember to parameterize NETLink WLAN.

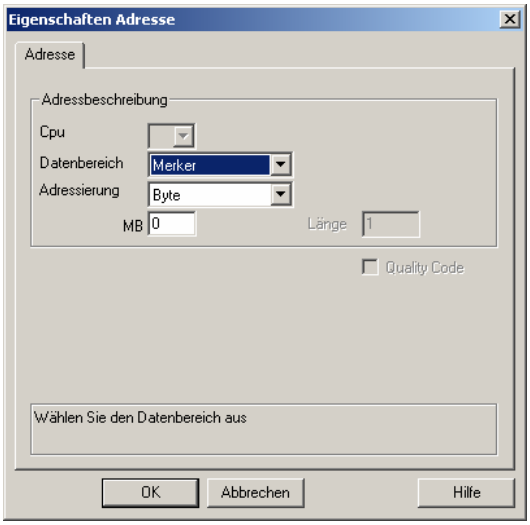


Under this connection we have just configured, we now have to create a variable. This is done by right-clicking to open the context menu of the new connection and selecting *'New variable...'*.

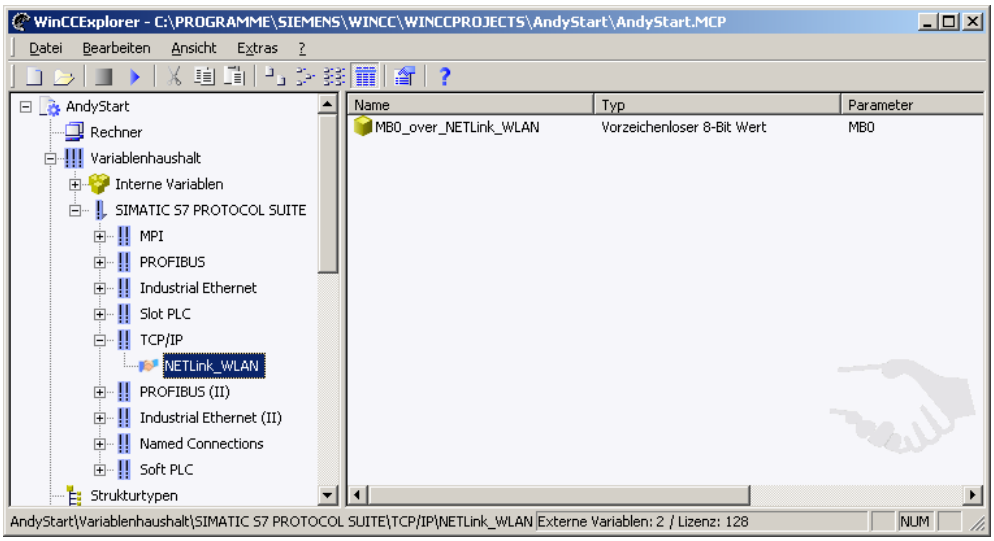


In the properties window of the variable, which was named *'MB0_over_NETLink_WLAN'* in this case, we can now select the type of variable by clicking the *'Select'* button.

Marker byte 0 is configured here.



The following screenshot shows that a variable named *'MB0_over_NETLink_WLAN'* now exists under the *'NET-Link_WLAN'* connection.



If this variable is now included in the initial screen of the WinCC project, for example, a connection will be established to the CPU with address 49 via NETLink WLAN to read or write marker byte 0 from this rack 0, slot 2.

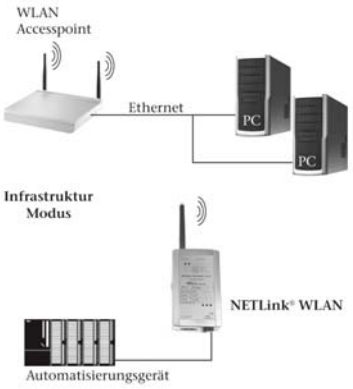
Further variables of different types can, of course, be created and used according to the same scheme.

It is also possible to create additional TCP/IP connections in order to communicate not only with rack 0 / slot 2, for example, but also with rack 0 / slot3. However, all the communication must go via bus address 49.

9 Configuration of WLAN functionalities

This section provides an overview of the two available WLAN modes which can be used with NETLink WLAN.

9.1 NETLink WLAN in the infrastructure mode (AP)



When using the infrastructure mode the communication of two WLAN components is handled by a mediation unit, an access point (AP). The AP functions as central coordination point of the communication. The infrastructure mode that has to consist of at least one WLAN end device and an AP is also called BSS.

Comparable to a mobile network the AP establishes a radio cell that is spatially restricted. WLAN end devices such as NETLink need to log on to this radio cell and authenticate to it. The authentication does only occur if the access data to the radio cell is stored in NETLink WLAN.

In order to log on NETLink WLAN to an infrastructure net the following aspects have to be regarded:

- The WLAN function needs to be activated in NETLink WLAN
- The infrastructure mode needs to be selected in NETLink WLAN
- The SSID of the access point needs to be stored in NETLink WLAN
- The encoding settings of NETLink WLAN need to correspond with those of the access point

9.2 NETLink WLAN in the ad hoc mode

The ad hoc mode describes an operating mode in which the WLAN components communicate with each other directly. Therefore, no central coordination point (access point) is involved in the communication. The data transfer is realized directly by and between the WLAN components. That is why this operating mode is also called “peer to peer mode”.

In order to connect NETLink WLAN directly with a PG/PC the following aspects have to be regarded:

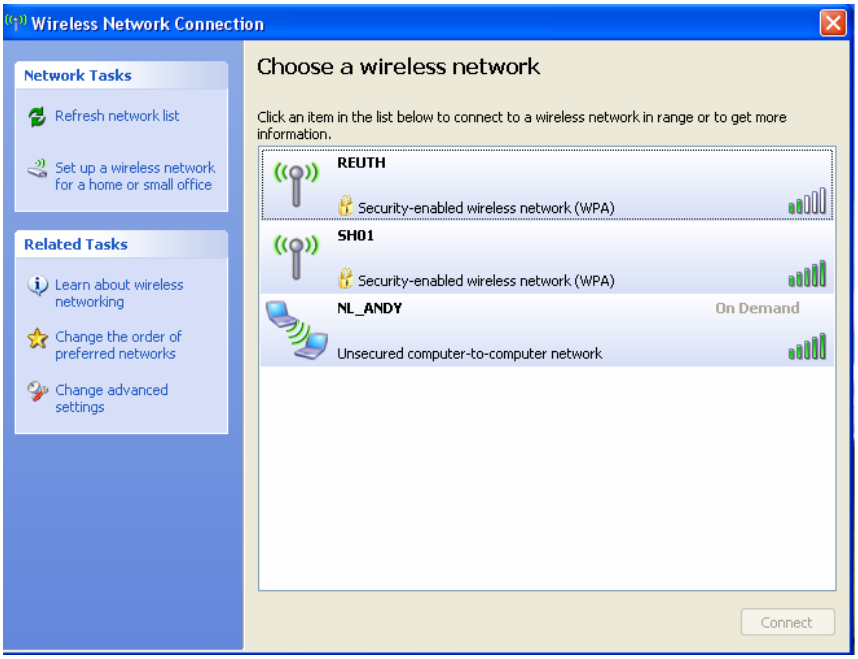
- The WLAN function needs to be activated in NETLink WLAN
- The ad hoc mode needs to be selected in NETLink WLAN
- NETLink WLAN needs to be defined with a station name
- The channel on which NETLink WLAN is supposed to send needs to be selected
- The desired encoding settings need to be made (in the ad hoc mode you can only use the relatively insecure WEP encoding standard)
- The party that starts the communication has to be able to understand one of the WLAN standards 802.11b or 802.11g furthermore the NETLink WLAN has to have a fixed IP address, since the adapter does not serve as a DHCP Server.

9.2.1 Connection establishment PC to NETLink WLAN in the unencrypted ad hoc mode

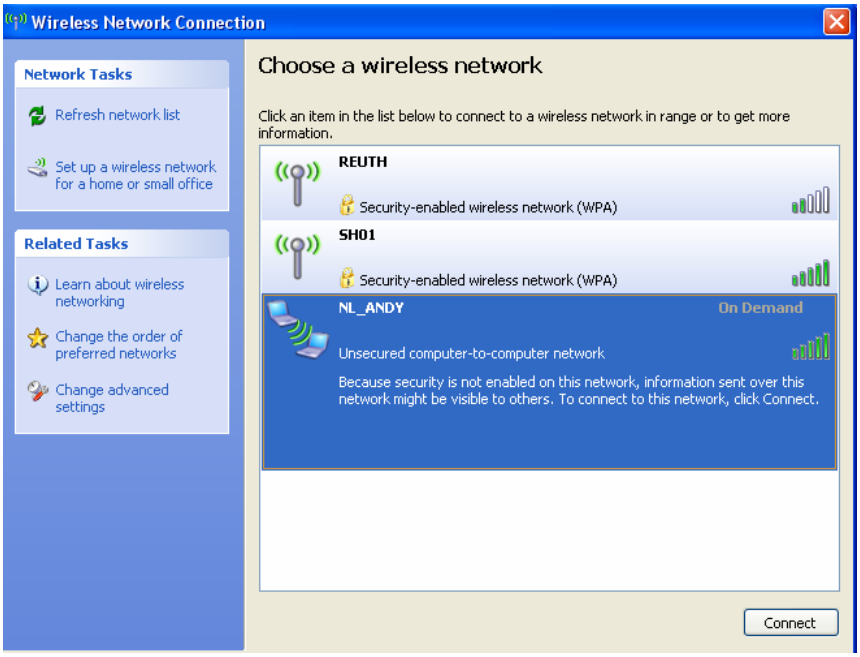
At this time it is assumed that NETLink WLAN already disposes of a station name, that it is reachable via WLAN in the ad hoc mode and that the WLAN connection is configurable via the Windows WLAN assistant.

1. Step: The WLAN adapter has recognized the wireless networks in operating distance.

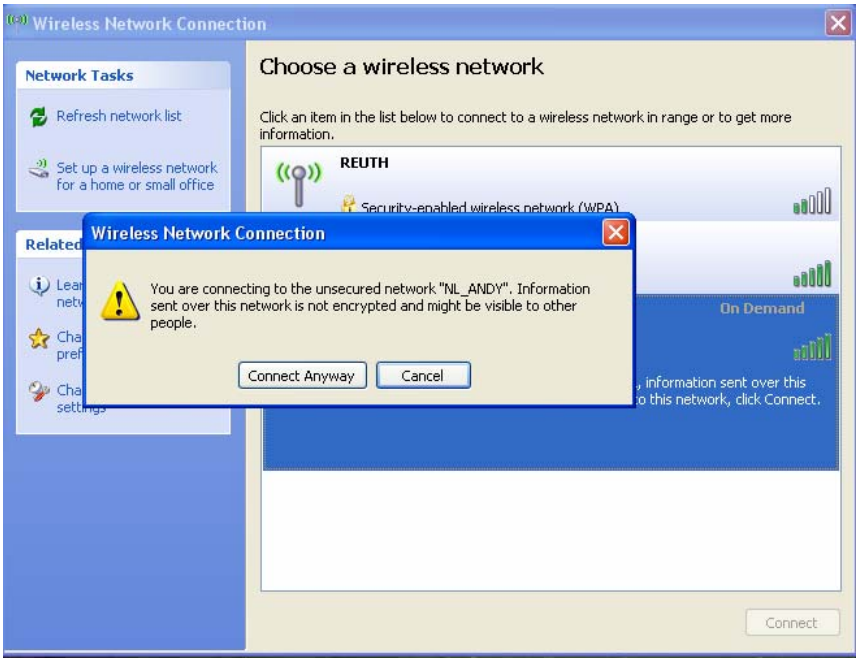
2. Step: This screen appears when you open the '*Wireless Networks*' manager by clicking the WLAN symbol.



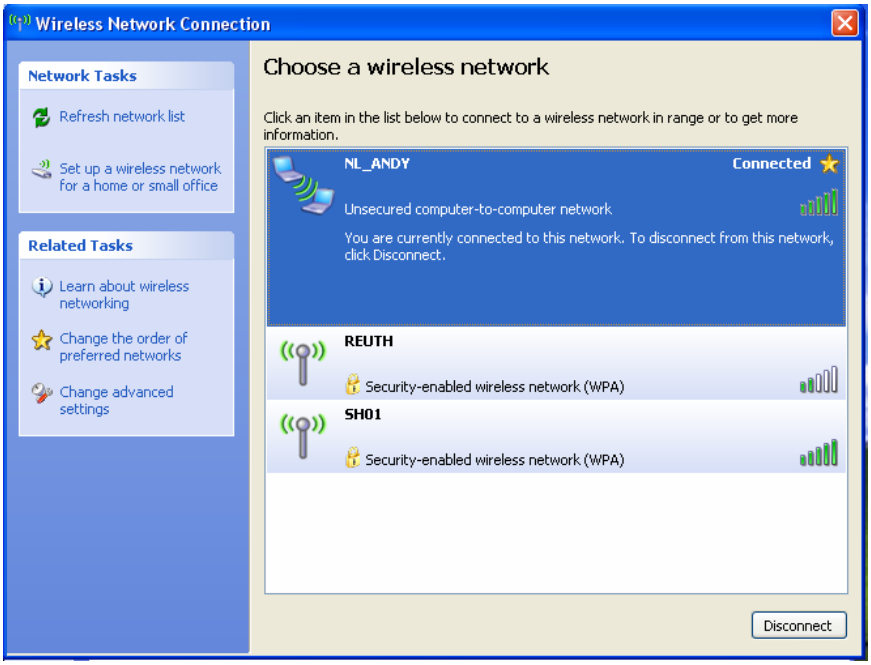
3. Step: Now select the NETLink WLAN, here 'NL Andy', that you wish to connect to.



4. Step: In order to establish the connection it is necessary to click the ‘Connect’ and the ‘Connect anyway’ buttons. The ‘Connect anyway’ button will only appear if no encoding is set in NETLink WLAN.



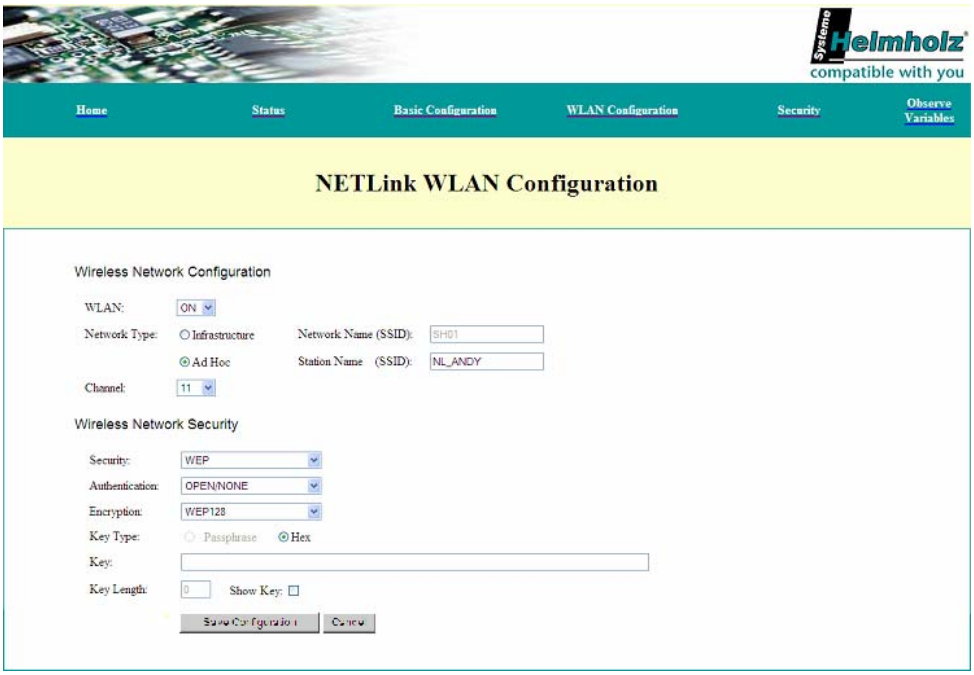
5. Step: Now the following screen appears.



6. Step: The connection to NETLink WLAN is now successfully established, and it can be implemented e.g. via the PG/PC interface parameterization.

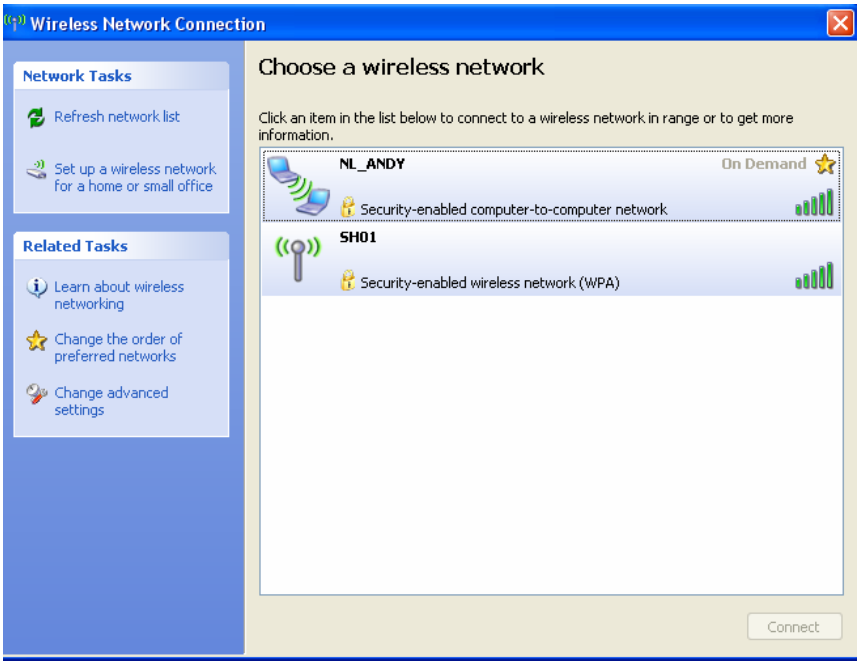
9.2.2 Connection establishment PC to NETLink WLAN in the encoded ad hoc mode

At this time it is assumed that NETLink WLAN is configured similar to the configuration shown on the following screen and that it is accessible via WLAN. Keep in mind to enter 26 characters in the box for the encoding key when using WEP 128 bit. The characters are only displayed if you tick the check box '*Show key*'. Otherwise the '*Key*' is hidden. Furthermore the WLAN connection in this example has to be configurable via the Windows WLAN assistant or via another producer.

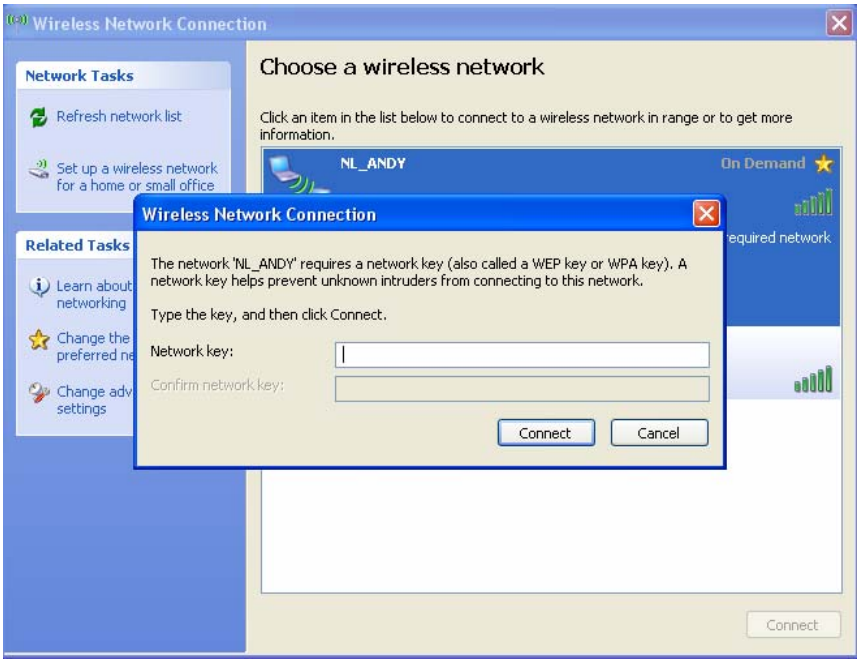


1. Step: The WLAN adapter has recognized the wireless networks in operating distance.

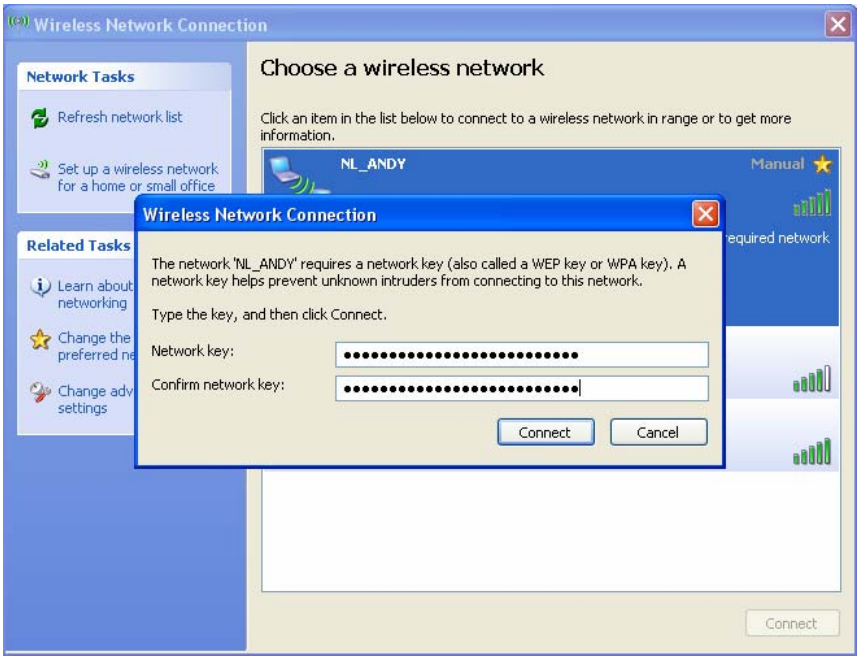
2. Step: This screen appears when you open the '*Wireless Networks*' manager by clicking the WLAN symbol.



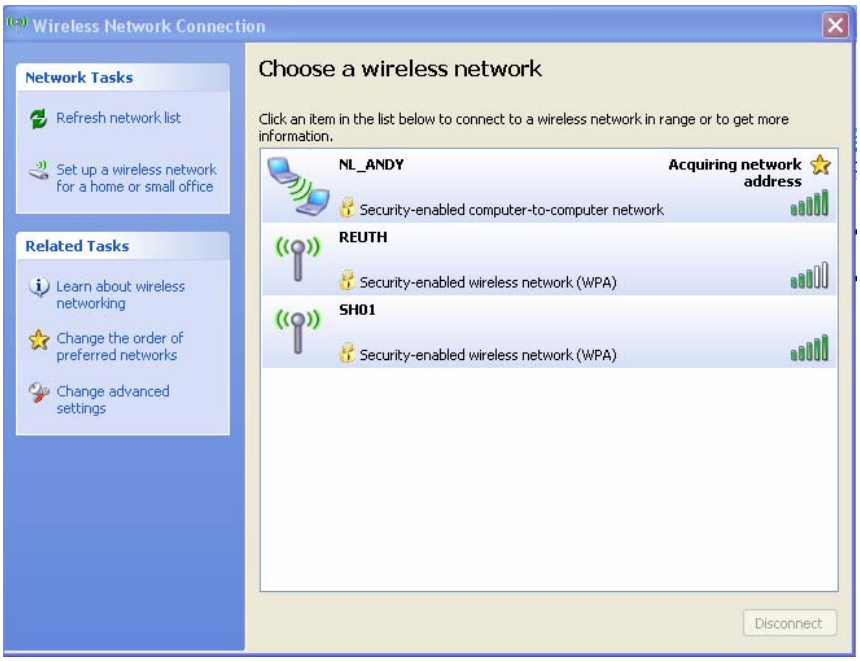
3. Step: Now select the NETLink WLAN, here '*NL Andy*', that you wish to connect to and click the '*Connect*' button.



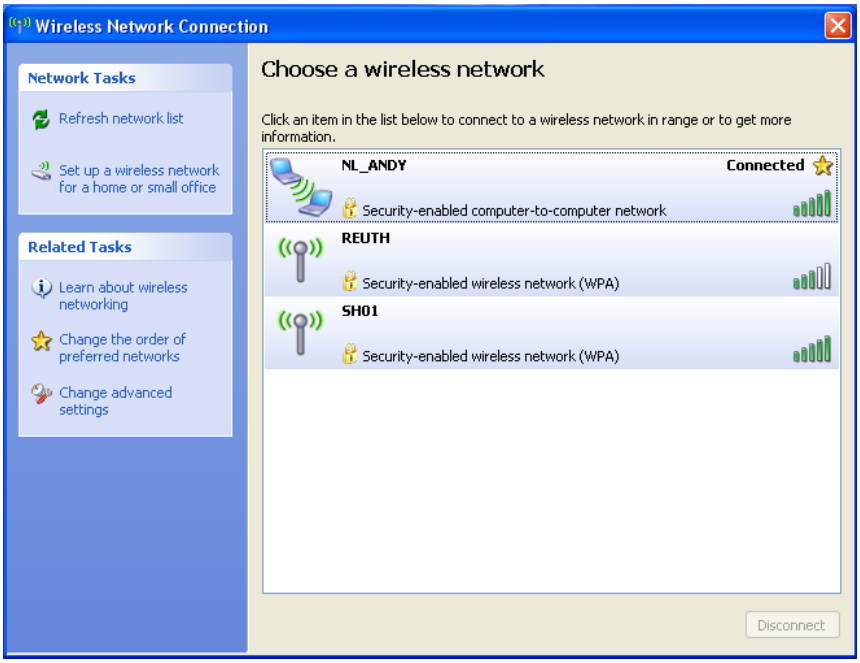
4. Step: Now enter the valid key for the respective NETLink WLAN and confirm by clicking the '*Connect*' button. Windows does not display the key, either, but keeps the characters hidden.



5. Step: The manager now indicates to obtain a network address. That is not entirely correct, since NETLink WLAN cannot allocate IP addresses. Therefore, the wireless network connection needs to be given a fixed IP beforehand.



6. Step: Afterwards the following screen is shown. The connection is now properly established, and NETLink WLAN can now be used e.g. as programming adapter.

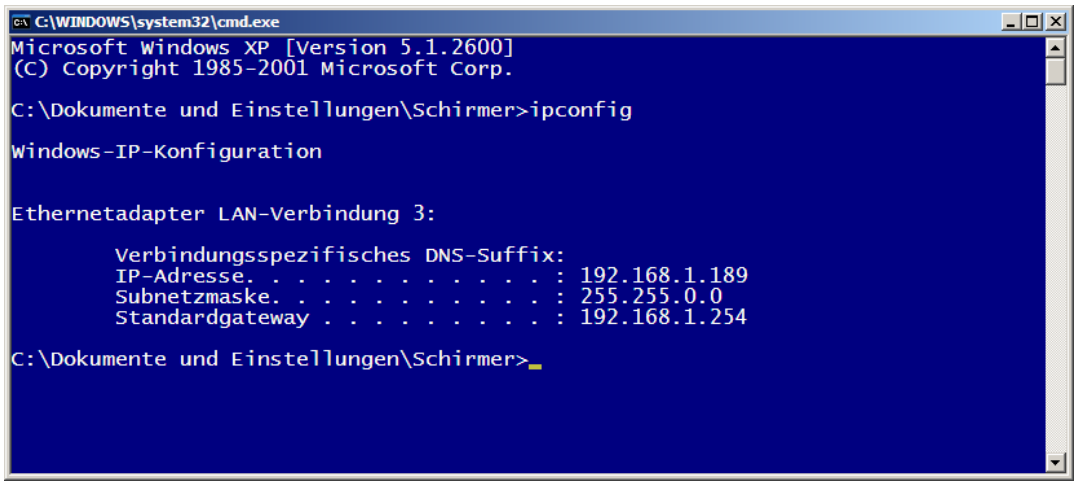


If a wrong key is entered the PC will establish a connection anyway. However, NETLink WLAN can not be used via this connection.

10 Troubleshooting

Q: I don't know the IP address of my computer.

A: Enter the command 'ipconfig' after the prompt to show the configuration of the Ethernet interfaces of your computer.



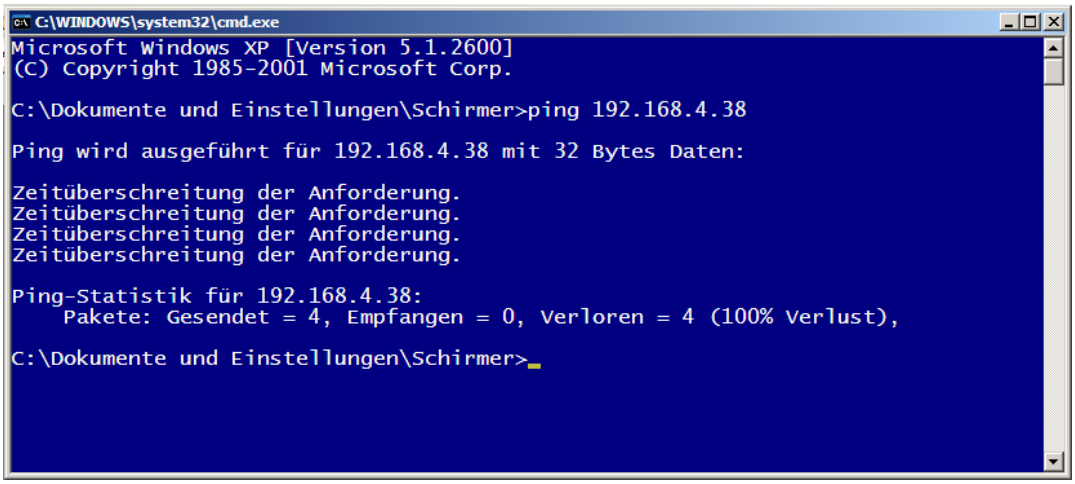
Q: My computer has a firewall. Which ports I must release?

A: The NETLink-S7-NET driver communicates with NETLink WLAN via TCP port 7777.
UDP ports 25342 and 25343 are also used to search for NETLink WLAN devices.
Please release at least port 7777 so that the basic functionality of the driver is available.
If you use the RFC1006 functionality (also known as S7-TCP/IP), port 102 must also be released.
ATTENTION: If you want to use the driver option '*Internet teleservice*' (see chapter 0) the specific ports configured there must be released also because this ports will be used instead port 7777.

Q: I get an error message when I access the controller.

The NETLink has the IP address 192.168.4.49 on delivery from the factory.

A: Check the error message.
The problem may be the setting of the PG/PC interface (e.g. PROFIBUS instead of MPI, address already allocated, etc.) or NETLink WLAN if it is not connected or not accessible at this IP address.
Make sure you have set the IP address correctly in the driver configuration. Please also enter the command *PING <IP address>* at the DOS prompt to check whether NETLink WLAN can also be accessed via the network.



Q: I am asked for a user name and a password by the configuration tool as well as by the web interface, but I never set user name or password.

The default user name is "NETLink WLAN"

The default password is 'admin'.

A: If no password is given by the user, the default user name "*NETLink WLAN*" and the default password '*admin*' are used.

Q: The setting dialog boxes are not appearing in the Simatic Manager:

A: Please note that after initial installation the NETLink-S7-NET driver must be added to the PG/PC interfaces.
Make sure you had administrator rights during installation. Reboot your PC after installation if prompted to do so.
You need at least version 5.1 of the Simatic Manager.

Q: When the adapter is plugged onto the PROFIBUS, no online connection is possible.

A: If possible, use the autobaud functionality.
If this is not possible or not desired, check the timing parameters for the PROFIBUS in the STEP7 configuration. Enter the read values into the advanced bus parameter settings via the '*Bus parameters'* button. If on-line access is still not possible, set a higher 'Ttr' (target rotation time) both in NETLink WLAN and on the CPU.

Q: The Starter program has problems accessing a Micromaster drive.

A: When you request a *'control priority'* for the Micromaster drive, please increase the Failure monitoring from 20ms to 200ms and the Application monitoring from 2000ms to 5000ms, so that the Starter software remains operable.

Q: Every time I execute a certain function, it fails and the red Active LED flashes.

A: It is an exception in the communication between the PC and NETLink WLAN. Please contact support and describe how the error can be triggered. The support team will attempt to solve the problem as quickly as possible.

Q: Every time I execute a certain function, it fails and the red Connect LED flashes.

A: It is an exception in the communication between the programmable controller and NETLink WLAN. Please contact support and describe how the error can be triggered. The support team will attempt to solve the problem as quickly as possible.

Q: Although NETLink WLAN is plugged directly into my CPU and no further nodes are connected, MPI and PROFIBUS connections sometimes break down at high baud rates.

A: Make sure that the bus is correctly terminated.
Even if NETLink WLAN is the only device on the bus apart from the CPU, the terminating resistor must be connected. Otherwise problems may occur, especially at high baud rates.

Q: If I set NETLink WLAN to autobaud in the PG/PC interface and try to go online, the active LED lights up briefly before a message appears telling me that the bus parameters cannot be determined.

A: Either the CPU used does not support the cyclic transmission of bus parameters (disabled via parameterization or function does not exist), or the CPU is so busy with general communication tasks that the lower-priority bus parameter telegram is transmitted too infrequently and cannot be detected by NETLink WLAN. Please deactivate the autobaud functionality in the NETLink-S7-NET driver (PG/PC interface) and set the correct baud rate and the correct profile.

Q: In the Web interface, I enabled the RFC1006 functionality and would like NETLink WLAN to go onto the bus using autobaud. Unfortunately, the active LED just flashes but no communication is possible via my visualization system.

A: Either the CPU used does not support the cyclic transmission of bus parameters (disabled via parameterization or function does

not exist), or the CPU is so busy with general communication tasks that the lower-priority bus parameter telegram is transmitted too infrequently and cannot be detected by NETLink WLAN. Please deactivate the autobaud functionality in the Web interface of the NETLink WLAN and set the correct baud rate with the corresponding bus parameters.

Q: I use the rack/slot mode of the RFC1006 interface (rack/slot mode = ON) and have specified address 2 for my existing CPU in the Web interface in 'Fix destination address for R/S mode'. Although NETLink WLAN online is active (active LED lights up), my visualization system tells me that no link can be established.

A: Make sure you have assigned the correct values to rack and slot in the parameterization. For example, to communicate with a CPU in a 300 rack, you must enter '0' for rack and '2' for slot. Many visualization system manufacturers have grouped together the two fields. In that case, there may be a field with the name 'Remote TSAP' containing a hex value such as '0102'. In this case, the hex value '02' stands for rack 0 and slot 2.

Q: I would like to use addressed mode of the RFC1006 interface (rack/slot mode = OFF) because that way I can access several CPUs on the same bus. Unfortunately I am not sure how to parameterize the fields rack and slot in the visualization used.

A: If addressed mode is used, a combination of rack and slot specifies the destination address of the automation system.
If the CPU is to be addressed with bus address 2, the value 0 for the rack and the value 2 for the slot must be entered.
Please note that the rack field consists of three bits and the slot field of five bits – i.e. together they comprise one byte and eight bits. That means, for example, the value 1 (00000001_{Bin}; 01_{Hex}) in the rack field must be entered for bus address 49 (00110001_{Bin}; 31_{Hex}) and the value 17 (00010001_{Bin}; 11_{Hex}) in slot field.
For parameterization tools that offer a field with a name like *'Remote TSAP'* for parameterization instead of separately parameterizable rack and slot fields, the value of the bus address can be entered directly without being taken apart and converted.
For example, for bus address 2, the hex value *'0102'* can be entered and for bus address 49 the hex value *'0131'*.
An address conversion table is given in Section 11.3.1 to simplify this task.

Q: If I mix RFC1006 connections and connections via the STEP7 driver, the link sometimes breaks off or error messages appear saying that it is not possible to establish a link.

A: For communication with S7-300 modules it may be necessary to parameterize the communication resources.
The user can influence the allocation of existing *'connection resources'* under object properties of the CPU in the hardware configuration.

Q: Once the configured PROFIBUS slaves have been added on my CPU, communication between NETLink WLAN and STEP7 becomes markedly slower.

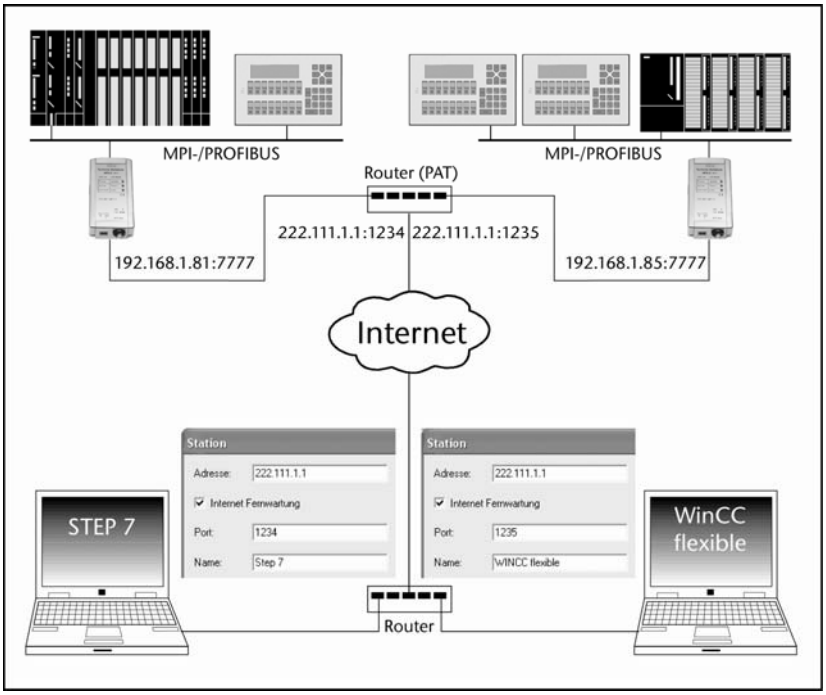
A: The user can influence the allocation of *'cycle load due to communication [%]'* under object properties of the CPU in the hardware configuration. The default value is 20 %.

Q: What should I look out for when implementing Internet teleservice via a router?

A: If NETLink WLAN devices are in a private network behind a router, they cannot be addressed by their private IP address on the fixed NETLink WLAN port 7777 from the Internet.

To be able to address the devices from the Internet despite this, a 'public' port is configured in the router for each NETLink WLAN.

After that, access is possible via the public IP address of the router and the configured port.



By default, the S7 network driver attempts to address NETLink WLAN via fixed port 7777, which would not work in the above scenario.

For that reason, as from driver version 2.5.0.0, the 'Internet Teleservice' option is installed, with which the port of a NETLink WLAN configured in the router can be set.

This configuration can be made in the 'Station' dialog box.

There is a detailed description of the settings for a 'station' in Section 5.1.2.

For explanations, see the figure above:

Private addr. NETLink WLAN → Public addr. NETLink WLAN

NETLink 1: 192.168.1.81 Port 7777 → 222.111.1.1 Port 1234

NETLink 2: 192.168.1.82 Port 7777 → 222.111.1.1 Port 1235

Q: My WLAN adapter does not find my NETLink WLAN in the ad hoc mode.

A: Make sure that your NETLink WLAN is in operating distance to your in WLAN adapter, that WLAN is set on ‚*ON*' in NETLink WLAN, that the ad hoc mode in activated in NETLink WLAN, and that your NETLink WLAN is accessible via the subnet configuration of your adapter. In addition you need to mind the VDI/VDE 2185.

11 Appendix

11.1 Technical Data

Dimensions in mm (LxWxH)	130 x 68 x 30
Weight	Approx. 280 g
Operating voltage	24 V DC ±25 %
Current consumption	200 mA
Ethernet interface	10 Base-T / 100 Base-TX
Ethernet connection	RJ45 socket
Ethernet transmission rate	10 Mbps and 100 Mbps
WLAN:	
Antenna terminal	SMA (male)
Type	802.11b; 802.11g
Frequency range	2,412 – 2,484 GHz
Transmission power	14 dBm + 1,5 dBm/- 1,0 dBm
Bit rate	max. 54 Mbit/s
Wireless security methods	WEP, WPA, WPA2
MPI/PROFIBUS interface	RS485, electrically isolated
MPI/PROFIBUS transmission rate	9.6 Kbps; 19.2 kbps 45.45 kbps 93.75 kbps 187.5 kbps 500 kbps 1.5 Mbps 3 Mbps 6 Mbps 12 Mbps
MPI/PROFIBUS connection	SUB-D connector, 9-way with programming unit interface and terminating resistor
MPI/PROFIBUS protocols	FDL protocol for MPI and PROFIBUS
Displays	3 LEDs, incl. 2 two-color, for general status information 2 LEDs for WLAN status 2 LEDs on the Ethernet interface for Ethernet status
Degree of protection	IP 20
Operating temperature	0 °C ... 60 °C
Storage and transportation temperature	-20 °C to +90 °C
Relative humidity during operation	5 % to 85 % at 30 °C (no condensation)
Relative humidity during storage	5 % to 93 % at 40 °C (no condensation)

11.2 Pin assignments

11.2.1 MPI/PROFIBUS interface pin assignments

Connec-tor	Signal	Meaning
1	-	unused
2	GND	Ground power supply (looped through)
3	RxD / TxD-P	receive / transmit data-P
4	-	unused
5	DGND	Ground for bus termination (looped through)
6	DVCC	5 V DC for bus termination (looped through)
7	VCC	24 V DC for power supply (looped through)
8	RxD / TxD-N	receive / transmit data-N
9	-	unused

11.2.2 Assignment of the Ethernet interface (host interface)

Connector	Signal	Meaning
1	TX+	transmit data
2	TX-	transmit data
3	RX+	receive data
4	-	unused
5	-	unused
6	RX-	receive data
7	-	unused
8	-	unused

NETLink WLAN comes with a shielded category 5 TCP cable with a length of three meters.

The maximum cable length between two TCP interfaces is 100 meters according to IEEE802.

If distances greater than 100 meters have to be covered, the use of switches or hubs is recommended.

11.2.3 Power supply socket

If an external power supply is used, please make sure the polarity is correct and all technical data are complied with.

11.3 Further Documentation

11.3.1 Address conversion table

The following table is a parameterization aid for fining the correct setting for rack/slot or for remote TSAP in addressed mode.

Bus add.	Rack	Slot	TSAP		Bus add.	Rack	Slot	TSAP		Bus add.	Rack	Slot	TSAP		Bus add.	Rack	Slot	TSAP
0	0	0	0200		32	1	0	0220		64	2	0	0240		96	3	0	0260
1	0	1	0201		33	1	1	0221		65	2	1	0241		97	3	1	0261
2	0	2	0202		34	1	2	0222		66	2	2	0242		98	3	2	0262
3	0	3	0203		35	1	3	0223		67	2	3	0243		99	3	3	0263
4	0	4	0204		36	1	4	0224		68	2	4	0244		100	3	4	0264
5	0	5	0205		37	1	5	0225		69	2	5	0245		101	3	5	0265
6	0	6	0206		38	1	6	0226		70	2	6	0246		102	3	6	0266
7	0	7	0207		39	1	7	0227		71	2	7	0247		103	3	7	0267
8	0	8	0208		40	1	8	0228		72	2	8	0248		104	3	8	0268
9	0	9	0209		41	1	9	0229		73	2	9	0249		105	3	9	0269
10	0	10	020A		42	1	10	022A		74	2	10	024A		106	3	10	026A
11	0	11	020B		43	1	11	022B		75	2	11	024B		107	3	11	026B
12	0	12	020C		44	1	12	022C		76	2	12	024C		108	3	12	026C
13	0	13	020D		45	1	13	022D		77	2	13	024D		109	3	13	026D
14	0	14	020E		46	1	14	022E		78	2	14	024E		110	3	14	026E
15	0	15	020F		47	1	15	022F		79	2	15	024F		111	3	15	026F
16	0	16	0210		48	1	16	0230		80	2	16	0250		112	3	16	0270
17	0	17	0211		49	1	17	0231		81	2	17	0251		113	3	17	0271
18	0	18	0212		50	1	18	0232		82	2	18	0252		114	3	18	0272
19	0	19	0213		51	1	19	0233		83	2	19	0253		115	3	19	0273
20	0	20	0214		52	1	20	0234		84	2	20	0254		116	3	20	0274
21	0	21	0215		53	1	21	0235		85	2	21	0255		117	3	21	0275
22	0	22	0216		54	1	22	0236		86	2	22	0256		118	3	22	0276
23	0	23	0217		55	1	23	0237		87	2	23	0257		119	3	23	0277
24	0	24	0218		56	1	24	0238		88	2	24	0258		120	3	24	0278
25	0	25	0219		57	1	25	0239		89	2	25	0259		121	3	25	0279
26	0	26	021A		58	1	26	023A		90	2	26	025A		122	3	26	027A
27	0	27	021B		59	1	27	023B		91	2	27	025B		123	3	27	027B
28	0	28	021C		60	1	28	023C		92	2	28	025C		124	3	28	027C
29	0	29	021E		61	1	29	023D		93	2	29	025D		125	3	29	027D
30	0	30	021F		62	1	30	023E		94	2	30	025E					
31	0	31	0220		63	1	31	023F		95	2	31	025F					

11.3.2 Information in the internet

http://www.helmholz.de

http://www.PROFIBUS.com

http://www.siemens.com

http://www.ietf.org/rfc

12 Glossary

128 Bit:	Means in this manual the encoding of WLAN data using a code of 128 bit. That adds to a total of 3*10^38 different keys
64 Bit:	Means in this manual the encoding of WLAN data using a code of 128 bit. That adds to a total of 1*10^19 different keys
802.11b:	IEEE standard that allows gross transfer rates up to 11Mbps in WLAN
802.11g:	IEEE standard, a succeeding model of 802.11b that allows gross transfer rates up to 54 Mbps in WLAN and that is compatible to 802.11b
Access Point:	Central access point for WLAN devices that are used in the infrastructure mode. Controls sending and receiving within a radio cell
Ad Hoc:	WLAN mode that functions like a peer to peer network in order to connect WLAN devices directly with each other without the involvement of an access point
Advanced PPI:	The extension of the PPI protocol of the S7-200 series. Normally only compatible with CPUs of the S7-22x series and higher
AES:	Advanced Encryption Standard, an encoding standard similar to TKIP for WPA2
ANP	See Auto negotiation
ASCII	American Standard Code for Information Interchange describes a drawing table that includes the Latin alphabet in upper and lower cases, the ten Arabic numbers as well as some punctuation marks and functional characters
Authentication:	Authentication is used to check if a device is device it pretends to be. Example: NETLink WLAN authenticates itself at the access point
Autobaud:	Also called "auto sensing". Means the support of the automatic adjustment of baud rates within a network
Autonegotiation:	ANP describes the function to automatically recognize and configure network partners
Baud rate:	The Speed of a BUS system
Bit:	Binary digit describes the smallest digital information unit. Defines 0 or 1

Browser:	Also called web browser. A program used to view web pages. In addition to addressing and the reference to other text passages respectively a graphic user interface can be displayed (see web interface)
BSS:	Basic Service Set describes the set-up of at least 2 WLAN stations such as. NETLink WLAN and an access point or a WLAN adapter
BUS:	Busses are connection systems for electronic components. The MPI Bus is e.g. a connection medium for S7
Byte:	A byte equals a compound series of 8 bits that compose a logical data entity
CAT5-TCP-Cable:	Category 5 Ethernet cable that supports a data rate of 100 Mbps over a distance of 100 m
Channel:	Transmission frequency that is to be used in the ad hoc mode. The access points provide the channel in the infrastructure mode
Client:	Device that requests services. Target of the requests is a server that returns the respective answers to the client
Computer:	Means in this manual the programming device (PG) or the personal computer (PC)
dBi:	Antenna gain in decibel with regard to an isotropic radiator
DHCP:	Dynamic Host Configuration Protocol. DHCP server can dynamically allocate DHCP clients an IP Address and other parameters on request
DNS:	Domain Name System is a shared database system in LAN as well as in the internet that transforms IP addresses to colloquial terms
Encryption:	Encryption is the general term for encoding procedures
Firewall:	A service running on a server that blocks out certain services/ports and prohibits unauthorized access
Gap:	The Gap Update Factor specifies after how many Token cycles the master checks if an additional master reports at the bus
Gateway:	A machine that functions like a router. In contrast to a router a gateway can also route data packets from different hardware networks
Hex:	A key for NETLink WLAN that is entered in hexadecimal notation
HSA:	Highest station address. Highest station address that is polled

Hub:	Mediation system between LAN segments. In contrast to a switch the data in a HUB which are generated in the Ethernet all abut on all ports
Infrastructure:	Operation type according to WLAN standard IEEE 802.11 that needs an access point. The access point is generally linked to an internal firm network via LAN in this mode
Interfaces:	General definition of interfaces such as a network interface card that constitutes an Ethernet interface
IP Address:	Internet Protocol Address. The IP is an address of a device within a network with which it can be accessed. It consists of four bytes and is expressed in decimal digits. Example: 192.168.4.49
ISO on top of TCP:	see RFC1006
Keytyp:	Character set that is to be used for the key. HEX or Passphrase (ASCII)
LAN:	Local Area Network. A network of computers which are relatively close to each other
MAC Address:	The MAC address is used only once for each single network component that is not changeable. It consists of 6 bytes and is expressed in hexadecimal characters. Example: 08-FF-FA-9C-ED-5A
Master	Active parties who may send data to other parties and request them as well if they possess the token
MLFB:	16-digit Siemens identification number
MPI:	Multipoint Interface. Interface that is used for S7-300 and S7-400 systems and that supports baud rates up to 1,5 Mbps
NAT:	Network Address Translation is a collective term for the automatic and transparent replacement of address information in data packets. Very useful for the establishment of a connection of private networks via a public line
Net mask:	see Subnet mask
Omni Antenna:	A rod-shaped antenna that radiates equally in all directions. They are usually intended for the use in buildings or outside and radiate the building in all directions
OPC:	OLE for Process Control allows data transfer between applications of different producers such as via the RFC1006 protocol

Open/None:	Authentication according to the "Open/None" method without the exchange of authentication data in the WEP encoding mode. Is said to be safer than „Shared“, since the key of the latter can be extracted by “sniffing”
Panel antenna:	A usually flat antenna that radiates strongest in the respective direction. They are usually used where a big distance has to be bypassed
Passphrase:	Describes a character set that can be used to save data from hackers in the encoding mode. Here the characters A-Z, a-z as well as 0-9 and the ASCII digits 33-126 can be used without hesitation
PAT:	Port address translation. Used when several private IP addresses of a LAN need to be translated into a public IP address
PG socket:	The PG socket of the bus plug enables the mounting of further bus parties
Port:	Address components used in network protocols in order to assign data segments to the right protocols, also with the help of port forwarding
PPI:	Point to Point Interface. Interface to S7-200 systems with a maximum baud rate of 187.5 kBps
PROFIBUS:	The protocol that is used mainly for automation, e.g. for the S7-300 and S7-400 systems with a maximum baud rate of 12 Mbps
Proxy:	System used for buffering. Requests can be faster via a proxy this way, and the system load is reduced at the same time. Primarily used to separate local network and WWW
Rack/Slot:	The projected module rack (Standard: 0) and the slot of the respective module (Standard CPU: 2). The result is an R/S in a standard projection of 0/2
Radio cell:	The area that is covered by an access point via antenna. Logged-on WLAN clients can connect to the access point within this area
Retry limit:	Bus parameter that determines the number of tries to call a DP slave
RFC1006:	Request for comment. A protocol type that defines the way in which an available ISO packet is transported as "net load" within a TCP data packet
RJ45 socket:	A network socket according to a connector system with 8 wires
Router:	Machine that assures within a network the forwarding of the arriving data of a protocol to the designated target net and sub net respectively

Routing:	Means a set function that mediates messages and data respectively between LANs, WANs, MPI and PROFIBUS
S7-TCP/IP:	Interface parameterization in the PG/PC interface that is based on TCP/IP and that is handled via the selected network interface card of the PC
Server:	Device that provides specific services on request of the clients
Shared:	WEP authentication method. First, the WLAN party sends a request for authentication to an access point. Hereupon, the access point sends a generated series of characters. The WLAN party encodes the series of characters with the entered key and returns the answer to the access point. Hereupon, the access point should accept the answer and send an authentication code that allows the WLAN party to log on the access point
Slave	A party that is allowed to exchange data with the master on the latter's request only
SMA:	Subminiature. A microwave plug or a microwave socket that is used for HF and microwave techniques as well as in WLAN due to its robustness
SSID:	Service Set Identifier. Name of a radio cell and an ad hoc device in a WLAN network respectively. It is here possible, too, to use ASCII characters A-Z, a-z, 0-9 and the special characters 33-126
Subnet mask:	Determines the net and host share of the IP address. Allows the classification of address areas and prohibits the direct access to other nets.
Switch	A device which can connect multiple machines over ethernet. In opposition to a hub a switch is able to "think", that means the switch saves the MAC address which is connected to a port and controls the traffic to it
TCP/IP	Transmission Control Protocol is a transport protocol to afford data transfer between network devices. IP is the expansion for internet protocol
Timeout	Is a protocol assignment which will be activated if a preset time is exceeded
TKIP	Temporal Key Integrity Protocol is a data coding method for WPA
Token	Is a telegram for the send authority of a network which will be hand off from master to master
Tqui	Transmitter fall time (Bit) is the time that is needed to restore the neutral gauge on the signal line after transmitting data

TSAP	The Transport Service Access Point is a layer 4 address which has to match crossed for a station and its achieved partner. The remote TSAP of Station1 equals to the local TSAP of Station2. The entry of variable characters e.g. numbers is possible
Tsdr	Protocol machining time of the answering partner (Station delay responder)
Tset	The Setup time (Bit) is the time which is allowed to elapse between sending and receiving telegrams
Tslot-Init	The Slot time (Bit) is the maximum time which is allowed to pass for a answer of the spoken device afore
Ttr	The Target rotation time (Bit) is the reference token time which means there is a comparison between the actual token time and the reference token time. It depends on how many time is available to the master for sending his own telegrams to the slaves
WAN	Wire Are Network is a network depending on computers which are widely separated by open ground. The internet is the largest known WAN
Webinterface	Is opened by a browser. There are data and functions e.g. to interact with NETLink WLAN
WEP	Wired Equivalent Encryption is the first encryption standard for WLAN networks and depends on the RC4 algorithm. For this function the static keys have to inscribe in every station.
WLAN	Wireless Local Area Network is a network of clients which are able to connected with each other or to an access point by radio communication
WPA	Encryption mode which is used as a workaround from WEP to WPA2. Compared to WEP this one is enhanced with a dynamic encryption named TKIP
WPA2/802.11i	The second version of WPA with better encryption and authentication algorithm

Notes