

S5-LAN++ user manual

(english)



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1 Description

The S5-LAN++ module connects the computer over network with a S5-PLC.

It includes a multiplexer for the S5-PLC, so you would be able for e.g. to read or write data with a visualization or production data acquisition and make parallel program-changes.

Attention: Please note, that the reaction time of the PLC will be increased, because now are running several communications parallel and they must be all processed with the PLC.

If the computer is connected direct to the module or over WLAN or over a VPN-connection, this is equal to the module. It is only important, that the connection is not broken or not to slow.

Before the use of a VPN-connection, you can make following test. Build-up the VPN-connection and send a ping to one client in this network. For timings of maximum 400ms you can be shure, that the communication to the module and connected PLC should be OK.

With version V1.20 and newer the module transfers in the AS511-protocol an identifier that it the conversation partner is a S5-LAN++-module. This information can by the communication-driver IP-S5-LAN-link be recognized and evaluated.

With the S5-LAN++-module you are capable to build up a coupling from a S7-PLC with Ethernet-CP (integrated or as a supplementary module) to a S5-PLC. In this case you will use the Siemens-function "**PUT/GET**". You configure this connection in your PLC, but now the IP-address of the S5-LAN++ is the IP-address of the configured partner.

If you project with the **TIA-portal**, then note the following points:

- Unlock PUT/GET-function in the PLC
- Properties of unspecified S7-connection:
remote-side: TSAP S5-LAN++: 302
local side: switch of Simatic AAC for S7-1500 and use instead TSAP: 10.1

You can find a documentation and sample project for "PUT/GET" in the hotline-section of the Siemens website, click here to reach it.

2 System requirements

2.1 Operating System(s)

- Windows 98 + SE
- Windows ME/NT/2000
- Windows XP
- Windows Vista
- Windows 7

2.2 Software

- PLC - programming software (e.g. PG2000, Step© 5, S5 for windows, WinCC)
- PLC - VCOM Software

2.3 Hardware

- Networkcard 10/100MBit
- 24V power supply (Phoenixbush or TTY-Interface)

2.4 Supported controls

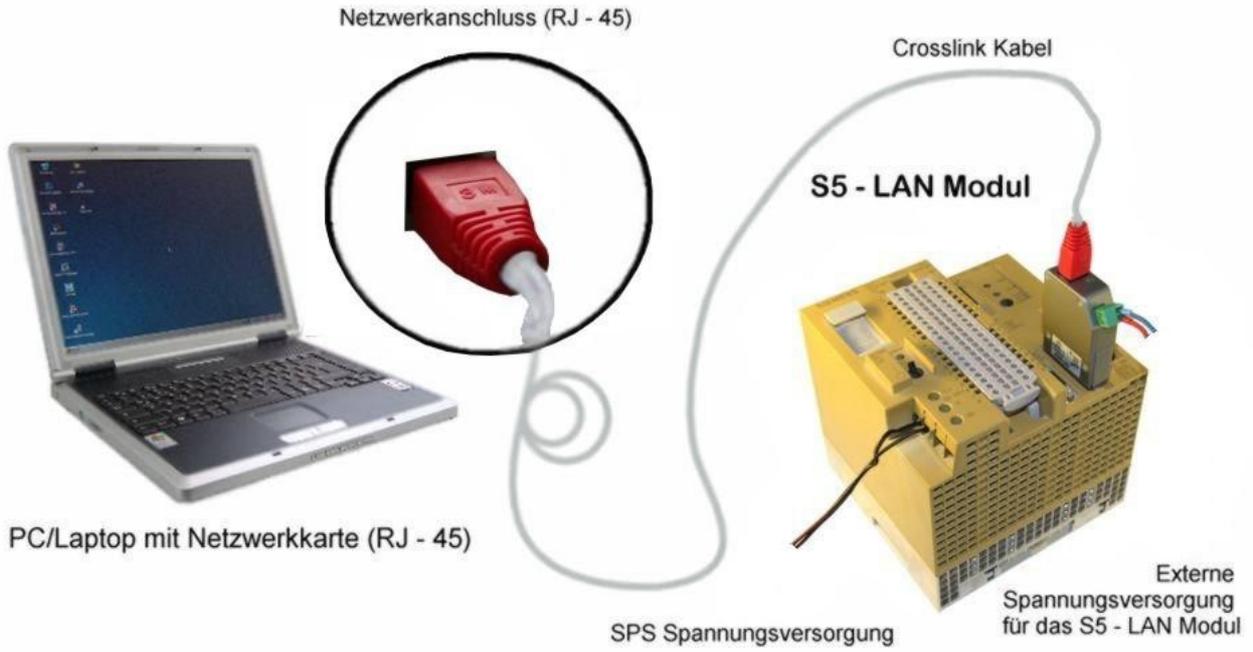
- S5-90U with external 24V-supply
- S5-95U with external 24V-supply
- S5-100U with external 24V-supply
- S5-115U
- S5-135U
- S5-155U
- Sinumerik 810 / 880 (only DB-access read/write)
- COMCON 110 from Berthel

2.5 Possible problems while commissioning of the module

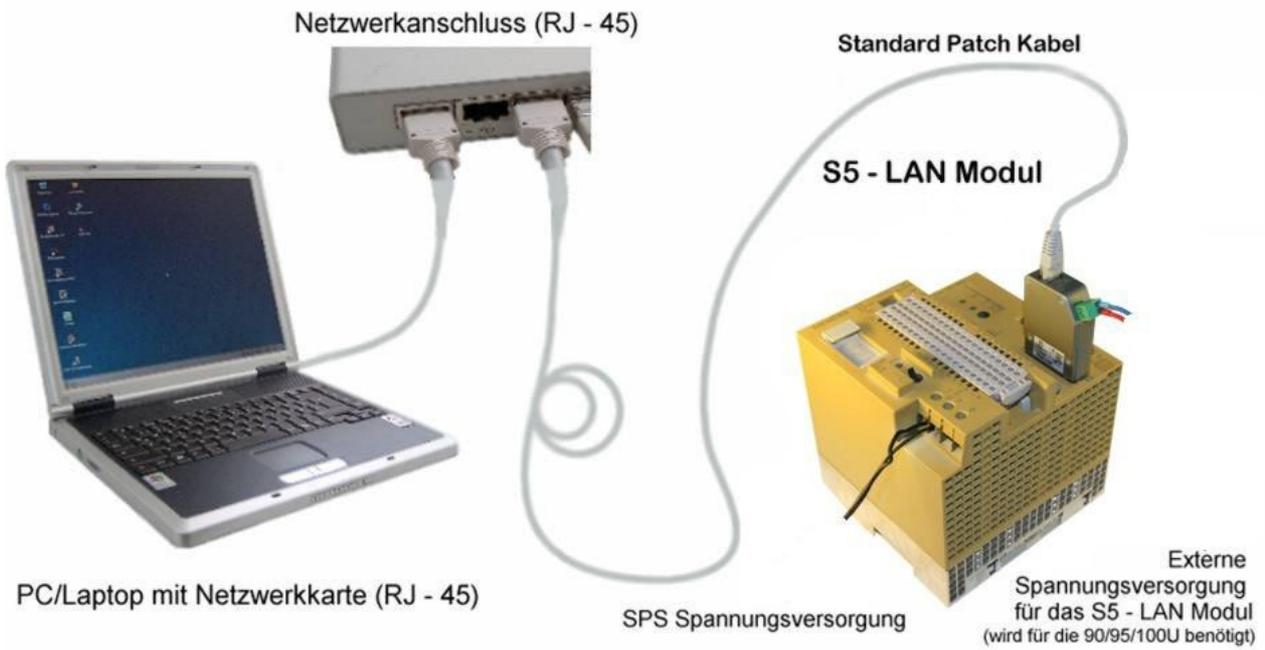
- Module is not found in the S5-LAN-Manager though a network connection
 - Module supplied with voltage, is the large green LED on/flashing?
 - Switch of the firewall in your PC and search again. The module expects in the delivery-state a DHCP-server, if none exists, the module takes itself an IP-address from the DHCP-area 169.xxx.xxx.xxx.
The firewall blocks IP-packets from this IP-address-range.
- No PLC-communication possible?
 - Module supplied with voltage?
 - Is the large green LED flashing (PLC not recognized/found), please checking the wiring/current-loop-sources?
 - Is the PLCVCom started?
 - Is PLCVCom connected with the module?
- Step5-Software reports system-error 0334h
 - Was the S5-patch for the module and PLCVCom installed?
 - Is used COM-port a real COM-port (virtual COM-ports (USB-RS232-converter, PC-cards) are not recognized and used directly from Step5)?

3 Connecting options

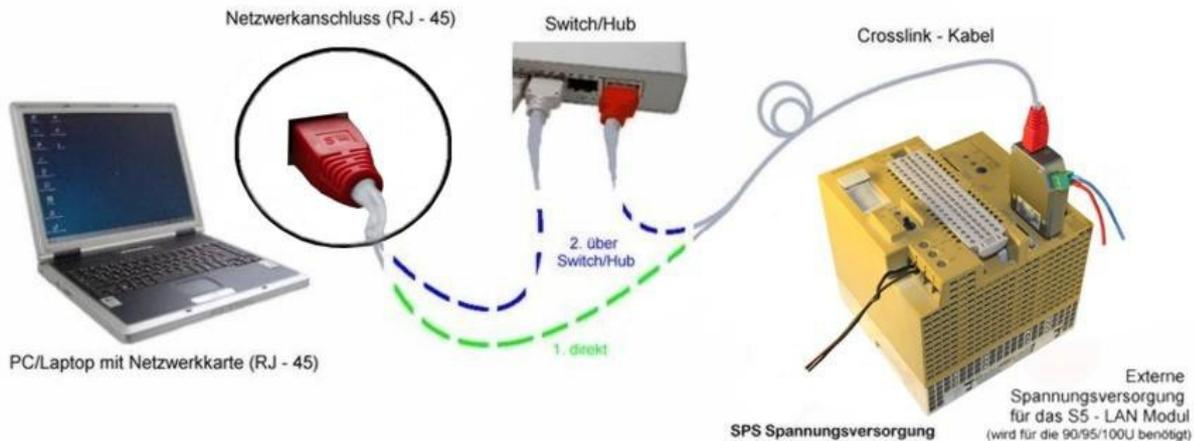
S5-LAN++ module direct connected with the PC.



S5-LAN++ connected with the PC over a Switch or Hub.



S5-LAN++ connection possibilities with CrossLink-cable



4 Installation

4.1 Hardware

The S5-LAN ++ module is connected directly to the PLC. About the network connection of the module, the PLC can be connected as follows:

S5-LAN ++ to switch / hub

Here, the network cable is plugged from the S5-LAN ++ module to the switch / hub. If you use a crosslink cable, plug this cable to the uplink port on the switch / hub. Use a switch with auto-negotiating function, so you can plug the network cable into a free port on the switch.

S5-LAN++ to PC

In this variant, you must use a crosslink cable. This plug with one end into the module and the other end into the network card.

The PLC provides the module with voltage. Alternatively, the module can be also connected to an external supply 24V/DC (if the PLC has no 24V/DC eg AG and AG-95U-100U).

4.2 Software

To establish a communication with the PLC, please install the PLC - VCOM software as described in the chapter " PLC-VCOM Installation ".

In addition you need programming software (eg PG2000, Step©5, S5 for Windows, WinCC) to work with the PLC.

4.2.1 Installation and usage of S5-LAN++-module under Win98

To work with the S5-LAN++-module under Win98, you need following software tool:

- PLCVCom - virtual COM-port

The installation of the PLC-VCOM-software is explained in section „PLC-VCOM Installation“.

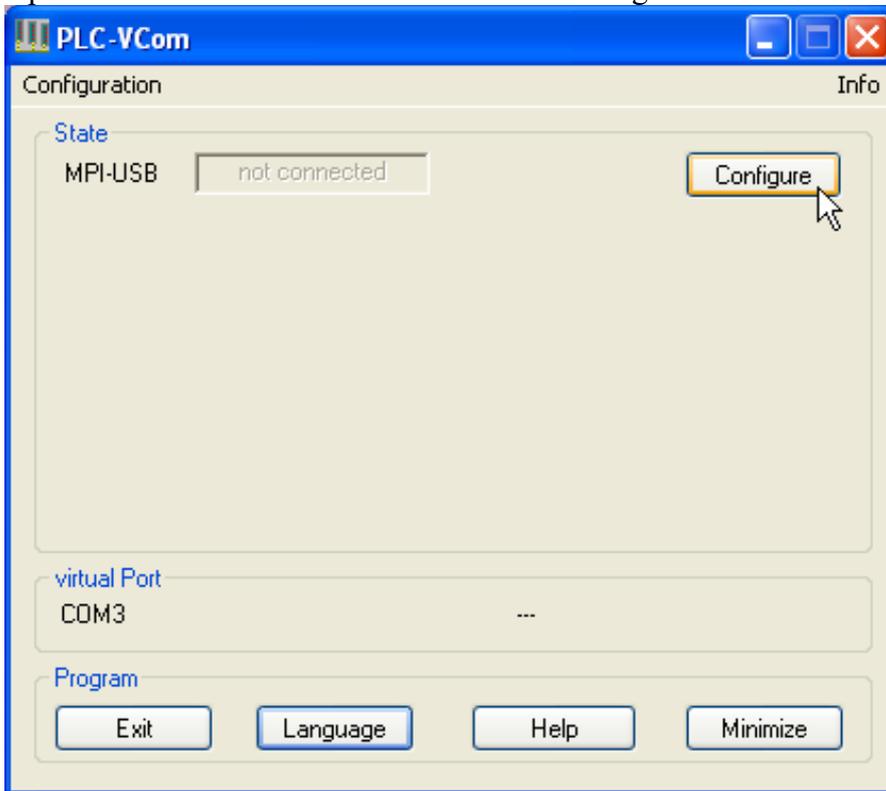
Attention ! Please note that the generated virtual COM-port is between COM1 to COM4. COM-ports higher than COM4 are not supported by the Step5-software!



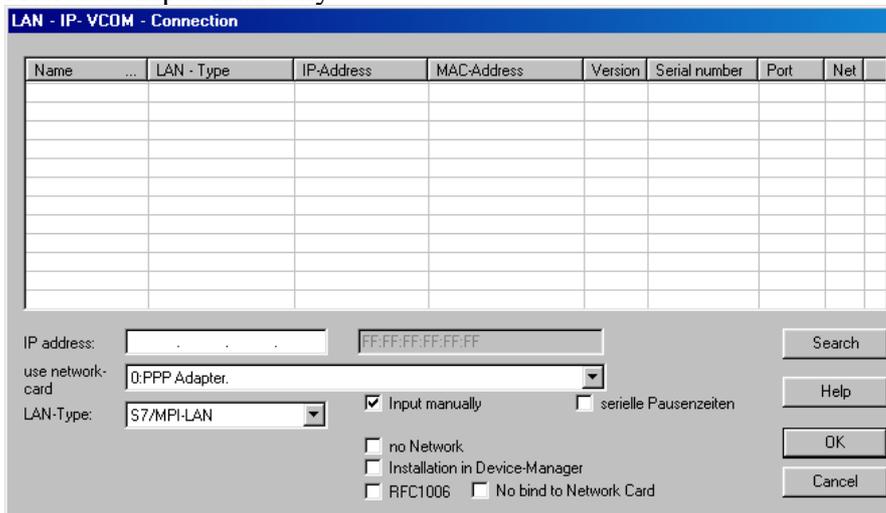
Before starting the installation, make sure to stop any possible running S5-software, otherwise the driver could not be installed.

If you have installed the PLCVCom on your PC, proceed as follows:

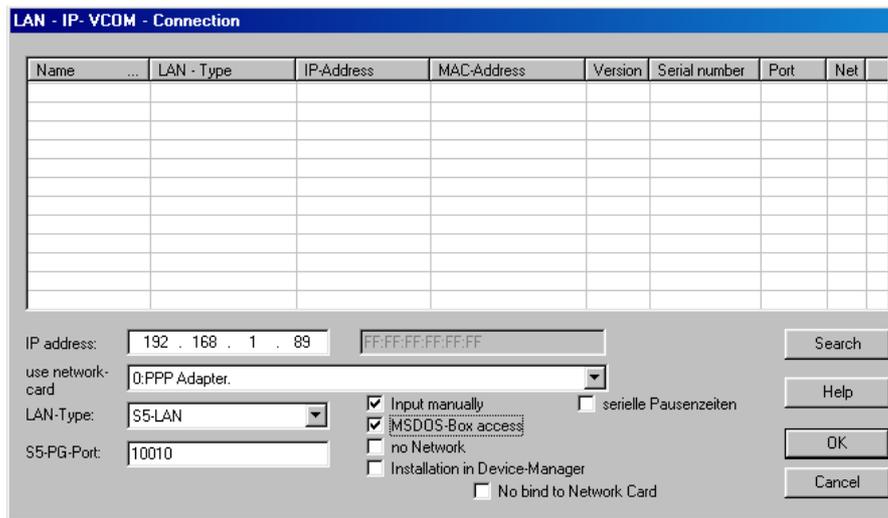
- Open the PLCVCom and click the button "Configure"



- Activate "Input manually"



- As soon as you have selected now as LAN-Type "S5-LAN++" a new controll-button "MSDOS-Box access" is visible. Please activate this also. Now enter the IP-address of the S5-LAN-module under "IP address" and with a click on "OK" the configuration would be acceded.



Now the virtual COM-port is set and activated, so you can go with your Step5-software via COM1 ... COM4 (depending on which COM port was selected for the virtual COM-port) ONLINE.

4.2.2 Installation of the Step5 © addition driver for PG-USB/S5-LAN ++ / USB-RS232-converter

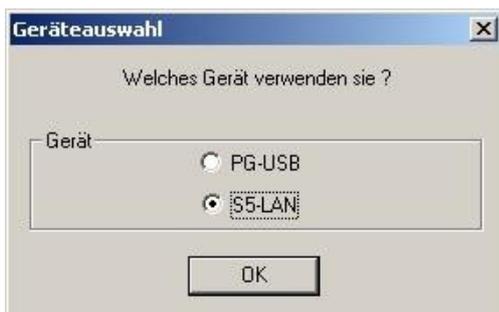
In order to make the the PLC-VCOM furnished virtual COM interface available for Siemens Step © 5 in the DOS box, must be installed this addition driver.

! Important ! PLC-VCOM must be installed before this Step © 5 addition driver. The installation of the PLC-VCOM software is explained in the chapter „PLC-VCOM installation“ .



Before you start the installation, make sure to stop any possible still running S5 original software, otherwise the driver can not be installed.

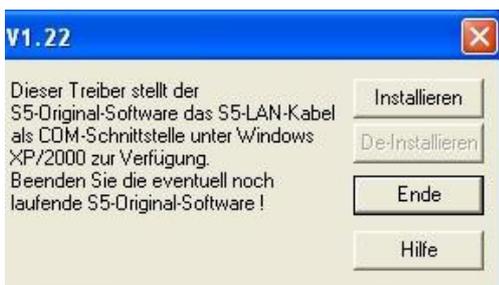
1. Please download from the you known web-site the "S5-patch" and extract the file on your PC.
2. Now start the application "S5USB.exe" from the previously extracted folder



3. Device selection

Now select the type of device.

Select "S5-LAN ++ / PG-USB-cable / USB-RS232-converter" and confirm with "OK".



4. In the next dialog, start the installation by clicking on the "Install" button.

The installation wizard will now copy the required data.

Please wait a moment.

5. Specify the folder where the software S5 is installed. Please wait while the installation routine

searches for the S5 software version.

6. Next, select the COM port and click "OK".

7. Soon as the installation is complete, you press "Finish".

8. When the "Install" button is disabled (gray font), the installation is complete.

9. Now close the wizard with "Finish".

With "Uninstall" you delete the already installed drivers.



If the COM port of the PLC-VCOM is changed afterwards, the Step5 © drivers must be reinstalled!

Attention!

For the Step5 Siemens software the COM port must be are between COM1 and COM4. Check and correct it if necessary.

To do this go into the Control Panel, then into system, select the hardware tab and click the button Device Manager. In the Device Manager under "Ports (COM & LPT)" appears the virtual COM port "USB Serial Port (COMx)".

Right click on the USB Serial Port and then select "Properties" in the context menu. There you click on the tab "Port Settings". In the next dialog you select the button "Advanced" and in the following dialog the COM port can be selected.

5 Control elements

5.1 LEDs and reset



The network LED's (10MB left / 100MB right) behave the same.

LED off: connected to no network.

LED on: network connected (LINK).

LED blinking: communication over the network.

State of S5 communication (green-round LED)

LED off: device is off or in boot state.

LED on: module reports AG online

Reset button for factory settings

The best solution to reset of the hardware configuration you trigger with a straight bent paper clip. Push the paper clip into the hole and after 2 seconds the S5 communication LED starts to flicker. Now you can remove the paper clip. The module makes a reset and starts with the configuration "DHCP / AutoIP" and "auto Subnet". When the LED shines the module is ready for operation again.

6 Implementing

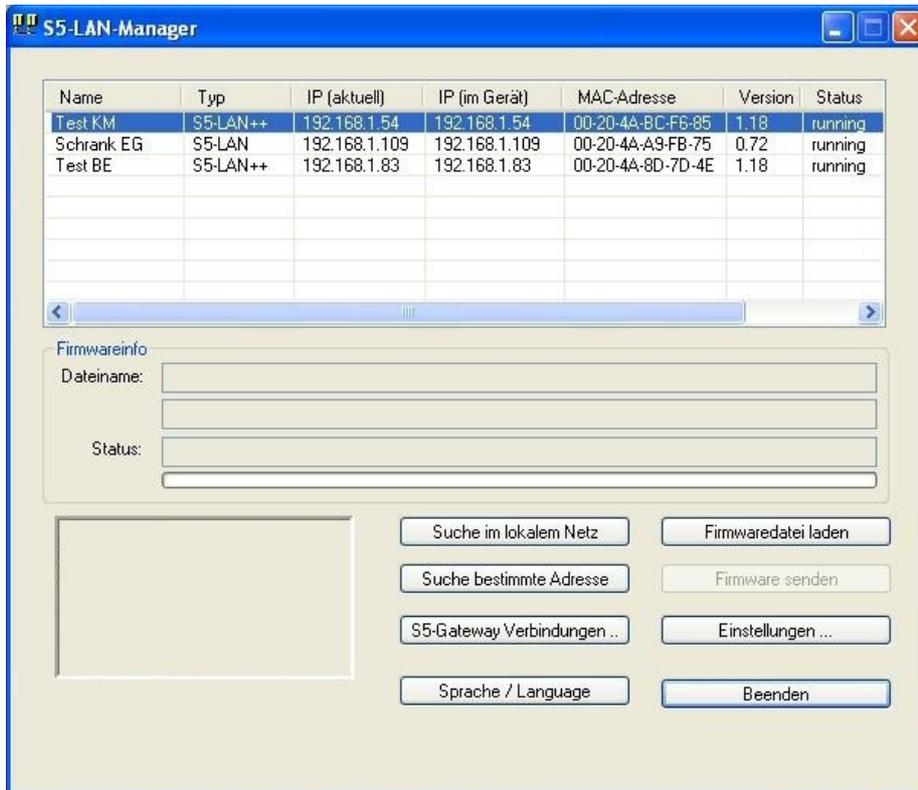
Connect your module as described in the chapter " Hardware installation " to the PLC and to the programming device or to your computer.



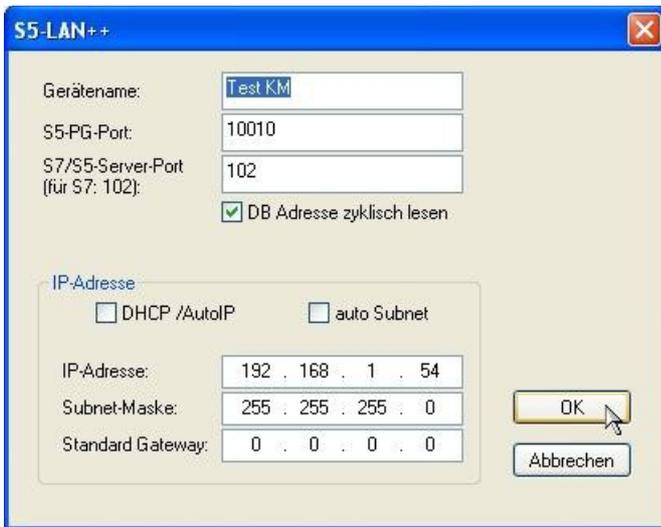
If you want to respond to a PLC via the module you have to comply the requirements as described in the chapter "system requirements" . In addition, please make sure that the module is properly connected

6.1 Initial configuration

1. Start the S5-LAN Manager from either the start menu or from the PLC-VCOM menu under "Configuration" => "S5LAN"



2. Click on "Local searches" to display the modules that are available in your network.
3. Click on a found module, to select it and mark it blue.
4. To change the settings of the S5-LAN ++ module, click on "Settings".



5. If desired enter here a name for your S5-LAN ++ to make it easier to recognizable the PLC-VCOM. In addition, please enter an IP address and a subnet mask, if your network has running a DHCP server.

6. to save the settings, click "OK"



More information about the S5-LAN Manager, see the chapter „,configuration“

6.2 Using the PLC-VCOM

(The PLC-VCOM is only needed if your module is not connected via the 9 pin COM port to the computer. For products with USB, Ethernet connection, etc., the PLC-VCOM is required)

1. Start the PLC - VCOM application (If it has not already started yet).
2. Click in the main window of the PLC-VCOM, in the status area “configure”. The configuration wizard will start.
3. It lists all the found modules / cables and the additional information’s such as IP address and MAC address of the module.
4. Choose the desired MPI cable and click „OK“ to go on.
5. If the connection is established the chosen cable is shown in the section state and on the left side you can see the status connected.
6. It also displays, the PLC-VCOM the IP address for the module and the IP address of the computer which is connected to the module.



If you have any problems with the use of PLC-VCOM software, go to the chapter PLC – VCOM and look there for operating instructions.

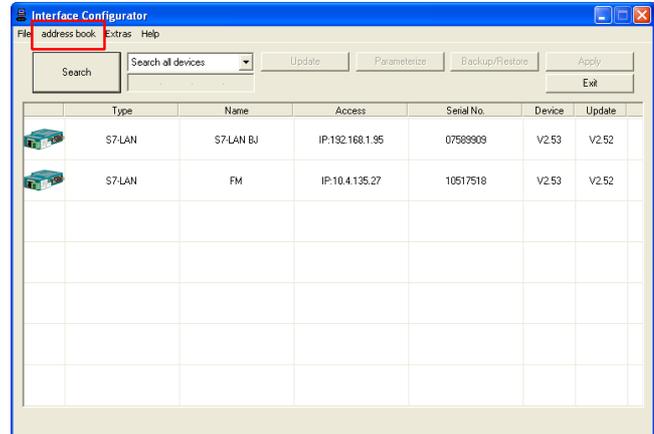
6.3 TIC-address-book



To use the address-book you need **TIC V2.37** or newer. For use with S5-LAN ++ modules (Step5) at least **PLCVCCom V2.81** is required. Even if you work with Step5, the TIC must be also installed on the PC!

Install the TIC on your PC by clicking on the "Setup.exe" file. After restarting the PC, please start the TIC via "Start" => "all programs" => "TIC".

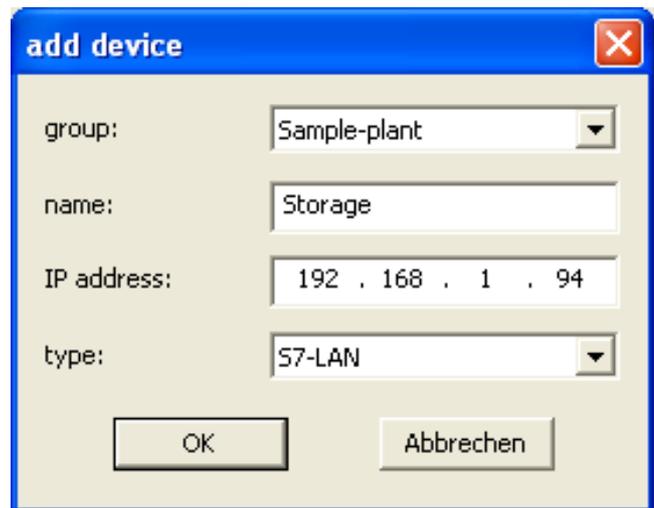
As soon as the TIC is started, it automatically starts searching for possible interface products. These are displayed in the table of the start menu.



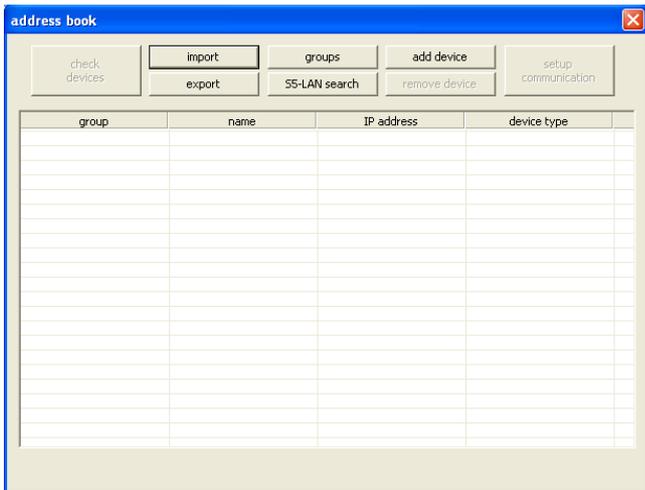
By clicking on "address book" => "open address book" opens the address book which manages the interface-products accessible via network.

You can also add devices directly to the address book by selecting the product in advance by clicking on it (deposit blue). After clicking on "address book" there is another menu-item entry "add device" clickable.

You will then get the prefilled dialog "add device" with the data of the selected device. By selecting the correct group and clicking on "OK" the entry is transferred directly to the address-book.



Open and use of the address-book



When the address-book is used for the first time, it is completely empty. For a better overview we recommend to define group-names.

Click on "groups" to get to the group management. Here you can add group names and delete them if necessary.

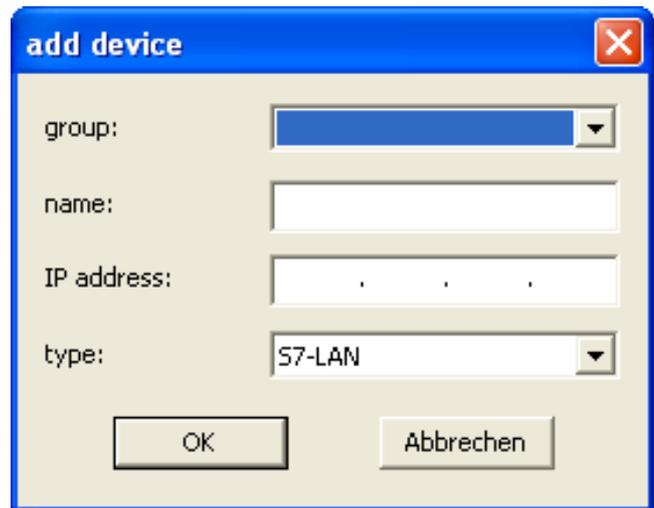
Without a group-name, interface products can not be added.

"Add device"

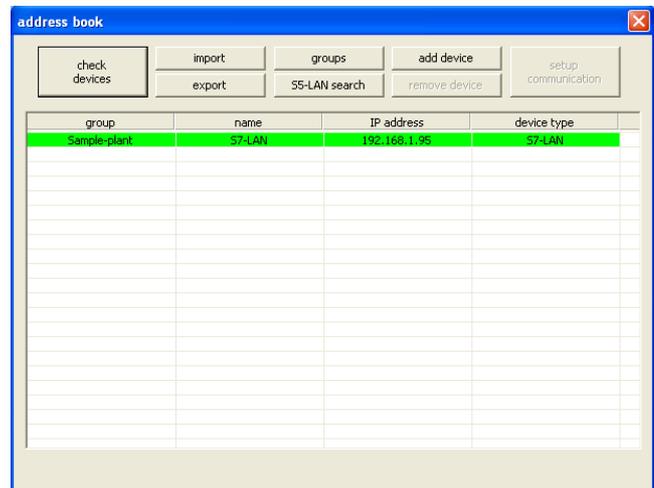
With this menu item all used modules can be entered. Also modules behind a router transition which are not found in the search. To enter the interface product, enter the required information:

- group
- name (for you to identify the product)
- IP address (of the product)
- type (of the respective product: S7-LAN, MPI-Lan, S5-LAN++)

Click on the OK-button to accept the entries.

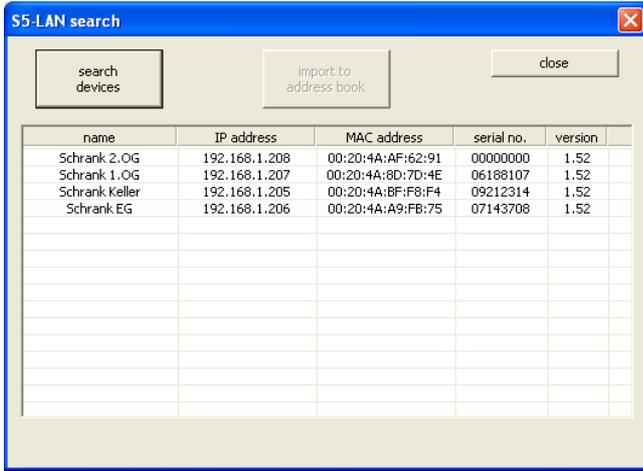


=>



"Add S5-LAN++ through search"

S5-LAN++ are not displayed during the automatic search of the TIC, because they are not an S7-interface-product. Therefore, there is the possibility to search directly for S5-LAN++-modules with the button "S5-LAN search".



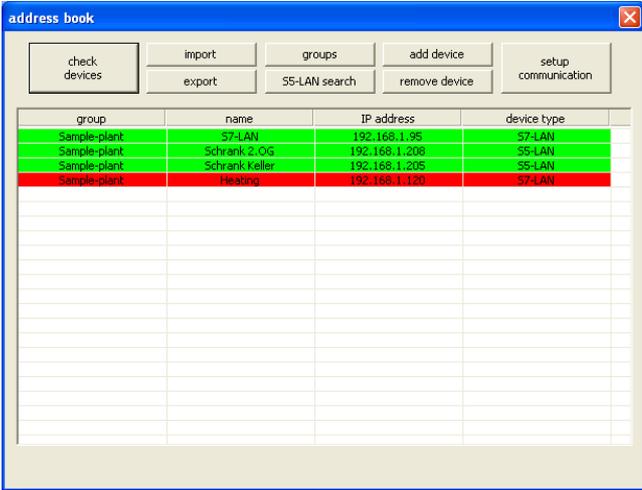
The table automatically lists all modules found in the network.

Caution: Modules that are behind a router transition can not be displayed during the search!

Click on the relevant module with the mouse and transfer it to the address book using "import to address-book". To confirm the selected module, the dialog "add device" with the data of the module is displayed. Click OK to accept and enter the device in the address book.

Attention: Modules inherited in the address book are not deleted in the search window! A multiple entry is not possible.

"Close" closes the search for S5-LAN++-modules, the address book looks like this, for example:



The entries in the address-book marked in green color are immediately accessible. If a module has a red background, then no communication can be established. This can happen, for example, through a non-active VPN-connection. In this case, set up the VPN-channel and check the accessibility of the stored modules again using "check devices".

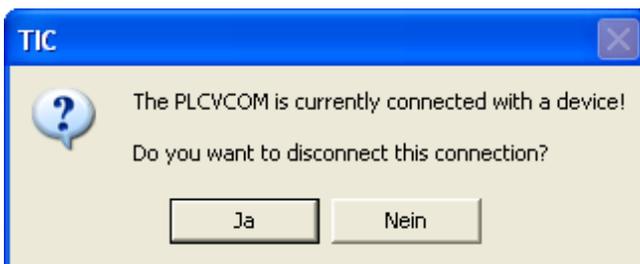
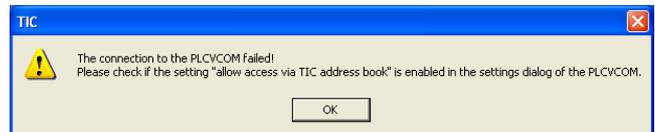
In order to establish communication with one of these modules simply click on a "green" stored entry and select the communication-driver to be used by "setup communication":



and confirm with "Apply". Now the driver for the module has been parameterized and the connection to the system can be established.



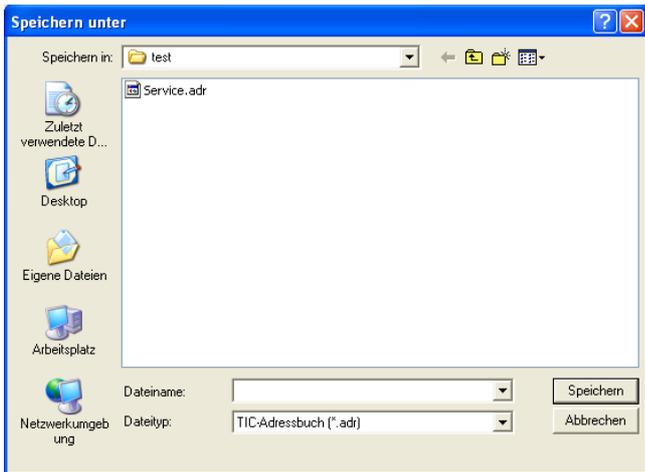
This can also be done with an S5-LAN++, except that there is no dialog for the PG/PC-interface settings, if necessary, the virtual Com-Port PLCVCom is started if it is not yet the case and the device-type and the IP-address of the device are transmitted to it. The program reports whether the access of the TIC in PLCVCom is switched on. If this is not the case, then please activate it in PLCVCom.



If the PLCVCom is connected to another module, this is indicated by a corresponding message. With "Yes" this connection is disconnected and rebuilt with the selected data.

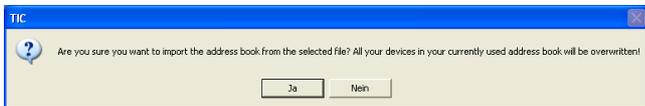
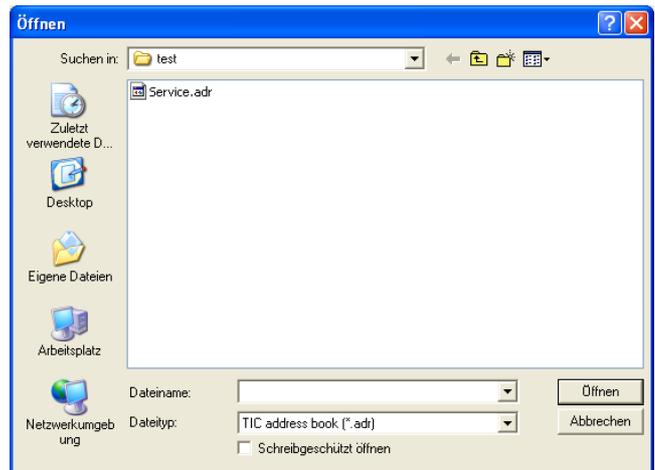
As soon as this connection is established, the corresponding feedback is sent to the user.





To transfer the address book from one PC to another PC, this can be done with the Import/Export-function. By clicking on "Export" the memory dialog opens to export the address book. Select the path and file name here and the export file will be written. This can be transferred to another PC.

To import the address book, just click on the button "Import". In the new dialog, select the address-book-file and accept with "open".



Attention: The import function overwrites any existing address book!

After clicking on "Yes" the selected address book is read in and can be used immediately.

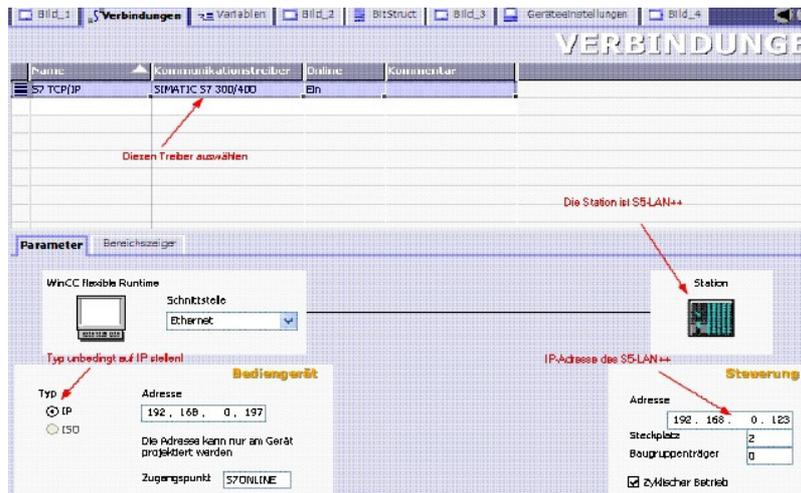
6.4 Programming software to use with direct access

After you have adjusted and connected the PLC-VCOM or the programming adapter to the COM-port on your computer, you will be able to connect with your programming software to the PLC and work with it.

How you have to adjust your programming software is described in the following points:

6.4.1 S7-TCP/IP to S5-LAN++

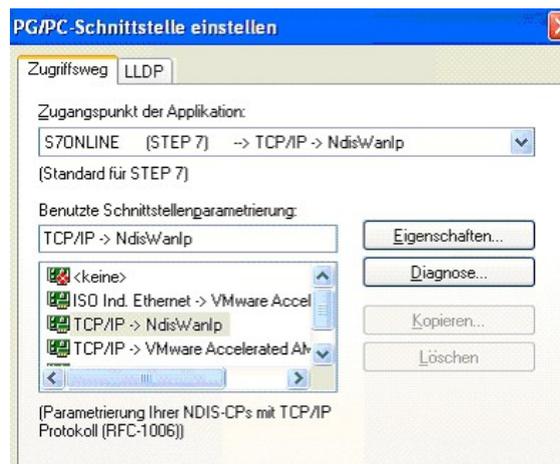
The S5-LAN++ behaves like an CP 343-1 or like a HMI-ProfiNet-connection. Therefore use the same configuration like a connection with Simatic S7 300/400 over TCP/IP.



For S5/S7 enter server-port 102 in the S5-LAN++!

In default settings this port is already on 102. Choose for the communications driver in the WinCC-flexible the SIMATIC S7 300/400 like in the picture shown. In the PLC you have to enter the IP-address of the S5-LAN++. Put the type on "IP". Rack- and slotnumber aren't significant for operation with the S5-LAN++. Just enter the standards: Rack 0, Slot 2.

Pay attention, that the settings of the access point (S7ONLINE) are correct. Settings can be done in the control panel "PD/PC-interface settings". Take care, that you choose an adapter which supports TCP/IP.



Important! Important! Important! Important!

The addressing

The conversion from S5-Float (KG-format) to S7-Float (IEEE 754) happens automatically in each direction. Therefore use a variable type with IEEE 754.

The addressing for flag, inputs, outputs, timer and counter are identical for S5 and S7. However, there are some difference between the datablocks. The addressing of the datablocks adapted to the S7.

Example:

DB10 DW 10 (S5) is addressed with DB10.DBW20 (S7). That's because the S7 addressed principle bytes. If you want to read one single byte e.g. DB10.DL4 (S5) you have to address DB10.DBB8. There are: even byteaddress = DL, odd address = DR in the DB of the S5.

Here some address-examples

Simatic S5	Simatic S7	Format
------------	------------	--------

MB 11	MB 11	Byte
MW 20	MW 20	Word
DB10 DW 9	DB10 DBW 18	Word
DB10 DW 60	DB10 DBW 120	Word
DB10 DL 3	DB10 DBB 6	Byte
DB10 DR 3	DB10 DBB 7	Byte
DB10 DD 25	DB10 DD 50	DWord
DB10 DD 35	DB10 DD 70	Real

How to address a DX (advanced DB e.g. 135)?

If a DX have to addressed in a e.g. CPU 135, the rule is:
DB-number 1-255 = DB, DB-number > 255 = DX

S-flags:

The s-flags are adapted because S7 don't know s-flags.
You can access the s-flags like this:

S5-LAN++ mapps the s-flags into the S7 datablock 1000.

Example for s-flags addressing:

Simatic S5	Simatic S7	format
SY 0	DB1000.DBB 0	Byte
SY 1	DB1000.DBB 1	Byte
SW 5	DB1000.DBW 5	Word
SW 10	DB1000.DBW 10	Word
SD 3	DB1000.DBD 3	DWord
SD 20	DB1000.DBD 20	DWord
S 0.0	DB1000.DBX 0.0	Bit
S 1.1	DB1000.DBX 1.1	Bit

6.4.2 PG2000 für S5 (V5.10)

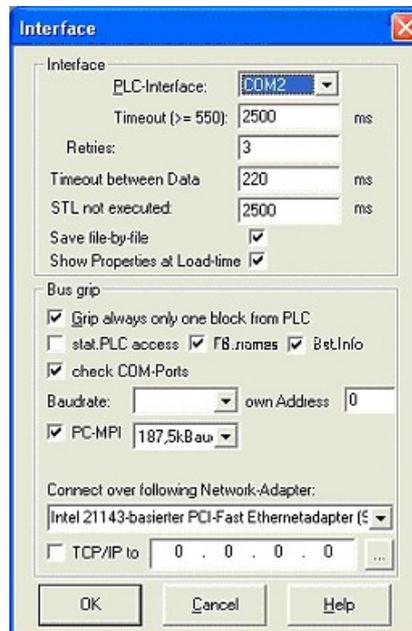
1. Start the PG 2000 software by using the desktop link or by using the application entry in the start menu.

2. Choose from menu "View" => "S5 155U-90 ..."

In the menu "Options" click "Interfaces".



3. A dialog appears. In the section “Interface“ you can configure the “PLC – Interface“ (COM – Port).



4. Set in the section "Bus grip" the tick "Grip allways only one block from PLC", "FB-names", "Bst. Info" and "check "COM-Ports"

5. Save your configuration by pressing “OK“.



6. Now the software is ready to establish a connection to the PLC.

Click the symbol “Open“ and afterwards press “PLC”.

Alternative you can click “File“ - “Open“ - “PLC“.

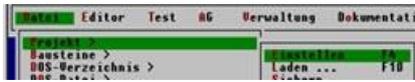
Mark	Baustein	Größe	Adresse	BB-Nr	Bausteinname
001	SET_CLK	128 W			zyklischer Bau
SFC 000	URZ	90 W			Uhrzeit setzen
SFC 001	URZ	90 W			Uhrzeit lesen
SFC 006	RD_SINFO	128 W			Startinformation
SFC 020	BLKMOV	92 W			Variable kopieren
SFC 021	PLL	92 W			Variablenperiod.
SFC 022	CREAT_DB	96 W			Datenbaustein
SFC 023	DEL_DB	90 W			Löschen eines DB
SFC 024	TEST_DB	94 W			Testen eines DB
SFC 036	MSK_FLT	96 W			Synchronfehler
SFC 037	DMSK_FLT	96 W			Synchronfehler
SFC 038	READ_ERR	96 W			Ereignisstatus
SFC 039	DIS_RT	92 W			Bearbeitung ne
SFC 040	EN_RT	92 W			Bearbeitung ne
SFC 041	DIS_RT	92 W			Bearbeitung vo
SFC 042	EN_RT	92 W			Bearbeitung vo
SFC 043	RE_TRIGR	96 W			Zykluszeitgeber
SFC 046	STP	96 W			CPU in Betriebs
SFC 047	WAIT	96 W			Verarbeitung

The connection between PG 2000 and the PLC is now established.

A new window appears. Now you can edit the blocks in the PLC.

6.4.3 SIMATIC Step© 5 Manager

1. Start your SIMATIC Step© 5 Manager by using the desktop link or the application entry in the start menu.



2. in the "File" menu , in submenu "project" you can the "Setting" dialog open.

3. In the tab "AG" configure the used PLC interface (example: "AS511").

Below that, you can set the COM port (example: "COM3").



4. with "F3" change, the "operating mode" to "online".

The window should display the "AG-type"

5. The connection with the PLC is successfully established when the "operating mode" changes to "Online."

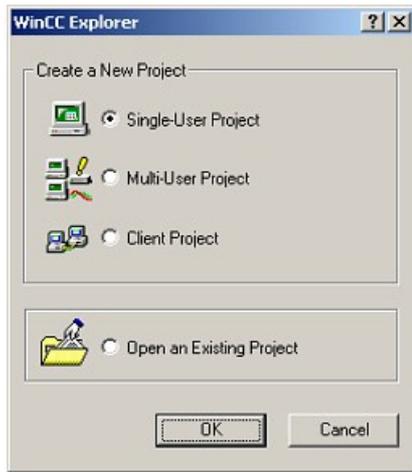
6.4.4 Windows Control Center (WinCC) (v6.0)

1. Start WinCC by using the desktop link or the program entry in the start menu.

2. Choose „New” in the menu „File” or click on the white („letter”) symbol to start a new project.

3. The next dialog offers you several project types „Single - User Project“, „Multi - User Project“ and „Client Project“.

The next steps are describing the „Single - User Project“.

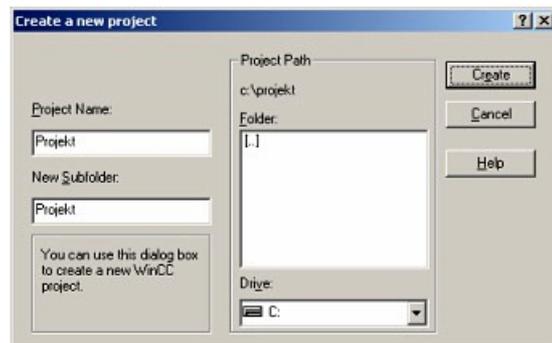


4. OK“ leads you to a new dialog. Type in the „Project Name“ and the „Subfolder“ of the „Project Path“

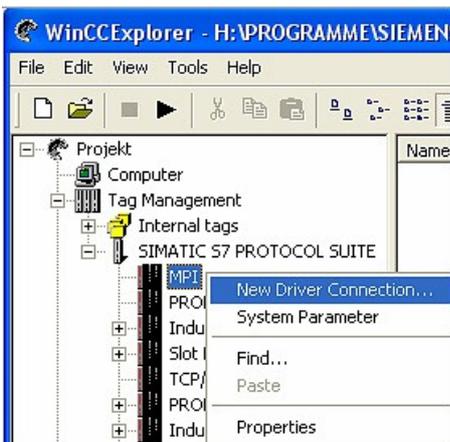
With „Create“ the chosen configuration is confirmed.



If you want to use one of the other options, please read this further in the manual of the WinCC software.

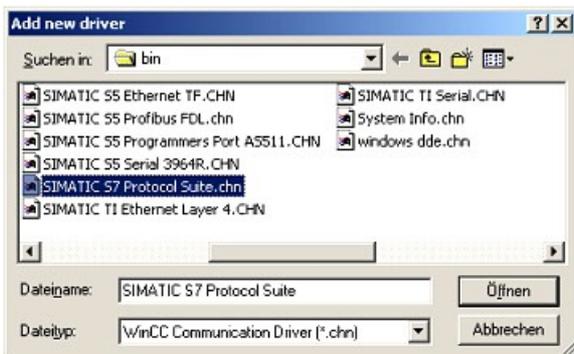


5. Please wait until the project is created. Afterward the project content is shown in the left part of the main window.



6. For a proper working communication with the PLC there must be defined how the software has to communicate with the PLC

Therefore right click on „Tag Management“ to open the context menu. Choose „Add New Driver ...“.



7. In the dialog „Add new driver“ select the driver which fits to your PLC

For a S5 PLC, you can choose the file SIMATIC S5 Programmiers Port AS511.chn.

If you are using a different PLC please inform yourself which driver fits with your PLC.



It is important that the chosen driver fits with the PLC otherwise the connection cannot be established.



8. In the explorer you should see into the variable manager the branch "SIMATIC S5 PROGRAMMERS PORT".

Expand the branch and the protocols for several connections will appear

Right click on the desired connection „S5-AS11“. A context menu opens. Click on „New Connection...“.

9. Now you are able to type in the name of the connection. With a click on „Configuration“ a new dialog will appear.

Set up the station address of the PLC (in this example „3“).

10. Confirm with "OK" until you are back to the main window.

11. Now you can with  start the communication and with  this end it again.

6.4.5 Direkte Kommunikation mit WinCC 6.0

Diese Kommunikation verwendet das H1-ISO-on TCP oder auch RFC1006 Protokoll. Es wird in der S5-Welt von Siemens verwendet, um über Ethernet mit den CP 1430 TCP zu kommunizieren. Dabei sind jeweils TSAP und SSAP anzugeben. S5-LAN++ akzeptiert jeden beliebigen Namen für SSAP bzw. TSAP.



Möchten Sie dieses Protokoll nutzen, so ist im Modul als S5-Server-Port 102 einzugeben.

Die Konfiguration des S5-LAN++ wird hier in einer Kurzfassung erklärt. Wie Sie Ihr S5-LAN++ Modul konfigurieren lesen Sie im Kapitel „Konfiguration“.

1. Als erstes starten Sie den S5-LAN Manager über die entsprechende Verknüpfung im Start – Menü.

2. Drücken Sie auf die Schaltfläche „Suche im lokalen Netz“ und markieren Sie das S5-LAN++ Modul das für die Kommunikation mit WinCC verwendet werden soll.

3. Über die Schaltfläche „Einstellungen“ gelangen Sie in den Einstellungs-Dialog. Dort konfigurieren Sie den „S5-Server-Port“ auf „102“.

4. Bestätigen Sie die Eingabe mit „OK“ und beenden Sie das Programm.

5. Des Weiteren müssen Sie die PG/PC Schnittstelle einstellen um einen geeigneten Zuordnungspunkt einzurichten. Gehen Sie in die Systemsteuerung und klicken Sie auf „PG/PC-Schnittstelle einstellen“.

6. Suchen Sie unter „Zugangspunkt der Applikation“ nach „TCP_IP:“. Sollte hier kein Eintrag vorhanden sein wählen Sie „<Hinzufügen/Löschen>“.



7. Dieser Dialog bietet Ihnen die Möglichkeit einen neuen Zugangspunkt hinzuzufügen.

Geben Sie dem neuen Zugangspunkt den Namen „TCP_IP:“ und eine beliebige Beschreibung (z.B. „WinCC S5-LAN++(TCP/IP)“).

Klicken Sie auf „Hinzufügen“ und „Schließen“ Sie anschließend den Dialog.

8. Markieren Sie die zu verwendende Netzwerkkarte und wählen Sie unter „Zugangspunkt der Applikation“ den Eintrag „TCP_IP: => TCP/IP => XXX“ aus, wobei „XXX“ für die verwendete Netzwerkkarte steht.

Speichern Sie die Einstellung mit „OK“.

9. Anschließend starten Sie WinCC 6.0. Erzeugen Sie ein neues oder öffnen Sie ein bestehendes Projekt.

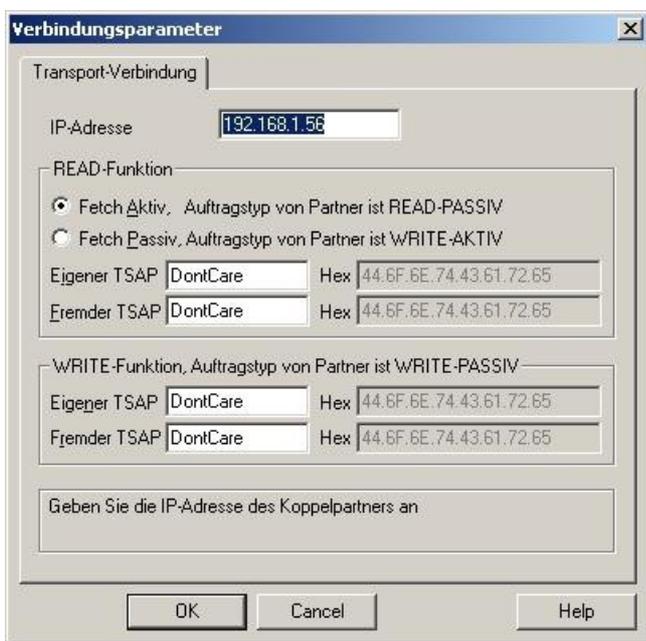
10. Im Explorer (linke Hälfte des Programms) können Sie verschiedene Projektinhalte sehen. Darunter auch den „Variablenhaushalt“. Klicken Sie mit der rechten Maustaste auf den „Variablenhaushalt“ und wählen Sie im Kontext Menü den Punkt „Neuen Treiber hinzufügen...“.

11. Wählen Sie als Kommunikationstreiber die Datei „SIMATIC S5 Ethernet Layer 4.CHN“ aus.

Mit „Öffnen“ gelangen Sie zurück zum Programm und können nun eine Veränderung im „Variablenhaushalt“ feststellen.



12. Öffnen Sie den neuen Zweig „SIMATIC S5 ETHERNET LAYER 4“ und klicken Sie mit der rechten Maustaste auf „S5-Transport (TCP/IP)“. Im Kontext Menü wählen Sie „Neue Verbindung...“.



13. Der Verbindung geben Sie im Eigenschafts-Dialog einen Namen (z.B. „S5-LAN“) und benutzen die Schaltfläche „Eigenschaften“, um der Verbindung die „IP-Adresse“ des S5-LANs mitzuteilen.

14. Im Bereich „READ-Funktion“ aktivieren Sie „Fetch Aktiv“ und vergeben genauso wie im unteren Bereich die Eigenschaften „Eigener TSAP:“ und „Fremder TSAP:“.

Bestätigen Sie die Verbindungsparameter mit „OK“.

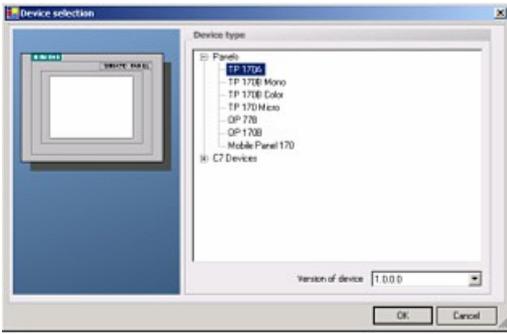
15. Zurück im Hauptfenster der Applikation sollte nun eine neue Verbindung im Zweig „S5-Transport (TCP/IP)“ von „SIMATIC S5 ETHERNET LAYER 4“ zu sehen sein.

Die Einstellungen für eine direkte Kommunikation mit WinCC sind abgeschlossen.

6.4.6 Windows Control Center flexible 2004 (WinCC flexibel) (v5.2.0.0)

1. Start the WinCC flexibel 2004 software by using the desktop link or the program entry in the start menu.

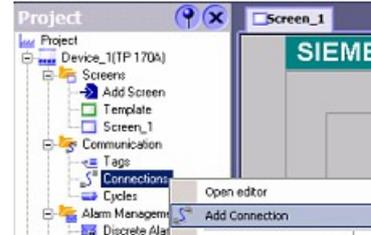
2. At first click on „Create an empty project“ in the „Start page“.



3. In the „Device selection“ mark the used operator panel (example: „TP 170A“)

confirm with „OK“.

4. After the project has been created right click in the project window on „Connections“ of the sub menu „Communication“.



In the context menu click on „Add Connection“.

5. Right in the main window appears the new tab "Connections" where you are different settings options.

Important for the connection are:

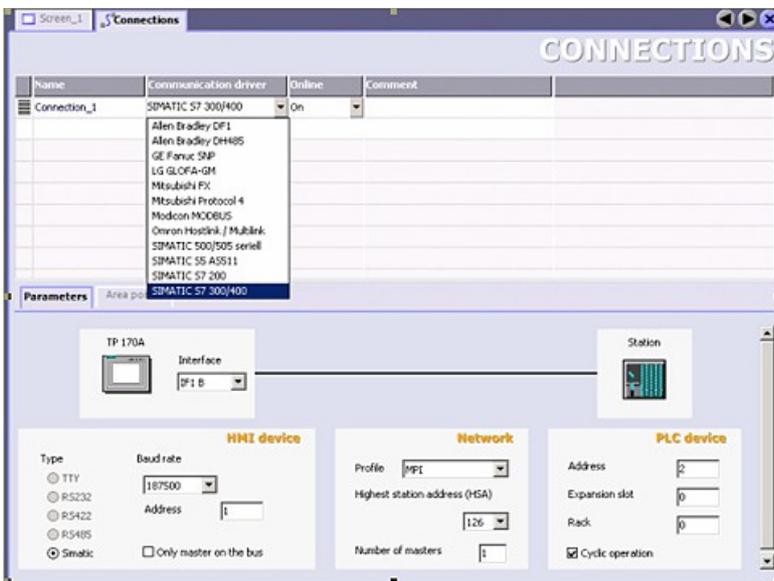
=> the communication driver (set up which PLC you are using

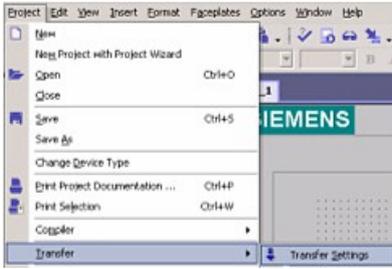
(eg: „SIMATIC S5 AS511“)

=> select the used "CPU - type" (eg "S5 95U")

=> configure the interface parameters in the section "terminal"

(eg: baud rate „9600“, Parity„even“, Data bits „8“, Stop bits „1“).



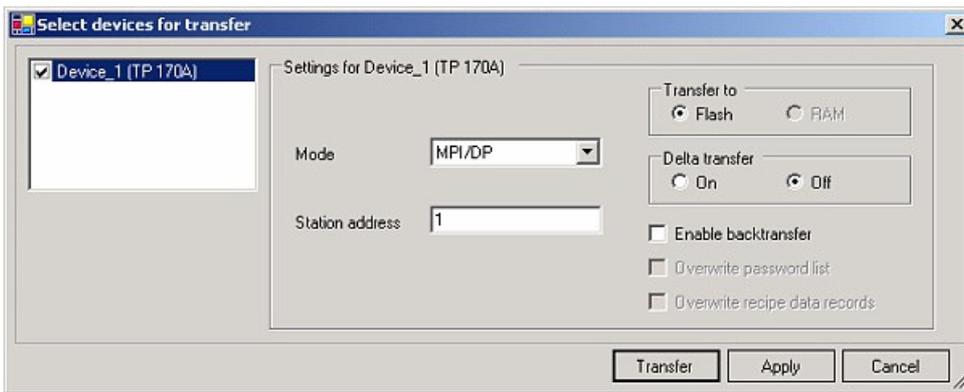


6. Now you can start with your work.

If you have finished work you can transfer this project to the panel by reading the next steps.

7. Choose „Transfer Settings“ from the sub menu „Transfer“.

8. In the new dialog change the „Mode“ to „serial“ and set the „Station address“ of the operator panel (e.g. „1“). Please set the baud rate to "19200". The "Delta transfer" is not supported by the S5-LAN. Turn them so "Off".



9. Press the button „Transfer“ to start communication with the terminal. Your project is about to be transferred.

The communication with the operator terminal is so successfully established .

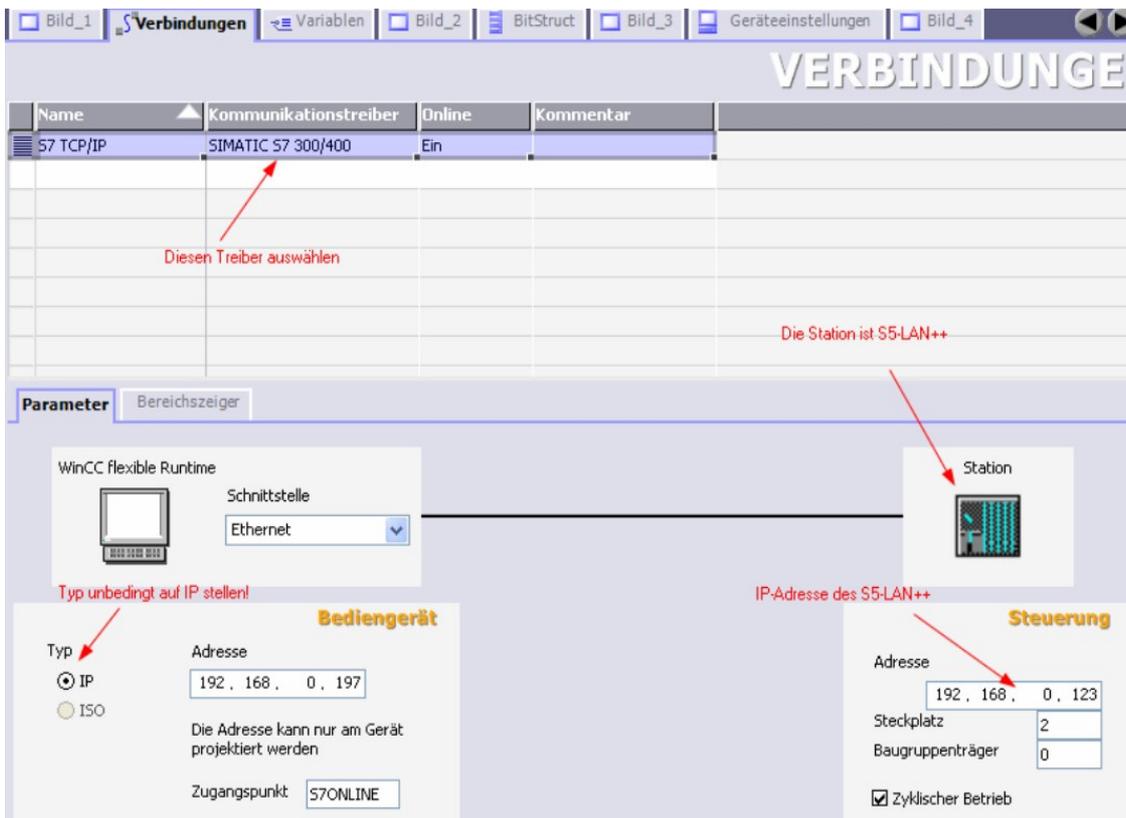
6.4.7 Communication WinCC flexible with S5-LAN++

S5-LAN++ behaves like a CP 343-1 or as an HMI ProfiNet connection. So you use the same configuration as when you are connected to the Simatic S7 300/400 with TCP/IP. Here's a short guide for setting WinCC Flexible:

1. Select in the S5-LAN++ as S5/S7 server port 102!
This port is usually by default setting ready at 102.

2. Select for a communication driver in the WinCC flexible SIMATIC S7 300/400 as shown in the picture. For the PLC you enter the IP address of the S5-LAN++. The Typ select to „IP“. Rack- and Slotnumber is for the usage with S5-LAN++ not significant.

Just enter the default data: Rack 0, Slot 2.



3. Please note that the access point (S7ONLINE) is set correctly.

The attitude you take in the Control Panel under "Set PG/PC Interface".

Make sure that an adapter with TCP / IP support is selected.

4. Addressing

The conversion from S5-float (KG-format) to S7-float (IEEE 754) is automatic in both directions.

It is important to use a variable type of IEEE 754.

The addressing of memory bits, inputs, outputs, timers and counters is the same for S5 and S7. However, there are differences in the data blocks. Addressing at the data blocks has been adapted to the S7.

For example:

DB10 DW 10 (S5) is addressed with DB10.DBW20 (S7). The background is that the S7 principle addresses in byte. If you want to read a single byte, for e.g. DB10.DL4 (S5), so you have to address DB10.DBB8. It is therefore necessary: even byte address = DL, odd address = DR in DB of the S5.

Here are some examples of address:

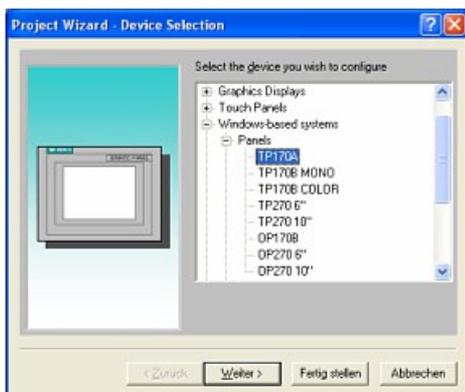
Simatic S5	Simatic S7	Format
MB 11	MB 11	Byte
MW 20	MW 20	Word
DB10 DW 9	DB10 DBW 18	Word
DB10 DW 60	DB10 DBW120	Word
DB10 DL 3	DB10 DBB 6	Byte
DB10 DR 3	DB10 DBB 7	Byte
DB10 DD 25	DB10 DD 50	DWord
DB10 DD 35	DB10 DD 70	Real

How can we address a DX (for e.g. extended DB135)

Must be for e.g. a DX addressed in a CPU 135, then the following rule applies:
DB-number 1-255 = DB, DB-number > 255 = DX.

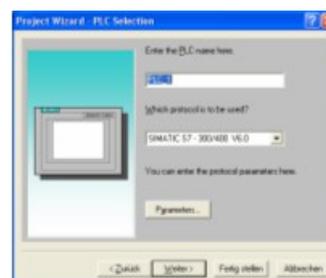
6.4.8 ProTool/Pro v6.0 SP2

1. Start ProTool/Pro by using the desktop link or program entry in the start menu.
2. Choose from the menu „File“ the sub menu „New“ or click on the right symbol.



3. The next dialog asks you which operator panel you are using.

Mark the used panel (e.g. „TP 170A“)



4. „Next“ leads you to a new dialog. Type in the specific fields the name of the PLC device and choose the used PLC in the driver selection

(e.g. „SIMATIC S5 – AS511 V6.0“)



5. Via „Parameter...“ you are calling an configuration dialog from the chosen PLC driver

Select the used "CPU type" and the "interface" to which the terminal is connected (eg "IF1 A").

Furthermore you configure the parameters of the interface ("type", "bits", "Parity", "Stop Bits", "baud rate").

7. confirm with „OK“ until you got back to the „PLC Selection“.Go on with „Next“.

8. In the main window start the Transfer Settings dialog by clicking on „File“ „Transfer“ „Settings...“. Coose „Serial“ and the COM interface of the operating terminal (e.g.: „COM1“). set the baud rate to "19200".

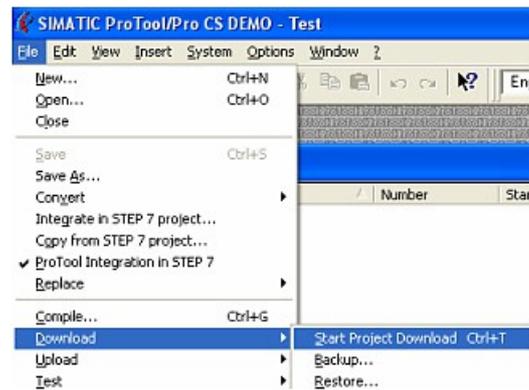
Confirm with „OK“.

and start with your work

If you have finished working on this project you can go on with the next steps.



9. If you want to transfer you project to the panel you have to generate the project first. This can be done with a click on „File“ - „Compile“.



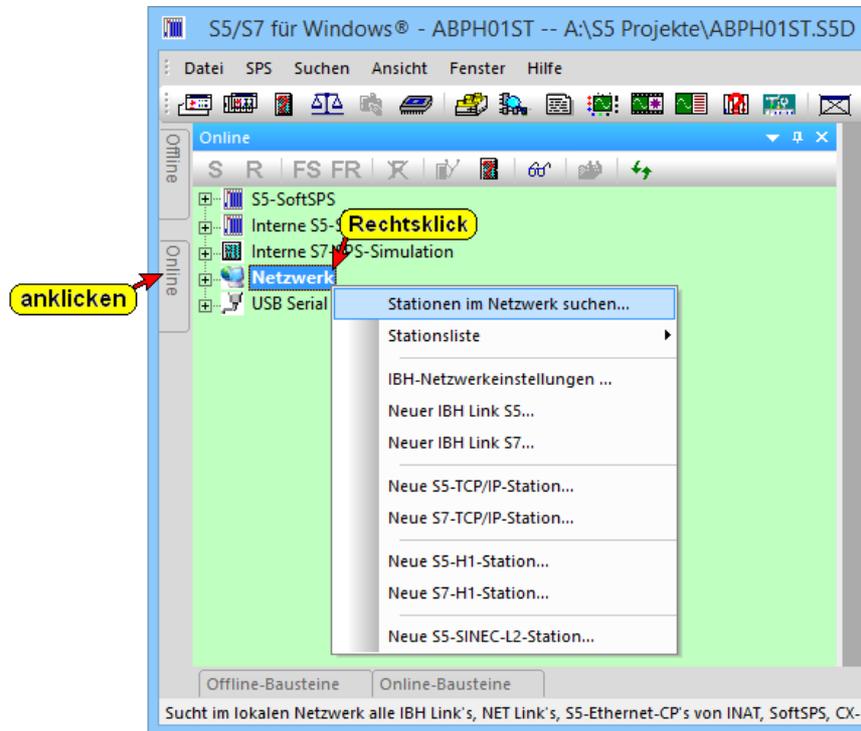
10. To transfer the project just click on „File“ „Download“ „Start Project Download“ or click on the right symbol .

Please wait while the project is transferred.

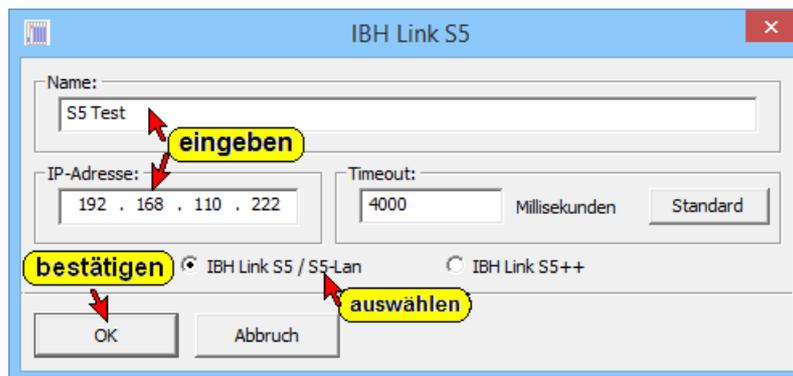
The communication between the operator panel is now established.

6.4.9 S5 for Windows (without virtual COM-port)

By selecting “New IBH-Link S5...”, an S5-LAN++ module present on the control can be connected to the tool to go ONLINE.



In this dialog you specify a name for the connection/control, enter the IP address of the S5-LAN++ module and the type of module itself. By confirming with “OK”, the setting is adopted and ONLINE access to this module is possible immediately.

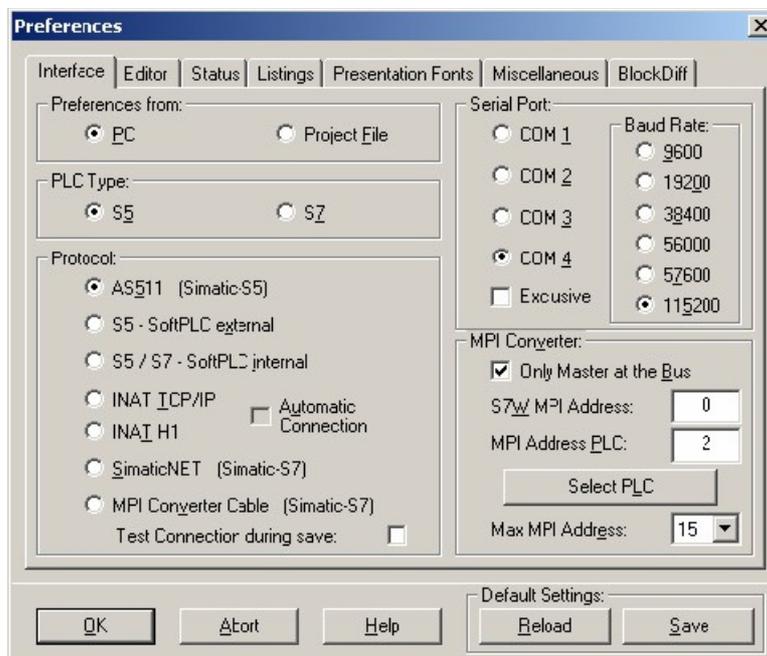
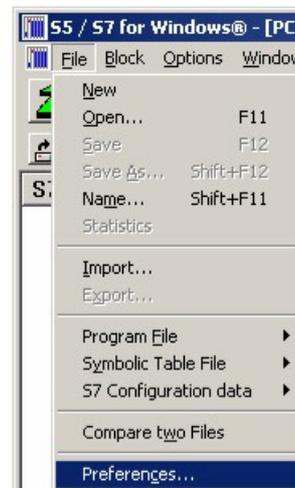


6.4.10 S5 for Windows v5.02 (with virtual COM-port)

1. Start the “S5 for Windows” software by using the link on your desktop or use the link in your start menu (standard is “Programs\S5 for Windows\S5 for Windows“)

2. Choose File - >Preferences... (top left in the menu bar) to configure the communication configuration between the computer and the PLC.

3. A new dialog appears which offers the possibility to set up a lot of configuration data about the communication with your PLC.



4. Choose the first registry card „Interface“ (standard) and set up the configuration data as described below:

=> Interface Settings from : „PC“

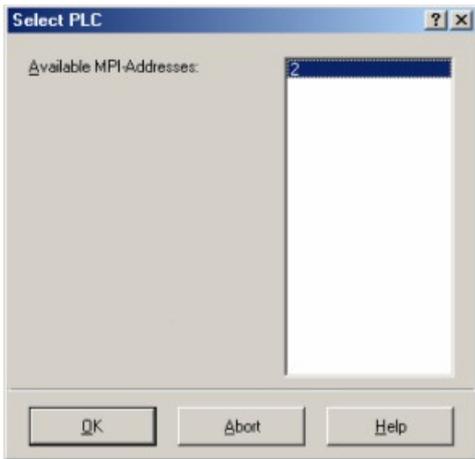
=> PLC type: „S5“

=> Protocol: „AS511 (Simatic - S5“)

=> Serial Port: Select here the COM port for the AG-access

=> Baud Rate: Choose the speed you want to use at the bus

4. 5. After the software is configured , click “Select PLC” in the area “MPI Converter“. A new dialog appears where you can select the desired PLC



5. In this dialog you can see all PLC's which are connected to your PC.

Choose from the list box (left) the desired station (the PLC) and confirm with "OK". (In the example "2")

6. Close the preferences dialog by pressing the „OK“ button.



Baustein	Adress
OB 1	-
SFC 0	-
SFC 1	-
SFC 2	-
SFC 3	-
SFC 4	-
SFC 20	-
SFC 21	-
SFC 22	-
SFC 28	-
SFC 29	-
SFC 30	-
SFC 31	-
SFC 32	-
SFC 33	-
SFC 34	-
SFC 36	-
SFC 37	-
SFC 38	-
SFC 39	-
SFC 40	-
SFC 41	-
SFC 42	-
SFC 43	-
SFC 44	-
SFC 46	-
SFC 47	-
SFC 49	-
SFC 50	-
SFC 51	-

7. Back in the main window press the „PC Block List“ button for testing the new established communication configuration.

8. 9. Please wait a moment for the software to read the desired blocks from the PLC. The blocks will be displayed in the listbox below the menu bar (see picture to the right).

The communication between the S5 for Windows and the PLC is now established.

6.4.11 S5-gateway communication (coupling)

1. Start the S5-LAN Manager, search for your module, select it and click with the mouse on "S5-gateway connection". This opens a dialog to set the connection.

Nr	Name	Typ	aktiv	P-Zyklus	Konfig-DB	IP-Partner	Port Lokal	Po
1	Exam...	ISO on ...		0	DB1.DBW0	192.168...	0	0
2		ISO on ...		0	DB0.DBW0	0.0.0.0	0	0

2. In the bottom of the dialog, click the link in the list you choose to configure the connection.

3. At the top you can give the connection a logical name.

4. Among them, configure the position of the "configuration data block". For this, type in the position of the data block in the left field (for example, "1" for DB1) and from which data word ("from DW") ranges the configuration.

5. As "Connection Type" is set "ISO-on-TCP connection". In this setting is used the TCP port 102.

6. The polling cycle (ms) indicates the elapsed time until the S5 the Gateway configuration area cyclically reads and examines, what is to do. when a 0 is specified then will be read constantly from the PLC.

7. In the field addresses you can only specify the IP address of the partner. The IP address of the Gateway you continue to configure S5 over the S5-LAN Manager.



If 0.0.0.0 is specified as partner IP address, the IP address is not checked when connecting. Thus any device can set up a connection that knows the TSAP of the S5 gateways.

8. On both devices you can stipulate the TSAP (Transport Service Access Point). This consists of 16 characters, and represents the identification of the connection. This is needed when several connections with an IP address are available.



Starting with firmware version 0.45 of the S5 Gateway a connection can be established with any TSAP, if the partner is specified nothing at TSAP (partner TSAP length = 0). For this the member just needs the IP address and the TSAP of the S5 gateways.

9. Communication with the "ISO-on-TCP connection" of the CP343-1 is compatible. Thus need to be coupled with S7 CP343-1 only the relevant connections are configured. Ask the TPDU size (Transport Protocol Data Unit) to "512". This sets the maximum data size that can be received or sent.



The communication to the S5 is handled via the PG interface. There is used a baud rate of 9600 bits / second. Of course this protocol needs longer maturities. Therefore, make sure that the partner sends data to the S5 Gateway module not too quickly. Otherwise it may lead to a task traffic jam. In an exchange of about 256 bytes a transmitter switch of at least 600 ms is recommended, even better would be 1000 ms.

Communication will be configured via the S5 gateway.

6.4.11.1 Technical information for the configuration area

Format of the configuration area:

	DL								DR								DW			
	7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0				
receive	reserved								RTYP ('D', 'X', 'M', 'E', 'A')								0			
									RDBN (at 'D' or 'X' block number)								1			
									RBEG (at 'D' or 'X' StartDW otherwise StartByte)								2			
									RLEN (Size of the receive mailbox in bytes)								3			
									reserved								4			
send	reserved								STYP ('D', 'X', 'M', 'E', 'A')								5			
									SDBN (at 'D' or 'X' block number)								6			
									SBEG (at 'D' or 'X' StartDW otherwise StartByte)								7			
									SLEN (Size of the receive mailbox in bytes)								8			
									reserved								9			
send									TxLEN (send - length in bytes)								10			
									TxSTAT (transmit state)								11			
	reserved								reserved								DO	ER	AC	12
																	NE	R	T	
receive									RxLEN (receive length in bytes)											13
									RxSTAT (receive state)											14
	res								reserved								ND	ER	AC	15
																	R	R	T	
reserved für									reserved											16
Extension									reserved											17
									reserved											18
									reserved											19

The individual fields in the detail:

Designation	Importance	function block	access
		parameter name	R = read

W =
write

RTYP	Data type of the receive mailbox: 'D' = DB 'X' = DX 'M' = flag 'E' = input 'A' = output	RTYP	R	W
RDBN	If RTYP DB or DX block number otherwise no use.	RDBN	R	W
RBEG	The beginning of the receive mailbox. If DB and DX data word is starting, otherwise start byte.	RBEG	R	W
RLEN	Length of the receive mailbox in bytes (even if DB).	RLEN	R	W
STYP	Data type of the send mailbox: 'D' = DB 'X' = DX 'M' = flag 'E' = input 'A' = output	STYP	R	W
SDBN	If STYP DB or DX block number otherwise no use.	SDBN	R	W
SBEG	Beginning of the send mailbox. If DB and DX is starting - data word, or start - data byte.	SBEG	R	W
SLEN	Length of the send mailbox in bytes (even if DB).	SLEN	R	W
TxLEN	Number of bytes that should be sent.	LEN	R	W
TxSTAT	Send Status evaluate if DONE or ERR is set to 1. If DONE is 1, so the order was executed without error. STAT is 0	STAT	W	R
TxACT	Start a send job in S5 - LAN.	ACT	R/W	R/ W
TxERR	Is 1 if an error has occurred. The error can be seen in detail the STAT field.	ERR	W	R/ W
TxDONE	Is 1 if the job was executed successfully end.	DONW	W	R/ W
RxLEN	Number of bytes that have been received	LEN	W	R
RxSTAT	Reception status once when DONE or ERR is set to 1. If DONE is 1 the order was executed without error. STAT is 0	STAT	W	R
RxACT	Releases the receive mailbox if 1	ACT	R/W	R/ W
RxERR	Is 1, if an error has occurred. The error can be seen in detail the STAT field.	ERR	W	R/ W
NDR	Is 1 if data has been received (data received). RxLEN then evaluate.	NDR	W	R/ W

It is provided for an easy communication of the FB55 (S5L_SEND) and FB56 (S5L_RECV). In these blocks is handled the communication between the gateway and S5 PLC. The FB's have been developed based on the S5 communication FC's (FC5, FC6, AG-SEND or AG-RECV).

NOTE: These devices use 200 MW and 202 MW as used flags.

It should be noted that individual statuses ERR, DONE, NDR only lie flat one cycle for each case. It will then executed the required steps (STAT evaluate or receive mailbox empty, etc.). Please see the description of the input / output parameters in the table above.

The following states can adopt the STAT field:

STAT on call of S5L_SEND

DONE	ERR	STAT	Meaning
1	0	0000H	Job completed without errors
0	1	8304H	Connection is not established
0	1	8185H	Send mailbox is too small SLEN
0	1	8184H	Illegal data type specified for the send mailbox
0	1	FFFFH	General Error

STAT on call of S5L_RECV

DONE	ERR	STAT	Meaning
1	0	0000H	Data has been received (LEN check and get the data)
0	1	8304H	Connection is not established
0	1	8185H	Receive mailbox is too small RLEN
0	1	8184H	Illegal data type specified for the receive mailbox
0	1	FFFFH	General error

In the following example the DB20 is used as the configuration DB. E 4.0 controls the sending and E 4.1 controls the receiving. If E 4.0 is '1', then will be sent 10 bytes of DB100 from DW 0. E 4.1 gives free the receive shelf DB100 DW from 100 with 10 bytes.

```

      : SPA FB 56
Name  : S5L_SEND
JDBN  :    KF +00020
JDBW  :    KF +00000
STYP  :    KC D
SDBN  :    KF +00100
SBEG  :    KF +00000
SLEN  :    KF +00010
ACT   :    E 4.0
LEN   :    KF +00010
DONE  :    M 11.0
ERR   :    M 11.1
STAT  :    MW 20
      :
      : SPA FB 56
Name  : S5L_RECV
JDBN  :    KF +00020
JDBW  :    KF +00000
RTYP  :    KC D
RDBN  :    KF +00100
RBEG  :    KF +00100

```

RLEN : KF +00010
ACT : E 4.1
LEN : MW 24
NDR : M 13.0
ERR : M 13.1
STAT : MW 22

6.5 S7-Panel to S5-PLC over S5-LAN++

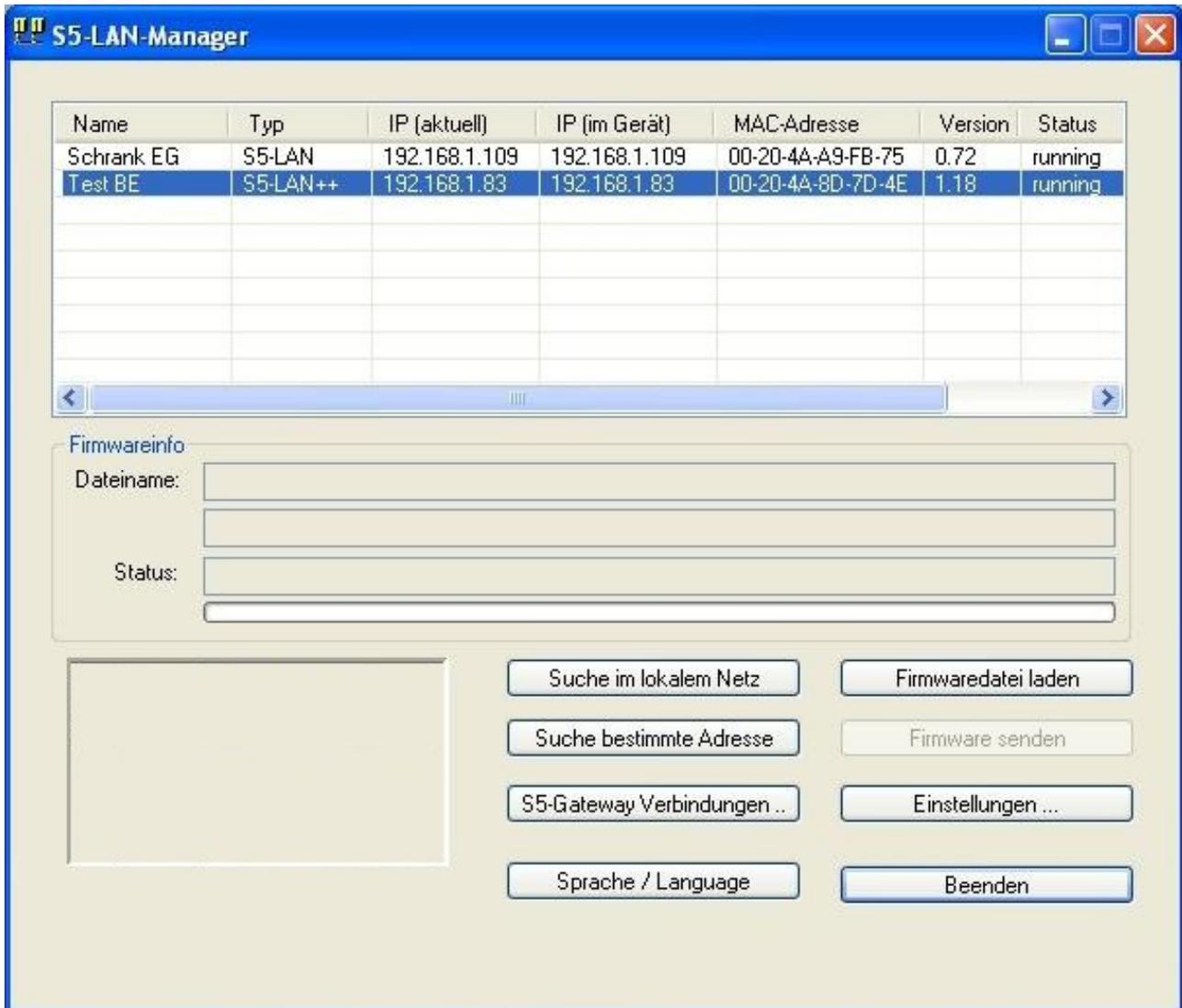
To read/write data from an S5-PLC with a current S7-panel such as “KTP” or “KTP Comfort”, the following must be set/used :

- Supply module with voltage
S5-90U to S5-100U: Supply via external 24V DC
S5-115U to S5-155U: supply from PG-interface of the PLC
- Set IP-address in S5-LAN++
In the delivery state, the module expects a DHCP server
- S5/S7 server-port must be set to 102!
- Plug the module onto the S5-PLC
- Create panel project with WinCC/TIA
IP-address panel matching the subnet of the S5-LAN++- module
- Create "S7 connection" with reference to the IP-address of the S5 LAN++
- Define variables that should be monitored/controlled and link them to the S7-connection
Access to data blocks requires doubling the address of the used data area!
- Translate panel project and transfer to panel

7 Configuration

7.1 S5-LAN Manager

Start the S5-LAN Manager from either the start menu or in the PLC-VCOM menu under "Configuration"



Search in local network

By clicking on the "Search in local Network" you send a broadcast to all modules which are located on your network. Every Reacting module is entered into the list.

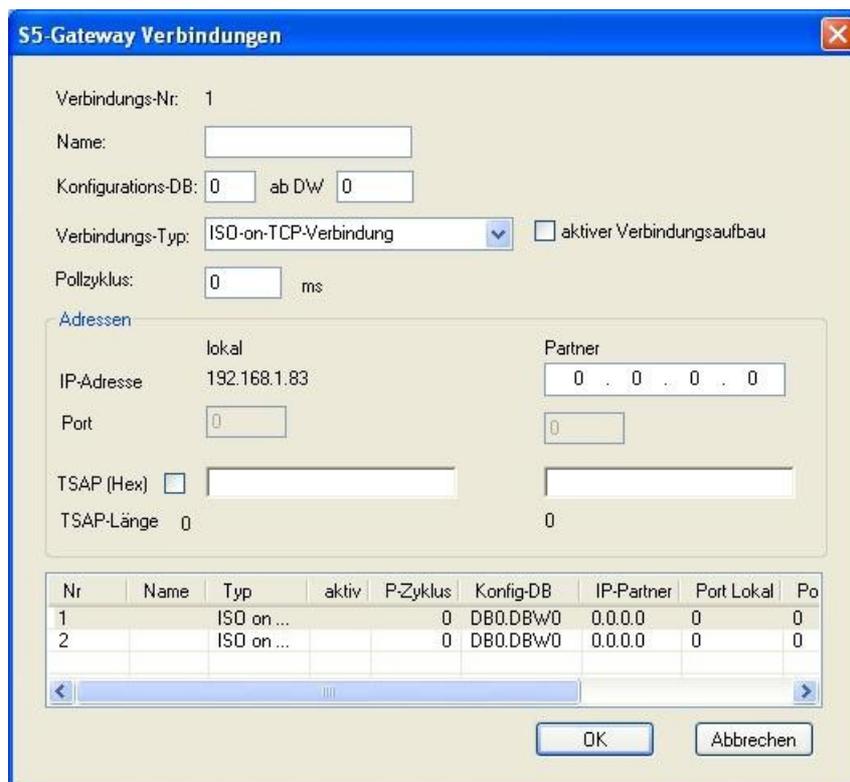
Search specific address:

If you already know the IP address of the S5-LAN module you can enter these in the following dialog with a click on "particular Search address" and search for with a click on "search".



S5 gateway connections:

This dialog is displayed only for S5-gateway modules. With this it is possible to establish connections to other controllers. More details to this dialog refer to the Chapter " S5-gateway communication (coupling) ".



Language:

Sets the language of the program between German and English.

Firmware file load:

To send a firmware file, it must first be loaded. This is done by clicking the button "Load Firmware File." It appears a dialog for selecting the appropriate *.bin (binary) firmware file. Select the appropriate firmware file and click OK. Firmware-specific information now are displayed in the section firmware info.

Send firmware:

Once you have loaded the firmware file, this button is activated. Select the module and then select

this button to send the firmware.

NOTE: It is highly recommended only to renew the firmware of the module if you have problems with the old version of module operation.



While the firmware is transmitted to the module and the module operation version is renewed, the module may not be removed from the network or from the power, otherwise is the danger that the module does not work properly.

Settings:

Click on Settings to change the properties in the following dialog of the S5 module. Click "OK" to save the new settings and close the dialog.

A screenshot of the 'S5-LAN++' settings dialog box. The window title is 'S5-LAN++'. It contains several input fields and checkboxes. The 'Gerätename:' field contains 'Test'. The 'S5-PG-Port:' field contains '10010'. The 'S7/S5-Server-Port (für S7: 102):' field contains '102'. There is a checkbox labeled 'DB Adresse zyklisch lesen' which is unchecked. Below this is a section for 'IP-Adresse' with two checkboxes: 'DHCP /AutoIP' (unchecked) and 'auto Subnet' (unchecked). Below these are three input fields: 'IP-Adresse:' with '192 . 168 . 1 . 83', 'Subnet-Maske:' with '255 . 255 . 255 . 0', and 'Standard Gateway:' with '0 . 0 . 0 . 0'. On the right side of the dialog are two buttons: 'OK' and 'Abbrechen'.

Name of the device

The device name can be any text. So you can clearly identify each S5/S7-Modul.

S5 PG port:

TCP / IP port number. About this port your S5 module and PG communicate together. Must be not normally changed. (Default: 10010)

S5 server port:

TCP / IP port number. Over this port is handled the S5-LAN ++ - LINK protocol. (Default: 2002)

DHCP/AutoIP:

If this box is active, at the start the module searches a DHCP server to get an IP address. If no server could be found after 3 attempts (may take a few seconds), the module will use an IP address from the "Auto IP" address range.

Auto subnet:

If set, the module calculates the subnet mask automatically. e.g. at 192.168.0.80 this is the 255.255.255.0. In this case nothing needs to be entered in the subnet mask field.

IP address:

If DHCP / AutoIP off, here can be entered the IP address of the S5 module.

Subnet mask:

Here you define the subnet mask. At 0.0.0.0 as input auto Subnet is enabled.

Default Gateway:

Operate the LAN module on a router, you type in the IP address of the router.



Make sure that the IP address you give to your module / cable (the same if S5-LAN or LAN-MPI), match to your network and is only awarded once. Likewise the PC which communicates with the cable, should have an appropriate IP address. If you are not sure what IP address you can assign, you should contact your network administrator.

7.1.1 Ports

port	type	description
65467	UDP	Search from S5-LAN ++, by using S5-LAN Manager / PLCVCOM
10010	TCP	PG port (PLCVCOM)
2002	TCP	S5 server port (VIPA)
102	TCP	S5 server port (RFC1006)

8 PLC-VCOM

8.1 Description

It creates a new, virtual com-port in your system, with which the programming software of your PC (such a. PG 2000, Step© 5/7, S5/S7 for Windows, WinCC, Microwin) can communicate with the device

Supported operating-systems:

- Windows XP
- Windows Vista
- Windows 7 Professional, Ultimate and Enterprise
- Windows 8.1 Professional
- Windows 10 Pro and Enterprise

The PLC-VCom application is needed for use with the following devices:

- MPI-LAN Cable– Art. No.. 9352-LAN
- S7-LAN Modul – Art. No.. 9352-LANCon
- MPI-USB Cable– Art. No.. 9352-USB
- S7-USB Modul – Art. No.. 9352-S7-USB
- MPI-II Cable (USB – mode) – Art. No.. 9352 + 9352.1
- S5-LAN Modul – Art. No.. 9359-LAN
- Tele-Service (as programming adapter) – Art. No.. 9377-(ANALOG/ISDN/GSM)-OP

By installing the PLC-VCOM adiconalmente were installed the **S5-LAN** and the **MPI-LAN**. Both offer the possibility to manage the network configuration of your products

8.2 Installation

1. Download the PLCVCom from the product-page of your MPI-product and start the installation.



2. After choosing language the welcome dialog appears in the chosen language.

Click “Next“ to define the installation path (see right picture).

This can be done with a click “Browse...”

If you are ready press “Next“ to go on.



3. In the next dialog you can choose the program folder for your start menu.

Go on with “Next”.

8.2.1 Final configuration of the PLC-VCOM



8. Choosing the COM – Port

Already occupied COM port can be viewed in Windows Device Manager if you are not sure which COM ports are still available.



If you are not sure which port is unused, press “OK“.

Later you can start this dialog again by clicking in the application folder of your start

menu on “SelectCOM”.



9. The installation ends with a click on “OK”.

8.3 Overview

Beside your watch, in your Windows – Taskbar, appears a new Symbol. This one is for the PLC – VCom software.

It shows the actual connection status with your cable/module MPI-II, MPI-USB, MPI-LAN, S7-USB, S7-LAN or S5-LAN.

8.3.1 Status description:



PLC – VCom is connected with your cable/module and operational.



PLC – VCom is not connected.



The red symbol indicates that sending/receiving data has been failed.

Send status: (left field):
Data is send to the
cable/module if this one is
green.



Receive status: (right field):
Data is received from the
cable/module if this one is
green.

8.3.2 Main Window



1. Configuration: Select and open the configuration program for your products.

- => PLC-VCOM: Management, connection and communication with the cables
- => S5-LAN: configuration of your S5-LAN modules
- => MPI/S7-LAN: Configuration of your MPI-LAN or S7LAN

2. Info: information about the PLC-VCOM and your computer.

3. Status: Display the connection parameters of the cable connected.

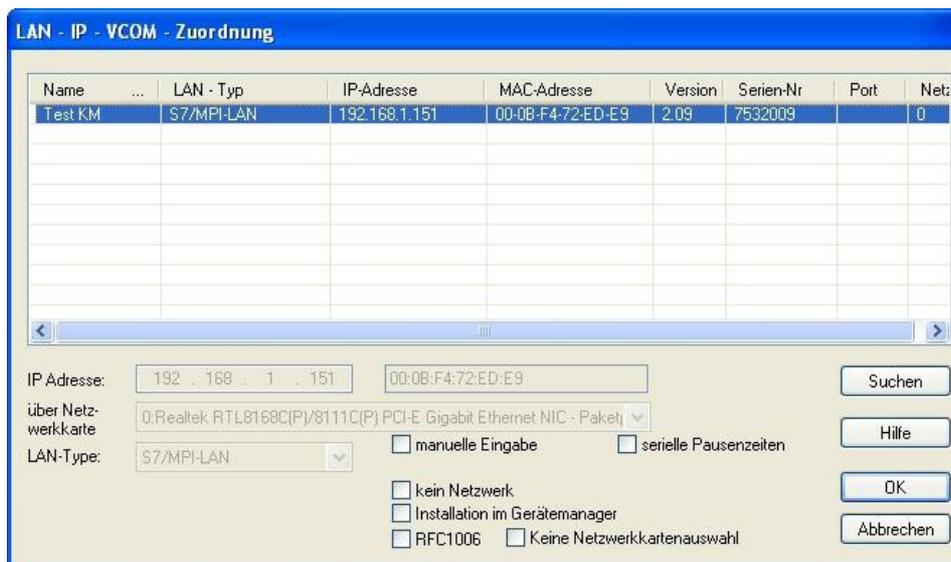
- => Top left: shows the name of the currently connected product
- => semi-left: shows the connection status
- => half right: shows the IP address of the connecting cable
- => Top right: Click here to search or select a device
- => right middle: name of the connected cable
- => bottom right: displays information about current computer connections

4. Virtual Port: Display of selected virtual COM ports and the program that the last has accessed on this COM port.

5. Program: Buttons to adjust the PLC-VCOM

- => Exit. This button closes the program and the COM – Port
- => Language: Switch the Language to english/german.
- => Help: opens the Help menu of the PLC-VCOM, when they should have problems or questions
- => “Minimize” the dialog. This button does not close the program. It just minimizes the program. You will find the PLC – VCom symbol in the Windows – taskbar beside the watch.

8.3.3 Configuration window



1. List of available cable / modules:

- => Linewise display of the products found with your properties

2. IP-Adress:

- => IP address and MAC address of the selected cable / module

3. Via network card:

- => Selection of the used network interface card

4. LAN-Type:

- => Selection of the be connected cable / Module Types

5. Several check boxes:

- => Manual entry: allows you to enter the parameters manually
- => no network: for products which are not in any network
- => Installing in the device Manager: Installs the PLC-VCOM COM port in Device Manager (required only for S7 for Windows and S7 Doctor software)
- => RFC1006: activation of RFC1006 communication method
- => no network card selection: Passes the routing of packets to the operating system
- => serial interval times: slow down the serial transmission eg panel transfers

6. Search

=> With a click on Search you are sending an broadcast to every cable/module that is connected with your network or your system. Every responding cable/module will be inserted to the list.

7. Help:

=> opens the Help menu of the configuration, if they have problems or questions

8. OK:

=> Ends the PLC-VCOM configuration and accepts the entered / selected settings

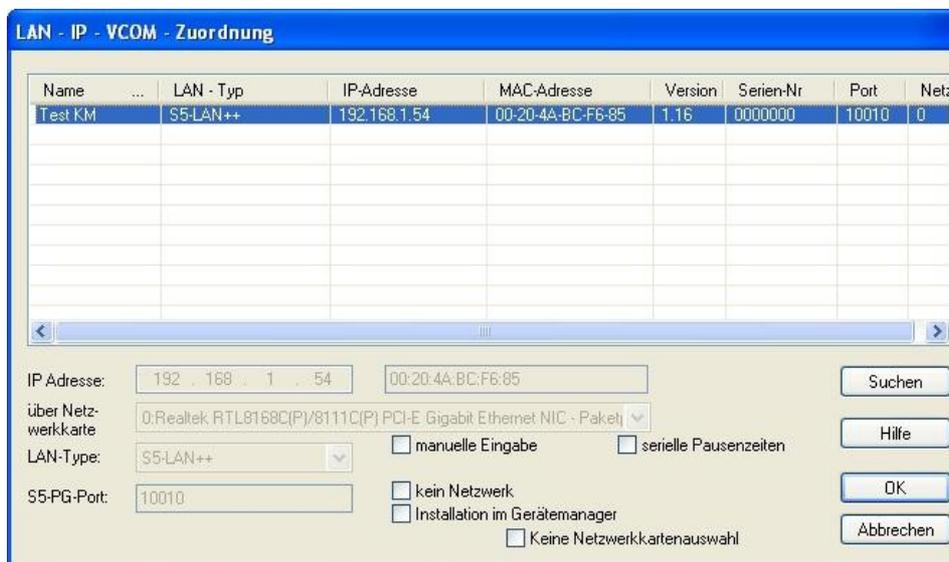
9. Cancel:

=> Ends the PLC-VCOM configuration and discards the entered / selected settings

8.4 Configuration

1. Start the PLC – VCom application, if this is not already running.
2. Open the PLC-VCOM by clicking on the icon  PLC-VCOM in the system tray.
3. After the PLC-VCOM is open, click in the status area on the "Configure" and the wizard to configure is launched.

8.4.1 S5-LAN / S5-LAN++



Name	LAN - Typ	IP-Adresse	MAC-Adresse	Version	Serien-Nr	Port	Net:
Test KM	S5-LAN++	192.168.1.54	00:20:4A:BC:F6:85	1.16	0000000	10010	0

IP Adresse: 192.168.1.54 00:20:4A:BC:F6:85 Suchen

über Netzwerkkarte: 0:Realtek RTL8168C(P)/8111C(P) PCI-E Gigabit Ethernet NIC - Paket Hilfe

LAN-Type: S5-LAN++ manuelle Eingabe serielle Pausenzeiten OK

S5-PG-Port: 10010 kein Netzwerk Installation im Gerätemanager Abbrechen

Keine Netzwerkkartenauswahl

8.4.1.1 Automatically

1. Click on "Search" to send a broadcast to all cables and modules which are located on your network or directly connected to the computer. Each on this broadcast responsive cable / module is entered in the list of participants.

2. Select the desired cable / module so that them are highlighted in blue. Here are all parameters automatically included in the configuration wizard.

8.4.1.2 Manual



The manual entry relates to the network users who are behind a router, located in other networks because of the broadcast for the automatic detection is not propagated by routers and therefore network users can not be found.

1. If you know the IP address of your cable, you can enter it manually. To activate the entry field for this purpose, click on the box "manual entry".
2. Enter at "IP address", the address of your cable / module that you want to connect to and select your type of cable in the "LAN Type".

8.4.1.3 Final settings

3. In the S5-LAN is unlocked the additional field S5 PG port. At the selection this will be automatically filled with the value that is stored in the S5-LAN or enter this port at a manual input by hand. This port can be changed using the S5-LAN Manager in the S5-LAN.



The S5-PG port is the programming port of the S5-LAN and is by default 10010. The S5-PG port, which is registered in the PLC-VCOM, must always match with the S5-PG-Port registered in the S5-LAN!

4. Select the options that you may need, such as no network card selection or serial break times.



Information about the options can be found in "Overview" section of the PLC VCOMs, that can be selected and deselected with the help of checkboxes.

5. Confirm your entry / selection with "OK".



6. In the main window of the PLC VCOMs appears after successfully connecting the cable type, with which the computer connects, the connection status "connected", the IP address and the name of the connected participant.
7. Finally click "Minimize" to decrease the PLC-VCOM in the notification area so that it can continue to manage the virtual COM port.

8.4.2 S5-Gateway / S5-Gateway+

Name	LAN - Typ	IP-Adresse	MAC-Adresse	Version	Serien-Nr	Port	Net:
Test KM	S5-LAN++	192.168.1.54	00-20-4A-BC-F6-85	1.16	0000000	10010	0

IP Adresse: 192 . 168 . 1 . 54 FF:FF:FF:FF:FF:FF Suchen

über Netzwerkkarte: 0:Realtek RTL8168C(P)/8111C(P) PCI-E Gigabit Ethernet NIC - Paketj Hilfe

LAN-Type: S5-Gateway+ manuelle Eingabe serielle Pausenzeiten OK

S5-PG-Port: 10010 kein Netzwerk Installation im Gerätemanager Abbrechen

Keine Netzwerkkartenauswahl

8.4.2.1 Automatically

1. With a click on "Search" you send a broadcast to all cables and modules that are located on your network or directly connected to the computer. Each to this broadcast responsive cable / module is entered in the list of participants.
2. Select the desired cable / module so that them are highlighted in blue. Here are all parameters automatically included in the configuration wizard.

8.4.2.2 Manual



The manual entry relates to the network users who are behind a router, located in other networks because of the broadcast for the automatic detection is not propagated by routers and therefore network users can not be found.

1. If you know the IP address of your cable, you can enter it manually. To activate the entry field for this purpose, click on the box "manual entry".
2. Enter at "IP address", the address of your cable / module that you want to connect to and select your type of cable in the "LAN Type".

8.4.2.3 Final settings

3. In the S5-LAN is unlocked the additional field S5 PG port. At the selection this will be automatically filled with the value that is stored in the S5-LAN or enter this port at a manual input by hand. This port can be changed using the S5-LAN Manager in the S5-LAN.



The S5-PG port is the programming port of the S5-LAN and is by default 10010. The S5-PG port, which is registered in the PLC-VCOM, must always match with the S5-PG-Port registered in the S5-LAN!

4. Select the options that you may need, such as no network card selection or serial break times.



Information about the options can be found in "Overview" section of the PLC VCOMs, that can be selected and deselected with the help of checkboxes.

5. Confirm your entry / selection with "OK".



6. In the main window of the PLC VCOMs appears after successfully connecting the cable type, with which the computer connects, the connection status "connected", the IP address and the name of the connected participant.

7. Finally click "Minimize" to decrease the PLC-VCOM in the notification area so that it can continue to manage the virtual COM port.

9 Addressing S7 Syntax

I/O/F/Z/T

The addressing of the flags, inputs, outputs, timers and counters is identical for S5 and S7.

DB

The addressing of the data blocks must be converted to the S7 format. The reason for this is that the S7 also addresses byte by byte in the DB, but the S5 by word. Usually word address * factor 2. The example also shows how individual bytes (DL / DR) can be addressed in the data block.

The following applies: even byte address = DL, odd address = DR in the DB of the S5.

Example:

Simatic S5	Simatic S7	Format
FB 11	FB 11	Byte
FW 20	FW 20	Word
DB 10 DW 9	DB 10 DBW 18	Word
DB 10 DW 60	DB 10 DBW 120	Word
DB 10 DL 3	DB 10 DBB 6	Byte
DB 10 DR 3	DB 10 DBB 7	Byte
DB 10 DD 25	DB 10 DBD 50	DWord
DB 10 DD 35	DB 10 DBD 70	Real

DX

There are no DX blocks in the S7. However, S5-LAN enables the DX blocks to be addressed via a DB with a number greater than 255.

The following applies: $DX\ n = DB\ 256 + n$

Example:

DX 10 DW 9	DB 266 DBW 18	Word
DX 10 DW 60	DB 266 DBW 120	Word
DX 10 DL 3	DB 266 DBB 6	Byte
DX 10 DR 3	DB 266 DBB 7	Byte
DX 10 DD 25	DB 266 DBD 50	DWord
DX 10 DD 35	DB 266 DBD 70	Real

S-Flags

The S7 does not recognize S flags. Here S5-LAN maps the S flags into the S7 DB1000.

Example of S flag addressing:

Simatic S5	Simatic S7	Format
SY 0	DB1000.DBB 0	Byte
SY 1	DB1000.DBB 1	Byte
SW 5	DB1000.DBW 5	Word
SW 10	DB1000.DBW 10	Word
SD 3	DB1000.DBD 3	DWord
SD 20	DB1000.DBD 20	DWord
S 0.0	DB1000.DBX 0.0	Bit
S 1.1	DB1000.DBX 1.1	Bit

10 Variant CLxxx-S7TCP (data areas)

There are data areas in the Bosch-controller that are not available in the S7. The data areas **DF**, **DP**, **RF** cannot be reached explicitly via the S7-syntax.

This is why these data areas are mapped to data blocks:

DF 0 - DF 15	=	DB 600 - 615
DF index 0xffff	=	DB 616
DP	=	DB 700
RF	=	DB 800

For the sake of completeness, the areas O,I,F are also mapped in DBs.

Input, I:	DB 900
Output, O:	DB 901
Flag, F:	DB 902

Since memory addressing at Bosch is done in BIG-Endian (like PC x86), access to 16 and 32 bits must be recognizable.

This can lead to problems if drivers (e.g. OPC-server) read byte by byte for optimization and do the conversion to 16/32-bit themselves

Solution: the different data types are also mapped into DB areas.

The DB area address + the DB number as listed above applies.

DBxxx	=	pure Byte access
DB10xxx	=	pure Byte access
DB20xxx	=	pure Word access
DB40xxx	=	double word

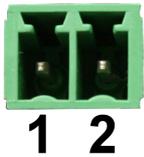
Notice:

The for communication required port “102” is only active when the module is plugged onto the CL-control with an external 24V DC supply and the module itself has recognized the CL-control. The built-in large, round LED (green) lights up permanently.

11 Technical data

Supply voltage:	24V DC +/- 20%
Power consumption:	2 watt
Display:	status-LED
Handling/Configuration:	reset-switch-key (factory setting) S5-LAN Manager to the PLC:
Interfaces:	TTY/20mA current loop (S5-LAN activ, S5-PLC passive) to the PD/PC: 10/100BaseTX RJ45-ethernet jack
Operating temperature:	0 - 55°C
Case:	ABS-plastic case
Dimensions:	42 x 15 x 65 mm
<u>Scope of delivery:</u>	S5-LAN++-module Power connector 2pins small

11.1 pin assignment power supply



Pin number	Short form	Designation	Direction
1	P24V	24V DC voltage	input
3	M24V	mass	input

Attention of assignment of the Phoenix socket:

The device has a reverse polarity protection diode integrated, thus the device itself is protected against reverse polarity. When this reverse polarity driven device is connected to a PLC, this can be damaged!

11.2 Pinning Ethernet

Pin no.	Short name	Notation	Direction
1	TX +	receive line +	Out
2	TX -	receive line -	Out
3	RX +	send line +	In
6	RX -	send line -	In

11.3 Pin assignment TTY / 20mA current loop

Pin number	Short form	Designation	Direction
1	NC	not used	
2	TTY OUT +	transmit data + (transistor collector)	output
3	NC	not used	

4	+24V	power supply +24V	input
5	NC	not used	
6	I-Tx	20mA power source transmitter	output
7	TTY IN +	receive data+ (LED anode)	input
8	NC	not used	
9	I-Rx	20mA power source receiver	output
10	Mext	mass +24V	input
11	NC	not used	
12	NC	not used	
13	NC	not used	
14	NC	not used	
15	NC	not used	

11.4 Pin assignment RS232 (for special-S5-LAN ++ variant-RS)

Pin number	Short form	Designation;	Direction
1	NC	not used	
2	TxD	transmit data	output
3	NC	not used	
4	NC	not used	
5	NC	not used	
6	NC	not used	
7	RxD	receive data	input
8	NC	not used	
9	NC	not used	
10	GND	mass	---
11	NC	not used	
12	NC	not used	
13	NC	not used	
14	NC	not used	
15	NC	not used	

12 Examples of applications

12.1 S5 to S5 – Gateway communication

12.1.1 Configure S5 gateway

Needed: S5-LAN Manager

Supported since firmware - version 0.44 of the S5 - Gateway

1. Start the S5-LAN Manager and search for your module. Select it and click with the mouse on the

"S5 - Gateway - Connection". This opens a dialog to set the connection.

2. In the lower area of the dialog you find the connection list, in which you choose the connection to configure.

3. In "name" you can now give the connection a logical name.

4. Under "Configuration - DB" type in the position of the data block in the left field, (eg "1" for DB1) and in right field from which data word (eg "1" for DW1) ranges the configuration.

5. As "link - type" set "ISO - on - TCP - Connection". In this setting is used the TCP port 102.

6. The polling cycle (in ms) specifies how much time elapses until the S5 - Gateway cyclically reads the configuration area and checks if something has to be done. If here is specified 0, is readed constantly from the PLC.

7. In the area of addresses you can only define the IP - address of the partner. Set the IP - address of the S5 - Gateway module to further configure the S5 - LAN Manager.

8. With both devices, you can use the "TSAP" (transportation - Service - Access - Point). This consists of 16 characters, and sets the ID of the connection represents. This is needed when several compounds with an IP - address exist. (Firmware version 0.45 of the S5 - Gateway can be built with any TSAP of a connection)

9. In the second module must be set in addition to the steps described in "Connection - Type" on the chopping the "Active connection" .

The communication via S5 - Gateway is now configured.

12.1.2 transfer blocks in PLC

1. Start your programming software and open now S5D - file "S5toS5 - Gateway".

2. So connect with your S5 - Gateway modules and transfer all the blocks (OB1, FB55 and FB56)

into the module belonging to the PLC. The same blocks you now even transfer into the second PLC. The blocks DB20 and DB100 are generated from alone.

12.1.3 Transmission cycle (S5)

In the following example the DB20 is used as configuration - DB. M10.0 controls the sending and M12.0 controls the receiving. If M10.0 is "1", then 20 bytes of the DB100 are sent from DW0. M12.0 gives free 20 bytes the receive mailbox DB100 from DW100.

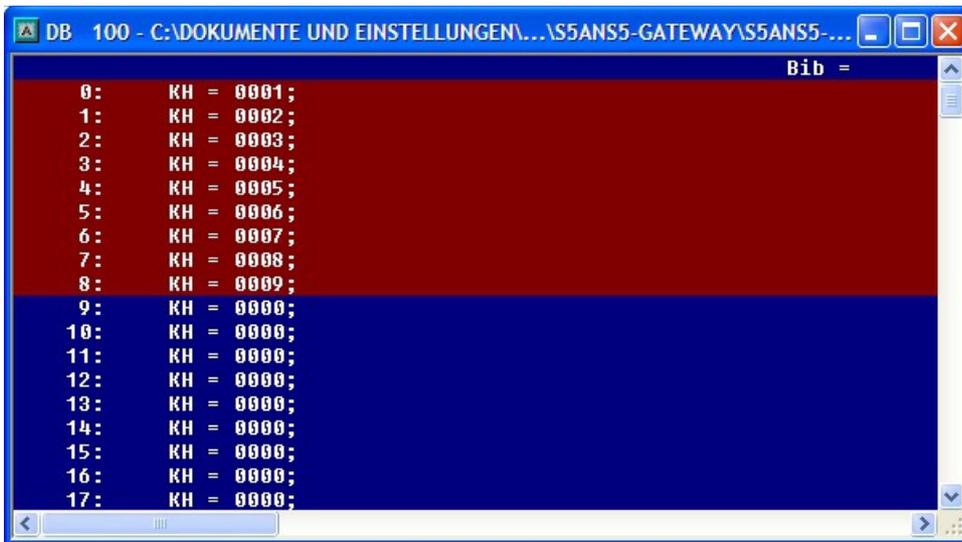
```
      : SPA FB  55
Name  : S5L_SEND
JDBN  :      KF +00020
JDBW  :      KF +00000
STYP  :      KC  D
SDBN  :      KF +00100
SBEG  :      KF +00000
SLEN  :      KF +00020
ACT   :      M  10.0
LEN   :      KF +00020
DONE  :      M  11.0
ERR   :      M  11.1
STAT  :      MW  20
      :
      : SPA FB  56
Name  : S5L_RECV
JDBN  :      KF +00020
JDBW  :      KF +00000
RTYP  :      KC  D
RDBN  :      KF +00100
RBEG  :      KF +00100
RLEN  :      KF +00020
ACT   :      M  12.0
LEN   :      MW  24
NDR   :      M  13.0
ERR   :      M  13.1
STAT  :      MW  22
```

Set the inputs E8.0 and E9.0 to "1" for sending and receiving.

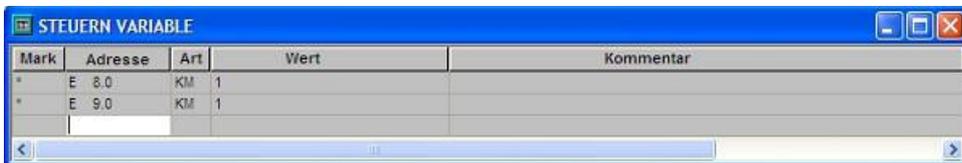
12.1.4 Test of the structure (S5)

1. Open the each DB100 in your PLCs and enter any values in the first 20 bytes.

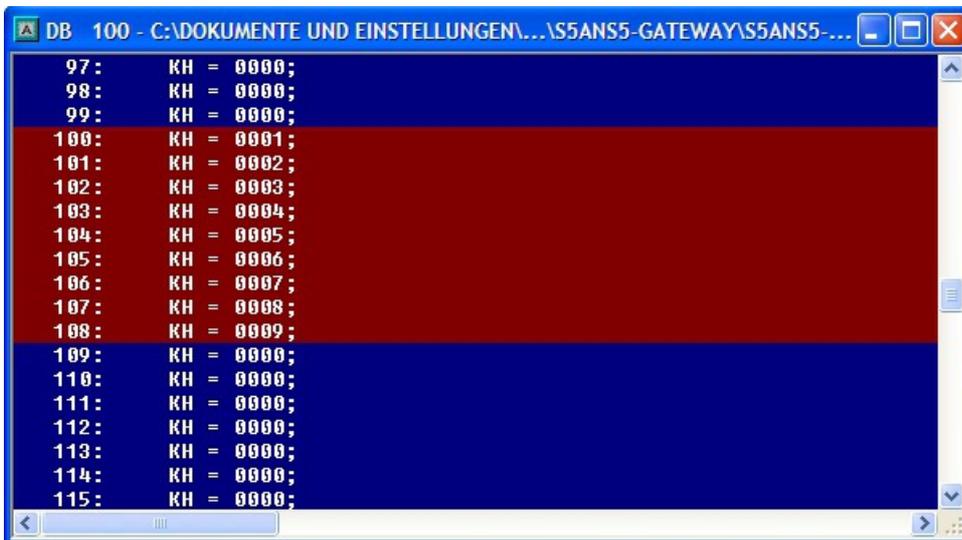
e.g.:(1; 2; 3; 4; 5; 6; 7; 8; 9)



2. Save the blocks and set the inputs E8.0 and E9.0 to "1" in your PLC with the active S5 - Gateway module and restart the cycle.



3. Now open the DB100 and check if the values from the 20 bytes that you have configured in the other PLC in the DB100 matches with those from DW100.



If they match, the communication was successful.

12.1.5 Format of the configuration area

	DL								DR								DW
	7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0	
received	reserved								RTYP ('D', 'X', 'M', 'E', 'A')								0
									RDBN (at 'D' or 'X' block number)								1
									RBEG (at 'D' or 'X' StartDW otherwise StartByte)								2

	RLEN (Size of the receive mailbox in bytes)	3
	reserved	4
send	reserved STYP ('D', 'X', 'M', 'E', 'A')	5
	SDBN (at 'D' or 'X' block number)	6
	SBEG (at 'D' or 'X' StartDW otherwise StartByte)	7
	SLEN (Size of the transmit mailbox in bytes)	8
	reserved	9
transmit	TxLEN (transmit - length in bytes)	10
	TxSTAT (send status)	11
	reserved reserved DO ER AC	12
		NE R T
received	RxLEN (receiving - length in bytes)	13
	RxSTAT (receive state)	14
	reserved reserved ND ER AC	15
		R R T
reserved for extension	reserved	16
	reserved	17
	reserved	18
	reserved	19

The single fields in the detail

		access		
		R = read		
		W = write		
Designation	Meaning	FB - parameter name	S5 - GW	SPS
RTYP	Data type of the receive mailbox: 'D' = DB 'X' = DX 'M' = flag 'E' = input 'A' = output	RTYP	R	W
RDBN	If RTYP DB or DX block number otherwise no use.	RDBN	R	W
RBEG	The beginning of the receive mailbox. If DB and DX is starting - data word, or start - data byte.	RBEG	R	W
RLEN	Length of the receive area in bytes(even if DB).	RLEN	R	W
STYP	Data type of the send mailbox: 'D' = DB 'X' = DX 'M' = flag 'E' = input 'A' = output	STYP	R	W
SDBN	If STYP DB or DX block number otherwise no use.	SDBN	R	W
SBEG	Beginning of the send mailbox. If DB and DX is starting - data word, or start - data byte.	SBEG	R	W

SLEN	Length of the send mailbox in bytes (even if DB).	SLEN	R	W
TxLEN	Number of bytes to be sent.	LEN	R	W
TxSTAT	Send Status evaluate if DONE or ERR is set to 1. If DONE is 1 the contract was executed without error. STAT is 0	STAT	W	R
TxACT	Start a send job in S5 - LAN.	ACT	R/W	R/W
TxERR	Is 1 if an error has occurred. The error can be seen in detail the STAT field.	ERR	W	R/W
TxDONE	Is 1 if the job was executed successfully end.	DONE	W	R/W
RxLEN	Number of bytes that have been received.	LEN	W	R
RxSTAT	Reception status once when DONE or ERR is set to 1. If DONE is 1 the order was executed without error. STAT is 0	STAT	W	R
RxACT	Enables the receive mailbox if 1.	ACT	R/W	R/W
RxERR	Is 1, when an error has occurred. The error can be seen in detail the STAT field.	ERR	W	R/W
NDR	Is 1 if data has been received (data received). RxLEN then evaluate.	NDR	W	R/W

It is provided for an easy communication which the FB55 (S5L_SEND) and FB56 (S5L_RECV). In these modules is set the communication between S5 - Gateway and PLC. The FBs was developed in dependence with the S5 - communication FC's (FC5, FC6, AG - SEND or AG - RECV).

NOTE: These devices use 200 MW and 202 MW as scratchpad flag area.

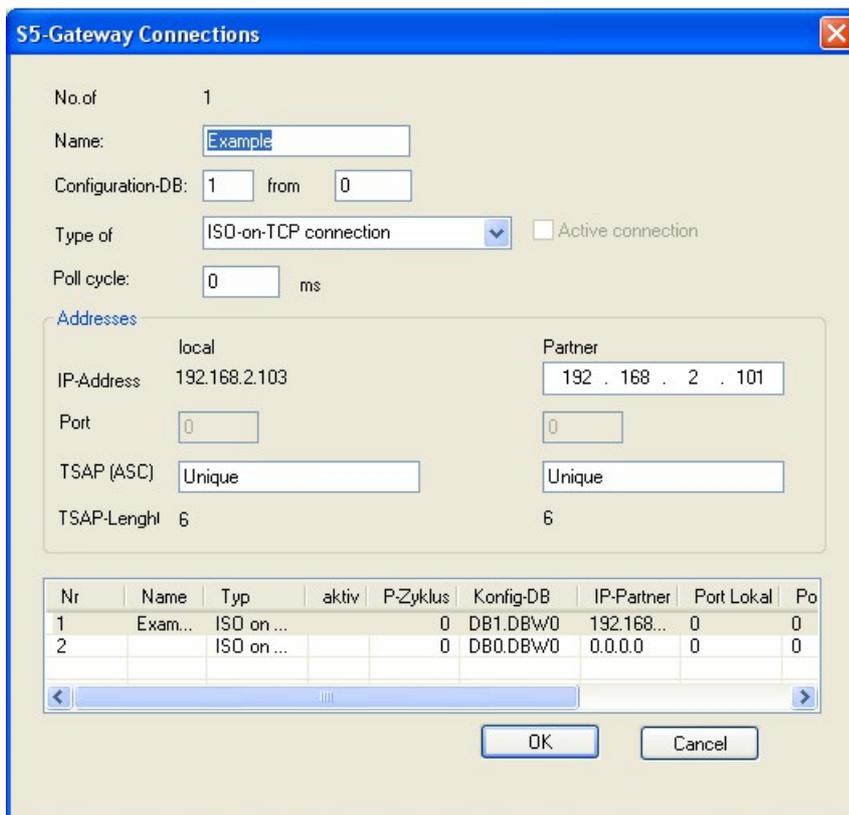
12.2 S5 to S7 – Gateway Communication

12.2.1 S5 – Configuring Gateway

Requirements: S5-LAN Manager

Supported since firmware version 0.44 of the S5 - Gateway.

1. Start the S5-LAN Manager and search for your S5 - Gateway module. As soon as found, select it and click on the button “S5 - Gateway - connection”. It appears a dialog where you can set up the gateway connection.



2. In the lower part of the dialog you will find the connection list where you select the connection you want to edit.

3. At the top of the dialog a edit box called "name:" allows you to give the connection a logical name.

4. Below set up the position of the "configuration data block". Therefore just set the position of the data block (DB) to the left edit box (e.g. "1" for DB1). Then set up the starting point which specifies when the configuration area starts (the edit box is called " from DW").

5. Set the connection type list box (it is called "connection type" in the dialog) to "ISO - on - TCP - connection". This connection type uses the TCP port 102.

6. The polling cycle (ms) specifies the elapsed time until the S5 - Gateway reads the configuration area and checks wether something has to be done. If this box is set to 0, the configuration area will be readed constantly.

7. Only the member of the IP address ("Partner") can be set in the address part ("Adresses"). The IP address of the S5 - Gateway you have to set as known by using the S5-LAN Manager.

8. Configure the TSAP (Transport - Service - Access - Point) to both devices. This one consists of 16 characters and identifiicates the connection. This will be needed to identify a connection to an IP address which has running more than one connections.

9. The communication is compatible to the "ISO - on - TCP - connection" connection of the CP343 - 1. In this case only has to be configured the required connections of the S7 - CP343 - 1. Set the TPDU - size (Transport - Protocol - Data - Unit) to 512. So you have specified that the maximum package size which can be received or transmitted is 512.

Finally the S5 - Gateway communication is set up.

12.2.2 Configure the S7 gateway

Start your Internet Explorer and type in the address bar the IP of the S7-LAN module. This will open the configuration page of the S7 - LAN.

12.2.2.1 With the web browser

Set in the "General" what should be the name for your module.

Among other things, the "TS function" must be turned off and "BUS - configuration use from PC" must be set to "NO". "Boot Settings" and "protocol type" must both be set to "Automatic".

Under "Network" you must set the "DHCP - client" to "OFF", and adjust the IP - address of the module.

Set the baud rate in "MPI / PROFIBUS" on 187K5 and determine the highest station address. Under "Local Station Address" give an number to your S7-LAN. The "profile" must be set to "MPI".

The next step is to configure the gateway. Here you have to set "Connection Type", "DB - Active" (the partner device "passive") and in the "Station Number" you must enter the number of your PLC. Now you should decide which of the configuration data block is in your PLC and from which data word. Type in the IP - address of your S5 - LAN in the field "IP - address partner". In "TSAP" your store the same name as you have assigned in the S5 - LAN Manager to your - S5 LAN.

Verbindungstyp	Stationsnummer	Datenbaustein	Datenwort	IP-Adresse Partner	TSAP	Pollzeit
DB-aktiv	5	10	0	192.168.1.54	1234	500
AUS	255	65535	65535	255.255.255.255		65535
AUS	255	65535	65535	255.255.255.255		65535
AUS	255	65535	65535	255.255.255.255		65535
AUS	255	65535	65535	255.255.255.255		65535
AUS	255	65535	65535	255.255.255.255		65535
AUS	255	65535	65535	255.255.255.255		65535
AUS	255	65535	65535	255.255.255.255		65535

Finally, you still have to enter the number of your CPU that is stored in your PLC about "RFC1006" in "destination - CPU", and the "Bus" should be "Config".



12.2.2.2 With the web browser from V2.10 (S7-LAN) / V2.36 (MPI-LAN)

- Startseite
- Verbindungen
- Display
- Optionen
- Konfiguration
- Passwort
- Neustart

Allgemein	
Name:	<input type="text" value="Test KM"/>
Werkseinstellungen laden:	<input type="button" value="Jetzt laden"/>
Netzwerk	
DHCP aktivieren:	<input type="checkbox"/>
IP-Adresse:	<input type="text" value="192.168.1.151"/>
Subnetzmaske:	<input type="text" value="255.255.255.0"/>
Gateway-Adresse:	<input type="text" value="0.0.0.0"/>
Buseinstellungen	
Bus-Konfig von PC verwenden:	<input type="checkbox"/>
Baudrate:	<input type="text" value="187K5"/>
Höchste Stationsadresse:	<input type="text" value="126"/>
P/G/PC ist einziger Master:	<input type="checkbox"/>
Profil:	<input type="text" value="MPI"/>
Lokale Adresse:	<input type="text" value="0"/>
Booteinstellungen	
Profil:	<input type="text" value="Automatik"/>
Für manuelle Profileinstellung	
Baudrate:	<input type="text" value="Automatik"/>
Datenbit:	<input type="text" value="8"/>
Parität:	<input type="text" value="keine"/>
Stopbit:	<input type="text" value="1"/>
Für RFC1006 Verbindungen	
Ziel CPU:	<input type="text" value="5"/>
S7-Subnetz-ID:	<input type="text" value="0000-0000"/>
Busparameter:	<input type="text" value="Konfig"/>
Sonstiges	
Protokollart:	<input type="text" value="Automatik"/>
TS-Adapterfunktionalität:	<input type="checkbox"/>
Fehlerausgabe auf Display:	<input type="checkbox"/>

Set in the "General" what should be the name for your module.

Under "Network" you must set the "DHCP - client" to "OFF" and adjust the IP - address of the module.

Set the baud rate in "Bus Settings", to 187K5 and determine the highest station address. Under "Local Station Address" you give a number to your S7-LAN. The "profile" must be set to "MPI" and at "BUS - use config from PC" must be set no "tick".

Under "other", the "TS Adapter functionality" must be off. "Boot Settings" and "protocol type" must both be set to "Automatic".

Finally, you still have to enter the number of your CPU that is stored in your PLC about "RFC1006"

in "destination - CPU" and the "Bus" should be "Config".

S7-LAN V2.10 **Test KM** **IP:192.168.1.151**

- Startseite
- Verbindungen
- Display
- Optionen
 - Variablen-Steuern
 - S7-Gateway
 - Watchdog
 - Konfiguration
 - Passwort
 - Neustart

Gateway-Verbindungen

DB-Aktiv	IP-Adresse	TSAP	Pollzeit	CPU	DB	Datenwort
▼ Aus	192.168.1.54	1234	500	5	10	0
▼ Aus	255.255.255.255		65535	255	65535	65535
▼ Aus	255.255.255.255		65535	255	65535	65535
▼ Aus	255.255.255.255		65535	255	65535	65535
▼ Aus	255.255.255.255		65535	255	65535	65535
▼ Aus	255.255.255.255		65535	255	65535	65535
▼ Aus	255.255.255.255		65535	255	65535	65535
▼ Aus	255.255.255.255		65535	255	65535	65535

The final step is to configure the gateway. Here you have to set "Connection Type", "DB - Active" (the partner device "passive") and at "Station Number" you have to enter the number of your PLC. Now you should decide which is the configuration data blocks in your PLC and from which data word. Type in the IP - address of your S5 - LAN in the field "IP - address partner". In "TSAP" your store the same name as you have assigned in the S5 - LAN Manager to your - S5 LAN.

12.2.3 Transfer blocks in PLC

1. Start your programming software and open the S5D - file "S5toS5 - Gateway".
2. Now connect with your S5 - Gateway modules and transfer all the blocks (OB1, FB55 and FB56) in the module belonging to the PLC. The same blocks you now even transfer into the second PLC. The blocks DB20 and DB100 are generated by itself.
3. Now open the S7P - file "S5toS7 - Gateway".
4. Now connect with your S7 - LAN module and transfer the blocks (OB1, FB10, FC15, FC16, DB10 and DB14) into the PLC

12.2.4 Start transmission cycle

S5 controller

In the following example, the DB20 is used as configuration - DB. M10.0 controls the sending and M12.0 controls the receiving. If M10.0 is "1", then 20 bytes of the DB100 are sent from the DW0. M12.0 the receive mailbox DB100 gives free 20 bytes from DW100.

```

      : SPA FB 55
name  : S5L_SEND
JDBN  : KF +00020
JDBW  : KF +00000
STYP  : KC D
SDBN  : KF +00100
SBEG  : KF +00000
SLEN  : KF +00020
ACT   : M 10.0
LEN   : KF +00020

```

```

DONE :      M   11.0
ERR   :      M   11.1
STAT  :      MW  20
      :
      : SPA FB   56
Name  : S5L_RECV
JDBN  :      KF +00020
JDBW  :      KF +00000
RTYP  :      KC   D
RDBN  :      KF +00100
RBEG  :      KF +00100
RLEN  :      KF +00020
ACT   :      M   12.0
LEN   :      MW  24
NDR   :      M   13.0
ERR   :      M   13.1
STAT  :      MW  22

```

Set the inputs E8.0 and E9.0 to "1" for sending and receiving.

S7 controller

In the following example, the DB10 is used as DB configuration. M10.0 controls the sending and M11.0 controls the receiving. If M10.0 is "1", then 20 bytes of the DB14 are sent from DW0. M11.0 the receive mailbox DB14 gives free 20 bytes from DW100.

CALL "S7LAN_SEND"

```

KOMDB   :   =   "S7LAN Kommunikation DB".KOM
SENDTYPE :   =   'D'
SENDDDB :   =   14
SENDADR  :   =   0
SENDLEN  :   =   20
ACT      :   =   M10.0
LEN      :   =   20
DONE     :   =   M10.1
ERROR    :   =   M10.2
STATUS   :   =   MW12

```

CALL "S7LAN_RECV"

```

KOMDB   :   =   "S7LAN Kommunikation DB".KOM
RCVTYPE :   =   'D'
RCVDDB  :   =   14
RCVADR  :   =   100
RCVLEN  :   =   20
ACT     :   =   M11.0

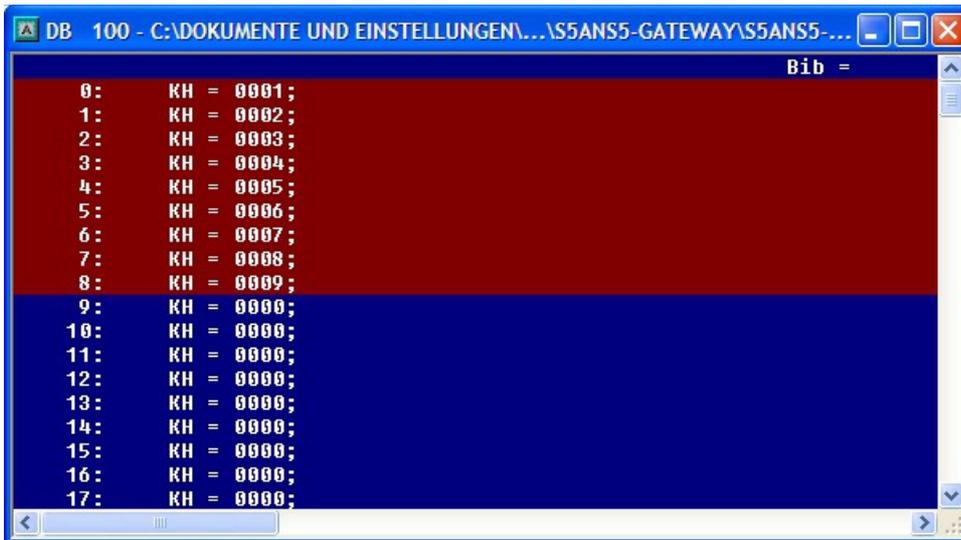
```

NDR : = M11.1
 ERROR : = M11.2
 STATUS : = MW14
 LEN : = MW16

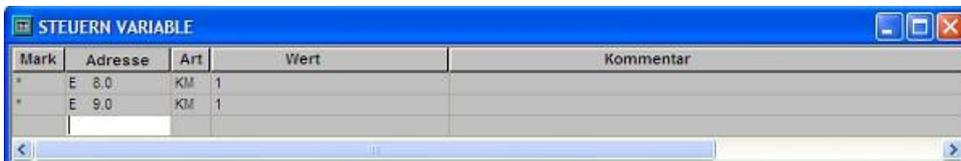
12.2.5 Test of the structure

1. Open the each DB100 in your PLCs and enter any values in the first 20 bytes.

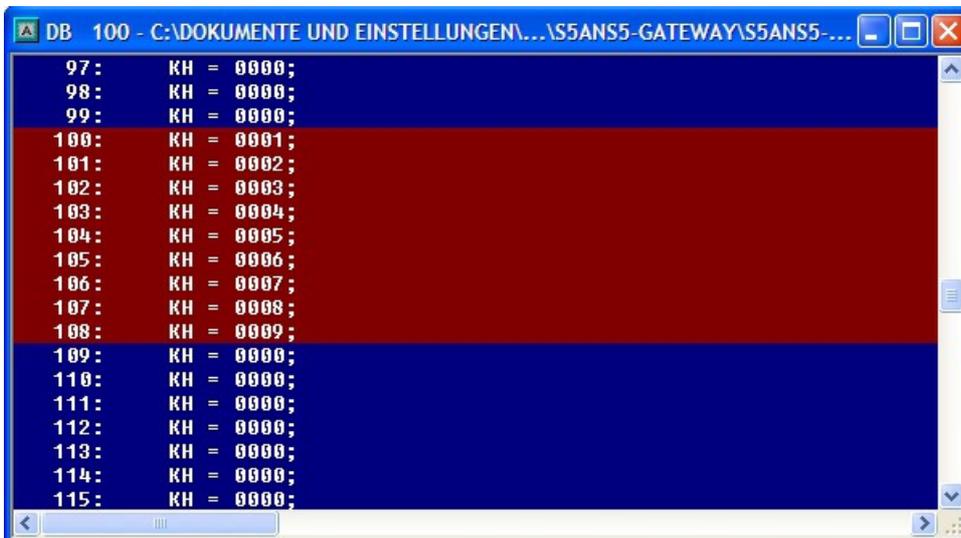
e.g.:(1; 2; 3; 4; 5; 6; 7; 8; 9)



2. Save the blocks and set the inputs E8.0 and E9.0 to "1" in your PLC with the active S5 - Gateway module and restart the cycle.



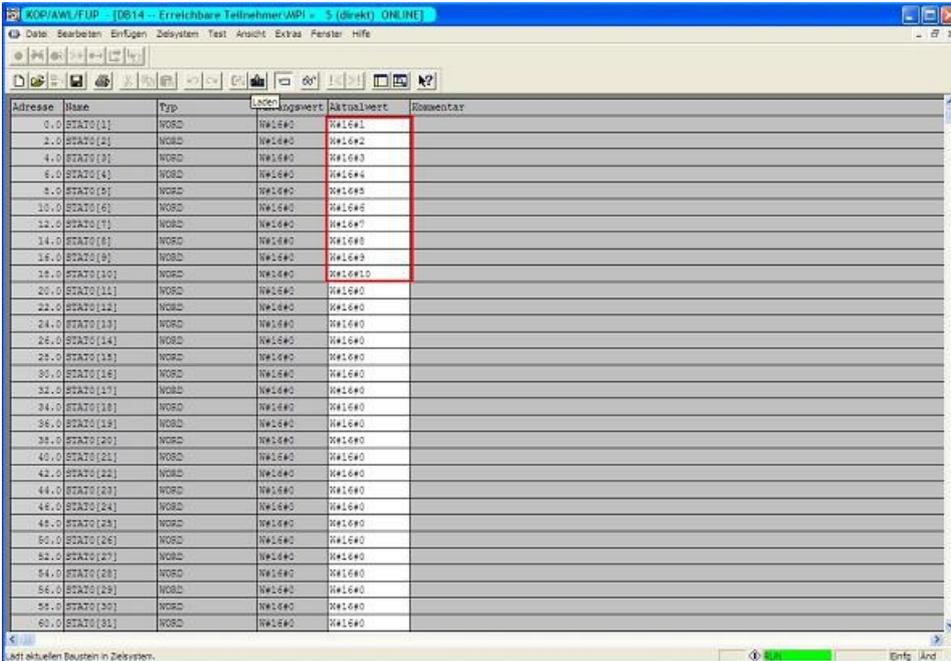
3. Now open the DB100 and check whether the values of the 20 bytes which you have configured in the other PLC in DB100 match with those from DW100.



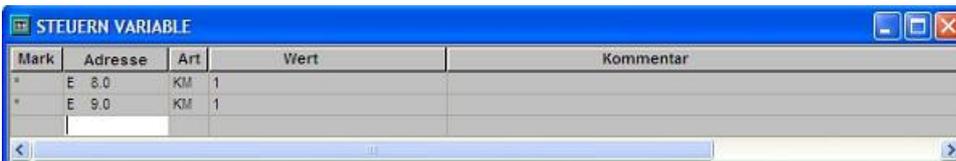
If they match, the communication was successful.

4. Open the DB14 in your S7 - PLC and enter any values in the first 20 bytes.

e.g.: (1; 2; 3; 4; 5; 6; 7; 8; 9; 10)



5. Save the blocks and set the inputs E8.0 and E9.0 to "1" in your S5 - PLC and restart the cycle.



6. Open the DB14 in your S7 - PLC and check if the values of the 20 bytes which you configured in the other PLC in DB100 and DB14 from DW0 match with those from DW100. If that is the case, the communication between S5 and S7 was successfully performed.

Address	Data Type	Source 1	Source 2
84.0	STATO[43]	WORD	W#16#0
86.0	STATO[44]	WORD	W#16#0
88.0	STATO[45]	WORD	W#16#0
90.0	STATO[46]	WORD	W#16#0
92.0	STATO[47]	WORD	W#16#0
94.0	STATO[48]	WORD	W#16#0
96.0	STATO[49]	WORD	W#16#0
98.0	STATO[50]	WORD	W#16#0
100.0	STATO[51]	WORD	W#16#1
102.0	STATO[52]	WORD	W#16#2
104.0	STATO[53]	WORD	W#16#3
106.0	STATO[54]	WORD	W#16#4
108.0	STATO[55]	WORD	W#16#5
110.0	STATO[56]	WORD	W#16#6
112.0	STATO[57]	WORD	W#16#7
114.0	STATO[58]	WORD	W#16#8
116.0	STATO[59]	WORD	W#16#9
118.0	STATO[60]	WORD	W#16#10
120.0	STATO[61]	WORD	W#16#0
122.0	STATO[62]	WORD	W#16#0
124.0	STATO[63]	WORD	W#16#0
126.0	STATO[64]	WORD	W#16#0
128.0	STATO[65]	WORD	W#16#0
130.0	STATO[66]	WORD	W#16#0
132.0	STATO[67]	WORD	W#16#0
134.0	STATO[68]	WORD	W#16#0
136.0	STATO[69]	WORD	W#16#0
138.0	STATO[70]	WORD	W#16#0
140.0	STATO[71]	WORD	W#16#0
142.0	STATO[72]	WORD	W#16#0
144.0	STATO[73]	WORD	W#16#0
146.0	STATO[74]	WORD	W#16#0

The bytes from DW100 should be the same as the ones you have configured in the DB100 S5 - PLC from DW0.

If they match, the communication was successful

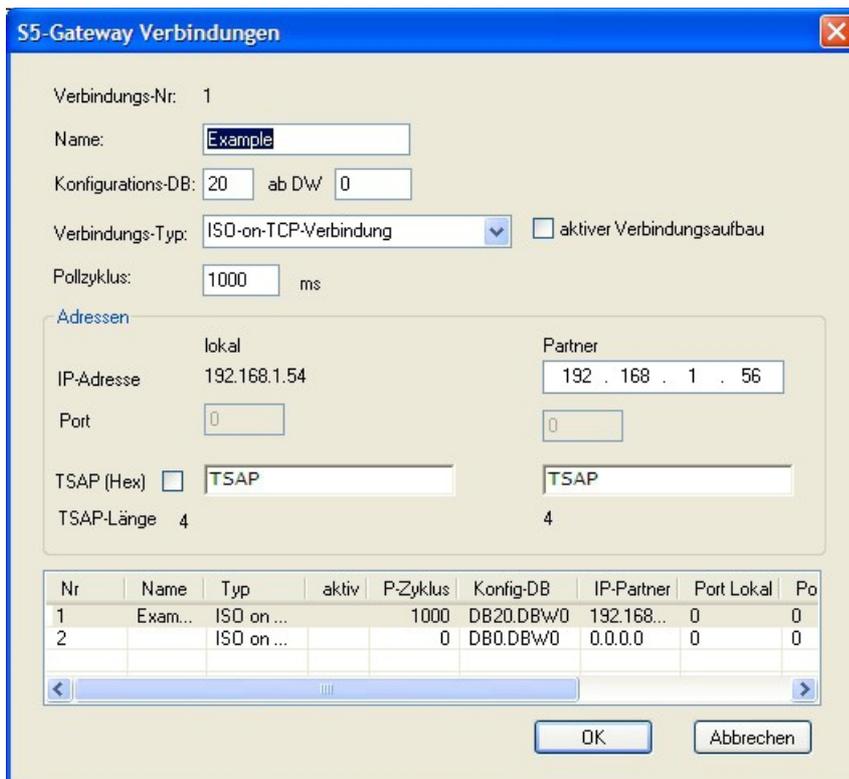
12.3 S7CP to S5 - Gateway communication

12.3.1 S5 – Configure Gateway

Required tools: S5-LAN Manager

Supported from firmware - version 0.44 of the S5 - Gateway

1. Start the S5-LAN Manager and search for your module. Mark this, and click with the mouse on the button "S5 - Gateway - Connection". It opens a dialog for setting the connection.



2. In the bottom of the dialog you find the link list, in which you can select the connection which you want to configure.

3. At "Name" you can now give the connection a logical name.

4. Under "Configuration - DB", enter the position of the data block in the left entry field, (eg "1" for DB1) and in the right field from which data word (eg "1" for DW1) the configuration area is located.

5. As "connection - type" you adjust "ISO - on - TCP - Connection". In this setting is used the TCP - port 102.

6. The polling cycle (ms) specifies how much time elapses until the S5 - Gateway cyclically reads out the configuration area and checks if something needs to be done. If 0 is specified here is readed constantly from the PLC.

7. In the area "Addresses" you can only specify the IP - address of the partner. The IP - address of the S5 - Gateway module you further configured via the S5 - LAN Manager.

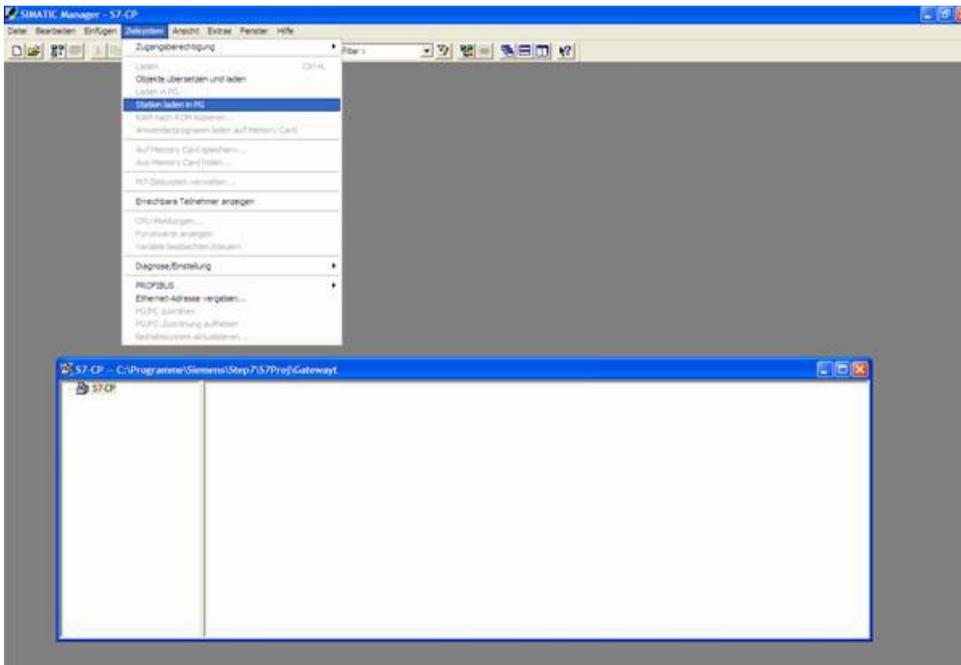
8. With both devices you can adjust the "TSAP" (Transportation - Service - Access - Point). This consists of 16 characters and represents the identification of the connection. This is needed when several compounds with a IP - address exists. (From firmware version 0.45 in the S5 - Gateway can be built a connection with any TSAP)

9. In the second module must be described here in addition to the steps and the "tick" must be set on "Active connection establishment" in "Connection - Type".

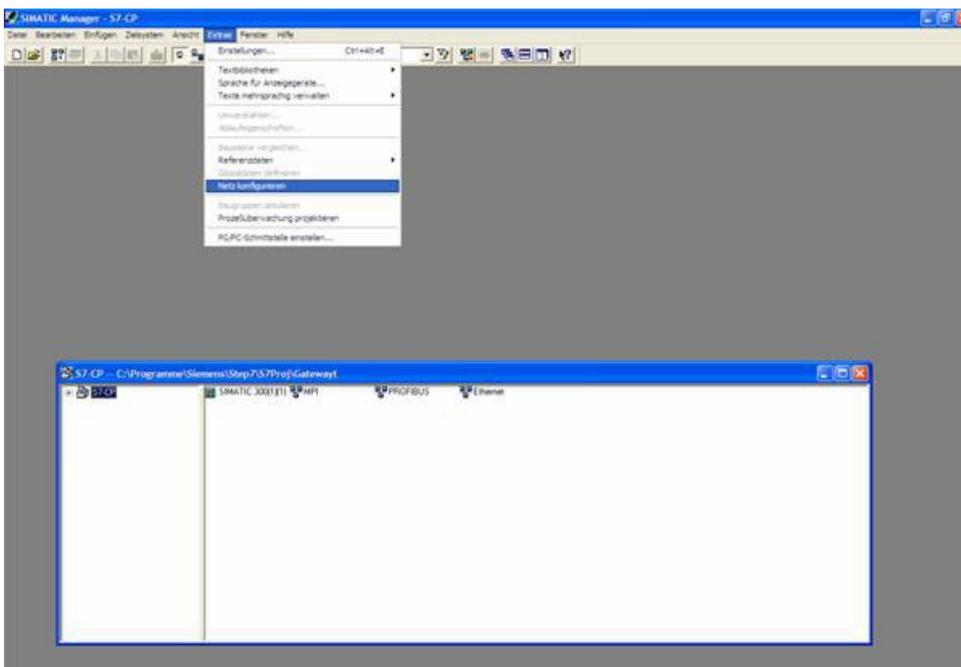
Communication via S5 - Gateway is now configured.

12.3.2 Configure S7-CP

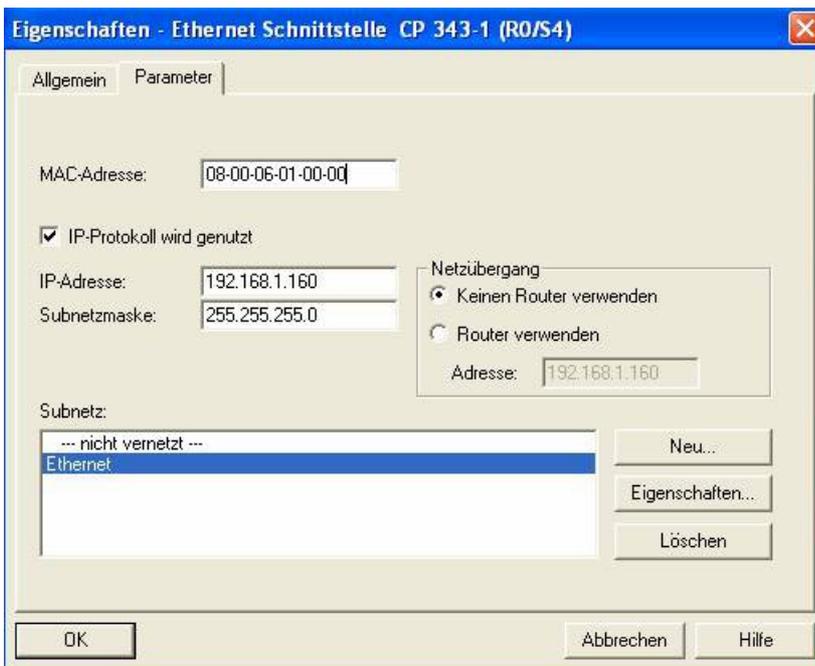
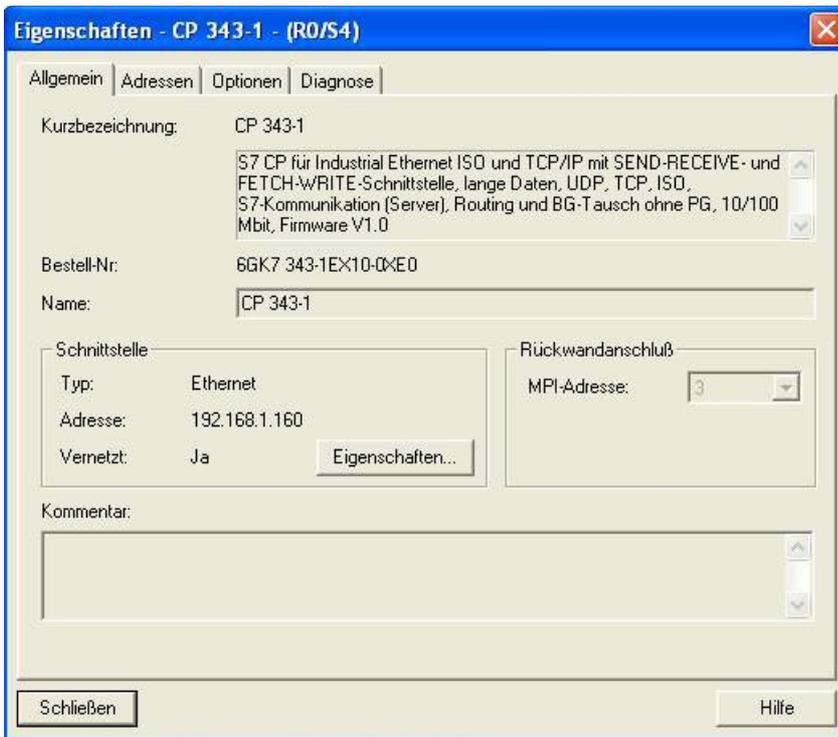
1. Start your programming software and load your station in the software.



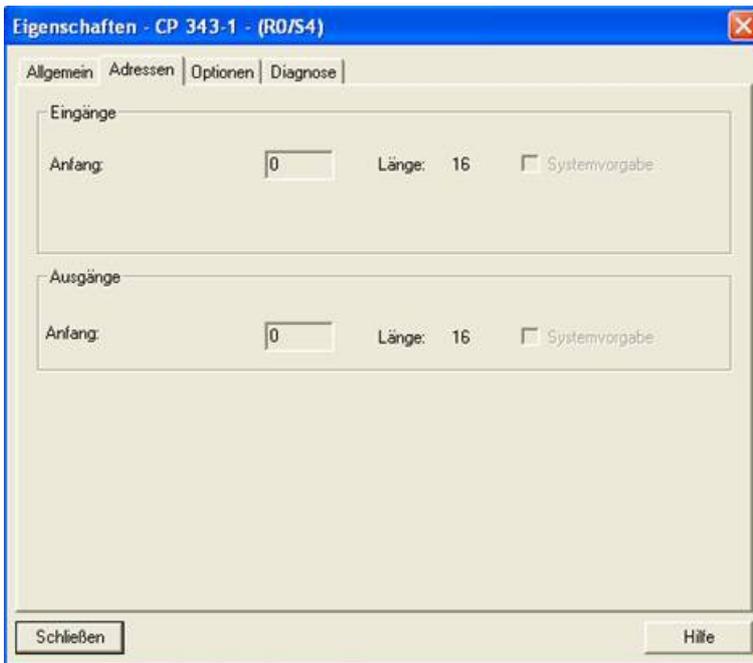
2. Now open the "NetPro" window over the "Tools" and "Configure Network", in which you can set up your stations and subnets.



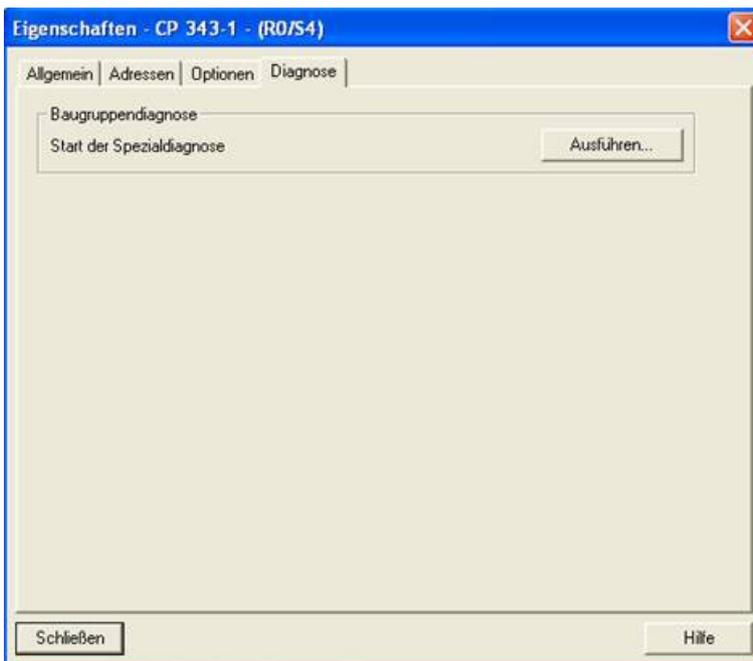
3. If you now execute a double click on your projected S7 opens the "Configure Hardware".



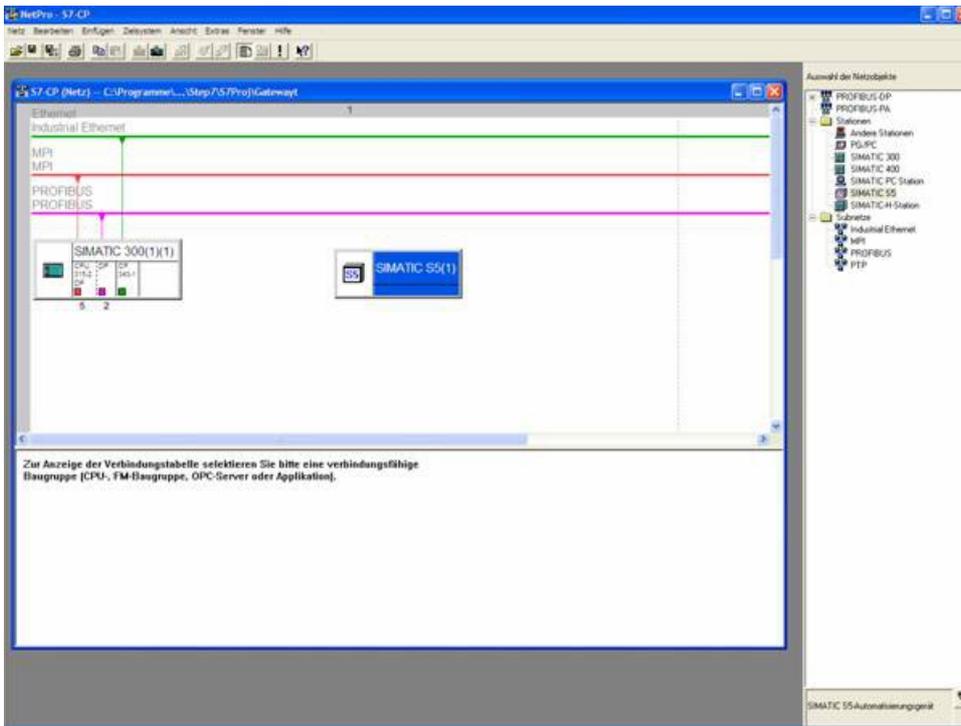
6. At the "Address" you can now determine the "beginning" and the "length" of the inputs and outputs.



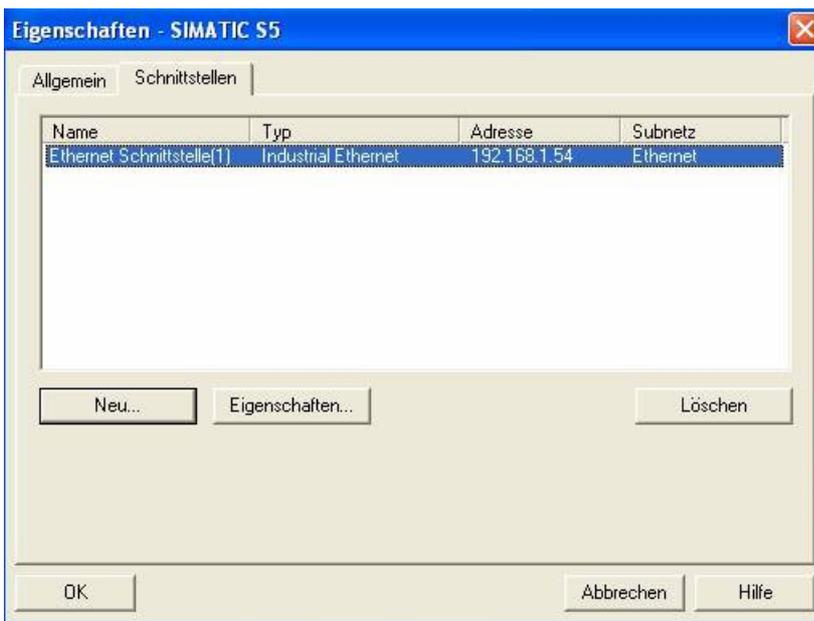
7. In the diagnosis part, you can open a diagnostic window that we need later to check our structure. So for the moment, you can close the object properties.

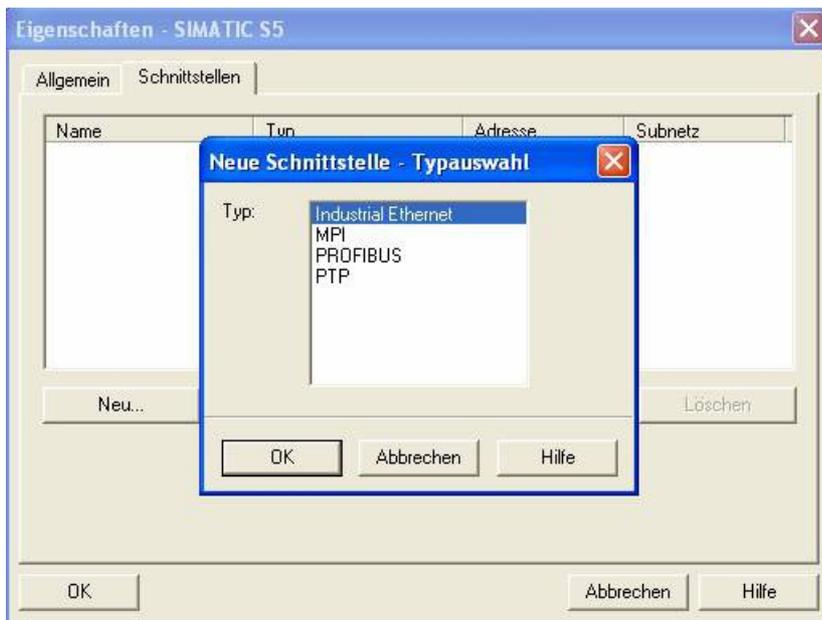


8. Now it is time to project your S5 - PLC in said you select from the right library and create by a double click.

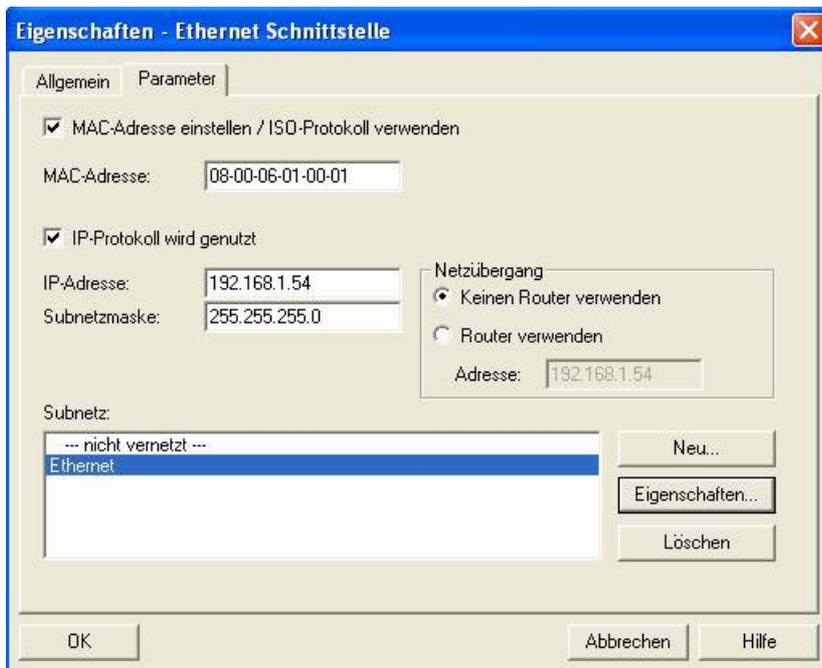


9. By right-clicking on your S5 you must now open the object properties in which you project a "Ethernet Interface" under interfaces as follows.

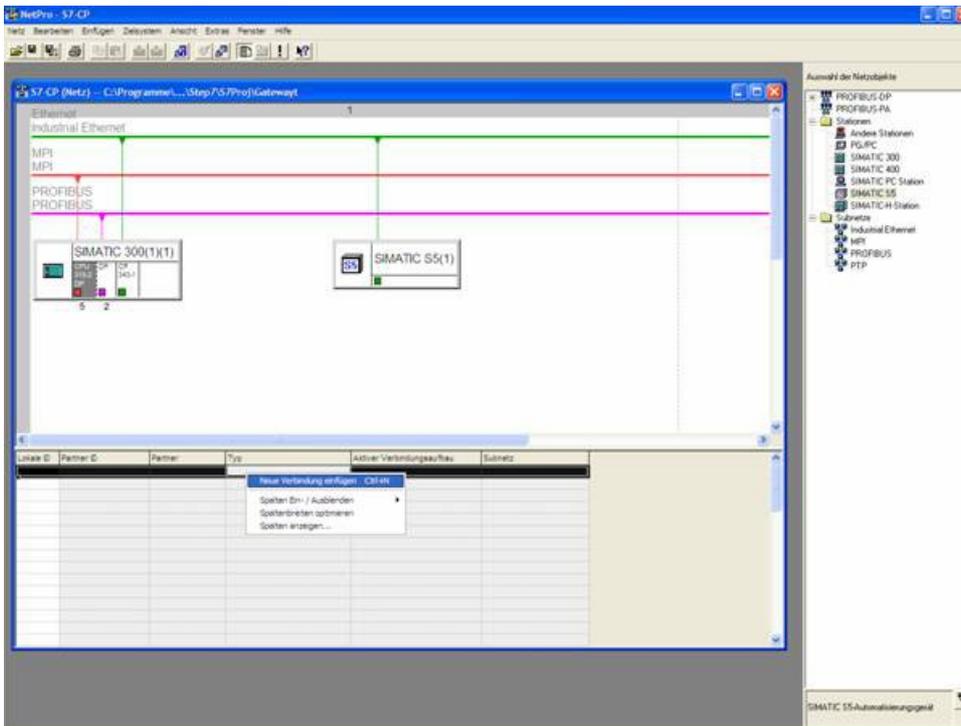




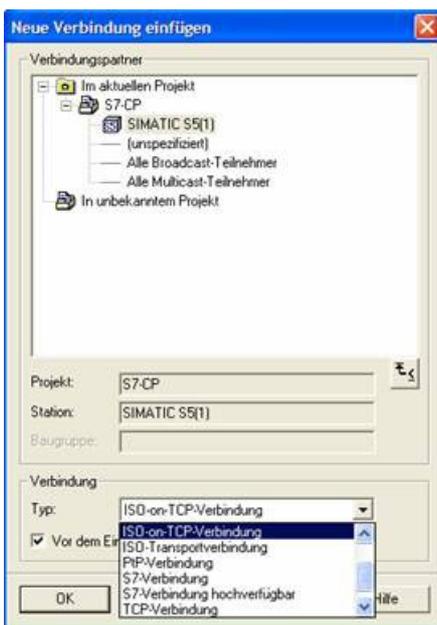
10. Type in "Parameters" then the IP of your S5 - LAN gateways, and confirm by clicking OK so that the object properties are now closed again.



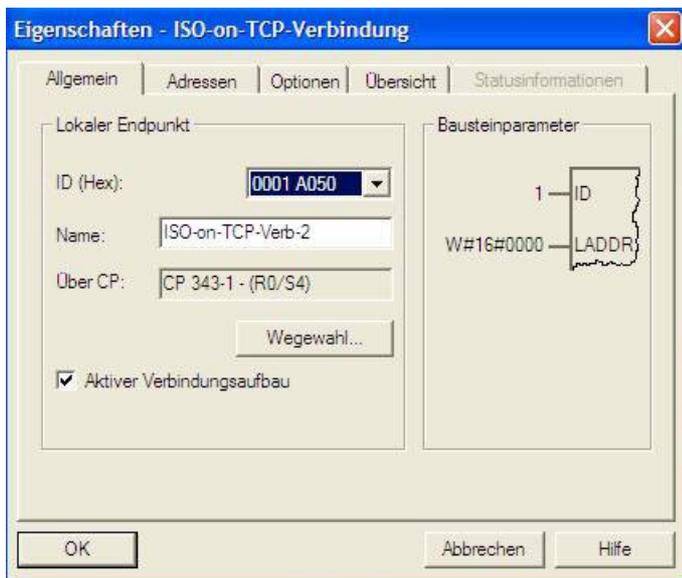
11. Now mark your CPU that is projected in your S7 by clicking. Now you can generate a new connection below in the connection table and indeed with a right click.



12. Now select here as the connection type the previously configured S5 - PLC and the "ISO-on-TCP connection".



13. Now open the properties of the connection with "OK", where you must now put a "tick" under the "General" in "active connection".



14. Under "Addresses" you just must now adjust the same "TSAP" like the one you have have given in S5 - LAN Manager to your S5 - LAN gateway.



12.3.3 Overwrite blocks in PLC

1. Start your programming software and open the S5D - file "S7 CPtoS5 - Gateway"
2. Now connect with your S5 - Gateway module and overwrite all blocks (OB1 FB55 and FB56) in the PLC. The blocks DB20 and DB100 are generated by itself.
3. Now open the S7P - file "S7 CPtoS5 - Gateway".
4. Now connect with your S7 - PLC and overwrite the blocks (OB1 FB1 FC5, FC6, and DB10) in the PLC

12.3.4 Start transmission cycle

S7 - Control:

The following example DB10 is used as the configuration - DB. M0.0 controls the sending and

receiving. When M0.0 is "1", then 20 bytes of DB10 sent from DW0 and gives free the receive shelf DB10 from DW100 20 bytes.

CALL "AG_SEND"

ACT : = M0.0
ID : = 1
LADDR : = W#16#0
SEND : = P#DB10.DBX0.0 BYTE 20
LEN : = 20
DONE : = M15.0
ERROR : = M15.1
STATUS : = MW11

O M 15.0
O M 15.1
R M 0.0
SPB noER
L MW 11
noER : SET

CALL "AG_RECV"

ID : = 1
LADDR : = W#16#0
RECV : = P#DB10.DBX100.0 BYTE 20
NDR : = M20.0
ERROR : = M20.1
STATUS : = MW21
LEN : = MW23

O M 20.0
O M 20.1
S M 0.0

S5 - Control:

The following example DB20 is used as the configuration - DB. M10.0 controls the sending and M12.0 the receiving. When M10.0 is "1", then 20 bytes of DB100 sent from DW0. M12.0 gives free the receive shelf DB100 from DW100 20 bytes.

: SPA FB 55
Name : S5L_SEND
JDBN : KF +00020
JDBW : KF +00000
STYP : KC D
SDBN : KF +00100
SBEG : KF +00000

```

SLEN : KF +00020
ACT : M 10.0
LEN : KF +00020
DONE : M 11.0
ERR : M 11.1
STAT : MW 20
:
: SPA FB 56
Name : S5L_RECV
JDBN : KF +00020
JDBW : KF +00000
RTYP : KC D
RDBN : KF +00100
RBEG : KF +00100
RLEN : KF +00020
ACT : M 12.0
LEN : MW 24
NDR : M 13.0
ERR : M 13.1
STAT : MW 22

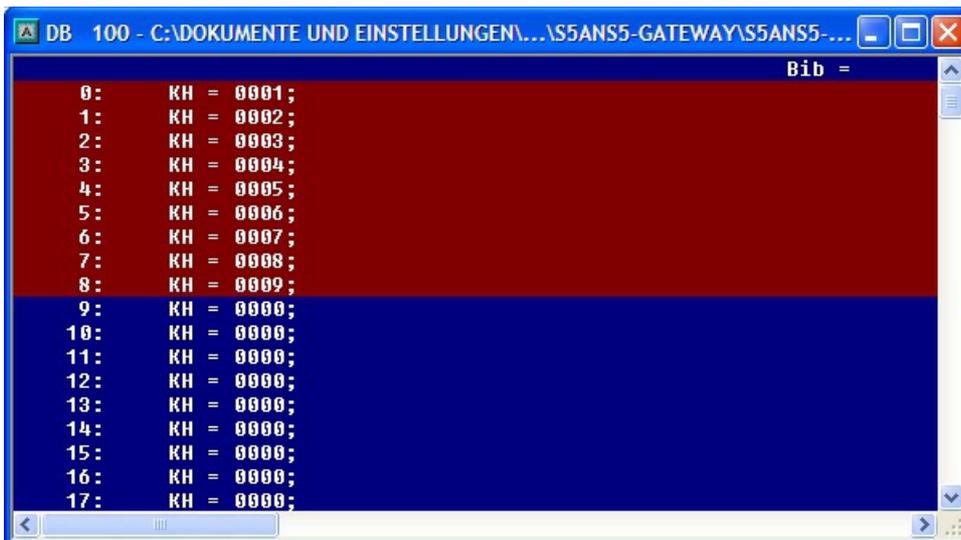
```

Then set the inputs E8.0 and E9.0 to "1" to start the cycle.

12.3.5 Test of the structure

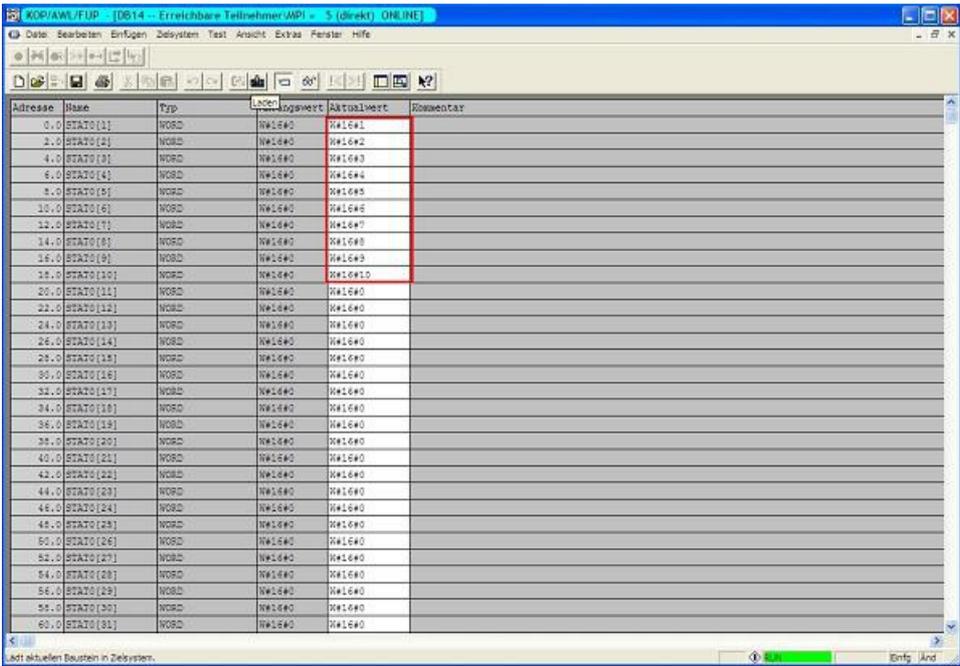
1. Open the DB100 in your S5 PLCs and enter any desired values in the first 20 bytes.

e.g.:(1; 2; 3; 4; 5; 6; 7; 8; 9)

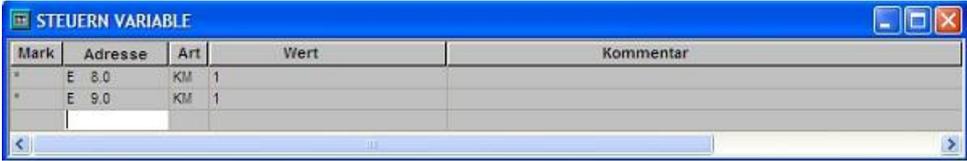


2. Open the DB14 in your S7 - PLC and enter any desired values in the first 20 bytes.

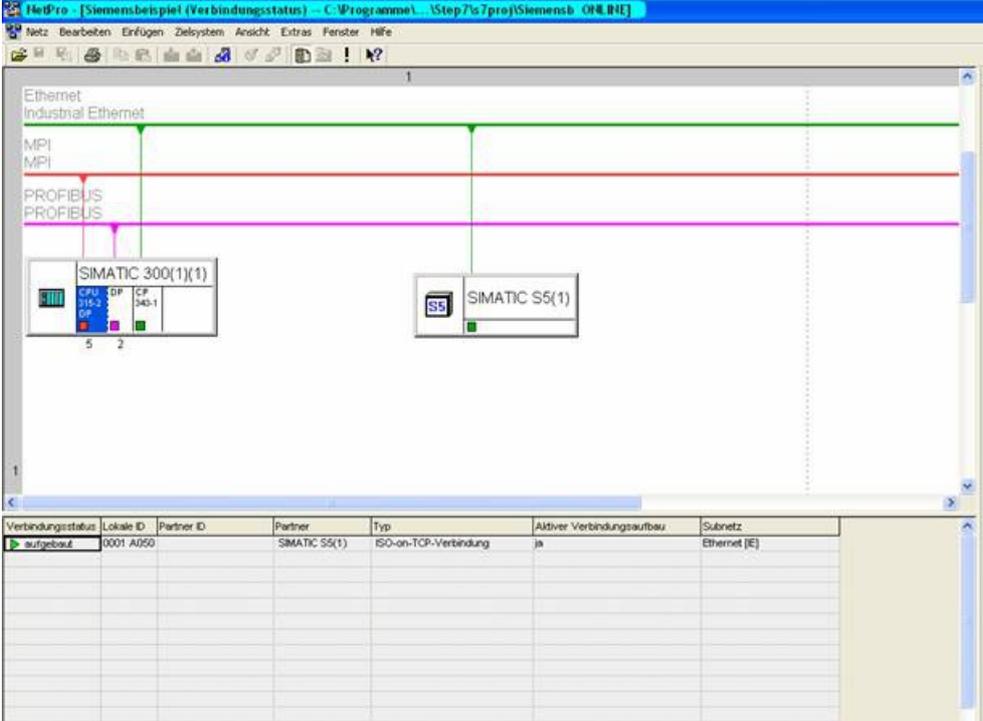
e.g.: (1; 2; 3; 4; 5; 6; 7; 8; 9; 10)



3. Save the blocks and set the inputs E8.0 and E9.0 in your PLC with the active S5 - Gateway module to "1" and start the cycle.

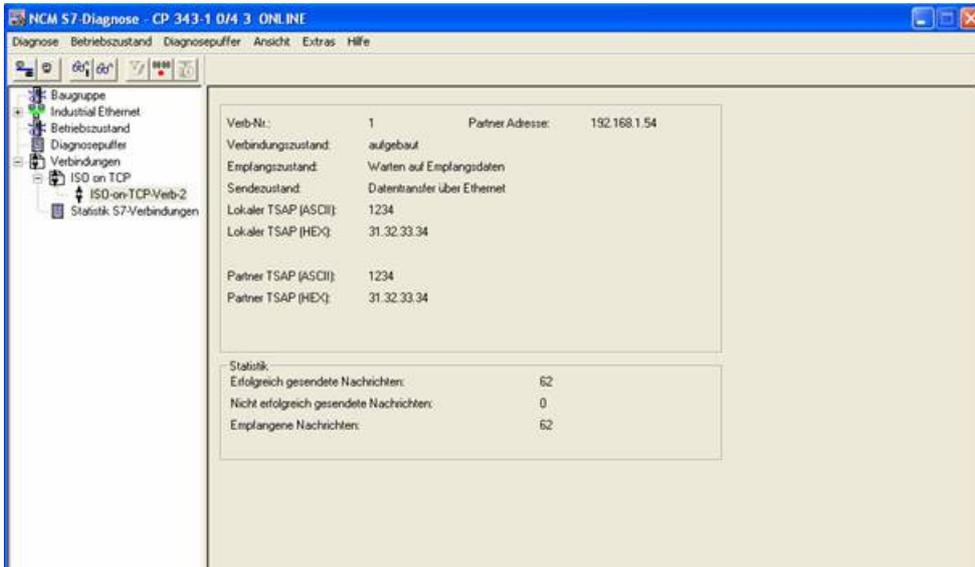


4. Now open the "NetPro" window again and mark your CPU. Now activate the "Connection Status". Now should be established the connection status below in your connection.

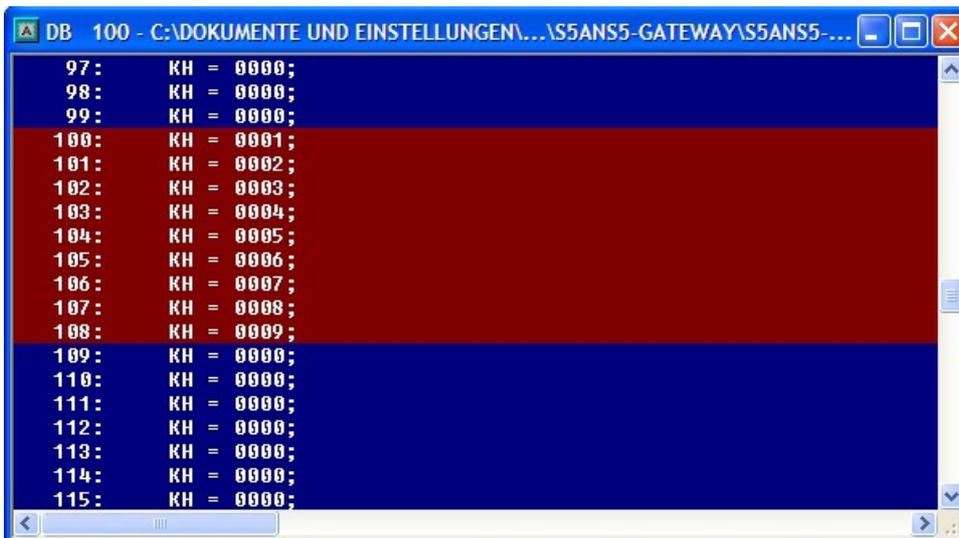


5. Now open the "diagnostic window" in the object properties of the "CP", as previously mentioned

before. Then start the "Cyclic Refresh" and observe under your "ISO-on-TCP connection" the statistics, where the sent and received messages are counted. So you can check if your connection is available and also runs.



6. Now open the DB100 in your S5 - PLC and the DB10 in your S7 - PLC and check if the values are consistent with those from DW100 of the 20 bytes that you configured in the other PLC in DB100 and DB10 from DW0. If that is the case, the communication between S5 and S7 was successfully completed.



The marked bytes should be the same as the ones you have configured in DB10 of the S7 - PLC from DW0.

Address	Data Type	Value 1	Value 2
94.0	STATO[43]	WORD	W#16#0
96.0	STATO[44]	WORD	W#16#0
98.0	STATO[45]	WORD	W#16#0
90.0	STATO[46]	WORD	W#16#0
92.0	STATO[47]	WORD	W#16#0
94.0	STATO[48]	WORD	W#16#0
96.0	STATO[49]	WORD	W#16#0
98.0	STATO[50]	WORD	W#16#0
100.0	STATO[51]	WORD	W#16#1
102.0	STATO[52]	WORD	W#16#2
104.0	STATO[53]	WORD	W#16#3
106.0	STATO[54]	WORD	W#16#4
108.0	STATO[55]	WORD	W#16#5
110.0	STATO[56]	WORD	W#16#6
112.0	STATO[57]	WORD	W#16#7
114.0	STATO[58]	WORD	W#16#8
116.0	STATO[59]	WORD	W#16#9
118.0	STATO[60]	WORD	W#16#10
120.0	STATO[61]	WORD	W#16#0
122.0	STATO[62]	WORD	W#16#0
124.0	STATO[63]	WORD	W#16#0
126.0	STATO[64]	WORD	W#16#0
128.0	STATO[65]	WORD	W#16#0
130.0	STATO[66]	WORD	W#16#0
132.0	STATO[67]	WORD	W#16#0
134.0	STATO[68]	WORD	W#16#0
136.0	STATO[69]	WORD	W#16#0
138.0	STATO[70]	WORD	W#16#0
140.0	STATO[71]	WORD	W#16#0
142.0	STATO[72]	WORD	W#16#0
144.0	STATO[73]	WORD	W#16#0
146.0	STATO[74]	WORD	W#16#0

The marked bytes from DW100 should be the same as the ones you have configured in DB100 of the S5 - PLC from DW0.

13 Application-examples

13.1 Panel-connection to S5/S7-PLC

Prepare controller

If you want to access a S7-200 via PPI or S7-300/400 via MPI/DP from your panel you will first have to connect the S7-LAN to the PPI/MPI/DP interface of your controller. The module normally will get the power supply directly from the controller and detects the bus parameters completely automatically. This means no manual configuration within the module is necessary. By default the S7-LAN has the IP address 192.168.1.56. This IP and further settings can be changed via the TIC or the web interface of the module if desired. For further information please read the short instructions and the manual from the S7-LAN module.

For the access to a S7-1200/1500 or LOGO! no S7-LAN is needed, because the panel can be directly connected through a Ethernet cable or via WiFi with two ALF-UA devices.

If you instead want to access a S5 controller from your panel you will first have to connect the S5-LAN++ to the PG interface of your controller. The module normally will get the power supply directly from the controller. For controllers (e. g. AG90/95/100U) which do not offer a power supply on the PG interface the module have to be powered externally via 24V DC. By default the S5-LAN++ does not have a IP address. To change this you will need to connect the S5-LAN++ to your PC and assign an address to the module (e. g. 192.168.1.56) with the help of the tool S5-LAN-Manager. For further information please read the short instructions and the manual from the S5-LAN++ module.

Important: Your controller with Ethernet interface or S5-LAN++ or S7-LAN as well as the panel and if applicable the two ALF-UA devices have to be all in the same subnet. In this instructions the

subnet 192.168.1.xxx is used, but you choose another subnet if you want.

Configure connection via WiFi

If you want to connect your controller and panel wireless via WiFi you will now have to configure the both ALF-UA devices.

First you should only connect the first device, which you later want to connect with the controller, and establish a connection to the WiFi network with the SSID “ALF-UA”. Your PC will automatically gets a IP address from the device. Now open the web interface of the device via the IP address 192.168.2.1 and log in with the user name “admin” and password “admin”.

Next change the operation mode of this device to “AP Bridge” and give the device a unique IP address from your subnet (e. g. 192.168.1.1) and enter a SSID (name of the network). For safety reasons you should choose “WPA2 PSK” as encryption and protect the network with a password.

In the next step you will have to connect to the second device, which you later want to connect with the panel. The first steps are the same as for the first device. For the operation mode you now select “Client Bridge” and give the device another IP address from the subnet (e. g. 192.168.1.2). For the WLAN parameters (SSID, encryption and password) you will have to enter the same values as for the first device.

>> Further information about the commissioning and the further configuration parameters can be found in the short instructions and the manual of the ALF-UA.

Configure connection in WinCC

In the last step you will have configure the connection to your controller within your panel. Therefore you have to open your WinCC or TIA project and navigate to the connections of the panel. Here you will need to add a new entry. For the interface of the control panel you will have to select “ETHERNET”. The remaining parameters can be taken from the following table.

controller type and access type	Communication driver	IP address	Rack	Expansion slot
S7-200 via PPI	SIMATIC S7 300/400	IP from S7-LAN	0	2
S7-300/400 via MPI/DP	SIMATIC S7 300/400	IP from S7-LAN	0	2
S7-300/400 via Ethernet-CP	SIMATIC S7 300/400	IP from PLC	0	2
S7-1200/1500 via Ethernet	SIMATIC S7 1200/1500	IP from PLC	0	1
LOGO! via Ethernet	SIMATIC S7 300/400	IP from PLC	0	1
S5 via PG port	SIMATIC S7 300/400	IP from S5-LAN+ +	0	2

As soon as you have configured your connection you will also can create variables within your panel project to read and write data from / to your controller.

13.2 S5/S7-PLC-coupling

Commissioning of S5-LAN++ and S7-LAN

Before you can start with the configuration of the coupling you should first set up your S5-LAN++

(to access your S5 controller via the PG interface) and / or S7-LAN (to access your S7 controller via PPI/MPI/Profibus) modules. For this please read the short instructions for the S5-LAN++ or S7-LAN.

Configure coupling

The S5-LAN++ and S7-LAN are supporting multiple couplings. In general a distinction is made between a active controller, which establishes and manages the connection, and a passive controller, which waits for the connection and queries.

For the coupling type “PUT/GET” a change is only needed on the active controller, because here flags and data blocks from the passive controller are directly accessed by the active controller.

For the coupling type “SEND/RECV” a change on both controllers is needed.

The following table shows a overview about possible couplings between controllers and shows up, where you can find more information about the configuration of the coupling. All descriptions and example applications can be downloaded on the product page of the S5-LAN++ and S7-LAN.

controller 1 (active)	controller 2 (passive)	coupling type	description / example
S7-200 via PPI	any	PUT/GET	project „S7-LAN_PUT-GET“
	S7-200 via PPI	SEND/RECV	project „S7-LAN_SEND-RECV“
S7-300/400 via MPI/DP	any	PUT/GET	project „S7-LAN Aktives PUT-GET“
	S7-300/400 via MPI/DP	SEND/RECV	project „S7-LAN an S7-LAN“
	S5 via PG port	SEND/RECV	project „S5-LAN++ an S7-LAN“
S7-300/400 via Ethernet-CP	S7-200/300/400 via PPI/MPI/DP	PUT/GET	S7-LAN manual section „Access via PUT/GET“
	S7-300/400 via MPI/DP	SEND/RECV	project „S7-LAN an S7-CP“
	S5 via PG port	PUT/GET	S5-LAN short instruction „S5-S7-coupling“
	S5 via PG port	SEND/RECV	Project „S5-LAN++ an S7-CP“
S7-1200/1500 via Ethernet	S7-200/300/400 via PPI/MPI/DP	PUT/GET	S7-LAN manual section „Access via PUT/GET“
	S5 via PG port	PUT/GET	S5-LAN short instruction „S5-S7-coupling“
S5 via PG port	S5 via PG port	SEND/RECV	project „S5-LAN++ an S5-LAN++“

For every example project shown in the table above there is also a description of the project. For S5 couplings this can be found within the ZIP archive with the example projects and for S7 couplings within the manual of the S7-LAN module.

13.3 Wireless round the S5/S7

Commissioning of ALF-UA

ALF-UA creates a WIFI network with the SSID "ALF-UA" and automatically assigns an IP-address via DHCP for the WIFI-participants who connect to the device.

Connect laptop/notebook to this WIFI-network, the respective PC is assigned an IP-address from the subnet 192.168.2.xxx.

If you need a different subnet for the connected controller, you can change the subnet after connecting the PC and ALF-UA:

- Connect PC to ALF-UA via WIFI
- Open the ALF-UA-website with a browser and IP address 192.168.2.1
- User name: admin
Password: admin
- Menu „network“ => „AP router“ => „LAN“ => „router IP“ enter the desired subnet
The changes are accepted by clicking on the diskette symbol
- After a restart, the device is available with the new parameters
- Rebuild the WIFI-connection of PC and ALF-UA

Connect the respective control/machine or S5-LAN++/S7-LAN-module to the LAN port of the ALF-UA with a patch cable. Now that the PC and ALF-UA have been connected, the machine can be reached "wirelessly" and you can communicate.