



Handbücher/Manuals



VIPA
Gesellschaft für Visualisierung
und Prozessautomatisierung mbH

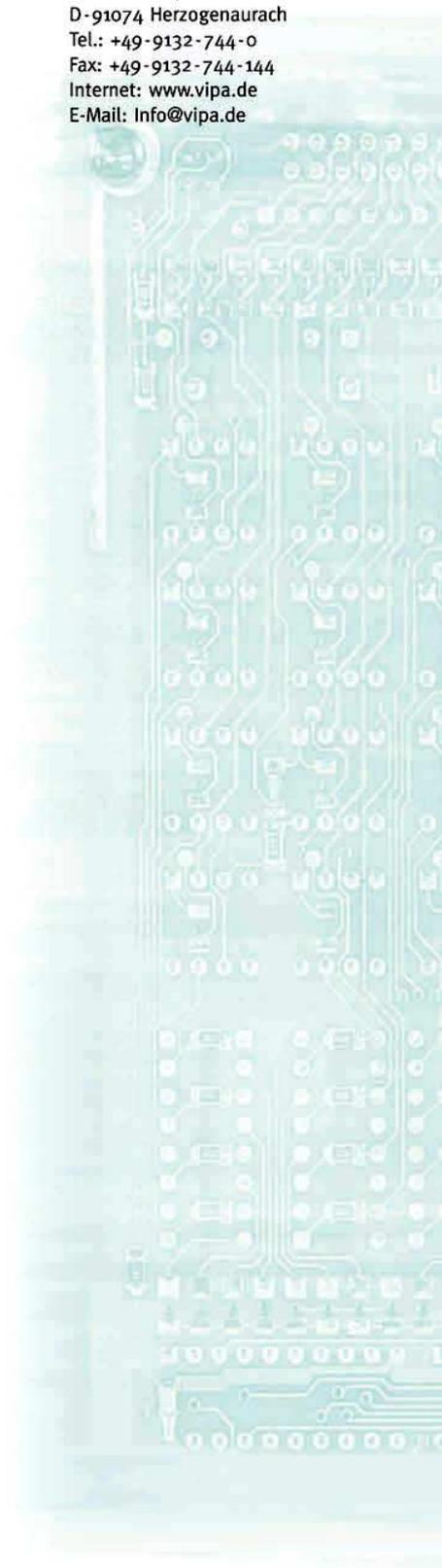
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Manual

VIPA WinNCS

Order no.: VIPA HB91E

Rev. 04/03



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Content

Introduction	1
Welcome.....	1
Changes to former versions	1
Getting started	2
Scope of delivery	2
System requirements	2
WinNCS installation.....	3
Directory structure of WinNCS	3
Starting the program.....	4
Closing the program	4
Program registration.....	5
WinNCS environment	7
Overview.....	7
Main window.....	8
Menu items.....	9
Saving a project.....	11
Printer output.....	11
Page view	13
Include programs.....	14
Online functions.....	16
"Network" window.....	19
Symbol bar of the "Network" window	20
Import / Export	22
"Parameter" window	23
I/O Map - Overview address area	24
Symbol manager	25
Help system.....	26
Context menu	27
WinNCS for CPs	28
Outline	28
Building up the network.....	29
Fast introduction of WinNCS with CP	33
Create new res. import a CP project	36
Alter an CP project	38
Parameterization of a CP	39
Parameter Ethernet	39
Parameter CP.....	42
Engineer CP connections for TCP/IP	60
Overview.....	60
TCP connection	61
TCP Multi connection	67
TCP system parameter	69
UDP connection	72
UDP multi connection.....	76
Engineer CP connections for H1	78
Overview.....	78
H1 transport connection	79
H1 transport multi connection.....	83
H1 system parameters	85
H1 datagramm connection	88

CP online functions	92
Overview	92
Online functions	93
Initialize protocol/address	95
Deployment of the symbol manager	96
Establish an online connection	99
Transfer and delete a project engineering	100
CP diagnosis	101
Trace status	110
WinNCS for Ethernet coupler	113
Outline	113
Fast introduction WinNCS for Ethernet coupler	114
Create res. import an Ethernet project	116
Alter an Ethernet project	119
Parameterize Ethernet coupler	121
Parameter for Ethernet	121
Parameter for Ethernet coupler	122
Project engineering of modules	132
Parameterize modules	133
Register Module configuration	133
Register Module parameter	135
Register Label	135
Print label	135
Profibus functionality	136
Overview	136
Fast introduction Profibus functionality	137
Create new res. import a Profibus project	139
Alter Profibus project and engineer DP master	141
Parameterize Profibus system	142
Parameter Profibus network	142
Parameter DP master	146
Project engineering DP slave	149
Parameter DP slave	150
Project engineering modules	153
Parameterize modules	154
Register Module configuration	154
Register Module parameter	156
Register Label	156
Print label	156
Data transfer between WinNCS and DP master	157
Transfer serial via online functions	158
Transfer via MMC reading device	159
Transfer via DP master PC card	160
System 200V functionality	161
Overview	161
Fast introduction System 200V functionality	162
Create new System 200V project	163
Alter System 200V project and engineer CPU	164
Parameterization of the System 200V	165
Parameter System 200V network	165
Parameter CPU	166
Engineer modules	170
Parameterize modules	171
Register Module configuration	171
Register Module parameter	174
Register Label	174

Print label.....	174
Data transfer.....	175
Import/Export.....	175
Glossar	177
Index	179

Introduction

Welcome

WinNCS is the new configuration and diagnostic system for system components. At present the following systems may be configured by means of WinNCS:

H1 / TCP/IP (Ethernet-CP, Ethernet coupler)
Profibus-DP (creates 2bf file)
CPUs for STEP 5 from Siemens (creates DB1)

WinNCS is the acronym for **Windows Network Communication System**. This program is the successor to NCS for MS-DOS.

The parameterization software runs under Windows 9x/2000/NT4. Configuration parameters that were created for H1 or for TCP/IP by means of NCS for MS-DOS can be imported into WinNCS.

We hope you will enjoy working with WinNCS!

Changes to former versions

The recent documentation describes the projecting software WinNCS starting with version 3.12.

Versions 3.12. and higher contain the following improvements:

- The context menu changes depending on the mouse position.
- Transfer functions are now online functions.
- Status/SteuernVar has been adapted from WinBB.
- Now, only one VPR-file is created that is extracted at WinNCS start and zipped again at closing.
- The GSD-file now supports the "special identifier format" for Profibus.
- Access to Ethernet coupler (search function with automatic setup, online engineering, firmware update)
- The online access to the Ethernet-CP has been extended by search functions with automatic setup and firmware update.
- Access control for TCP/IP-CPs happens via IP lists.
- The demo version of WinNCS allows to export one DB1.

Getting started

Scope of delivery

The WinNCS program is delivered with the following components:

WinNCS
BDE (Borland Database Engine)
H1 Driver
Manual

System requirements

The following hardware components are required for WinNCS:

Pentium-based IBM compatible PC
A minimum of 8MB RAM (we recommend 64MB)
30MB of unused disk space on the hard disk
Super-VGA video adapter with a minimum resolution of 800x600 pixels
Windows 9x, Windows 2000 or Windows NT operating system
An optional printer

WinNCS installation



WinNCS.exe

WinNCS is installed by means of a setup program. We strongly advise that you terminate all other Windows programs before executing the setup program. Insert the CD and execute *Setup.exe*.

The following procedure is performed:

The setup assistant is initialized. Select a language and confirm your selection with [OK].

The "Welcome" window is displayed. This contains information on the installation and on the copyright – confirm by clicking [Next] and indicate your agreement with the licensing conditions by means of [Yes].

Enter your name and the name of your company into *User information*.

Select the WinNCS directory as *Path*.

All files of WinNCS and of the BDE (Borland Database Engine) are copied to your PC.

The installation is finished as soon as the message "Setup completed" appears.

Directory structure of WinNCS

Setup defines WinNCS directory during installation. At this time the following directory structure is created on your hard disk.



GSD The directory for the current Profibus GSD-files:

Every manufacturer supplies the characteristics of their slave in the form of a GSD-file which you must use to configure your profibus slave.

If you have later versions of GSD-files or GSD-files from other vendors you must please copy these into this directory.

Ws295sdk Ws295sdk contains an installation utility for Win-Sock2 functions required for Win95. These functions are a required by WinNCS for TCP/IP communications.

Starting the program

The simplest manner to start WinNCS is by selecting WinNCS in the start menu. You can also start the program by executing the *WinNCS.EXE* file.

The program displays the start window containing information on the version.

To ensure that your work with WinNCS is optimized you should set the font to *small fonts* and the resolution to "800x600" in the **control panel**.

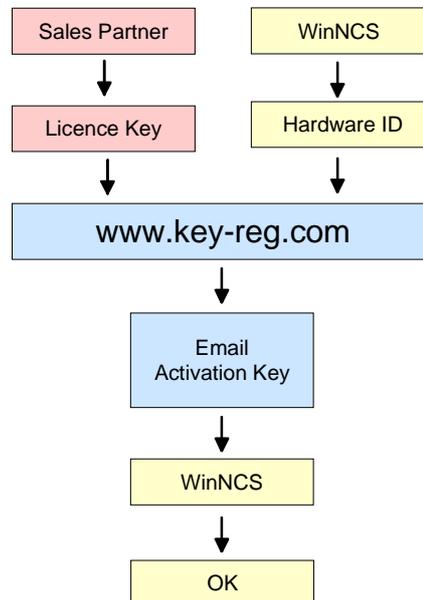
Closing the program

WinNCS is terminated from the main menu. When the program is terminated, a file with the name *WinNCS.ini* is saved to the disk. *WinNCS.ini* contains all the configuration settings that you have entered into the program.

Program registration

Outline

The registration has the following approach:



Licence key

You receive the licence key from your sales partner.

Hardware ID

Via ? > *Registration* the registering dialogue opens.



The dialog box shows your Hardware ID and a link to the website where your activation key is calculated.



Calculate activation key

Click on the link to <http://www.key-reg.com>. The following website opens.

The screenshot shows a web browser window with the address bar containing 'http://www.key-reg.com/'. The main content area displays a registration form with the following fields and controls:

- A dropdown menu for a title, currently set to 'Mr.'.
- Text input fields for: Name, Company, Department, Place, Telephone, Email, Hardware ID, and Licence key.
- A 'Submit' button at the bottom right of the form.

Customer data

Name

Please insert the required data:

Customer name

Company

Customer site

Email

The activation key will be sent to this address.

Hardware ID

The ID shown in WinNCS.

Licence Key

You've received the licence key from your sales partner.

After clicking onto [Submit], an Email with the activation key is send to the given Email address.

Activate Licence

To activate your license, please type the activation key into your software under "Registration" and confirm with [OK].

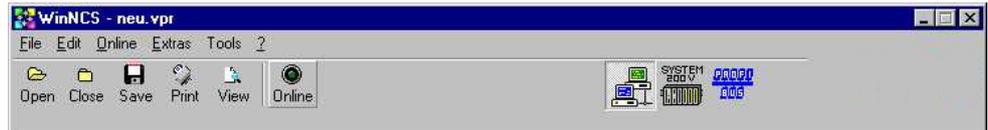
Now the Software is registered.

WinNCS environment

Overview

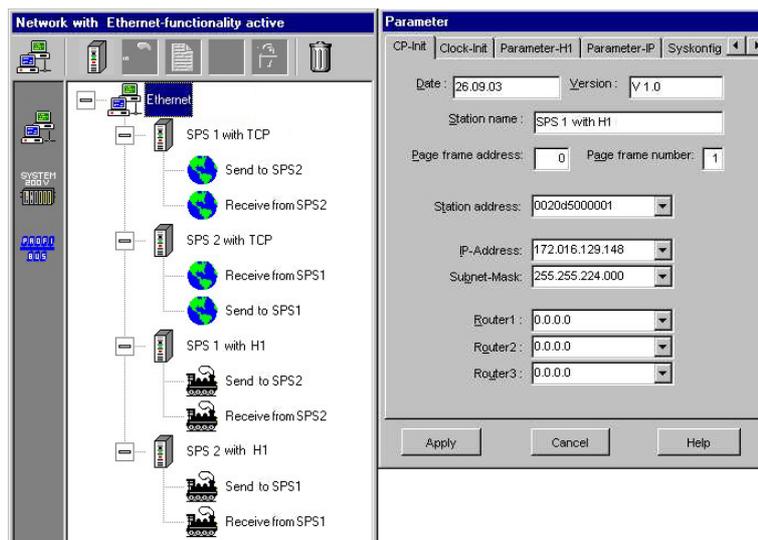
Main window

WinNCS starts, the main window is displayed.



As soon as you create a new project or open an existing one via **File > Create/open project** , additionally the dialog windows „Network“ and "Parameter" are shown.

"Network" and "Parameter" window



The „Network“ window gives you a fast overview over the complete project for it is possible to engineer several systems at one time. These are saved as one project file in the database.

A tree structure lists networks with subordinated stations and concerning connection jobs.

The parameters concerning to the network, the station and connection job are shown and altered in the "Parameter" window.

Help system

WinNCS provides several help functions. Detailed help is to find via ? in the main menu. Context related help to a certain dialog window appears when you strike the function key at activated window.

Context menu

WinNCS offers a context menu that is activated via the right mouse button. This menu gives you access to functions that are only available at this mouse position.

Main window

General WinNCS starts, the main window is displayed. This contains the menu bar and the tool bar that are allocated to the most important functions.



Menu bar

Main functions The menu bar is located at the upper border of the main window. The following table lists the commands available from the menu:

File	Create/open a project, Save, Save As, Close, Printer settings, Preview, Print, Close
Edit	Symbols (Symbol manager only available for "Ethernet functions")
Online	Online functions
Extras	Center windows, Dockable windows, German, English, Ethernet, System 200V, Profibus
Tools	Include and start external programs
?	Help topics, About

Menu items

Menu items res. buttons

This table describes the menu items with according button and function. The most important functions can be called via buttons.

File > *Create/open a project*



Create a new project or open an existing project. A file selection window is displayed where the respective project file can be selected. WinNCS project files have an extension of *.vpr. The file names of the four most recent projects are included in the file menu and these can be opened directly from there.

File > *Save*



The current state of the project is saved. This function is executed automatically for the menu items *close* and *Exit*.

File > *Save as*

The project file can be saved with another name in another directory.

File > *Close*



The project that is currently open is saved. The "network" window and the database window are closed

File > *Print options*

The print options provide access to certain settings for the type and layout of the printout. The print options determine both, the layout of the printed page as well as the layout on screen.

File > *Page view*



Depending on the selected print options the preview returns a detailed output or a list of the configured records.

File > *Print*



The parameter settings for the LAN, the stations or links are displayed. Depending on the print options a detailed display or a list of configured records is printed. Before the printout is started, the standard printer menu is displayed where you can enter additional printer options. Here you can select a certain printer and specify the number of copies. Any other settings are ignored.

File > *Exit*

All configuration settings for the program, i.e. the window position and size, are saved. Subsequently all the windows are closed and the program is terminated.

Edit > *Symbolism*



The symbol manager is only available from the "Ethernet" option. It is used to assign symbolic names to absolute addresses. Addresses may consist of Ethernet addresses or of IP addresses.

- Online >**
Online functions
- 
- Activate res. deactivate the online functions for "Ethernet" and "Profibus".
- Extras >**
Window centering
- This command centers the program windows displayed on screen.
- Extras >**
Docking windows
- All program windows may be docked together.
- Extras > German**
or
Extras > English
Extras > Ethernet
- 
- Selects the "Ethernet" functionality.
Here you select the required language without terminating the program. At the moment you can select between German and English.
This setting is used to configure H1- or TCP/IP-modules. When you exit from the menu, the tool bar in the network window of the "Ethernet" functionality is changed accordingly. You can now position H1 or TCP/IP stations in the network window and configure the respective connections.
- Extras > Profibus**
- 
- Selects the "Profibus" functionality.
This option must be selected when you wish to configure a Profibus network. When you exit from the menu, the tool bar in the network window of the "Profibus" functionality is changed accordingly. You can now position the Profibus-DP master stations in the network window and assign Profibus slave modules with the respective peripherals.
- Extras >**
System 200V
- 
- Select the "System 200V" functionality.
These functions must be selected when you wish to configure a CPU for STEP5 from Siemens and the respective modules.
As soon as you have selected this function, the tool bar in the "network window is changed. Now you may configure the CPUs and modules shown above. For a CPU, WinNCS creates an image of DB1 in accordance with your configuration which you can export as s5d-file.
- Tools > Tools ...**
- 
- In "Tools" you can start external programs that you have previously added to the list of tools.

Saving a project

Database The database integrated into WinNCS is based on the Paradox format. All configuration and setup data for functional groups, stations, modules and connections are saved in a database.

Project If a project is open, all project files (incl. database) are in the directory *PROJECT*.

When you close the project, the complete folder *PROJECT* is saved in the file *PROJECT.VPR* and copied back again in the folder *PROJECT* at the next opening.

Printer output

General The printout serves the documentation and -in case- the error search of your project engineering. Depending on the settings in the print options, you may print lists, detail views or labels for the complete project or a network.

Print labels For printing labels, you have to select *Labels* in the print options. When you reach the module level of a network, *Print* starts the printing of all labels for these modules.

Page view For a preview of the print output you may choose the *Page view*. This shows the print pages on screen.

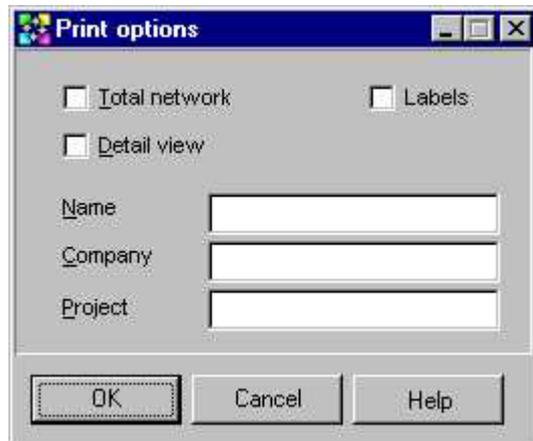


File > Print



The menu option **File > Print** or via the according button calls the standard dialog window for printing. In this window you select the printer and choose the number of copies. Adjusting page areas is not possible.

File > Print options Via the print options you may choose several options for type and layout of the print output. The print options concern to the output on paper and in part to the page view at the screen. Selecting **File > Print options**, the according dialog window appears.



Total network If this box is activated, a print command starts the printing of the complete project engineering. This box has no influence on page view.

Detail view You may choose whether a printout is detailed or in form of a list. If you select *Detail*, the output (printer or monitor) contains every element on an individual page.

Labels To print labels, mark a module in the "Network" window, tick the control box *Labels* and ok. The labels for all modules on the same hierarchic level are printed. The *page* view allows you to control the labels on the screen before printout.

Printing labels sets the control boxes *total network* and *Detail view* without function.

Project, Name, Company Entries in these lines are printed in the bottom line of the printout.

Include programs

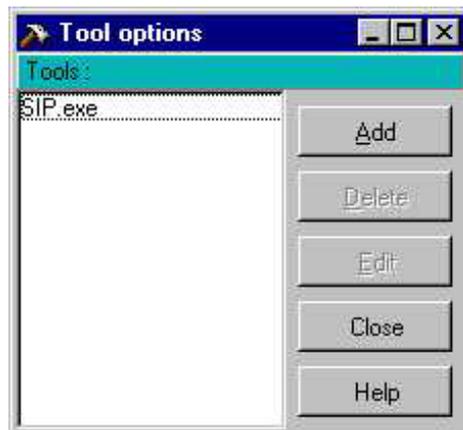
Tools



Via *Tools* you have access to external programs that are administrated in form of a list in the tool options.

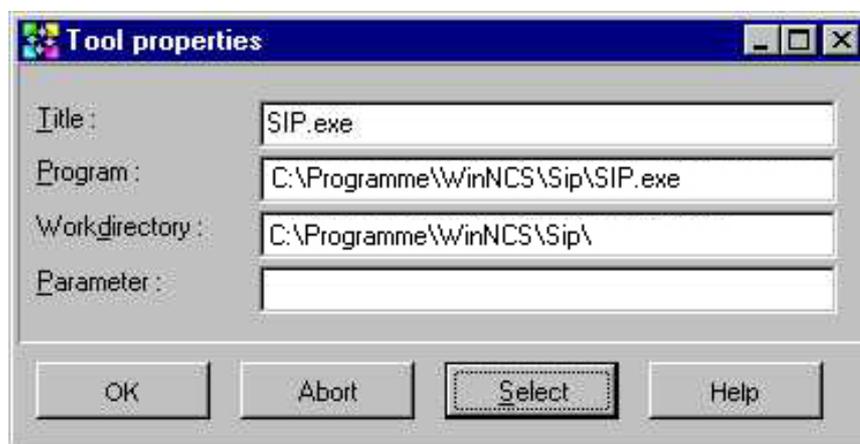
After the first installation of WinNCS, the program list is empty.

To add an external program, open the window for tool options via **Tools > Tools**.



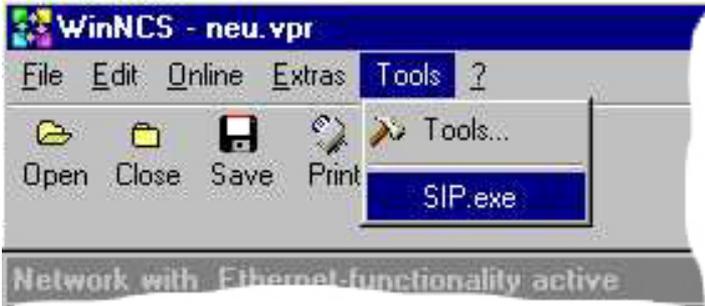
Click on [Add]. The window "Tool properties" appears.

Click on [Select] and browse to the wanted directory where your exe-file is stored. Choose it.



With [OK] the program is overtaken into the list. You may add more programs or leave the window with [Abort].

Now you gain direct access to the program via the menu option *Tools*.



The list is extendable.

Online functions



Via **Online** > *Online functions* or via the according button you may activate res. deactivate the online functions.

The online function buttons appear as symbol bar in the lower area of the main window.



Online functions at Ethernet functionality



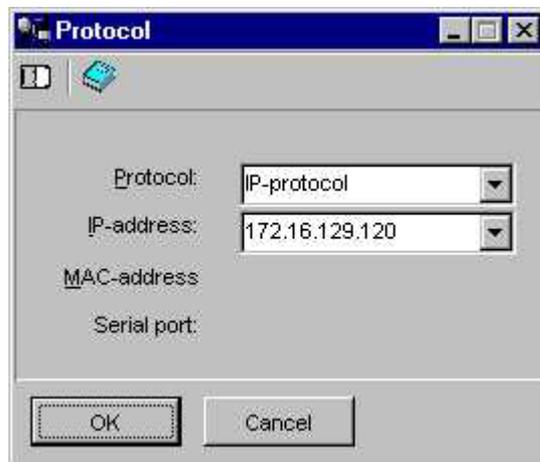
The following describes the online functions in the **functionality "Ethernet"**. Please regard that the online functions are only available with an Ethernet-CP.

For the online access to an Ethernet coupler, WinNCS provides special functions.



To preset the protocol type and station address.

The IP address is overtaken into the Init dialog as soon as an online function is executed.



Establishes a connection between your PC and CP using the communication parameters given under Init.

An online connection is the precondition for the following functions.



Sets the CP into RUN state (Software-RUN). Herefore, the RUN/STOP levers of the CPs have to be in position RUN.



This button sets the CP STOP state (Software-STOP) even if the RUN/STOP lever of the CP is in position RUN. Before transferring a project into the CP, the CP has to be set in Software- STOP.



This function shows the recent operating state (RUN / STOP) of the CP in the status bar of the main window.



If your CP is in (Software-) STOP, you may transfer your project into the CP via this button.



This function imports the project engineering from the PC into WinNCS.



This function transfers your project from the CP-RAM into the internal Flash-ROM. You need this function after the project transfer depending on the used CP.



This button initializes an overall_reset. An overall_reset sets the CP back into delivery state. The project is deleted and the original IP address is assigned.

Before an overall_reset you have to set the CP to STOP state. Afterwards, the CP has to boot again. Switch the voltage supply of the CP off and on again.



The *Identification mask* shows all parameters that are necessary for the unambiguous identification of a CP. All parameters of this mask are only for monitoring purpose and may not be altered here.



This button opens an output window with the *Indicator words* from 0 to 223. The indicator words are monitored as Byte in hexadecimal format.

The indicator word of the order number 0 has a special function. The order number 0 contains the number of the order that is recently executed by SEND ALL res. RECEIVE ALL in the module.



Monitors the summary state of all connections.



Monitors the summary state of all H1 transport connections



Monitors the summary state of all H1 datagramm connections



Monitors the summary state of all TCP connections



Monitors the summary state of all UDP connections



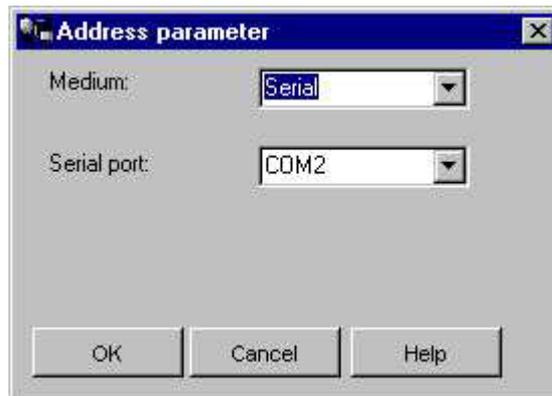
A click on the button *Status and Control* opens an operand table. Enter here the operands that you want to visualize res. alter.

As soon as you have a connection to the destination station, WinNCS automatically sets the operand format and transfers the status values to the monitor.

Online functions at Profibus functionality The functionality "Profibus" supports the following online functions:



Preset address parameter.



Establishes a connection between your PC and the Profibus-DP master using the communication parameters set under Init.

An online connection is the precondition for the following functions.



This function transfers your Profibus project into the DP master.



This button allows you to import a project from the DP master into WinNCS.

Online functions at System 200V functionality The functionality "System 200V" does not support online functions.



"Network" window

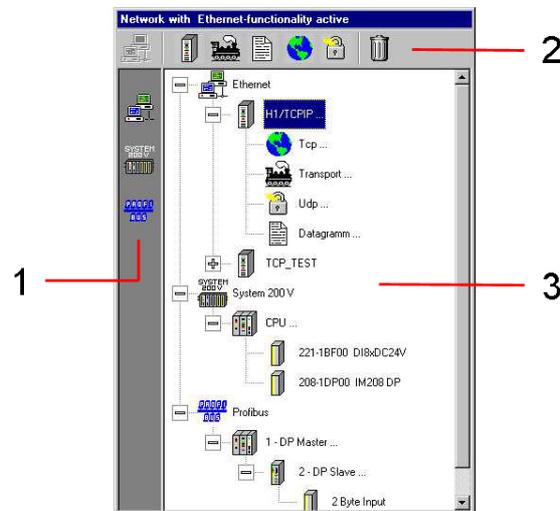
General

The "Network" window gives you an overview of your complete project engineering. Here you may configure several systems at one time and store them centrally in a data base.

The single stations are shown with their subordinated modules, system components and connection orders in a tree structure. This view is common for Windows and the usage is easily learned.

The "Network" window always appears together with the "Parameter" window.

"Network" window



Areas

[1] Functionality

Here you choose which functionality is provided by WinNCS. You may choose between Ethernet, Profibus and System 200V functionality. You may only work on those projects that have the selected functionality.

[2] Network elements

Depending on the functionality and the position in the network list, the according network elements are listed. By means of a mouse click, they may be inserted into the network list at the recent position.

[3] Network list

The network list gives you an overview over your complete project. The position in the network list influences the content of the "Parameter" window and the activation of network elements.

Every level of the network list may be expanded like known from Windows when a Plus [+] is beside the symbol.

A [+] means that there are further symbols on lower levels. Expand it by clicking on [+] and reverse it with a click on the then appearing Minus [-] beside the main symbol.

Symbol bar of the "Network" window

General

The headline of the network window shows the functionality that has been set via **Extras** or via symbol bar of the main window.

Depending on the chosen functionality, you will find the following buttons on the symbol bar:

Function group Ethernet



The symbol *Function group* groups several stations of one functionality to a logical block.

The **functionality "Ethernet"** allows you to configure your Ethernet components.

This functionality has the following control buttons:

Ethernet station



This button adds an Ethernet station into your network. Afterwards you parameterize the connections for this station.

TCP connection



Add a TCP connection via this button. A TCP connection transfers the data connection orientated with acknowledgement of the partner station. You may also configure your TCP connection as multi connection.

UDP connection



This symbol assigns an UDP connection. The UDP connection provides a connection free, not always reliable communication service.

H1 transport connection



For H1 transport connections you click on this symbol. H1 transport connections allow a connection orientated communication via the H1(TP4) protocol.

Please regard that not all CPs support the H1 protocol. More detailed information is to find in the documentation of your CP.

H1 datagramm connection



This button assigns an H1 datagramm connection. H1 datagramm connections are, similar to the UDP connections, unsecured connections of the H1(TP4) protocol.

Ethernet coupler



Via this button, you insert an Ethernet coupler into your network for which you afterwards configure the according modules.

Modules



Insert the modules connected to the Ethernet coupler via this button.

**Function group
Profibus**

The **functionality "Profibus"** allows you to configure your Profibus-DP master.

This functionality provides the following buttons:

Profibus-DP master



This button inserts a Profibus-DP master into your network list.

Profibus-DP slave



To insert a DP slave, you click on this button. Using GSD-files, you may also include Profibus slaves of other manufacturers into WinNCS.

Modules



Modules that are connected to the DP slave are assigned via this button.

**Function group
System 200V**

Via the **functionality "System 200V"** you may create central configurations of a CPU for STEP5 from Siemens and the concerning modules. Via the export function you may export the parameter and configuration data as DB1 data block into a s5d-file.

This functionality provides the following buttons:

CPU



Add a CPU to your network list with this button.

Modules



Insert the modules that are connected to the CPU.

General functions

Delete



The recently selected symbol is deleted from the "network" window. All lower positions are automatically also deleted.

Import / Export



Import



Export

Via the *context menu*, the "network" window allows you to *import* your data basic file into the network res. to *export* a station from the network as data basic file.

Depending on the selected functionality, the export creates a file (in the following called data base) with CPU/Station and module data and stores it in the format of your hardware platform. This data base may be transferred into the according module.

Depending on the selected functionality, the import inserts the data base with CPU/Stations and module data into the "network" window.



Note!

Please regard that the data is always inserted below the recent cursor position in the "network" window.

Import/Export options

The following text lists the Import/Export options for the different functionalities:

Functionality "Ethernet"

The functionality "Ethernet" imports and exports projects as NCS-file. The import also supports NCS-files created with the MS-DOS projecting tool NCS Version 2.62 or higher.

Import:	ncs-file	H1/TCP/IP symbol is added and the network build-up.
Export:	ncs-file	Station parameter and connection data is exported.

Functionality "Profibus"

The functionality "Profibus" is able to import projects that have been created with the projecting tool COMProfibus from Siemens. You may also export a created Profibus system as 2bf file.

Import:	2bf- file	from COMProfibus from Siemens or from WinNCS.
Export:	2bf- file	Bus parameters and master project engineering of the master selected in the "network" window are exported.
Assignment:	2bf- file	The functionality "System 200V" allows you to point to an (already exported) 2bf file to reserve an address. More detailed information is to find under the register module configuration.

Functionality "System 200V"

The functionality "System 200V" supports only export!

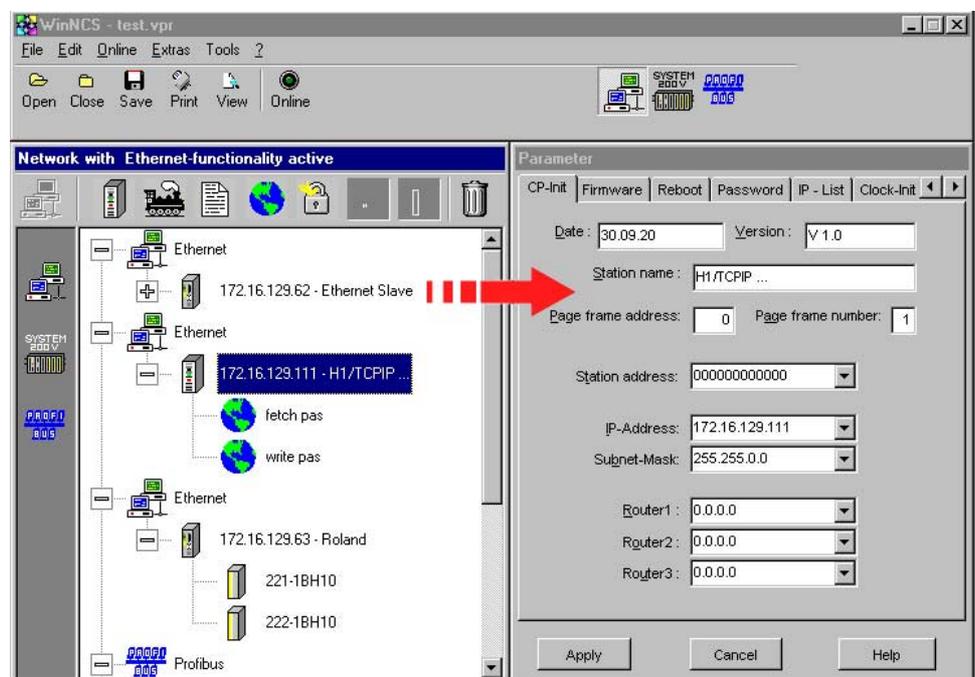
Export:	s5d- file	Configuration data for CPU and modules (incl. DB1)
---------	-----------	--

"Parameter" window

"Network" window "Parameter" window

WinNCS stores the parameterization data of all stations in a database. Together with the "network" window a structured view of large systems with many single stations is possible.

The "parameter" window shows the database mask depending on the position of the cursor in the "network" window. If the cursor in the "network" window is on a function group symbol, the function group database mask is shown, at a station, the station database mask and if the cursor is on a connection, the according connection database mask. As soon as a new symbol is added to the "network" window, the parameter window creates a new database mask with presetted parameters. "Network" and "parameter" window are in direct connection to each other and are always up-to-date after applying a record set.



Apply Cancel

Depending on the chosen element, the "parameter" window shows different register cards.

With [Apply] you take the alterations of all registers over to the database and they are stored automatically.

[Cancel] sets back the changes in all registers.

After applying a record set, the "network" window monitors the name of the according function group, station or connection.

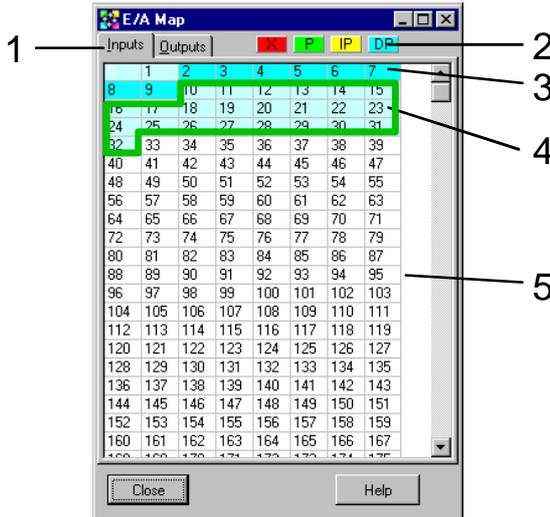
I/O Map - Overview address area

Map

If you click on [Map] in the parameter window, another window opens that monitors the assignment of the peripheral address area.

Here you may see from which address offset on the in- res. output data of the chosen module is stored.

For in- and output area the window has each one register.



[1] Each one register for in- and output area

[2] Legend

[3] The address range of the currently marked module is shown in full color.

Here for example, the module maps its 8Byte input data starting with address 2.

[4] Address areas that are occupied by other modules are shown in halftone.

[5] Not used addresses are shown in white.



Please regard that not all areas are used by every functionality and the "Map" button is not everywhere available.

Depending on the functionality the I/O map shows the following information:

Ethernet functionality (only Ethernet coupler)

DP (blue) Address area that is occupied in the Ethernet coupler by the modules.

Profibus functionality

X (red) Shows address areas that are reserved.

You may reserve each up to 4 address areas for in- and outputs. These areas are protected at the automatic address allocation.

DP (blue) Address area that is occupied in the CPU by the modules that are connected via Profibus.

System 200V functionality

P (green) Address area that is occupied by the central connected modules of the CPU.

IP (yellow) Marks the address area that is used by a periphery integrated in the CPU.

X and **DP** see Profibus functionality

Symbol manager

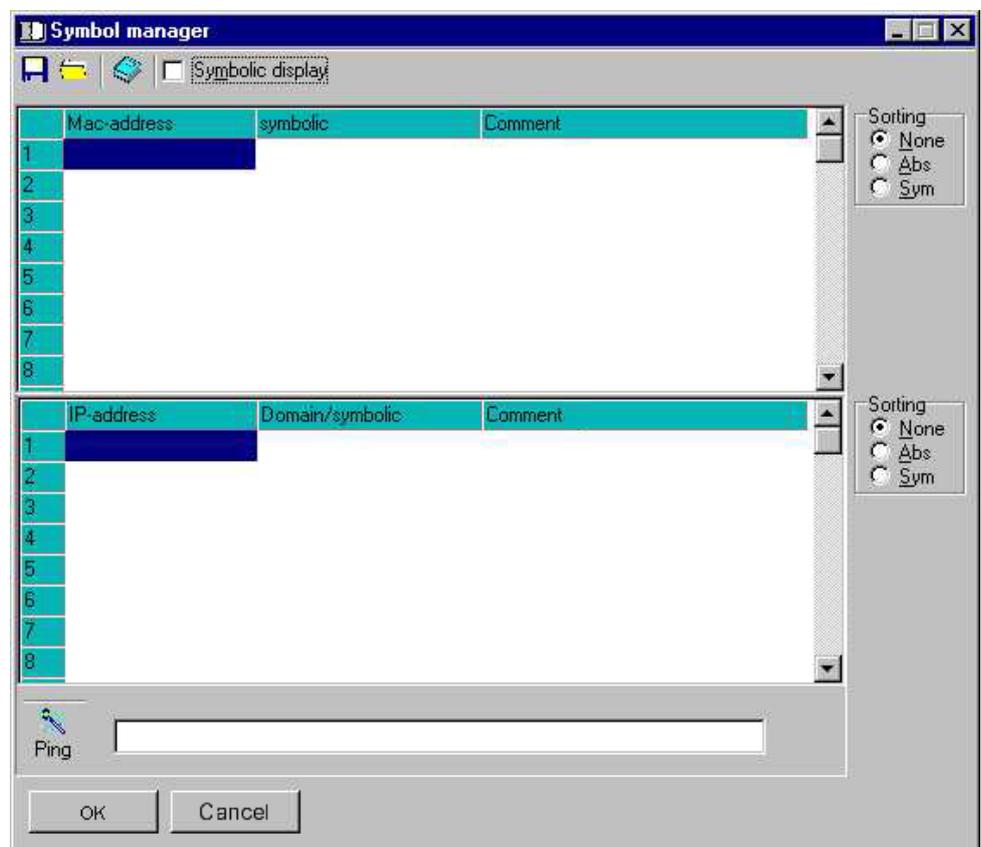
Edit >
Symbolism



The symbol manager allows you to assign symbolic addresses to the IP and Ethernet addresses. When the tick box "Symbolic display" is activated, all input and selection fields in WinNCS are using the symbolic names instead of the address.

The symbol manager is only available with "Ethernet" functionality.

Please regard that the list of symbols is not stored with the project. A created symbol list can be stored with a file name. A stored symbol list can be loaded into the symbol manager. At restart of the program always the last symbol list is loaded.



Name is limited to 20 characters

A name may have a max. of 20 characters. There are no other conventions for names.



If you assign a name more than one time to Ethernet res. IP addresses this is recognized and monitored.

Activation of the symbolic view

The activation happens by ticking "Symbolic display".



Ping function



The symbol manager has an integrated Ping function. This allows you to proof if the destination module is physically in the net by typing the according IP address.

Help system

Menu option ?

WinNCS provides various help functions. During parameterization you always have access to the help topics that are in the main menu under the menu option?.

Function key F1

If you need help in the WinNCS window, strike the function key **F1** in the according window or the input screen. A context related help window appears.

Help topics

The call of help topics opens a help window with an overview of the help topics sorted in categories. Clicking on a book symbol you reach the wanted topic. There may be other topics below.

Via double click on a topic you may read the help text. With a double click on an open book, you close it again.

For a topic search you may type an expression directly into the window or search in the index.

More detailed information about the help system is to find in the description of your Windows system or by striking F1 in the help window.

Context menu

General For WinNCS is programmed after Windows conventions, the program also offers a context menu that is activated via the right mouse button. This menu gives you direct access to functions that are only available at this mouse position.

Functions Depending on the mouse position, the context menu contains:

Insert mode Activate res. deactivate the insert mode

Copy Strg/Ctrl+C Copy marked data

Insert Strg/Ctrl+V Insert mode active: Insert at current position
Insert mode not active: Insert at end of list

	Start	Set CP into Run state
	Stop	Set CP into Stop state
	Status	Request recent CP state
	Delete	Delete data base at the PC
	Download	Transfer data base from PC to CP.
	Upload	Transfer data base from CP to PC.
	Flash	Transfer data base from CP into internal Flash
	Info	Monitoring station parameter
	Indicator word	State of the indicator words
	All	Summary state for all connections
	Trans	Summary state of H1 transport connections
	Data	Summary state for H1 datagramm connections
	TCP/IP	Summary state for TCP/IP connections
	UDP	Summary state for UDP connections
	Control VAR	State and control of the operands
	Import	Import data base into network
	Export	Export station from the network as data base

WinNCS for CPs

Outline

TCP/IP- and H1- CPs

The Ethernet functionality allows you to engineer your TCP/IP and H1-CPs.

The project engineering includes directly the CPs as well as the connections of the CPs.

Engineering options

As soon as you've configured your CP, you may transfer your project engineering to the CP, depending on the CP online via the existing network, directly serial or via MMC.

At the online transfer, the data is send either via TCP/IP or via H1 (TP4-Stack required) by giving the according IP res. Ethernet address.

Via different status functions you may request the status of the CP online and start or stop the CP.

You may execute an online firmware update. This functionality requires a password.

For the concrete access options of your CP, please refer to the according manual.

Starting with CP firmware V.213 all listed online accesses to the CP are possible. For detailed information refer to the manual of the CP.

Search and import stations

Starting with version 3.12, WinNCS is able to search stations in the Ethernet and to import their project engineering.

Please take care that PC and CP are in the same IP circle. Otherwise you need an IP circle switch at the PC.

You may also alter the IP address of your CP online to fit it into the IP circle of the PC. Please regard that this action deletes the configuration in the CP.

Import options

Under Ethernet functionality, you may im- or export projects as ncs-file. You may also import ncs-files created with the MS-DOS-NCS projecting tool Version 2.62 or higher.

Building up the network

Outline For the communication via TCP/IP res. H1 you need some presettings and driver installations, described in the following.

Configuration for TCP/IP To communicate with the CP via TCP/IP protocol, the CP and the local computer have to be connected via a network. For this you need a network card that must be included in your operating system as a hardware component.

The recent network configuration is monitored in the **system control** under *network*. If not already done, add the network components for the *TCP/IP protocol*.

Furthermore, the network component TCP/IP needs an *IP address* via [Properties]. The IP addresses of the local computer and the CP must be in the same IP circle to be able to communicate with each other. Ask your system operator for the IP addresses.



Note!

Please regard that you have to adjust the IP circle of your projecting PC to the IP address of your CPU for the transfer via Ethernet at the first project engineering.

Every IP address must be unique within the network.

Change IP circle

To change the IP circle, click on network neighborhood with the right mouse button. Via *Properties* you reach a dialog window where you may type a new IP address and subnet mask depending on the operating system.



Note!

Before you start changing the properties, please note the recent settings of the network properties.

Please regard that every IP address must be unique within the network.

For example: For access via Ethernet to the address 172.16.192.11 you set the network card of your projecting PC to the following IP address:

172.16.192.X, where "X" can be one number between 0 and 255 except 11.

For the subnet mask you set: 255.255.255.0

Change IP circle at the CP

Starting with the CP firmware version V.213, you can online adjust the IP address of a CP that is not in the IP circle of your PC. [Search Slaves], click on a found CP and select the Ethernet parameter window of WinNCS.

Due to technical reasons, the assignment of a new IP address deletes the current configuration of the CP.

Configuration for H1

The consignment of WinNCS includes an H1 driver. This driver contains the H1 protocol stack for the H1 communication between WinNCS and the CP.

The driver has to be installed under WINDOWS-NT4 or WINDOWS 2000 and is only useable for this operating systems. The installation happens via the network neighborhood.

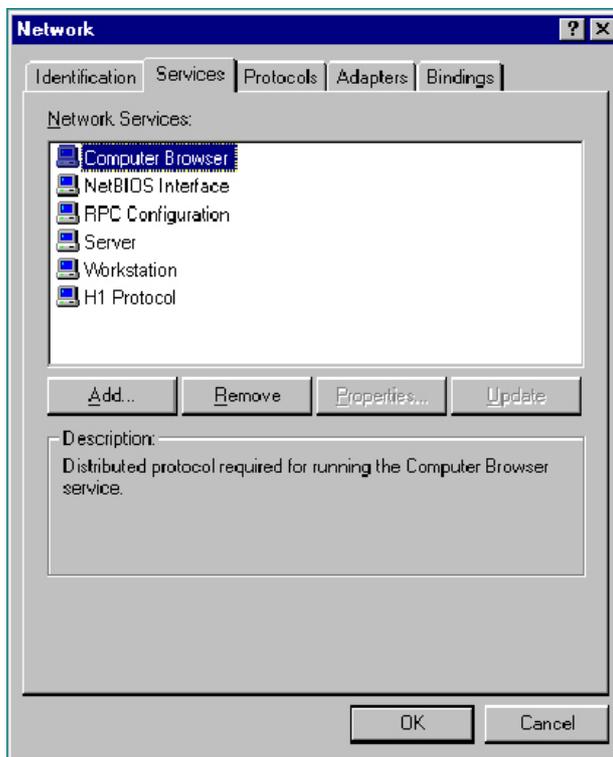
Please regard that not all CPs support the H1 protocol. More detailed information is to find in the CP manual.

Installation under Windows NT4



Click on **Network neighborhood** at the desktop with the right mouse button and select *Properties*. A dialog window with several registers opens.

Select the register *Services* and add the delivered H1 driver.



Mark the new H1 driver and click on *Properties*. Another window opens where you may insert or delete network cards in the system. WinNCS and the H1 driver support up to four cards.

You may set a hardware filter for the H1 driver to avoid that all telegrams reach the system via the network card.

This filter allows the following adjustments:

Directed Only the telegrams related to the address reach the system.

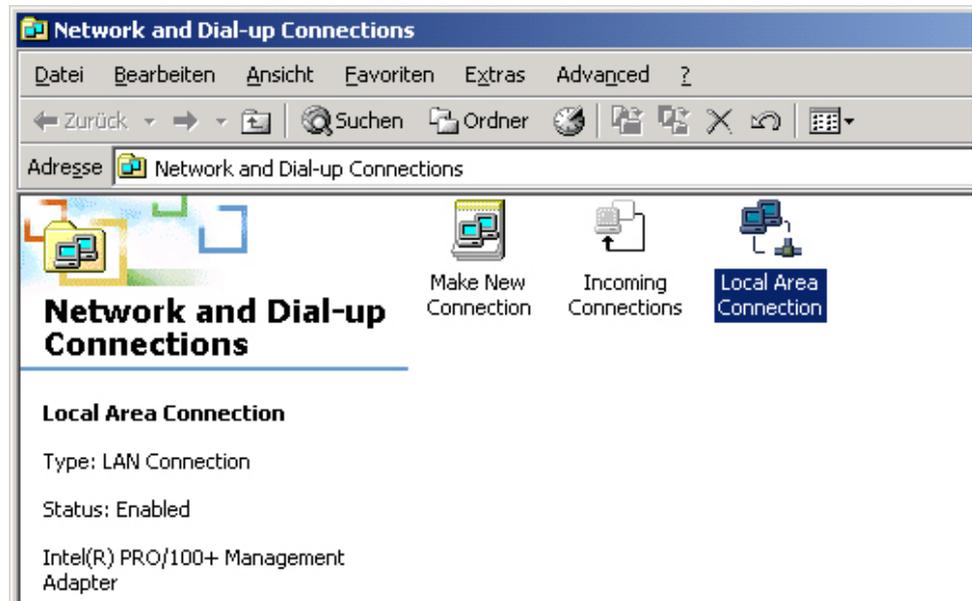
Promiscuous mode All telegrams reach the system.

The max. number of connections supported by the H1 driver is set in the field *Max Connections*.

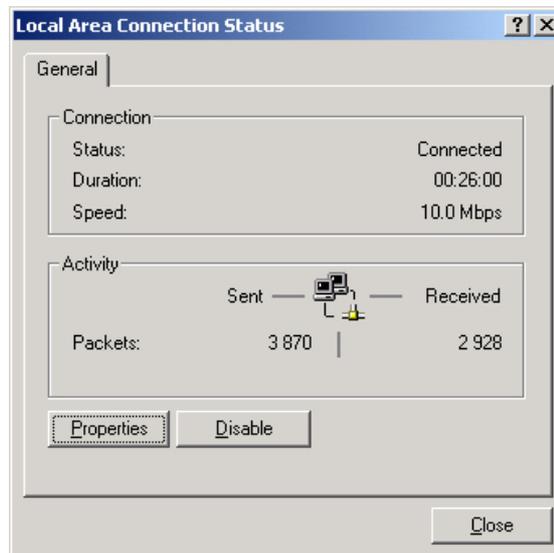
Installation under
WINDOWS 2000



Click on **My Network Places** on the desktop with the right mouse button and call the *Properties*. The following dialog window appears.



Click on *Local Area Connection*. Another dialog window appears.

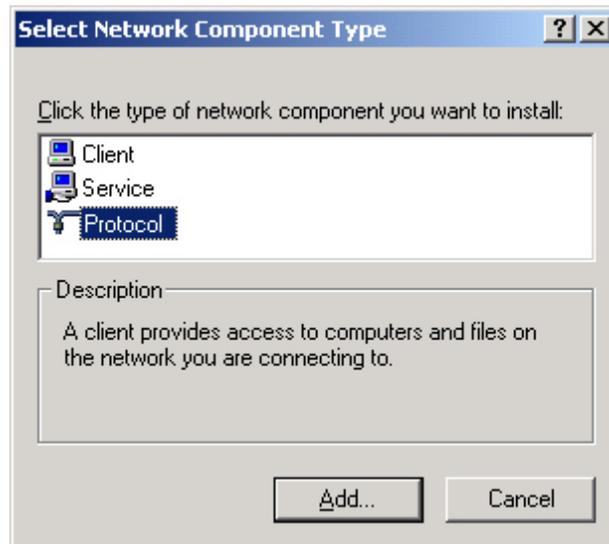


Click on *Properties*.

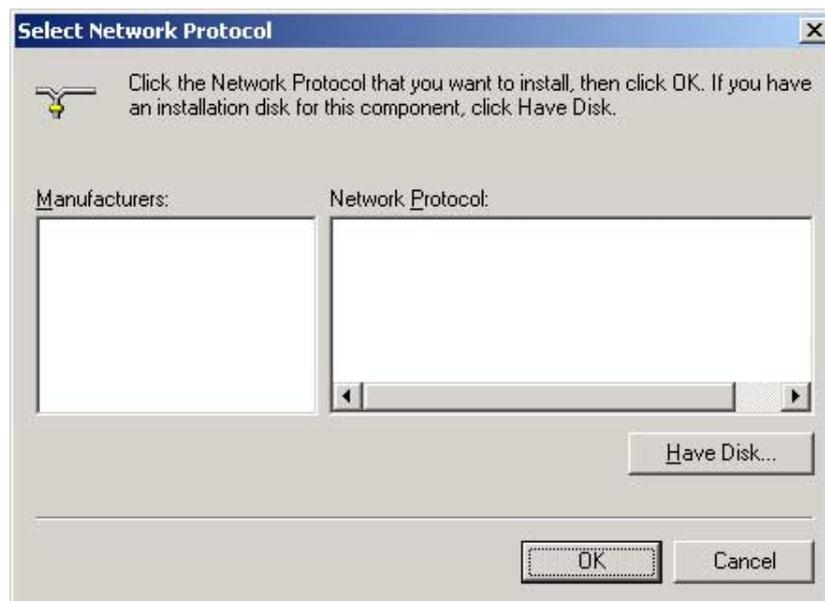
Click on *Install* in the next dialog window.

Installation under
WINDOWS 2000

Select *Protocol* in the next dialog window and click on *Add*.



The following dialog window appears:



Insert the WinNCS-CD and click on *Have Disk*. You find the driver **H1PROT.INF** on the CD under H1WIN2000. Select and install it.

After the installation you have to reboot the PC.

Fast introduction of WinNCS with CP

Outline

The project engineering of the CP portion happens in 3 parts:

- **CP project engineering** via WinNCS (Connection to Ethernet)
- **Hardware configuration** (Include CP in CPU)
- **PLC programming** via user application (Connection to PLC).

CP project engineering under WinNCS

- Start WinNCS.
- Click on  to select the functionality "Ethernet".
- Create a new project with the function group "Ethernet" via **File > Create/open project**.
- Add a new station via . Now you reach the parameter window "CP-Init".
- Type *Station name*, *IP address* and *Subnet mask* and click on [Apply].
- If needed, you get the IP address and the subnet mask from your system operator. The other entries remain unchanged.
- To engineer connections, click on . Type the according parameters for *order type*, *order model*, *order no.*, *priority*, *IP addresses* and *ports* and click on [Apply]:

Transfer the CP project

Depending on the used CP, you have the following possibilities to transfer the WinNCS project:

- Transfer directly via Ethernet**
- Transfer via CPU deploying a MMC**
- Transfer serial**

Information about the transfer methods supported by your CP res. CPU is in the according manuals for the devices.

to a) Transfer directly via Ethernet

At the transfer directly via Ethernet, you establish an Ethernet connection between WinNCS and your CP by choosing the according destination IP address.

Precondition: Same IP circle for PC and CP.

- Connect the CPU with the Ethernet.
- Turn on the power supply of the CP (start-up 30s).

- Activate the online functions via



- Set "IP protocol" under



and type the current IP address of the CP.

- Establish a connection via



- Set the CP into software STOP via



and select the according station in the network window.

- With



, the transfer into the CP starts. If a request for a NCS file appears, you forgot to choose the correct station! Return to the last step, choose the correct setting and start the transfer again.

- As soon as the transfer has finished, reboot the CP via



to b) Transfer via CPU with MMC

At the transfer via CPU and MMC, you export your project as ncs-file and copy this to an MMC. The MMC can be plugged into the CPU and transferred to the CP.

- Mark the station and choose



Export via the right mouse button.

- Name the file as webcp.ncs (CP project) and transfer it to your MMC.
- Set the RUN-STOP switch of your CPU to STOP and turn off the power supply.
- Plug this MMC into the CPU and turn on the power supply. After a short start-up time, the alternating blinking of the LEDs SF and FRCE shows that the CP file has been found on the MMC.
- You start the transfer by tipping the RUN-STOP switch into position MR within 10s. During the data transfer the LEDs SF, FRCE and MMC are blinking alternating. The transfer has been finished successful when all CPU-LEDs are on. If these are blinking fast, an error has occurred.
- Turn off your power supply, take out the MMC and turn on the power supply again. CPU and CP are rebooted. Now the CP is on the network with the assigned IP address.

Hardware configuration

Via the hardware configuration the according CP has to be included into the peripheral area of the CPU.

For example, the inclusion of the CP portion of a NET-CPU has the following approach:

Precondition: SIMATIC manager from Siemens V. 5.1 or V.5.2 with SP1 and SIMATIC NET

- Start the SIMATIC manager from Siemens with a new project.
- Add a new System300 station via **Insert** > *Station* > *SIMATIC 300-Station*.
- Activate the station "SIMATIC 300" and open the hardware configurator by clicking on "Hardware".
- Configure a rack (Simatic300 > Rack-300 > Profile rail).
- For all CPUs 31x are configured as CPU 315-2DP, you select the CPU 315-2DP with the order no. 6ES7 315-2AF01-0AB0 in the hardware catalog.
This is to find under Simatic300 > CPU-300 > CPU 315-2 DP.
- Insert the CP343-1 TCP at the plug-in location 4 (Simatic300 > CP-300 > Industrial Ethernet > CP 343-1 TCP).
- Via a double click on the CP 343-1 TCP you open the properties window and you type that IP address into properties that you have defined in WinNCS.
- If needed parameterize the CPU res. the modules. The parameter window is opened at double click on the depending module.
- Save your project.

The transfer of the hardware configuration happens together with the user application.

User application

For the data transfer between CP and CPU an user application is required that contains the communication blocks. A library with the according handling blocks is in the consignment of your CPU. The user application should have the following structure:

- Create a communication channel between CPU and CP by means of the SYNCHRON block.
- Program the according SEND and RECEIVE blocks for initializing send and receive orders.
- Program the blocks SEND_ALL res. RECEIVE_ALL for data transfer.

This is the end of the fast introduction. The following pages contain a detailed description of the project engineering.

Create new res. import a CP project

Create new Ethernet project

Start WinNCS.



Funktionalität Ethernet



Click on  to set the functionality "Ethernet".

File > Create/Open project



Create a project with the function group "Ethernet" via **File** > *Project create/open*.

You get a file selection window where you can type a name for your project file. If you type the name of an already existing file it will be opened.

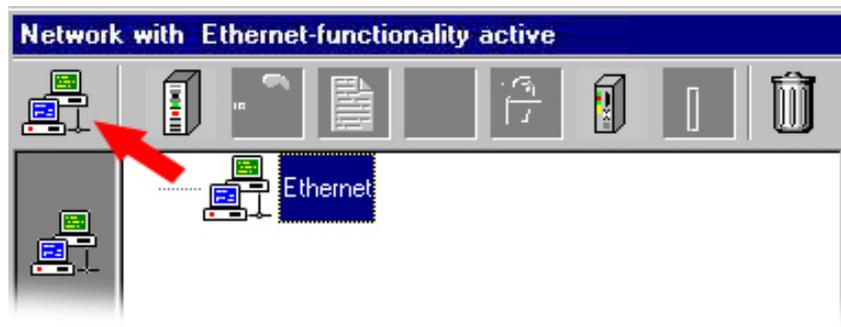
The project files of WinNCS have "vpr" as extension. The file names of the four last recent opened projects are listed in the **file** menu and can be opened directly.

As soon as you confirm your entries, the "network" window with the concerning "parameter" window appears.

The "network" window shows your new Ethernet net. The "parameter" window serves for example the assignment of a symbolic name for the network.



With a click on  in the "Network" window you may add further networks with the selected "Ethernet" functionality to your project.

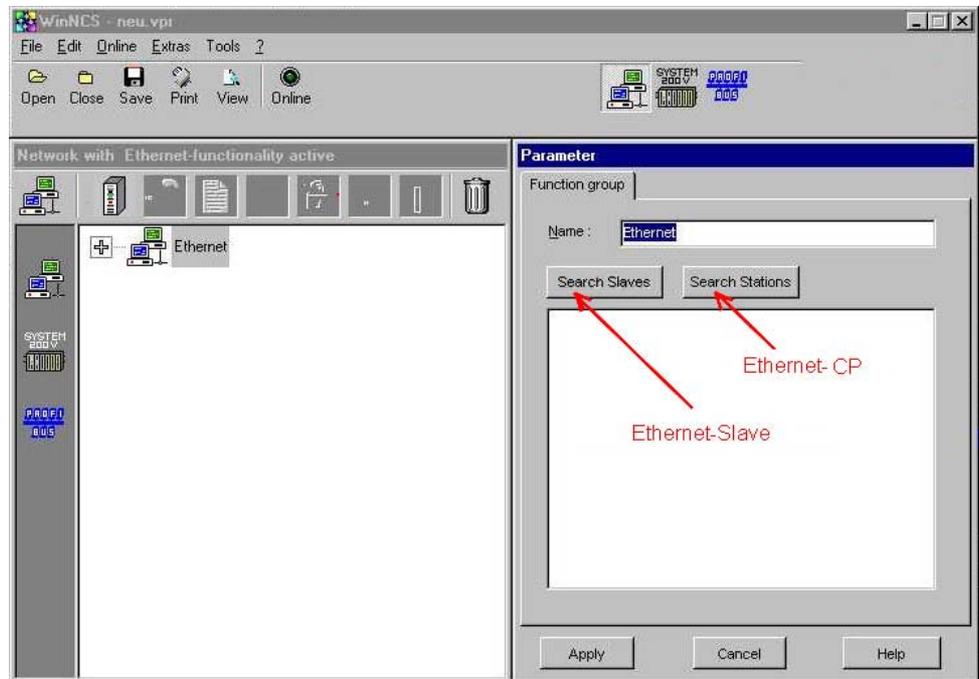


Additionally to the "network" window, the "parameter" window opens. The "parameter" window serves the parameter setting for the elements of the "network" window. For example you may here assign a symbolic name for the network that is then used in the "network" window.

Search and import an Ethernet project

Starting with WinNCS version V 3.12 you have the comfortable possibility to search stations in the Ethernet and to import their project engineering.

By means of a click on the Ethernet level, you reach the "parameter" window with the search functions.



The search supports the following systems:

- [Search slaves] Search all Ethernet coupler
- [Search stations] Search all Ethernet-CPs

A click on [Search slaves] starts the search for all Ethernet coupler in the network.

The available couplers are listed. Via double click you import the project of the current station and monitor it in the "network" window for further configuration.



The online search is for the complete network up to the gateway.

All listed Ethernet coupler may be engineered online.

With CPs you have to regard that the engineering PC has to be in the same IP circle than the CP.

Import of NCS-files from older WinNCS versions



Import

The Ethernet functionality allows you to import and export projects as ncs-file. You may also import ncs-files of the MS-DOS-NCS configuration tool Version 2.62 or higher.



Go to the network level in the network window and choose Import in the context menu (right mouse button).

A file selection window opens. Choose the according ncs-file. As soon as you confirm your entry, the ncs-file is imported and included into the network as station.

Alter an CP project

Preparation

Load the project you want to alter or create a new one.

As soon as you've loaded res. opened your project this is monitored in the "network" window with according "parameter" window.

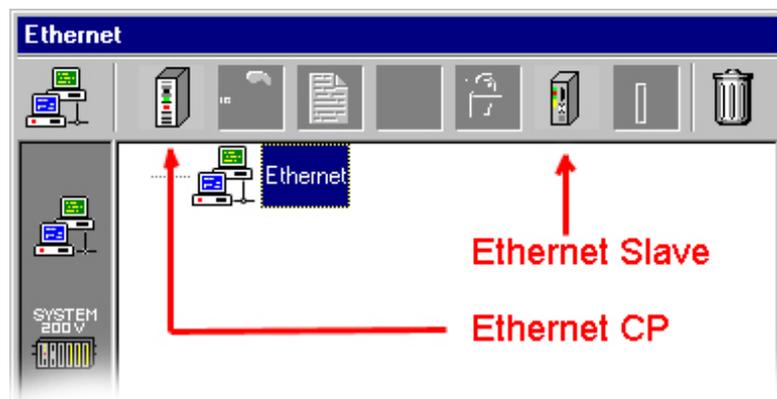
Starting from a network symbol that shows the functionality, the "Ethernet" functionality allows you to set stations, connections or modules and to parameterize them in the concerning "parameter" window.

Difference between Ethernet coupler and Ethernet-CP

WinNCS separates the following groups that can be engineered:

- Ethernet coupler res. slave IM 253NET
- Ethernet-CP stations and CPUs with CP portion

The combination of both groups is not possible but you may create one network for every group within a project.



In basic, both groups are engineered identically.

Project engineering

Depending on the position in the network list, the upper part of the window contains symbols that can be used for the construction of a network.

Engineer the wanted station by clicking on the according symbol.

Do your settings in the concerning "Parameter" window.



Note!

You may only return to the "network" window when you confirm your entries via [Apply]. When you click on [Cancel], your station is deleted res. your entries are.

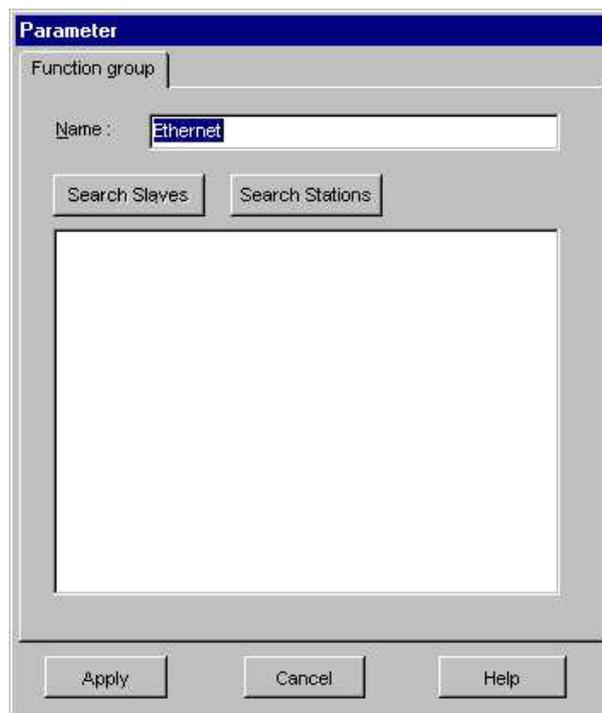
If you now click on the station in the "Network" window, you get a list of network elements useable for this station.

At an Ethernet coupler you may set modules, at a CP station connections.

Parameterization of a CP

Parameter Ethernet

Register Function group



Name

Here you may assign a name for your function group (max. 32 characters). The name is for a better overview. There are no restrictions for the name but it is urgently advised to use unambiguous names for function groups.

As soon as you [Apply] your entries, the name is taken over and shown in the "network" window.



Search all Ethernet coupler



Search all Ethernet-CPs

A click on a search button starts the search for all available stations res. Ethernet coupler in the net.

Available stations are listed. Via double click on the wanted station, the according project is imported and monitored in the "network" window for further parameterization.

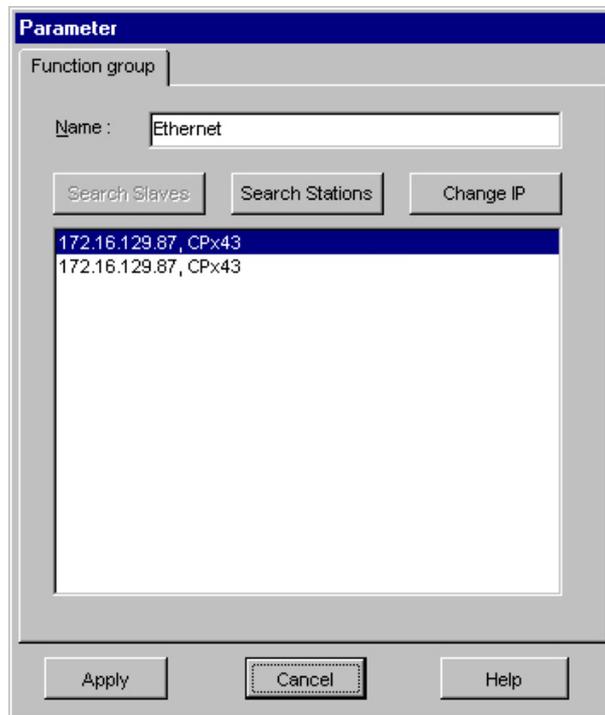


The online search is for the complete network up to the gateway. All available Ethernet couplers may be engineered online.

With CPs you have to take care that the project engineering computer is within the same IP circle like the CP.

Online search of CPs

With a click on [Search stations], an online search for CPs is executed and all found CPs are listed. Additionally the button [Change IP] appears.

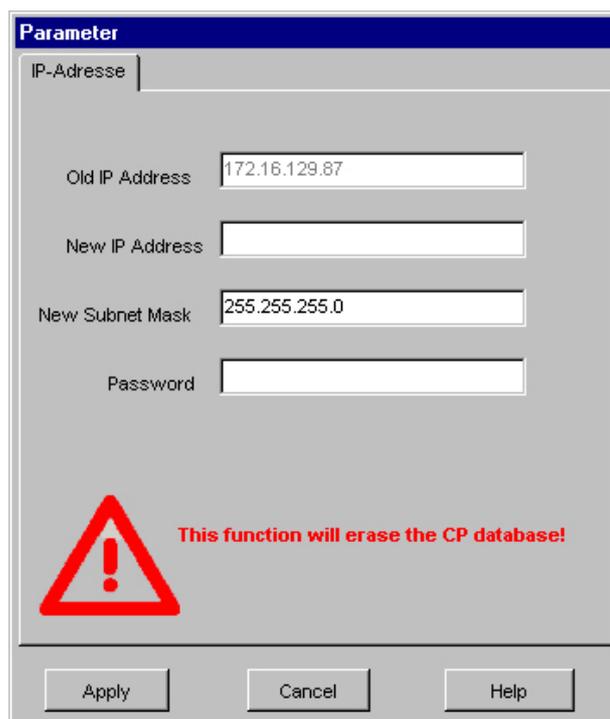


Change IP

As soon as you click on a CP in the CP list, you may change the IP address res. the subnet mask with [Change IP].

For this function deletes the project engineering in the CP, a password is required that is given at the CP project engineering.

In delivery state, the password is 00000000 (8xzero).

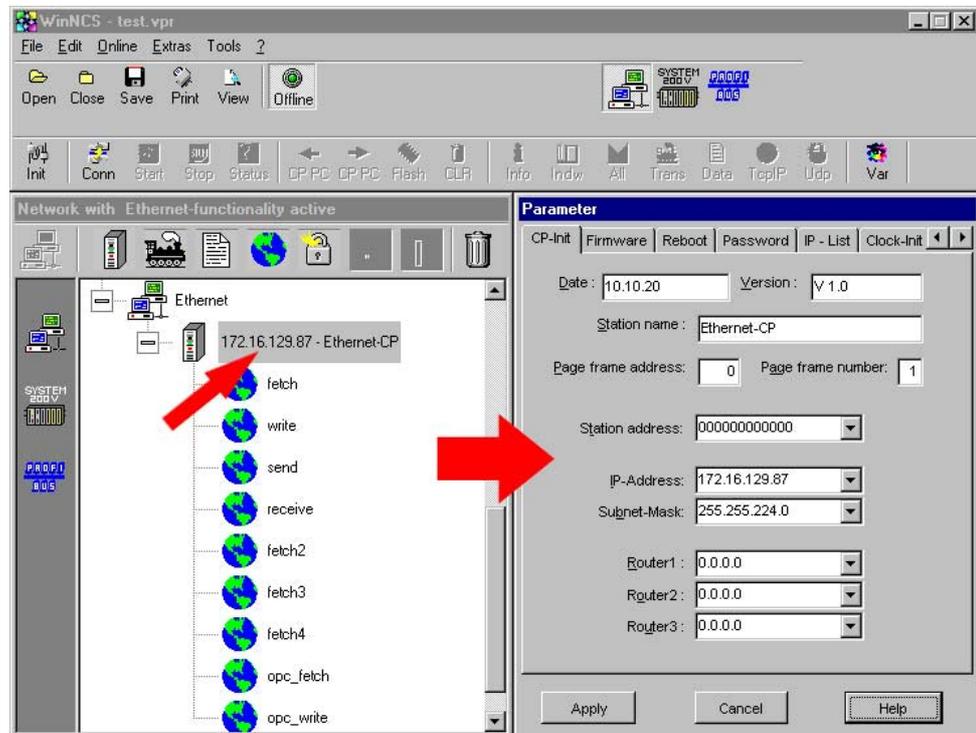


As soon as you set an IP address, subnet mask and a valid password, the new address data is transferred to the CP via [Apply]. The data transfer and the progress of the reboot is shown in WinNCS via a progress indicator. When the CP has ready booted, you get an acknowledgement and WinNCS returns to the dialog "Function group".

Parameter CP



You reach the "parameter" window by clicking on an Ethernet CP in the network list



The "parameter" window contains the following registers:

- CP-Init (Basic initialization of the CP)
- Firmware (Online firmware update)
- Reboot (Start online reboot at the CP)
- Password (Password for online engineering and firmware update)
- IP-List (Access protection for IP addresses)
- Clock-Init (Parameterization as time master)
- Parameter-IP (System parameter for the IP protocol)
- Parameter-H1 (System parameter for the H1 protocol)
- Sysconfig (Parameter for Performance improvement)
- Domain Name System (Symbolic address assignment for TCP/IP)
- Gateway (Translation of serial data to Ethernet protocol)



Note!

Please regard that not every CP supports all parameters. For more detailed information refer to the description of your CP.

Register CP-Init



The register *CP-Init* contains the basic initialization of your CP. Here you parameterize addresses and other identification parameter of the CP.

The screenshot shows the 'Parameter' dialog box for CP-Init. The dialog has several tabs: 'CP-Init', 'Firmware', 'Reboot', 'Password', 'IP - List', and 'Clock-Init'. The 'CP-Init' tab is selected. The fields are as follows:

- Date: 20.08.03
- Version: V 1.0
- Station name: Station 1
- Page frame address: 0
- Page frame number: 1
- Station address: 000000000001
- IP-Address: 000.000.000.000
- Subnet-Mask: 255.255.000.000
- Router1: 000.000.000.000
- Router2: 000.000.000.000
- Router3: 000.000.000.000

Buttons at the bottom: Apply, Cancel, Help.

Date, Version

The entry of date and version serves your own documentation. It always shows the last parameterization alteration. The version number follows no restrictions.

Station name

You may assign a name for the station (max. 19 characters). Station names serve the overview and eases the parameterization of connections. Please take care with the symbolic addresses that the symbolic name of a station res. its address and the station name of the parameterization here are identical.

This allows a stringent name assignment.

Page frame basic address

The page frame basic address fixes the start address of the 4 communication page frames that are mapped into the memory area of the control. Normally the PLC program works in the basic page frame. The other page frames are -if available- used by other controls in the system.

The page frame basic address must be divisible by 4 and is in the range between 0 and 252, i.e. you may insert the following values: 0, 4, 8, 12, ... 252. Within one control, the page frame basic addresses must not overlap. Some CPs are fixed to a page frame basic address of 0.

- Page frame number** Here you set how many page frames are used by the CP to communicate with the PLC. Some CPs are fixed to a page frame number of 1.
- Station address** Type the Ethernet address (station address) that is required for the H1 communication.
- IP address** Die IP address is a 32Bit address that must be unique within the network. The address is a combination of 4 numbers separated by a dot.
To build-up private IP networks within the internet, RFC 1597/1918 reserves the following address ranges:
- | | | | |
|----------|-------------|-----|-----------------|
| Class A: | 10.0.0.0 | ... | 10.255.255.255 |
| Class B: | 172.16.0.0 | ... | 172.31.255.255 |
| Class C: | 192.168.0.0 | ... | 192.168.255.255 |
- Your system operator has the IP address that is required for TCP/IP communication. The original IP address is to find on a label on the CP.
- Subnet mask** The IP subnet mask is a 32Bit filter mask for IP addresses. Deploying subnet masks, subnets are build-up by definition of IP number circles. Subnets only communicate with each other via router.
The address entered here has the same structure and value range like the IP address. For the project engineering of a CP with the PC, you have to make sure that PC and CP have the same subnet mask.
- Router** A router is able to connect different network topologies with each other like e.g. Ethernet with token ring. It also serves the connection of subnets. Router have one IP address per network that connect the networks logical. A connection of 2 networks via router has 2 addresses.
If you don't want to use router IP addresses you enter 0.0.0.0 at router.

Register Firmware



Depending on the used firmware on the CP, this register allows you to execute an online firmware update.

As soon as you have given a firmware file and a valid password and click upon [Apply], the firmware is transferred online to the CP defined by the IP address and activated.

This function is password protected. The password is preset in the register Password.

The screenshot shows the 'Parameter' dialog box with the 'Firmware' tab selected. The dialog has several tabs: CP-Init, Firmware, Reboot, Password, IP - List, and Clock-Init. The 'Firmware' tab contains three input fields: 'IP Address' with the value '000.000.000.000', 'Firmware' with a file selection button (three dots), and 'Password'. At the bottom of the dialog are three buttons: 'Apply', 'Cancel', and 'Help'.

IP address

This field contains the IP address of the destination station for the firmware update. Per default, the IP address of the currently engineered station is entered. The given IP address can be changed.

Firmware

Click on and choose a valid firmware file. The firmware may only be transferred with a valid password.

Password

Type the valid password for the CP portion. The password in delivery state is: 00000000 (8xzero).

The alteration happens in the register Password.

[Apply] firmware update

As soon as you entered IP address, firmware and password, the new firmware is transferred to the CP with [Apply] and the CP is rebooted.

The progress of the reboot and the firmware update is shown via a progress indicator. When the reboot is ready, there is an acknowledgement.

Register Reboot



Depending on the firmware of the CP, you may execute a reboot online. As soon as you entered a destination IP address and a valid password, the CP is rebooted with [Apply]. This function is password protected. The password is preset in the register Password.

The screenshot shows the 'Parameter' dialog box with the 'Reboot' tab selected. The 'IP Address' field contains '000.000.000.000' and the 'Password' field is empty. The 'Apply' button is highlighted.

The progress of the reboot is shown via a progress indicator. When the reboot is ready, there is an acknowledgement.

The screenshot shows the 'Parameter' dialog box with the 'Reboot' tab selected. The 'IP Address' field contains '0.0.0.0' and the 'Password' field contains '*****'. A progress indicator bar is visible below the password field, showing approximately 75% completion.

IP address

This field contains the IP address of the destination station for the reboot. Per default, the IP address of the currently engineered station is entered. The given IP address can be changed.

Password

Enter the password valid for the CP. The password in delivery state is to find in the description of your CP.

The alteration of the password happens in the register Password.

Reboot via [Apply] As soon as you click on [Apply], a reboot is executed at the CP. Reboot is only possible with valid password.

Register Password



Depending on the used firmware you may assign a password for the online firmware update and reboot.

This dialog window allows you to change the password. Enter the recent (old) password and twice the new one.

A click on [Apply] transfers the new password online to the CP defined by the IP address.



Note!

Please regard that the alteration of the password only happens online. Thus you have to make sure that your PC is able to communicate with the CP via the given IP address.

IP address

This field contains the IP address of the destination station for the reboot. Per default, the IP address of the currently engineered station is entered. The given IP address can be changed.

Old Password

Enter the recent valid password. Every CP is delivered with the password 00000000 (8xzero).

New Password

Type the new password for the CP. The password has to consist of at least 8 characters.

Repeat

For confirmation of the password, type it a second time.

Register IP-List



Starting with version 3.0.8, WinNCS gives you the option to control the access to a CP via IP-List. The access control only influences the transfer of project data via WinNCS res. from PU into CP and CPU.

The normal data transfer between CPs and PUs is not influenced.

By means of the IP-List you may exclude or include IP addresses res. address ranges for the project engineering. The access control is only active when you choose "WinNCS" or "PU" or both.

The IP-List is transferred together with the CP project engineering.

The screenshot shows the 'Parameter' dialog box with the 'IP-List' tab selected. The dialog has several tabs: 'CP-Init', 'Firmware', 'Reboot', 'Password', 'IP-List', and 'Clock-Init'. The 'IP-List' tab contains a 'Type' section with two radio buttons: 'Access denied for ...' (selected) and 'Access for ...'. Below this is a table with four columns: 'IP address from', 'IP address to', 'WinNCS', and 'PU'. The table has 10 rows, each with empty input fields for the IP addresses and checkboxes for 'WinNCS' and 'PU'. At the bottom of the dialog are 'Apply', 'Cancel', and 'Help' buttons.

IP address from	IP address to	WinNCS	PU
		<input type="checkbox"/>	<input type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>

Type

Type defines the type of the access list:

Access denied for ...

IP-List contains IP addresses that are not allowed to access the CP via WinNCS res. PU. The not listed addresses have access rights.

Access for ...

The list contains IP addresses that have access on the CP via WinNCS or PU. The not listed addresses have no access rights.

IP address fields

The IP address fields can be filled with single IP addresses or complete address ranges. A single IP field has to be entered in the left IP field. After [Apply] it is taken over into the right field.

WinNCS, PU

Depending on the chosen list type, you may here release or restrict the access for WinNCS res. PU.

Register Clock-Init



Every CP is able to work as master if parameterized accordingly.

The screenshot shows the 'Parameter' dialog box with the 'Clock-Init' tab selected. The dialog has several fields and options:

- Clock master:
- Time format:
 - MMS
 - BCD
- Dest. address:
 - Broadcast
 - Multicast
- Address: FFFFFFFFFF
- Cycle time sync.: 10

Buttons at the bottom: Apply, Cancel, Help.



Note!

At mixed deployment with Siemens CPs you have to make sure to use the MMS time format because this is the only one supported by Siemens.

Clock master

When the superordinated master (Clock transmitter) fails, the CP parameterized here can get a dynamic master. For this, the CP has to be highest priority and you have to use it as clock master.

For clock master mode you have to enter the destination address (Broadcast or Multicast) and at Multicast the destination Ethernet address. Time format and cycle time must be conform.

As slave, only time format and cycle time must be conform.

Destination address *Broadcast*

When choosing broadcast, the address is set to FFFFFFFFFFh. It is not changeable.

The clock telegrams are sent to all bus participants.

Multicast

The clock telegrams are only sent to the bus participants that are members of the multicast circle given by the address.

Address At the setting Broadcast this address is at FFFFFFFFh. At Multicast you type the address for the multicast circle.

Cycle time for SYNC telegrams You may choose the cycle time for sending a synchronization telegram in a range of 1...60 seconds. Default are 10s.
The synchronization telegram is transferred in MMS or BCD format.



Attention!

Please regard that time format and cycle time must be conformly parameterized within the system! The last byte of the Ethernet address of every Cp has to be different!

MMS format For the synchronization of foreign modules you may only use the MMS format. The clock telegram has the following structure:

----	tttt	Byte 0	t: time in ms starting at 0:00 o'clock
tttt	tttt	Byte 1	
tttt	tttt	Byte 2	
tttt	tttt	Byte 3	
dddd	dddd	Byte 4	d: Date in days starting from the 1.1.1984
dddd	dddd	Byte 5	
vkkk	kk--	Byte 6	v: Sign 0=+, 1=-; k: time change in 0,5 hours
----	--e-	Byte 7	e: 0=time of DCF; 1=time of replacement master

BCD format The BCD format is a simpler alternative. Please regard that the BCD format is not useable with all CPs.

1/10s	1/100s	Byte 0	Parts of seconds
10s	1s	Byte 1	Seconds
10m	1m	Byte 2	Minutes
ab10h	1h	Byte 3	a: Modus: 0=12h, 1=24h; b: 0=AM, 1=PM; Hours
www	----	Byte 4	0=Monday ... 6=Sunday
10T	1T	Byte 5	Day of month
10M	1M	Byte 6	Month
10J	1J	Byte 7	Year
v--k	kkkk	Byte 8	v: Sign: 0=+, 1=- k: time change in 0,5 hours
----	1/1000s	Byte 9	1/1000s
ssss	--em	Byte 10	s: Time status: (Click status in ANZW); e: Flag: 0=time of DCF; 1=time of rep. mast. m: Module valid: 0=valid, 1=invalid

Module valid means that the recent master-CP could be parameterized and does not work with default parameters.

Register Parameter-IP



The IP system parameters show the operating parameter of the TCP/IP communication on the network. The values should only be changed for very important reasons.

The screenshot shows a dialog box titled 'Parameter' with four tabs: 'Parameter-IP', 'Parameter-H1', 'System config', and 'Domain Name'. The 'Parameter-IP' tab is active. It contains several input fields for network parameters:

Keep Alive Time:	30000
Window size:	1024
Large Packets Num:	5
Large Packets Size:	1514
Small Packets Num:	5
Small Packets Size:	160
Huge Packets Num:	0
Huge Packets Size:	4096
Timeout Time:	10000

At the bottom of the dialog box, there are three buttons: 'Apply', 'Cancel', and 'Help'.

Keep Alive Time

This parameter shows the dissipation watch time of the TCP connection in ms. The dissipation watch time is the watch time for a connection when no telegram traffic occurs.

Value range: 0 to 999999 ms (Default: 30000 ms)

Window Size

Size of the data window.

Value range: 1 to 65535 (Default: 1024)

Large Packets Num

Number of send and receive buffer.

Value range: 1 to 65535 (Default: 5)

Large Packets Size

This setting is fix on 1514 for Ethernet.

Small Packets Num

Number of acknowledgement telegrams.

Value range: 1 to 65535 (Default: 5)

Small Packets Size

Size of the small packages.

Value range: 1 to 65535 (Default: 160)

Timeout Time

System internal CP parameter; this value shouldn't be changed.

Value range: 1 to 999999 (Default: 10000)

Register Parameter-H1



The H1 system parameters are the operating parameters of the level 4, required for the slave-master-communication. The values should only be changed for very important reasons.

The screenshot shows the 'Parameter' dialog box with the 'Parameter-H1' tab selected. The dialog contains the following fields and values:

Parameter Name	Value	Parameter Name	Value
Min. Credit	0	Retrans timeout	100
Persistence Count	1	Min retrans timeout	10
Abort Timeout	6000	Closing abort timeout	600
Protocol Option	2	Flow ctrl. win timeout	1000
Protocol Class	4	Inactivity max. count	3
TPDU Size	10	Open win timeout	10
TPDU additional	3	Max open win count	8

Buttons at the bottom: Apply, Cancel, Help.

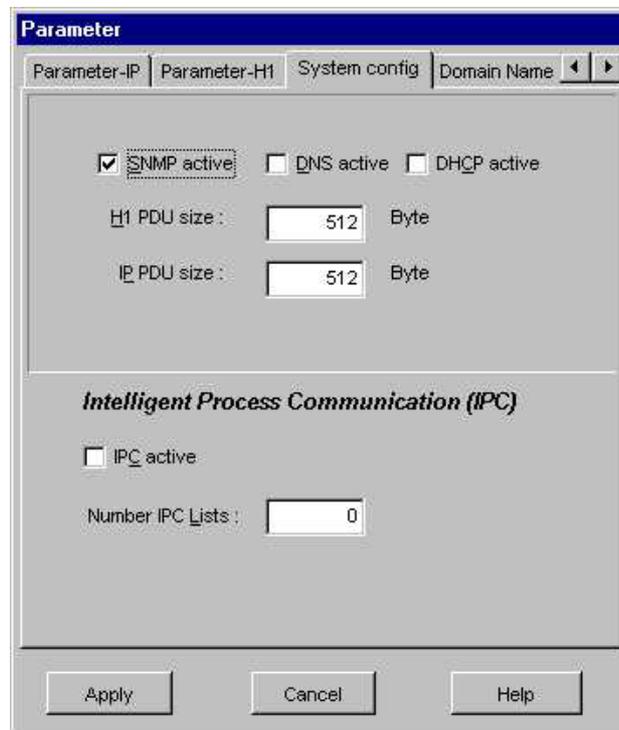
- Min. Credit** The CP uses per se a Credit 0 procedure. The value is fix at 0 and can not be altered.
- Persistence Count** Value range 0 to 65535 (Default: 1)
- Abort Timeout** Persistence count x Abort Time = max. time within the TP4 protocol stack establishes the connection res. waits for connection.
Value range 0 to 65535 with unit 10ms (Default: 6000).
- Protocol Option** This value is fix at 2 and can not be altered.
- Protocol Class** This value is fix at 4 and can not be altered.
- TPDU Size** Value range 0 to 13 (Default: 10)
- TPDU Additional Options** This value is fix at 3 and can not be altered.

Retrans. Timeout	Time interval for the Connect Retry in time window Abort-Timeout. Value range 0 to 65535 with unit 10ms (Default: 100)
Min. Retrans Time	Retransmission of not acknowledged data frames. Value range 0 to 65535 with unit 10ms (Default: 10)
Closing Abort Timeout	Maximum time within the partner can acknowledge frames. Value range 0 to 65535 with unit 10ms (Default: 600)
Flow Control Window Timeout	Idle control of a connection. Value range 0 to 65535 with unit 10ms (Default: 1000)
Inactivity Max. Count	Idle control of a connection. Value range 1 to 65535 (Default: 3)
Open Window Timeout	Retransmission of not attested acknowledges with Credit > 1. Value range 0 to 65535 with unit 10ms (Default: 10)
Max Open Window Count	Retransmission of not attested acknowledges with Credit > 1. Value range 1 to 65535 (Default: 8)

Register System config



With system config, a dialog window for general settings for the system to speed-up the performance opens.



SNMP active

If chosen, the **S**imple **N**etwork **M**anagement **P**rotocol (short: SNMP) is used. SNMP controls networks from different manufacturers via a central administration-PC. The protocol uses UDP packages for send and receive. SNMP allows the system operator to call several SNMP information services. This causes the transfer of variables that inform e.g. about the module state.

As default SNMP is active.

DNS active

The **D**omain **N**ame **S**ystem (short DNS) is the bridge between symbolic name and IP address. This makes the communication more comfortable. A DNS server is used where the communication is led via a domain.

The DNS server administrates the symbolic names and combines the symbolic names with IP addresses via the "Host-Name-Table".

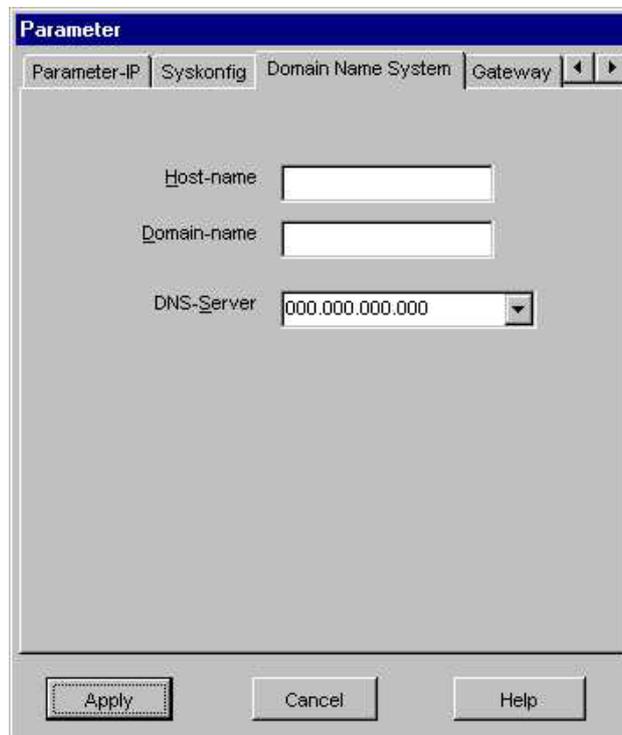
As default DNS is active.

DHCP active	<p>DHCP stands for Dynamic Host Configuration Protocol. If chosen, the IP address for this station is assigned dynamically. Like at the Domain Name Server there is a DHCP server that administrates the IP addresses and assigns them dynamically.</p> <p>Administrators may fix groups of addresses, called „ranges“. At the address allocation automatically an address is assigned that is within the DHCP section of this part of the network.</p> <p>As default DHCP is active.</p>
H1 PDU Size	<p>Maximum size of the H1 data blocks in Byte that may be transferred on network level. PDU stands for Protocol Data Unit and means one data block.</p> <p>Value range: 0..65535</p> <p>Default: 512</p>
IP PDU Size	<p>Maximum size of the IP data blocks in Byte that may be transferred on network level. PDU stands for Protocol Data Unit and means one data block.</p> <p>Value range: 0..65535</p> <p>Default: 512</p>
IPC	<p>At the Intelligent Process Communikation IPC, also called spontaneous operation, data is send to the host for one time on CP request. Afterwards only data that has been changed since the last transfer is transferred. The IPC is used for communication between host and several CPs.</p> <p>This acyclic transfer method is faster and causes significant less netload than the cyclic transfer.</p> <p>This allows the data aquisition of several hundred PLC systems via TCP/IP.</p> <p>IPC is only permissible with FETCH order types and is supported by other visualization systems.</p> <p>As default IPC is active.</p>
Number IPC Lists	Type the number of IPC orders.

Register Domain Name System



This register collects the data required for the deployment of a DNS server.

A screenshot of a software dialog box titled 'Parameter'. The dialog has four tabs: 'Parameter-IP', 'Syskonfig', 'Domain Name System', and 'Gateway'. The 'Domain Name System' tab is selected. Inside the dialog, there are three input fields: 'Host-name' (a text box), 'Domain-name' (a text box), and 'DNS-Server' (a dropdown menu showing '000.000.000.000'). At the bottom of the dialog are three buttons: 'Apply', 'Cancel', and 'Help'.**Host-Name**

Symbolic name that is used for your system within the domain.

Domain-Name

Domain where your automation system is linked-up to like e.g. "company.com".

DNS-Server

IP address of the computer that serves as DNS server.

Register Gateway



The gateway is a router to translate serial data to an Ethernet protocol (TCP/IP or H1) and vice versa. You have to set the following logical and physical parameters:

The screenshot shows the 'Parameter' dialog box with the 'Gateway' tab selected. The fields are as follows:

- Protocol: RK512
- Baudrate: 9600
- Data Bits: 8
- Parity: even
- Stop Bits: 2
- Flow Control: Hardware
- 3964 / RK512**
 - ZNA: 0 ms
 - ZVZ: 200 ms
 - QVZ: 500 ms
 - BWZ: 10000 ms
 - STX: 3
 - DBL: 6
 - Priority: 1
 - Buffer Size: 128
 - RK512 QVZ: 5000 ms

Buttons at the bottom: Apply, Cancel, Help.

Physicalic parameters

Protocol

As protocol type, the protocols RK512 and RK512R are available.

Default: RK512

Baudrate

The chooseable baudrates are 150, 300, 600, 1200, 1800, 2400, 4800, 7200, 9600, 14400, 19200, 38400, 57600, 115000

Default: 9600

Data Bits

5, 6, 7, 8

Default: 8

Parity

None, odd, even

Default: even

Stop Bits

1, 1.5, 2

Default: 2

Flow Control

None, Hardware, XON/XOFF

Default: Hardware

Logical parameters for 3964/RK512	<i>ZNA</i>
	Time after the send order in ms
	Default: 0
	<i>ZVZ</i>
	Check EOM for reception in ms
	Default: 200
	<i>QVZ</i>
	Acknowledgement delay time for STX at send in ms
	Default: 500
	<i>BWZ</i>
	Block delay time at reception in ms
	Default: 10000
	<i>STX</i>
Number of retries for connection initiation.	
Default 3	
<i>DBL</i>	
Number of retries for data blocks	
Default: 6	
<i>Priority</i>	
Priority of the communication	
0 = LOW, >0 = High	
Default: 1	
<i>Buffer Size</i>	
Buffersize for a connection	
Default: 128	
<i>RK512 QVZ</i>	
Time for the logical response telegram in ms	
Default: 5000	

Engineer CP connections for TCP/IP

Overview

Precondition You've build-up an Ethernet network with at least one CP.

Overview connections As soon as the station is high-lighted, you may add following connections to your project:

- TCP connection also as Multi-TCP connection
- UDP connection also as Multi-UDP connection

TCP connection



Add a TCP connection with this button. A TCP connection transfers the data to the partner, connection orientated and with acknowledgement. You may engineer your TCP connection also as Multi connection.

UDP connection



This symbol assigns an UDP connection to a station. The UDP connection is a connection free not always reliable communication service.

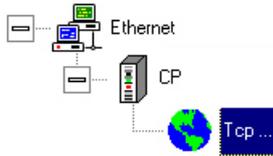
Combination options

The following tables show the options for order and connection types as well as their combination.

Please regard that not all types are supported by every CP. For more detailed information please refer to the according manual.

Order type	Order priority	Structure	Order model
SEND	1 / 2	Active	TCP / UDP / TRADA / RFC 1006
RECEIVE	1 / 2	Passive	TCP / UDP / TRADA / RFC 1006
SEND	1 / 2	Active	TCP / UDP / TRADA / RFC 1006
RECEIVE			(Multi connection)
RECEIVE	1 / 2	Passive	TCP / UDP / TRADA / RFC 1006
SEND			(Multi connection)
SEND	3	Active	TCP / TRADA
RECEIVE	3	Passive	TCP / TRADA
FETCH active	2 (fix)	Active	TCP / IPK
FETCH passive	2 (fix)	Passive	TCP / IPK
WRITE active	2 (fix)	Active	TCP
WRITE passive	2 (fix)	Passive	TCP

TCP connection



The register "TCP connection" allows the entry of connection orientated TCP connections.

TCP provides the secure addressing of the stations by using port numbers.

The screenshot shows the 'Parameter' dialog box for configuring a TCP connection. The dialog has three tabs: 'TCP connection', 'Multiconnection', and 'System parameter'. The 'TCP connection' tab is active. The fields are as follows:

- Connection name: Tcp ...
- Page frame offset: 0
- Order number: 10
- Priority: 2
- Order type: Send
- Order model: Single order
- Local station Port: 1500
- Foreign station Port: 1300
- IP-Addr: 0.0.0.0 (unchecked)
- Host-name: (empty)
- Attempt: 0

Buttons at the bottom: Apply, Cancel, Help.

- Connection name (Identification in the system)
- Page frame offset, order number (connection to the PLC)
- Order type, order model, priority (character of the connection)
- Port, IP address (addressing)

Identification in the system

For the identification in the whole system you may assign a name to every connection.

Connection to the PLC

Via the parameters page frame offset and order number the PLC gets a reference for a connection. Set them in the handling block via SSNR and ANR.

Character of the connection

Order type, order model and the priority characterize a connection.

Under *order type* you define the direction (send or receive).

Order model allows you to choose between single order, transparent data transfer without acknowledgement (communication with different telegram lengths via header), intelligent process communication (data send only after changes) and RFC 1006 (Protocol set for sequential data handling in telegrams).

Priority fixes how to handle the data.

Addressing

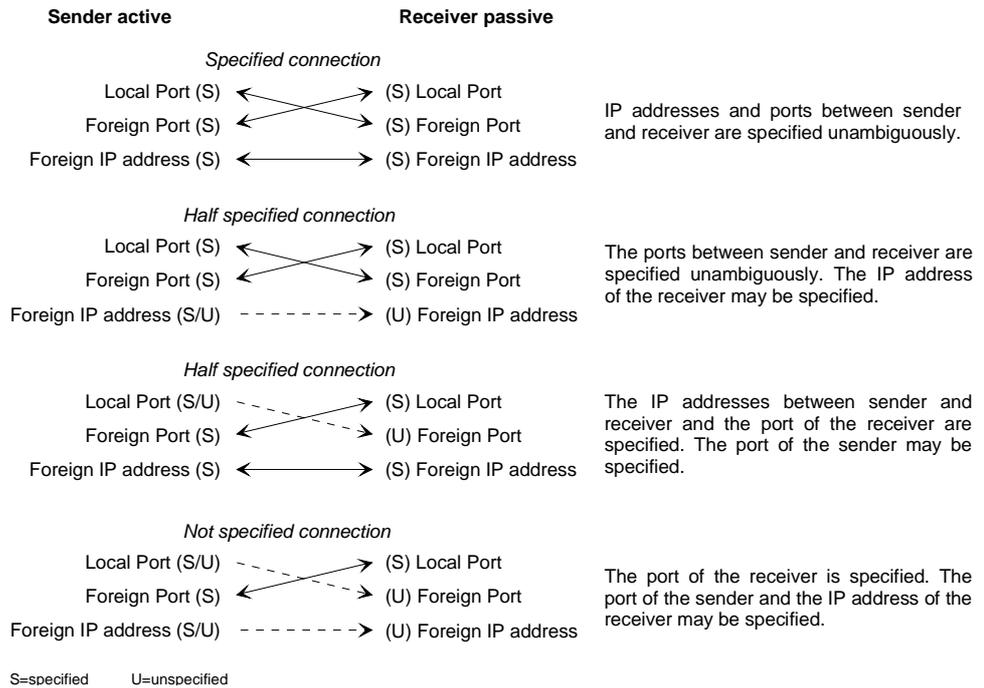
The addressing happens via ports and IP addresses.

If you've typed a station name under *host name*, the system tries to communicate with its host name via a Domain Name Server. This is tried for the "attempt" number of times. Afterwards, the IP address is automatically used if it is active.

Without a host name, the station always uses the IP address. For this kind of communication, a communication channel defined by ports has to be build-up.

unspecified ports and IP address

You may define port and IP address unspecified, i.e. port and IP address are not relevant for evaluating telegrams if you type 0 as port address res. 0.0.0.0 as IP address. The following combinations are possible:



Parameter TCP connection

Connection name	You may assign a name for your connection. The length is up to 32 characters.
Page frame offset (SSNR)	<p>The page frame offset (SSNR-Offset) defines the offset to the basic interface number (Basis-SSNR). The basic interface number is given at initialization. At mono processor operation, the page frame offset has to be set at 0. At multi processor systems, the value is between 0 and 3.</p> <p>Please regard the following options:</p> <p>CPU 1 communicates via page frame 1 (Basis-SSNR+ SSNR-Offset 0) CPU 2 communicates via page frame 2 (Basis-SSNR+ SSNR-Offset 1) CPU 3 communicates via page frame 3 (Basis-SSNR+ SSNR-Offset 2) CPU 4 communicates via page frame 4 (Basis-SSNR+ SSNR-Offset 3)</p> <p>Value range: 0 to 3</p>
Order number (ANR)	<p>Every connection that will be called by a PLC handling block needs an order number. Together with the page frame offset, the PLC program is able to call the connection. Thus, an order number must not exist twice and causes an error warning at parameterization in WinNCS. Within the control program, the order number (ANR) is given to a PLC handling block together with the page frame offset number (SSNR).</p> <p>Value range: 1 to 199</p>
Priority	<p>This parameter sets the priority of the telegram on the CP. The priority may range between 1 (highest priority) to 3 (lowest priority).</p> <p>Connections with the priorities 1 and 2 are –seen from connection link-up– so called static connections, i.e. after a connection termination (evtl. initialized by a reset handling block) the connection establishing is retried.</p> <p>Connections with priority 3 are –seen from connection link-up– so called dynamic connections, i.e. after a connection termination the connection establishing is not retried. The connection link-up happens by means of an order of the application to the connection. If the connection is established, it remains active until a termination is initialized.</p> <p>Orders with priority 1 differ to the ones with priority 2 and 3 in order processing. The size of the user data is limited to the defined block size. A block via the ALL handling blocks does not happen.</p> <p>These rules are only valid for connection orientated orders via TCP.</p> <p>Value range: 1 to 3</p>

Order type

Choose the order type. The following order types are available:

Send Directly	Send unstructured data.
Receive Directly	Receive unstructured data.
Fetch Active	Read requested data from another control.
Fetch Passive	Used for the passive part of Fetch.
Write Active	Write requested data in another control.
Write Passive	Used for the passive part of Write.

Order model

The following order models are available:

Single order

SEND and RECEIVE receive the telegrams in TCP protocols as user data without preceded header. Under the model "single order" the telegram data transfer should be defined via fixed telegram lengths! The joker length -1 in the RECEIVE-FB is not permissible!

Trada without acknowledgement

TRADA stands for TRANSPARENT DATA exchange. TRADA serves the communication via TCP with differing telegram lengths. The user data is preceded by a PLC header that contains the number of user data. The order type RECEIVE evaluates this header and the user data is transferred to the control with the defined length.

For this the joker length -1 in the RECEIVE-FB is permissible.

IPC

At the intelligent process communication IPC, also referred to as spontaneous operation, data is sent for one time from the CP to the PC at request. Afterwards only the altered data is sent. The IPC is used for the communication between one PC and several CPs. IPC is only permissible with the FETCH order types.

RFC 1006

RFC 1006 provides as protocol extension of TCP the secure packaging of TCP telegrams. With RFC1006 only SEND and RECEIVE orders are permissible. Besides of the IP address TSAPs instead of ports are used for the addressing.

For every SEND order the CP automatically creates a RECEIVE order and vice versa. The assignment of order numbers for automatically created orders follow some rules.

Port address for local and foreign stations

The port address fixes the connection address where the data is exchanged. The port address of the local station is comparable to the own TSAP at the H1 level. The port address for the local station consists of a 5 digit decimal code (16Bit address). TCP as well as UDP use port addresses for the data transfer to the according application level. Please regard that some ports between 0 and 255 are reserved for special services. The port addresses of the local and the foreign station must be different from each other.

Value range: 0 to 65536

IP address

The IP address is a 32Bit address that must be unique within the network. The address is a combination of 4 numbers separated by a dot.

Value range: 000.000.000.000 to 255.255.255.255

At activated IP address, the given IP address is used after the defined number of attempts to find a DNS server. Otherwise the station name given under host name is used.

Ask your system operator for the IP address res. the host name.

You may type the port address res. the IP address unspecified, i.e. typing 0 as port address res 0.0.0.0 as IP address, port res. IP address are not relevant for evaluating telegrams.

TCP connection with RFC 1006

RFC 1006

The TCP transport service is stream orientated. This means that data packages arranged by the user are not necessarily delivered in the same sequence. Packages may be transferred together where the partner is not able to identify the packet borders.

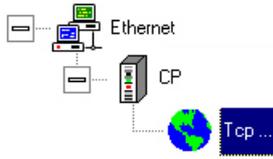
This purpose is fulfilled by the protocol set RFC 1006. The protocol set describes the operation mode of an ISO transport interface (ISO 8072) based upon the transport interface TCP (RFC793).

For RFC 1006 runs as protocol set of TCP, the decoding takes place in the data section of the TCP packet.

Directives for the project engineering

- At RFC 1006 only SEND and RECEIVE orders are permissible.
- For every SEND order, the CP automatically creates a RECEIVE order and vice versa. The assignment of order numbers has to follow this restrictions:
 - SEND orders may only have odd order numbers. The automatically generated RECEIVE order gets the next higher odd order number (Example: SEND, ANR:5 >> RECEIVE, ANR:6)
 - RECEIVE orders may only have even order numbers. The automatically created SEND order gets the next lower order number (Example: RECEIVE, ANR:3 >> SEND, ANR:2)
- The automatically created orders are not monitored in WinNCS.
- For the addressing, IP addresses and TSAPs instead of ports are used.
- At TSAPs it is separated between small and capital letters.
- The maximum length of a TSAP is 8 characters. The length has to be set in WinNCS.
- Independent from the used protocol, the standard SEND and RECEIVE orders in the PLC are necessary for data transfer.

TCP Multi connection



The register "Multi connection" allows you to parameterize multi connections. You may install a new connection for a connection parameterized under "TCP connection" with reverse order type. The IP addresses, port numbers, page frame offset and priority of the already configured connection are used. You must only type a new order number. At a TCP connection you may parameterize another multi connection now.

The screenshot shows the 'Parameter' dialog box with the 'Multiconnection' tab selected. The dialog is titled 'Parameter' and has three tabs: 'TCP connection', 'Multiconnection', and 'System parameter'. The 'Multiconnection' tab is active, showing settings for a connection named 'TCP-Multi 2'. The settings are as follows:

Parameter	Value
Page frame offset:	0
Order number:	20
Priority:	2
Order type:	Send
Page frame offset:	0
Order number:	21
Priority:	2
Order type:	Receive

At the bottom of the dialog, there are three buttons: 'Apply', 'Cancel', and 'Help'.

At a multi connection you only have to type a new *order number*.

Page frame offset and *priority* are taken over from the already existing connection. At a multi connection these values can not be altered.

Automatically the reverse *order type* is set. The addressing (Port, IP address) is taken over vice versa.

Parameter TCP multi connection

Page frame offset (SSNR) The page frame offset (SSNR-Offset) defines the offset to the basic interface number (Basis-SSNR). The basic interface number is given at initialization. At mono processor operation, the page frame offset has to be set at 0. At multi processor systems, the value is between 0 and 3.

Please regard the following options:

CPU 1 communicates via page frame 1 (Basis-SSNR+ SSNR-Offset 0)

CPU 2 communicates via page frame 2 (Basis-SSNR+ SSNR-Offset 1)

CPU 3 communicates via page frame 3 (Basis-SSNR+ SSNR-Offset 2)

CPU 4 communicates via page frame 4 (Basis-SSNR+ SSNR-Offset 3)

Value range: 0 to 3

Order number (ANR) Every connection that will be called by a PLC handling block needs an order number. Together with the page frame offset, the PLC program is able to call the connection. Thus, an order number must not exist twice and causes an error warning at parameterization in WinNCS. Within the control program, the order number (ANR) is given to a PLC handling block together with the page frame offset number (SSNR).

Value range: 1 to 199

Priority This value is taken from the defined connection. At a multi connection, this value is not alterable.

This parameter sets the priority of the telegram on the CP. The priority may range between 1 (highest priority) to 3 (lowest priority).

1 is the so called express priority, 2 and 3 are the normal priorities. The priorities 0 and 4 are not supported. The express priority has no faster data transfer than the normal priorities.

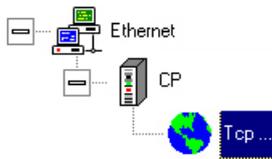
Value range: 1 to 3

Order type The opposite order type is chosen automatically.
The following order types are available:

Send: Send unstructured data.

Receive: Receive unstructured data.

TCP system parameter



The register "System parameter" allows you to set areas for the indirect addressing and parameters for the intelligent process communication (IPC). The indirect addressing is only permissible with the order types FETCH and WRITE.

The screenshot shows the 'Parameter' dialog box with the 'System parameter' tab selected. The dialog is divided into two main sections: 'indirect addressing' and 'Intelligent Process Communication (IPC)'. The 'indirect addressing' section has a table with columns for 'Operand', 'DB-Nr.', 'Offset', and 'Length'. The 'Intelligent Process Communication (IPC)' section has fields for 'Timeout' (in ms) and 'PDU-Size' (in Bytes). At the bottom, there are 'Apply', 'Cancel', and 'Help' buttons.

	Operand	DB-Nr.	Offset	Length
Source/Dest.	<input type="text"/>	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>
Display word	<input type="text"/>	<input type="text" value="0"/>	<input type="text" value="0"/>	

Intelligent Process Communication (IPC)

Timeout: ms

PDU-Size: Bytes

Indirect addressing You may set a static connection orientated area where information about data source, data destination and indicator word are stored. The indirect addressing is only permissible for the order types FETCH and WRITE. Under *Source/destination*, you type the data area of the PLC where data source/destination are defined. In *Indicator word* you set the data area where the indicator word range is defined.

Intelligent process communication For every connection of the order model IPC you may set a time window in *timeout* within the CP has to communicate with the CPU. The maximum size of the IPC data area is defined via the parameter *PDU-Size*.

Parameter TCP system parameter

Source/Destination Gives the source/destination for FETCH/WRITE in the own automation device. You may set one of the following values:

Operand	DB-No.	Offset	Length	Type
DB	1..255	0..2047	1..2048	Data block
MB		0..255	1..256	Bit memory byte
EB		0..127	1..128	Input byte
AB		0..127	1..128	Output byte
PB		0..255	1..256	Periphery byte
ZB		0..255	1..256	Counter cells
TB		0..255	1..256	Time cells
BS		0..511	1..512	System data
AS		0..32767	1..32768	Absolute addresses
DX	1..255	0..2047	1..2048	Data block extended
DE	1..255	0..2047	1..2048	Data block extern
QB		0..255	1..256	Periphery byte extended
SB		0..4095	1..4096	Extra bit memory

Indicator word Gives a data word of the CPU address area for FETCH and WRITE where the data is stored.

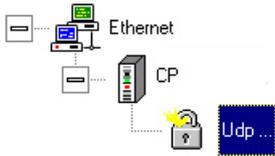
Operand	DB-No.	Address	Type
DB	1..255	0..2040	Data block
DX	1..255	0..2040	Data block extended
MW		0..252	Bit memory word

Hints to the assignment of data blocks at the indirect addressing is to find in the description of your standard handling blocks.

Timeout Type a time window for every IPC connection within which the CP has to communicate with the CPU.

PDU-Size The maximum size of the IPC data area.

UDP connection



At UDP the telegrams are transferred without reception acknowledgement.

UDP is convenient for the transfer of permanently changing data. If one transfer fails, the next up-to-date transfer comes already after a few seconds.

The screenshot shows the 'Parameter' dialog box for a 'Multiconnection' UDP connection. The 'Connection name' is 'Udp ...'. The 'Page frame offset' is 0, 'Order number' is 3, and 'Priority' is 2. The 'Order type' is 'Send' and the 'Order model' is 'Multicast'. The 'Local station' port is 1025 and the 'Foreign station' port is 1025. The 'IP-Addr' is 0.0.0.0, 'Host-name' is empty, and 'Attempt' is 0. Buttons for 'Apply', 'Cancel', and 'Help' are at the bottom.

- Connection name (Identification in the system)
- Page frame offset, order number (Connection to PLC)
- Order type, order model, priority (Character of the connection)
- Port, IP address (Addressing)

Identification in the system

For the identification in the complete system, you may assign an according name to your connection.

Connection to PLC

Via the parameters page frame offset and order number you set a connection identification in your PLC by defining it for your handling block via SSNR and ANR.

Character of the connection

Order type, order model and the priority characterize the connection. Under *Order type* you set the direction (send or receive). The *Order model* allows you to choose between *Multicast* (addressed are all multicast circle stations) and *Broadcast* (send via Broadcast address). The *priority* defines how to handle the data.

Addressing

The addressing takes place via port and IP address. If you've assigned a station name under *Host Name*, this is used to communicate via a Domain Name Server. If this attempts fail after the given number of trials, the selected IP address is used if it is activated by a tick. Without a host name, always the IP address is used. Please regard that some CPs need a port address with UDP.

Parameter UDP connection

Connection name You may assign a name to your connection. The maximum length is 32 characters.

Page frame offset (SSNR) The page frame offset (SSNR-Offset) defines the offset to the basic interface number (Basis-SSNR). The basic interface number is given at initialization. At mono processor operation, the page frame offset has to be set at 0. At multi processor systems, the value is between 0 and 3. Please regard the following options:

CPU 1 communicates via page frame 1 (Basis-SSNR+ SSNR-Offset 0)

CPU 2 communicates via page frame 2 (Basis-SSNR+ SSNR-Offset 1)

CPU 3 communicates via page frame 3 (Basis-SSNR+ SSNR-Offset 2)

CPU 4 communicates via page frame 4 (Basis-SSNR+ SSNR-Offset 3)

Value range: 0 to 3

Order number (ANR)

Every connection that will be called by a PLC handling block needs an order number. Together with the page frame offset, the PLC program is able to call the connection. Thus, an order number must not exist twice and causes an error warning at parameterization in WinNCS. Within the control program, the order number (ANR) is given to a PLC handling block together with the page frame offset number (SSNR).

Value range: 1 to 199

Priority

This parameter sets the priority of the telegram on the CP. The priority of UDP connections is 1 or 2. Priority 1 is the highest priority.

Connections with the priorities 1 and 2 are –seen from connection link-up– so called static connections, i.e. after a connection termination (possible initialized by a reset handling block) the connection establishing is retried.

Orders with priority 1 differ to the ones with priority 2 in the internal order processing. The size of the user data is limited to the defined block size. A block via the ALL handling blocks does not happen.

Value range: 1 to 2

Order type	<p>Choose the order type. The following order types are available:</p> <p>Send: Send unstructured data.</p> <p>Receive: Receive unstructured data.</p>
Order model	<p>The model defines the transfer type. You may send unsecure telegrams to one receiver, a chooseable receiver group or to all receiver.</p>
<i>Multicast</i>	<p>Unsecure order for the chosen multicast circle. This is a connection that is not send to all stations but only to those within the same multicast circle number. The destination group is defined via the IP address. As soon as you choose multicast here, the multicast ID is set in the IP address.</p>
<i>Broadcast</i>	<p>Connection free sending of single messages to all partners of the defined broadcast address res. reception of single messages from partners sending via the defined broadcast address.</p> <p>The broadcast address is 255.255.255.255.</p>
Port address for local and foreign station	<p>The port address defines the connection address where the data is exchanged. The port address for the local station is comparable with the own TSAP on the H1 level. The port address for the local station consists of a 5 digit decimal number (16Bit address). TCP as well as UDP use port addresses for data transfer to the according application level. Please regard that some ports between 0 to 255 are reserved for common services.</p> <p>Value range: 0 to 65535</p>
IP address	<p>The IP address is a 32Bit address that must be unique within the network. The address consists of 4 numbers separated by a dot. Here you define multicast circles. Multicast circles are defined in the range 224.0.0.0 to 239.255.255.255.</p> <p>Ask your system operator for the IP address.</p> <p>Value range: 000.000.000.000 to 255.255.255.255</p>

UDP multi connection



The register "multi connection" gives you the opportunity to parameterize multi connections. A multi connection is a multiple connection. You may install a new connection for a connection parameterized under "UDP connection" with reverse order type. The IP addresses, port numbers, page frame offset and priority of the already configured connection are used. You must only type a new order number.

The screenshot shows a dialog box titled "Parameter" with two tabs: "UDP Connection" and "Multiconnection". The "Multiconnection" tab is active, showing a section titled "UDP-Multi2". The parameters are as follows:

Parameter	Value
Page frame offset	0
Order number	3
Priority	2
Order type	Send
Page frame offset	0
Order number	11
Priority	2
Order type	Receive

At the bottom of the dialog box, there are three buttons: "Apply", "Cancel", and "Help".

At a multi connection you only have to type a new *order number*. *Page frame offset* and *priority* are taken over from the already existing connection. At a multi connection these values can not be altered. Automatically the reverse *order type* is set. The addressing (Port, IP address) is taken over vice versa.

Parameter UDP multi connection

Page frame offset (SSNR) The page frame offset (SSNR-Offset) defines the offset to the basic interface number (Basis-SSNR). The basic interface number is given at initialization. At mono processor operation, the page frame offset has to be set at 0. At multi processor systems, the value is between 0 and 3.

Please regard the following options:

CPU 1 communicates via page frame 1 (Basis-SSNR+ SSNR-Offset 0)

CPU 2 communicates via page frame 2 (Basis-SSNR+ SSNR-Offset 1)

CPU 3 communicates via page frame 3 (Basis-SSNR+ SSNR-Offset 2)

CPU 4 communicates via page frame 4 (Basis-SSNR+ SSNR-Offset 3)

Value range: 0 to 3

Order number (ANR) Every connection that will be called by a PLC handling block needs an order number. Together with the page frame offset, the PLC program is able to call the connection. Thus, an order number must not exist twice and causes an error warning at parameterization in WinNCS. Within the control program, the order number (ANR) is given to a PLC handling block together with the page frame offset number (SSNR).

Value range: 1 to 199

Priority This value is taken from the defined connection. At a multi connection, this value is not alterable.

This parameter sets the priority of the telegram on the CP. The priority may range between 1 (highest priority) to 3 (lowest priority).

1 is the so called express priority, 2 and 3 are the normal priorities. The priorities 0 and 4 are not supported. The express priority has no faster data transfer than the normal priorities.

Value range: 1 to 3

Order type The opposite order type is chosen automatically.
The following order types are available:

Send: Send unstructured data.

Receive: Receive unstructured data.

Engineer CP connections for H1

Overview

Preconditions You've build-up an Ethernet network with at least one CP.

Overview connections As soon as you select a station, you may insert the following connections in your project:

- H1 transport connection also as Multi connection
- H1 datagram connection also as Multi connection

H1 transport connection



Insert a H1 transport connection by means of this button. At a H1 transport connection the data is transferred connection orientated with acknowledgement of the partner. Here you may also parameterize the H1 transport connection as multi connection.

H1 datagram connection



This symbol assign an H1 datagram connection to a station. The datagram connection serves a relation free not always secure communication service.

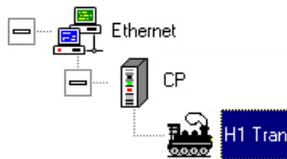
Combination options

The following tables list all possible order and connection types with their combinations.

Please regard that not every CP supports all types. Please refer to the CP documentation.

Order type	Order priority	Type	Read/Write	Order model
SEND	0 / 1	Active	No	Datagram
RECEIVE	0 / 1	Passive	No	Datagram
SEND	2 / 3 / 4	Active	No	Transport
RECEIVE	2 / 3 / 4	Passive	No	Transport
SEND	2	Active	No	Transport (Multi connection)
RECEIVE	2	Passive	No	Transport (Multi connection)
SEND				
FETCH active	2 (fix)	Active	Yes	Transport
FETCH passive	2 (fix)	Passive	Yes	Transport
WRITE active	2 (fix)	Active	Yes	Transport
WRITE passiv	2 (fix)	Passive	Yes	Transport

H1 transport connection



The register "H1-Transport connection" allows the entry of connection orientated H1 connections.

H1 provides the secure addressing of the stations by deployment of TSAPs.

The screenshot shows the 'Parameter' dialog box for configuring an H1-Transport connection. The dialog has two tabs: 'Multiconnection' (selected) and 'System parameter'. The 'Connection name' field contains 'Transport ...'. The 'Page frame offset' is set to 0, 'Order number' to 1, and 'Priority' to 2. The 'Order type' dropdown is set to 'Send'. The 'Local TSAP' section has 'Asc' set to 'nordpol', 'Length' to 7, and 'Hex' to '6E6F7264706F6C'. The 'Foreign TSAP' section has 'Asc' set to 'südpol', 'Length' to 6, 'Hex' to '73FC64706F6C', and 'Address' set to '0020D5000000'. At the bottom are 'Apply', 'Cancel', and 'Help' buttons.

- Connection name (Identification in the System)
- Page frame offset, order number (connection to the PLC)
- Order type, priority (character of the connection)
- TSAP, Ethernet address (Addressing)

Identification in the system

For the identification in the whole system you may assign a name to every connection.

Connection to the PLC

Via the parameters page frame offset and order number the PLC gets a reference for a connection. Set them in the handling block via SSNR and ANR.

Character of the connection

Order type and the priority characterize a connection. Under *order type* you define the direction (send or receive).

Priority fixes how to handle the data.

Addressing

The addressing happens via TSAPs (Transport **S**ervice **A**ccess **P**oint) and Ethernet addresses. For the communication, a communication channel has to be established that is defined by TSAPs.

The Ethernet address has a length of 6Byte. The first three bytes define the manufacturer. These bytes are set by the IEEE comitee. The last three bytes are at your disposal. Within a network there must not be more than one station with the same Ethernet address. Within company systems, the Ethernet addresses are assigned central by the network administrator.

Parameter H1 transport connection

Connection name You may assign a name for your connection. The length is up to 32 characters.

Page frame offset (SSNR) The page frame offset (SSNR-Offset) defines the offset to the basic interface number (Basis-SSNR). The basic interface number is given at initialization. At mono processor operation, the page frame offset has to be set at 0. At multi processor systems, the value is between 0 and 3.

Please regard the following options:

CPU 1 communicates via page frame 1 (Basis-SSNR+ SSNR-Offset 0)

CPU 2 communicates via page frame 2 (Basis-SSNR+ SSNR-Offset 1)

CPU 3 communicates via page frame 3 (Basis-SSNR+ SSNR-Offset 2)

CPU 4 communicates via page frame 4 (Basis-SSNR+ SSNR-Offset 3)

Value range: 0 to 3

Order number (ANR) Every connection that will be called by a PLC handling block needs an order number. Together with the page frame offset, the PLC program is able to call the connection. Thus, an order number must not exist twice and causes an error warning at parameterization in WinNCS. Within the control program, the order number (ANR) is given to a PLC handling block together with the page frame offset number (SSNR).

Value range: 1 to 199

Priority

This parameter sets the priority of the telegram on the CP. The priority may range between 0 (highest priority) to 4 (lowest priority).

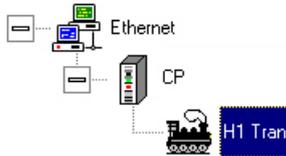
Connections with the priorities 0, 1 and 2 are –seen from connection link-up– so called static connections, i.e. after a connection termination (evtl. initialized by a reset handling block) the connection establishing is retried.

Connections with priority 3 and 4 are –seen from connection link-up– so called dynamic connections, i.e. after a connection termination the connection establishing is not retried. The connection link-up happens by means of an order of the application to the connection. For priority 3 is valid: if the connection is established, it remains active until a termination is initialized. Connection retries of the CP are not executed. At priority 4, the connection is terminated automatically after the telegram transfer.

Value range: 0 to 4

Order type	Choose the order type. The following order types are available:
<i>Send Directly</i>	Send unstructured data.
<i>Receive Directly</i>	Receive unstructured data.
<i>Fetch Active</i>	Read requested data from another control.
<i>Fetch Passive</i>	Used for the passive part of Fetch.
<i>Write Active</i>	Write requested data in another control.
<i>Write Passive</i>	Used for the passive part of Write.
Remote address (Adr)	<p>Here you type the address of the partner station that will communicate with this connection. The partner station has to be addressed with an Ethernet address. The Ethernet address must be unique within the network.</p> <p>The Ethernet address has a length of 6Byte. The first three bytes define the manufacturer. These bytes are set by the IEEE comitee. The last three bytes are at your disposal. Within company systems, the Ethernet addresses are assigned central by the network administrator.</p>
Transport Service Access Point (TSAP)	Via TSAPs connection channels for a connection are build-up with H1. The length of a TSAP is between 1 and 8Byte. The assignment may be in Hex or ASCII format.
Local TSAP	This is the TSAP of the own (local) station.
Local TSAP length	Sets the length of the local TSAP in Byte.
Remote TSAP	This is the TSAP of the destination station (foreign station).
Remote TSAP length	Sets the length of the foreign TSAP in Byte.

H1 transport multi connection



The register "multi connection" gives you the opportunity to parameterize multi connections. A multi connection is a multiple connection. You may install a new connection for a connection parameterized under "H1 transport connection" with reverse order type. The Ethernet address, TSAP, page frame offset and priority of the already configured connection are used. You may also run the multi connection via another page frame or priority. At an H1 transport connection, up to three further multi connections are possible.

The screenshot shows the 'Parameter' dialog box with the 'Multiconnection' tab selected. The dialog is divided into four sections for configuring multiple connections:

Section	Page frame offset	Order number	Priority	Order type
Initial (Left)	0	1	2	Send
Trans-Multi2 (Right)	0	10	2	Receive
Trans-Multi3 (Bottom Left)	0	11	0	Send
Trans-Multi4 (Bottom Right)	0	12	0	Receive

Buttons at the bottom: Apply, Cancel, Help.

At a multi connection you only have to type a new *order number*.

Page frame offset and *priority* are taken over from the already existing connection. At a multi connection these values can not be altered.

Automatically the reverse *order type* is set. The addressing (Port, IP address) is taken over vice versa.

Parameter H1 transport multi connection

Page frame offset (SSNR) The page frame offset (SSNR-Offset) defines the offset to the basic interface number (Basis-SSNR). The basic interface number is given at initialization. At mono processor operation, the page frame offset has to be set at 0. At multi processor systems, the value is between 0 and 3.

Please regard the following options:

CPU 1 communicates via page frame 1 (Basis-SSNR+ SSNR-Offset 0)

CPU 2 communicates via page frame 2 (Basis-SSNR+ SSNR-Offset 1)

CPU 3 communicates via page frame 3 (Basis-SSNR+ SSNR-Offset 2)

CPU 4 communicates via page frame 4 (Basis-SSNR+ SSNR-Offset 3)

Value range: 0 to 3

Order number (ANR) Every connection that will be called by a PLC handling block needs an order number. Together with the page frame offset, the PLC program is able to call the connection. Thus, an order number must not exist twice and causes an error warning at parameterization in WinNCS. Within the control program, the order number (ANR) is given to a PLC handling block together with the page frame offset number (SSNR).

Value range: 1 to 199

Priority This value is taken from the defined connection. At a multi connection, this value is not alterable.

This parameter sets the priority of the telegram on the CP. The priority may range between 0 (highest priority) to 4 (lowest priority).

1 is the so called express priority, 2 and 3 are the normal priorities. The priorities 0 and 4 are not supported. The express priority has no faster data transfer than the normal priorities.

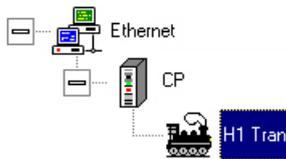
Value range: 1 to 3

Order type The opposite order type is chosen automatically.
The following order types are available:

Send: Send unstructured data.

Receive: Receive unstructured data.

H1 system parameters



The register "System parameter" allows you to set areas for the indirect addressing and parameters for the intelligent process communication (only relevant for TCP/IP). The indirect addressing is only permissible with the order types FETCH and WRITE.

The screenshot shows the 'Parameter' dialog box with the 'System parameter' tab selected. The dialog is divided into two main sections: 'indirect addressing' and 'Intelligent Process Communication (IPC)'. At the bottom, there are 'Apply', 'Cancel', and 'Help' buttons.

	Operand	DB-Nr.	Offset	Length
Source/Dest.	<input type="text"/>	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>
Display word	<input type="text"/>	<input type="text" value="0"/>	<input type="text" value="0"/>	

Intelligent Process Communication (IPC)

Timeout : ms

PDU-Size : Bytes

Indirect addressing You may set a static connection orientated area where information about data source, data destination and indicator word are stored. The indirect addressing is only permissible for the order types FETCH and WRITE.

Under *Source/destination*, you type the data area of the PLC where data source/destination are defined.

In *Indicator word* you set the data area where the indicator word range is defined.

Intelligent process communication The IPC parameters are only relevant for TCP/IP and are not used for H1.

Parameter H1 system parameter

Source/Destination Gives the source/destination for FETCH/WRITE in the own automation device. You may set one of the following values:

Operand	DB-No.	Offset	Length	Type
DB	1..255	0..2047	1..2048	Data block
MB		0..255	1..256	Bit memory byte
EB		0..127	1..128	Input byte
AB		0..127	1..128	Output byte
PB		0..255	1..256	Periphery byte
ZB		0..255	1..256	Counter cells
TB		0..255	1..256	Time cells
BS		0..511	1..512	System data
AS		0..32767	1..32768	Absolute addresses
DX	1..255	0..2047	1..2048	Data block extended
DE	1..255	0..2047	1..2048	Data block extern
QB		0..255	1..256	Periphery byte extended
SB		0..4095	1..4096	Extra bit memory

Indicator word Gives a data word of the CPU address area for FETCH and WRITE where the data is stored.

Operand	DB-No.	Address	Type
DB	1..255	0..2040	Data block
DX	1..255	0..2040	Data block extended
MW		0..252	Bit memory word

Hints to the assignment of data blocks at the indirect addressing is to find in the description of your standard handling blocks.

Timeout
PDU-Size This parameters are only relevant for TCP/IP and are not used for H1.

Example for the indirect addressing Indirect addressing via SEND handling block

Call the SEND-HTB

```

A   DB X           ; Open data block x
SP  FB244         ; Call SEND block
A
    NAME : SEND
    SSNR : KY 255,1 ; 255-ID for ind. Addr., 1 pointer to DW1
    A-NR : KY 0,0   ; irrelevant
    ANZW: MW 0     ; irrelevant

```

Data block

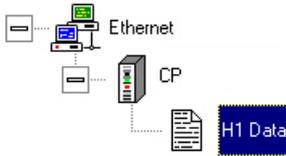
```

DB X
DW 1KY      0,1
DW 2KY      0,31
DW 3KC      MW
DW 4KY      0,200

```

The left byte of the parameter SSNR is the switch criterium between direct and indirect addressing. If the left byte is > 0, it is an indirect addressing. The right byte is –in this case– the pointer to the parameter field.

H1 datagram connection



At datagram connections, the telegrams are transferred relation and acknowledgement free. H1 datagram connections are convenient for the transfer of permanently changing data. If one transfer fails, the next up-to-date transfer comes already after a few seconds. The loss of datagrams, e.g. if the receive buffer is exceeded, is not recognized.

The screenshot shows the 'Parameter' dialog box with the 'Datagram connection' tab selected. The fields are as follows:

- Connection name: Datagramm ...
- Page frame offset: 0
- Order number: 2
- Priority: 0
- Order type: Send (dropdown)
- Order model: Single order (dropdown)

Below these are two sections for TSAP (Transport Service Access Point):

- Local TSAP:** Asc: 00000001, Length: 8, Hex: 3030303030303031
- Foreign Tsap:** Asc: 00000001, Length: 8, Hex: 3030303030303031, Address: 0020D5000000 (dropdown)

Buttons at the bottom: Apply, Cancel, Help.

- Connection name (Identification in the System)
- Page frame offset, order number (connection to the PLC)
- Order type, order model, priority (character of the connection)
- TSAP, Ethernet address (Addressing)

Identification in the system

For the identification in the whole system you may assign a name to every connection.

Connection to the PLC

Via the parameters page frame offset and order number the PLC gets a reference for a connection. Set them in the handling block via SSNR and ANR.

Character of the connection

Order type, order model and the priority characterize a connection. Under *order type* you define the direction (send or receive). Under *order model* you select between *Multicast* (addressed are all multicast circle stations) and *Broadcast* (send via broadcast address).

Priority fixes how to handle the data.

Addressing

The addressing happens via TSAPs (**T**ransport **S**ervice **A**ccess **P**oint) and Ethernet addresses. For the communication, a communication channel has to be established that is defined by TSAPs.

The Ethernet address has a length of 6Byte. The first three bytes define the manufacturer. These bytes are set by the IEEE comitee. The last three bytes are at your disposal. Within a network there must not be more than one station with the same Ethernet address. Within company systems, the Ethernet addresses are assigned central by the network administrator.

Parameter H1 datagramm connection

Connection name You may assign a name for your connection. The length is up to 32 characters.

Page frame offset (SSNR) The page frame offset (SSNR-Offset) defines the offset to the basic interface number (Basis-SSNR). The basic interface number is given at initialization. At mono processor operation, the page frame offset has to be set at 0. At multi processor systems, the value is between 0 and 3.

Please regard the following options:

CPU 1 communicates via page frame 1 (Basis-SSNR+ SSNR-Offset 0)

CPU 2 communicates via page frame 2 (Basis-SSNR+ SSNR-Offset 1)

CPU 3 communicates via page frame 3 (Basis-SSNR+ SSNR-Offset 2)

CPU 4 communicates via page frame 4 (Basis-SSNR+ SSNR-Offset 3)

Value range: 0 to 3

Order number (ANR) Every connection that will be called by a PLC handling block needs an order number. Together with the page frame offset, the PLC program is able to call the connection. Thus, an order number must not exist twice and causes an error warning at parameterization in WinNCS. Within the control program, the order number (ANR) is given to a PLC handling block together with the page frame offset number (SSNR).

Value range: 1 to 199

Priority This parameter sets the priority of the telegram on the CP. The priority may range between 0 (highest priority) to 1 (lowest priority). Connections with the priorities 0 and 1 are –seen from connection link-up– so called static connections, i.e. after a connection termination (evtl. initialized by a reset handling block) the connection establishing is retried.

Value range: 0 to 1

Order type Choose the order type. The following order types are available:

Send Directly: Send unstructured data.

Receive Directly: Receive unstructured data.

Type	<i>Type</i> sets the type for the transfer. You may send unsecure telegrams to a certain receiver, to chooseable receiver groups or to all receivers.
<i>Single order</i>	Unsecure order for one station.
<i>Multicast</i>	Unsecure order for chosen multicast circles. As soon as you choose multicast, the multicast-ID is set as Ethernet address. Multicast circles are defined via the last three nibbles of the Ethernet address.
<i>Broadcast</i>	Relation free sending of single messages to all partners connected via the broadcast address res. reception of single messages coming in via the broadcast address. The broadcast address with H1 is FFFFFFFFFFh.
Foreign address (Adr)	Here you type the address of the partner station that will communicate with this connection. The partner station has to be addressed with an Ethernet address. The Ethernet address must be unique within the network. The Ethernet address has a length of 6Byte. The first three bytes define the manufacturer. These bytes are set by the IEEE comitee. The last three bytes are at your disposal. Within company systems, the Ethernet addresses are assigned central by the network administrator. Broadcast telegrams don't need an Ethernet address.
Transport Service Access Point (TSAP)	Via TSAPs connection channels for a connection are build-up with H1. The length of a TSAP is between 1 and 8Byte. The assignment may be in Hex or ASCII format. TSAPs are also necessary for broadcast telegrams). To simplify the procedure, you may set the same ID for the own and the foreign TSAP.
Local TSAP	This is the TSAP of the own (local) station.
Local TSAP length	Sets the length of the local TSAP in Byte.
Foreign TSAP	This is the TSAP of the destination station (foreign station).
Foreign TSAP length	Sets the length of the foreign TSAP in Byte.

CP online functions

Overview

Under the online functions WinNCS provides functions for the online access to your CP.

Via **Online** > *Online functions* or via , you may activate res. deactivate the online functions.

The buttons of the online functions appear as symbol bar in the lower part of the main window.

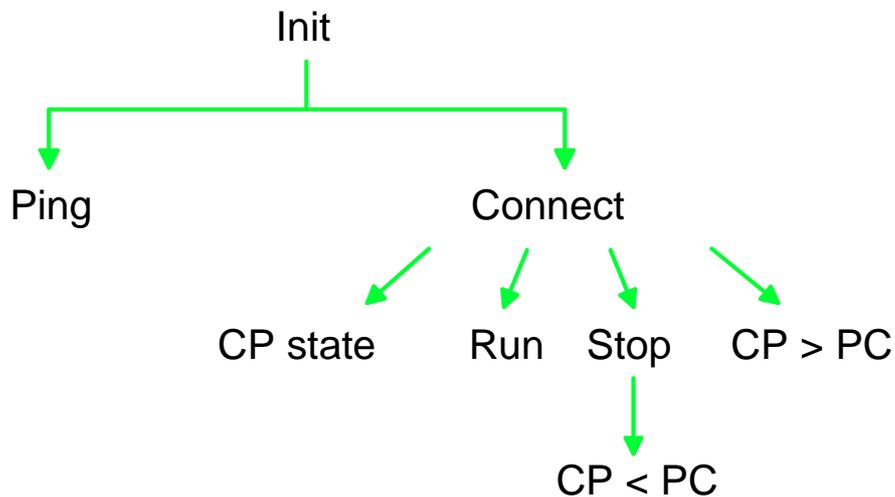


Basic online functions

The basic *online functions* are the connection establishment, the status processing and request. These functions are activated by clicking on the Offline/Online symbol and the symbol bar appears.

Preconditions

Some preconditions have to be fulfilled for the online functions. The following picture illustrates the relations:



Like to see in the picture, all online functions require an initialization of the destination module. For a status change (RUN/STOP) res. status request also a connection is required.

Online functions



Via **Online** > *Online functions* or the according button, you may activate res. deactivate the online functions.

The buttons of the online functions appear as symbol bar in the lower part of the main window.



Initialize CP



Presetting of the protocol type and station address.

The IP address is taken over into the Init-Dialog as soon as an online function is executed.



Establish connection



Establishes a connection between your PC and CP. The communication parameters given under Init are used.

An online connection is the precondition for the following functions.

Start CP



Sets your CP into RUN state (Software-RUN). The RUN/STOP lever of the CP has to be in RUN position.

Stop CP



Sets your CP into STOP state (Software-STOP), even if the RUN/STOP lever of the CP is in position RUN. Before transferring a project into your CP, the CP has to be set into Software-STOP.



This function shows the current operating state (RUN/STOP) of the CP in the status bar of the main window.



If your CP is in (Software-)STOP you may transfer your project to the CP by means of this button.



This function imports the project engineering from the PC into WinNCS.



This function transfers your project from the CP-RAM into the internal Flash-ROM. Depending on the deployed CP, this function is required after the project transfer. For detailed information please refer to the documentation of your CP.



This button executes an overall reset on your CP. The overall reset sets the CP back into delivery state. The project is deleted and the original IP address is reassigned.

Before the overall reset, the CP has to be set into STOP. After the overall reset, the CP has to reboot. Switch the voltage supply of the CP off and on again.



The *Identification mask* monitors all parameters that identify the CP unambiguously. All parameters of this screen are only for control purposes and may not be altered.



This button opens a window with a list of the *indicator words* from 0 to 223. The indicator words are monitored as Byte in hexadecimal form.

The indicator word with the order number 0 has an extra meaning. The order number 0 contains the order number that is currently processed in the module by SEND ALL res. RECEIVE ALL.



Monitors the sum state of all connections.



Monitors the sum state of all H1 transport connections



Monitors the sum state of all H1 datagram connections



Monitors the sum state of all TCP connections



Monitors the sum state of all UDP connections



After a click on the button *Status and Control*, an operand table opens. Enter the operands you want to visualize res. alter.

As soon as the connection to the destination station is established, WinNCS sets the format for the operands automatically and transfers the status values to the monitor.

Initialize protocol/address



As basic precondition for the online functions you have to initialize the destination module. At *Initialization* you set the destination module and the transfer type. You can call the destination device serial or online via the network. For this you need protocol parameters.

The functions for the module transfer and the status functions need the following parameters:



IP address

This address is the IP address of the CP that is the communication partner at the online functions.

Protocol

You may choose between IP protocol, Serial-CP143, Serial-CP443, H1 protocol and Serial-H1.

Symbol manager



The *symbol manager* allows you to assign symbolic names for Ethernet and IP addresses.

If you've activated the symbolic addressing, everywhere in the program the symbolic names appear where otherwise the absolute addresses would be.



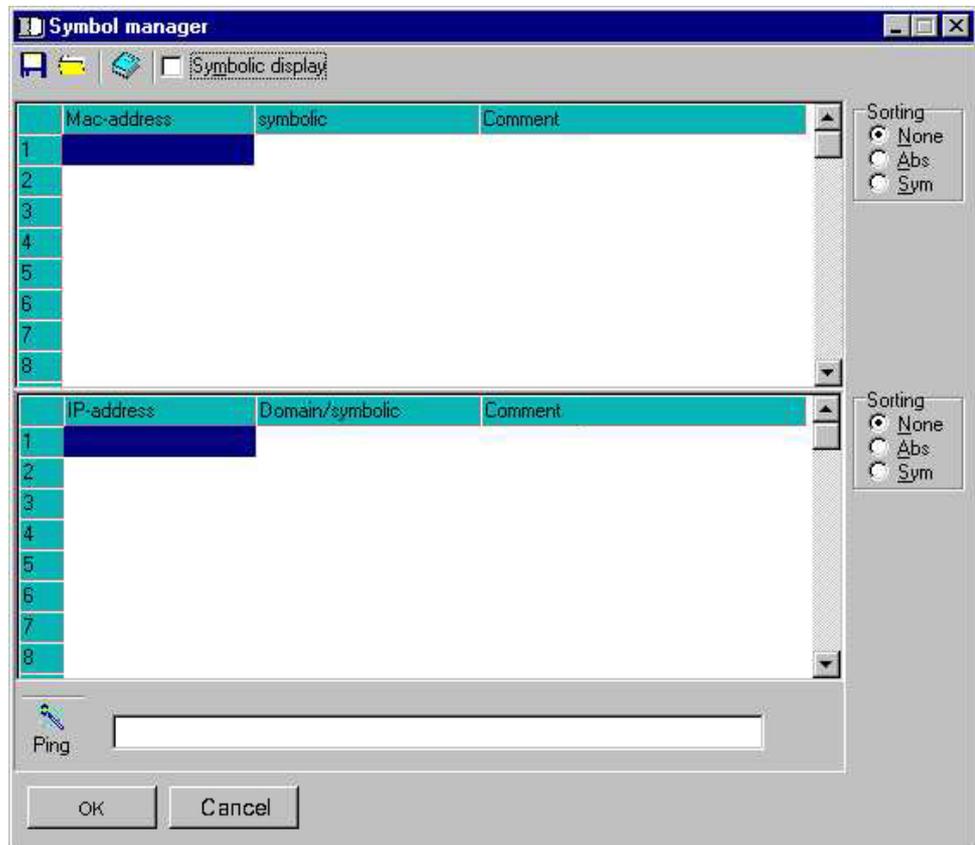
The ping function **Ping** in the symbol manager allows you to detect whether the destination module is physically at the network and answers the ICMP message sent by the ping.

Deployment of the symbol manager

Edit >
Symbolism



The symbol manager is only available with the Ethernet functionality. The symbol manager allows you to assign symbolic names to your Ethernet and IP addresses.



The symbolic names are available in the selection lists of WinNCS where addresses are assigned.

Name is limited to 20 characters

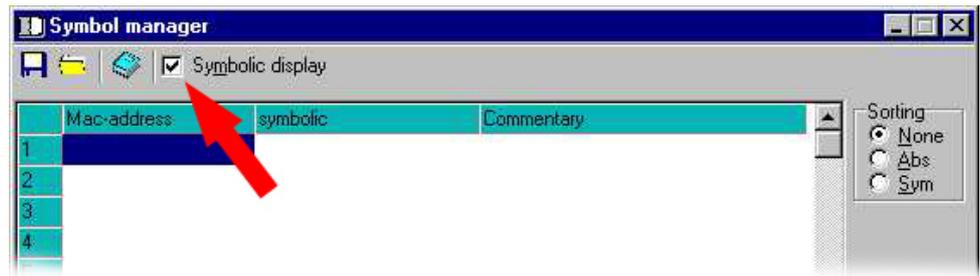
A name has the maximum length of 20 characters. Other conventions do not exist.



Double assigned names for Ethernet res. IP addresses are recognized at translation and monitored.

Activation

The activation happens via the tick box "Symbolic display".



If you've activated the symbolic addressing, everywhere in the program the symbolic names appear where otherwise the absolute addresses would be.

If an absolute address has no assigned symbolic address, the absolute one is used. The comment appears only in the symbol manager.

Sort options

For a better overview you may sort the list after absolute addresses or after symbolic names.

The sorting can be switched off via *None*.



Load res. open symbol file



Please regard that the symbol list is not stored together with the project. A created symbol list can be stored under a file name. A stored symbol list can be loaded into the symbol manager with the load function.

At a program restart, the latest symbol list is automatically loaded.

Ping function



The *ping function* allows you to proof if the destination device is physically connected to the network.

Set the focus on the wanted IP address in the symbol table.

With a ping, an ICMP message is send to the destination device. Within a certain reaction time, the module answers and the result is shown as text.

If ping has been successful, the message "Ping-Echo in n ms" is monitored otherwise an error message occurs.

Preconditions

The ping function needs the following conditions:

- The destination device is initialized via .
-  is not active
- the IP protocol is set
- the destination device has been booted, the state is RUN or STOP

OK, Cancel

After a click on [OK], the lists are confirmed and in case of invalid or double symbolic names, a message window appears. With [Cancel] all alterations and the automatically entered addresses are lost.

Establish an online connection

Precondition initialization



As basic precondition for the online functions you have to initialize the destination module. At *Initialization* you set the destination module and the transfer type. You can call the destination device serial or online via the network. For this you need protocol parameters.



Establish connection



This button establishes a connection to the CP selected under . As soon as the connection is established, you gain access to the CP via the online functions.

Another click on  and the connection is terminated again.

The result of the connection initialization is shown via .

An online connection is the precondition for the following functions.

Monitor CP operating state



This button monitors the current operating state of the CP (RUN/STOP) in the status bar of the main window.

Change operating state

To change the operating state, please use the following buttons:

Stop CP



Sets your CP into STOP state (Software-STOP), even if the RUN/STOP lever of the CP is in position RUN. Before transferring a project into your CP, the CP has to be set into Software-STOP.

Start CP



Sets your CP into RUN state (Software-RUN). The RUN/STOP lever of the CP has to be in RUN position. The CP reboots and the connection between PC and CP is terminated. The CP needs app. 10 seconds until ready again, i.e. the RUN-LED is on. For a new communication, the connection has to be established again.

Transfer and delete a project engineering

Precondition initialization



As basic precondition for the online functions you have to initialize the destination module. At *Initialization* you set the destination module and the transfer type.

Import project into PC



This function imports a project engineering from a CP into WinNCS. For this you select a file name in the file selection window. Regardless of the CP state, the data is stored at the hard disc.

Transfer project into CP



Transfer your project into a CP. You have to set the CP in STOP state first via . Select the according file name in the file selection window. After the successful transfer you reboot the CP with . After a synchronization time of app. 10 seconds, the CP reboots with the new parameters.

If the new data changed the address of the CP, you have to tell this at the next connection attempt.

Transfer project into Flash-ROM



Some CPs require a "Flashing" after the project engineering. Here the current CP project is copied from the CP-RAM in the internal CP-Flash-ROM. For detailed information refer to the CP manual.

Overall_Reset of the CP



This button initializes the overall reset of the CP. The project on the CP is deleted and the CP is set back to the original IP address. For an overall reset, the CP has to be in STOP.

CP diagnosis

Overview

WinNCS has got a wide range of CP diagnosis options.

	Monitors all parameters that identify a CP unambiguously like address, serial number and firmware.
	Displays the indicator word states of the CP
	Monitors the sum state of all connections
	Monitors the sum state of all TCP connections
	Monitors the sum state of all UDP connections
	Monitors the sum state of all H1 transport connections
	Monitors the sum state of all H1 datagram connections

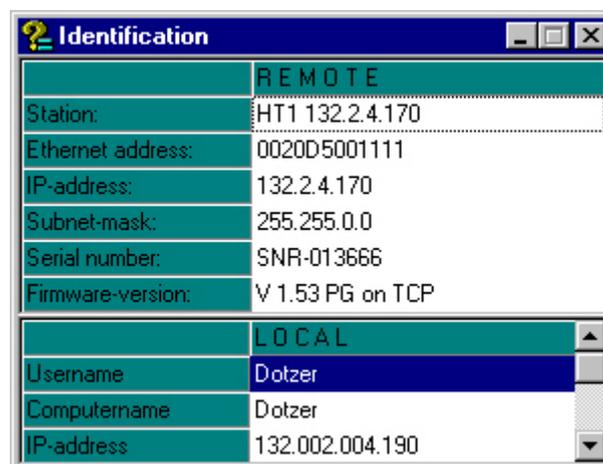
Identification



A click on  opened the "Identification" window. Monitors all parameters that identify a CP unambiguously. All parameters of this screen are only for control purposes and can not be altered.

Shown are station name, Ethernet and IP address, subnet mask, serial number and firmware version.

Additionally, "Local" gives you information about your PC like user name, computer name and IP address.



Parameter

Station	Name of the according station that you've assigned at the initialization of the CP. If no database is loaded in the module, no name is shown.
Ethernet address	Ethernet address of the module that you may assign res. alter at the initialization of the CP. If no database is loaded in the module, the original Ethernet address is shown.
IP address	IP address of the module that you may assign res. alter at the initialization of the CP. If no database is loaded in the module, the IP address is calculated from the Ethernet address and shown.
Subnet mask	Subnet mask for IP addresses that you may assign at the initialization of the CP.
Serial number	Serial number of the module, the value is not alterable in WinNCS.
Firmware version	Version of the firmware in the module. The value is not alterable in WinNCS.

Indicator words



When you click on , the window "Indicator words" opens. The indicator words of the orders 0 to 233 are listed as Byte in hexadecimal form.

Display words TCP_TEST																
ANR	+0	+1	+2	+3	+4	+5	+6	+7	+8	+9	+10	+11	+12	+13	+14	+15
0	08	02	02	02	02	02	02	EA	EA	04	04	04	04	04	04	04
16	02	02	02	02	EA	02	EA	FA	FA	FA	FA	FA	FA	FA	FA	FA
32	FA	02	02	02	02	02	08	EA								
48	EA	02	02	02	02	02	02	02	02	02	02	EA	EA	FA	FA	FA
64	FA	FA	FA	FA	FA	FA										
80	FA	FA	FA	FA	FA	FA										
96	FA	FA	FA	FA	FA	FA										
112	FA	FA	FA	FA	FA	FA										
128	FA	FA	FA	FA	FA	FA										
144	FA	FA	FA	FA	FA	FA										
160	FA	FA	FA	FA	FA	FA										
176	FA	FA	FA	FA	FA	FA										
192	FA	FA	FA	FA	FA	FA										
208	FA	73	FA	FA	FA	FA	FA									

Please regard that the indicator word with the order number 0 has an extra meaning. The order number 0 contains the order number that is currently processed in the module by SEND ALL res. RECEIVE ALL.

When you click on , the display is cyclically updated and the states of all indicator words are started res. stopped. The button serves as on/off switch.

If the status has been stopped,  gives you the opportunity to update the display for one time.

The interface number (SSNR)  can be switched in the range of [0..3] at any time if supported.

Important indicator words	FAh	The error ID "F" tells that the according order is not defined in the CP. The status ID A shows that the order is blocked (for SEND/FETCH and RECEIVE).
	AAh	The error ID "A" shows that the connection of the order is not res. not yet established. The status ID "A" blocks SEND, RECEIVE and FETCH.
	08h	The connection is reestablished (e.g. after a CP reboot), the SEND is released (SEND communication order).
	09h	The connection is reestablished (e.g. after a CP reboot), the RECEIVE is released (RECEIVE communication order).
	04h	SEND is successfully finished, data has been transferred.
	02h	The SEND, RECEIVE, READ res. WRITE order is in progress. At SEND the partner is not yet ready for RECEIVE, at RECEIVE the partner has not yet given a SEND.
	05h	RECEIVE is successfully finished, the data has arrived at the control.

Status monitor of connections



Via  you reach information about all configured connections of a CP and their status and error messages.

CLR	Typ	Pos	SSNR	ANR	V-Status	V-Id	A-Type	A-Status	A-Error	A-end
	H1	1	0	1	1300	32	Send	0048	0000	*
	H1	2	0	2	0300	40	Receive	0058	0000	*
	H1	3	0	3	1300	31	Send	0022	0000	*
	H1	4	0	4	1300	31	Receive	0058	0000	*
	H1	5	0	5	1300	36	Read aktive	0058	0000	*
	H1	6	0	6	1300	38	Write aktive	0048	0000	*
	H1	7	0	7	0300	34	Read passive	0048	0000	*
	H1	8	0	8	0300	33	Write passive	0058	0000	*
	H1	9	0	15	1300	35	Send	0048	0000	*
	H1	10	0	16	0300	41	Receive	0058	0000	*
	H1	11	0	17	1300	42	Send	0022	0000	*
	H1	12	0	18	1300	42	Receive	0058	0000	*
	H1	13	0	19	1300	30	Read aktive	0058	0000	*
	H1	14	0	20	0300	29	Read passive	0023	0000	*
	H1	15	0	21	1300	37	Write aktive	0048	0000	*

With a click on , the states of all connections are monitored. The button serves as on/off switch.

If the protolling has been stopped, you may update the display for one time with .

To monitor a connection, you may display its state in a separate "Trace" window with  and update it with .

Detailed information about a connection appears with .

The functions "Detail" and "Trace" influence the runtime/performance of your connections!



Note!

Please regard that not all CPs support the sum state display. For the status monitor of a special connection type, click on the according connection type. The dialog windows for the sum state of a connection type have the same structure like the dialog window of the sum state of all connections.



Monitors the sum state of all TCP connections



Monitors the sum state of all UDP connections



Monitors the sum state of all H1 transport connections



Monitors the sum state of all H1 datagram connections

Column headlines

Pos	Position of the connection in the list
SSNR	Number of the page frame where a connection is running.
ANR	Order number of the connection
V-Status	Status of the connection
V-ID	Internal connection number that is used by the system.
A-Art	Shows the order type: SEND, RECEIVE, READ ACTIVE (PASSIVE), WRITE ACTIVE (PASSIVE).
A-Status	Monitors the status of the order processing.
A-Error	Errors during order processing.
Aend	Status changes are marked with a "*".

Symbols



The *status output* of all connections is activated res. deactivated. The status key has a LED monitor as indicator for the cyclic status update. When you highlighted a connection, only the state of this is shown. The mark is set in the first column with mouse or cursor. The > character stands for a marked connection.



Momentary status, the connection data is updated once.



You reach the *single status* of the connection that you selected in the sum state.



You reach the *trace status* of the connection that you selected in the sum state.

CLR

All highlights in the sum state window are deleted.

Important status and error messages of the status functions

V-Status

V-Status shows the state of a connection.

Code	Description
X000h	Initialization is running
X100h	Connection establishment is running
X101h	Connection establishment is running again
X300h	Connection established
X500h	Connection termination local
X501h	Connection termination from partner
XF00h	Connection error

X: 0=active; 1=passive; 2=dynamic

A-Status

The A-Status shows the state of the order processing.

Code	Description
0000h	No order processing at this time
0020h	Data to foreign station
0021h	Data from foreign station
0022h	Wait for SEND acknowledgement
0023h	Wait for data from foreign station
0024h	Local SEND acknowledgement
0040h	SEND-DIRECT received from control
0048h	Wait for SEND-ALL call
004Ah	SEND-ALL data received
0050h	Wait for RECEIVE-DIRECT call
0052h	Acknowledgement from RECEIVE-DIRECT received
0058h	Wait for RECEIVE-ALL call
005Ah	RECEIVE-ALL acknowledgement received
0060h	FETCH-DIRECT received from control

A-Error

Here the errors are monitored that occurred during error processing. The following error messages are defined:

Code	Description
00h	No error
01h	Wrong Q/ZTYP at the handling block
02h	Area not present in CPU
03h	Area in CPU too small

04h	QVZ error in CPU The source res. destination parameter points to an area of the CPU with defective or not available memory. The QVZ error only occurs with Q/ZTYPE AS, PB, QB or memory failures.
05h	Error in the indicator word The parameterized indicator word can not be processed. This error occurs if you set ANZW as data word res. double word that is not or not longer in the specified data block, i.e. DB too small or nor present.
06h	No valid ORG format The data destination res. source is neither in the handling block (Q/TYP="NN") nor in the connection block.
07h	Reserved
08h	No free transport connections The capacity of the transport connections is exceeded. Delete not necessary connections.
09h	Remote error An error occurred in the communication partner at a READ/WRITE order.
0Ah	Connection error The connection for an order is not res. not yet established. The error stops as soon as a connection is established. If all connections of the CP are terminated, an error in the module or the bus cable may be the cause. Another reason could be a wrong parameterization.
0Bh	Handshake error This may be a system error or the data block size is too large.
0Ch	Initialization error A wrong handling block or an oversized data block has been used at initialization.
0Dh	Cancel after RESET This is an operation message. At priority 1 and 2, the connection is terminated and established again as soon as the communication partner is ready for a new connection. At priority 3, the connection is deleted, a new initialization is possible.
0Eh	Order with basic load function This is an operation message. The order is a READ/WRITE-PASSIVE and can not be started from the automation device.
0Fh	Order not present The called order is not engineered on the CP.

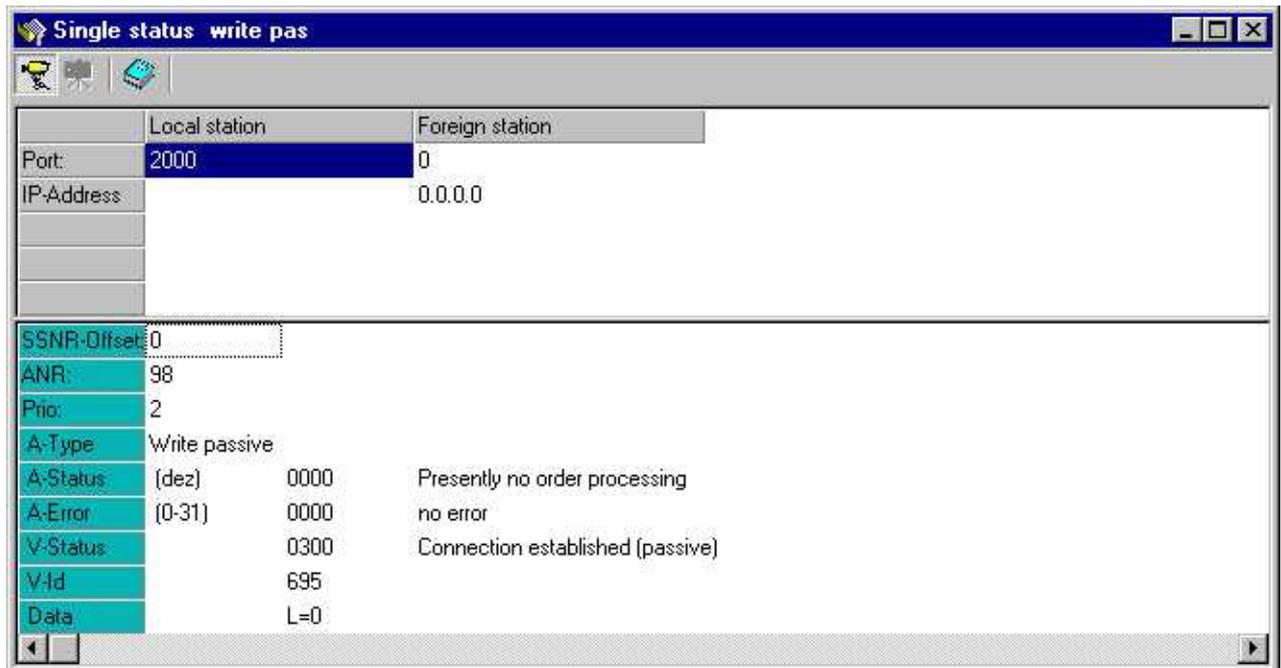
Single status



For a chosen connection from the sum status list the status and error messages are monitored. If you break the update you reach a mode where you can work through the communication of the connection step by



step by clicking on . The upper part of the window shows port and IP address at TCP/UDP connections and Ethernet address and TSAP at H1 transport and datagram connections.



Row headlines

A-Type	Shows the order type: SEND, RECEIVE, READ ACTIVE (PASSIVE), WRITE ACTIVE (PASSIVE).
A-Status	Status of the order processing
A-Error	Errors during order processing
V-Status	Status of the connection
V-Id	Internal connection number used by the system
Data	Netto data (max. 32Bytes are shown)

Symbols



The *Status monitor* of a connection is activated res. deactivated. The activation influences the runtime behavior of your connections.

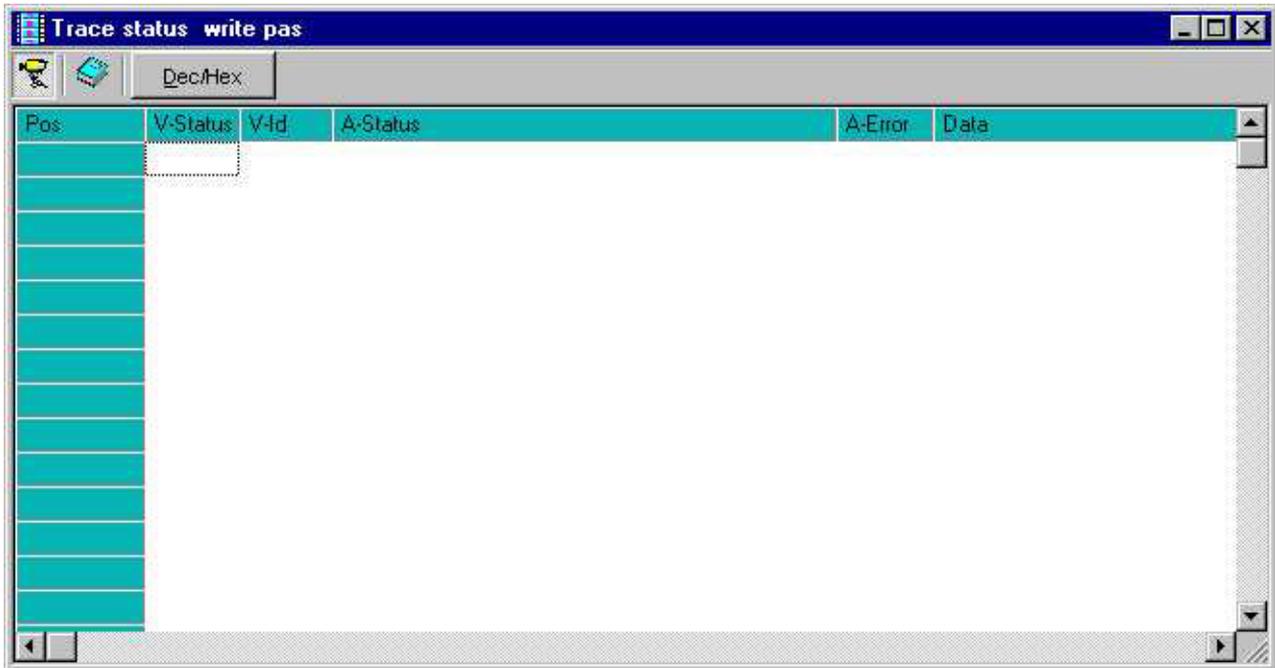


The connection data is *updated* once.

Trace status



For a connection from the sum status list, the status and error messages are shown. The list is able to monitor the last 200 telegrams of a connection. With more messages, the oldest telegrams are overwritten. When you break the status, you can walk through the list.



Column headlines

Pos	Position of the telegram in the list
V-Status	Status of the connection
V-ID	Internal connection number used by the system
A-Status	Status of the order processing
A-Error	Errors during order processing
Data	Netto data (max. 32Bytes are shown)

Buttons/Symbols



The *Status monitor* of a connection is activated res. deactivated. The activation influences the runtime behavior of your connections.

Dec/Hex

The data can be monitored in hexadecimal or ASCII format.

Status and Control



A click on the Button *Status and Control* opens an operand table. Enter the operands you want to visualize res. alter.

As soon as you've established a connection to the destination station via  , WinNCS sets automatically the operand format and transfers the status values to the monitor.

Via "Control value" you may preset a control value. A doubleclick marks the value in blue for transfer.

To transfer marked control values, start again the status processing via  or click on  during status processing.

With  you may store the operand table and load it to WinNCS via .

The sequence counter "Seq" shows changes as Modulo 255 value (0...255). The sequence counter allows you to control the incoming telegrams with a network analyzer. Every change of an operand value is verified by a time stamp.

	Operand	Format	Status Value	Control Value	Seq	Timestamp	Commentary
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							
11							
12							
13							

Column headlines

Operand	Operand from the control
Format	All valid formats
Status value	Monitored status value
Control value	Defineable control value
Seq	Sequence counter showing changes
Time stamp	Time of the last alteration
Comment	Operand comment

Symbols



Connect with the CP



Start of the status processing, transfer of marked control values during status processing



Alter (control) a value in the control via transfer of marked control values during status processing



Load an operand table



Save an operand table. A stored operand table is automatically loaded at a reboot of WinNCS and linked to the original button if it is activated.

WinNCS for Ethernet coupler

Outline

- General** The "Ethernet" functionality allows to configure Ethernet couplers. The project engineering includes the Ethernet coupler and the connected modules.
- Engineering options** WinNCS supports the following engineering options:
- Project engineering online
Starting with version 3.12, WinNCS is able to search stations in the Ethernet and to import their project engineering.
A click on [Search slaves] lists all Ethernet coupler that are within the network and a double click on the wanted one imports it into WinNCS. Here you may work on the project engineering online and transfer the project to the Ethernet coupler via [Apply].
 - Project engineering offline
You engineer your slave offline and transfer your project with the integrated download function of WinNCS.
- Access mechanism** The access happens via Port 5048 to the configuration server of the Ethernet coupler.
The configuration server evaluates the number of connected modules, their address and parameter areas and offers these information to WinNCS under its IP address.
WinNCS searches all couplers (slaves) of the network per broadcast. The network is searched up to the gateway.
With this data, WinNCS creates a symbolic network and monitors it in its "network" window.
Here you can assign real module types to the symbolic network online and with password and where applicable parameterize them.
- Integrated Browser function** Via the integrated "Browser" function you may gain access to the website of the Ethernet coupler.
The look of the website can be configured in WinNCS.
- Firmware update online** You may online assign an IP address to the Ethernet coupler and update the firmware.
All altering accesses are password protected. The password is requested once per session and slave.
In delivery state, the Password is 00000000 (8xZero)

Fast introduction WinNCS for Ethernet coupler

Preconditions

For the project engineering, the following preconditions should be fulfilled:

- Recent GSD for the Ethernet coupler is stored in the GSD directory of WinNCS.

For the project engineering of the modules in WinNCS, the properties of the components are delivered in a GSD-file.

Copy the GSD-file in the GSD directory of WinNCS.

- For the online engineering, the Ethernet coupler should be built-up with the according modules, connected to Ethernet and supplied with voltage.



Attention!

For every Ethernet coupler is delivered with the IP address 10.0.0.1, you must not install more than one new Ethernet coupler at a time!

Approach of the online project engineering

- Start WinNCS.



- By clicking on , you select the functionality "Ethernet".
- Create a project with the function group "Ethernet" via **File > Create/Open project**.
- >>A parameter window for the online search of "slaves" and "stations" opens. [Search slaves] lists all Ethernet coupler and [Search stations] all CPs auf.
- Click on [Search slaves]
 - >>All Ethernet coupler are searched and listed with IP address and occ. symbolic name.
- A double click on a slave transfers it to the "network" window and lists it with the I/O periphery.
 - >> If there is no parameterization yet, the modules are listed symbolic without label.
- For every Ethernet coupler is delivered with the IP address 10.0.0.1, you should first assign a network address valid in your company net to the Ethernet coupler. Herefore you mark the Ethernet coupler and type the *IP address* and *Subnet Mask* in the "Parameter" window under the register "network" area TCP/IP.
- Click on [Apply]. When asked for the password, type 00000000 (8xzero), if you didn't change it yet.

- Assign the according module type to the module symbol in the "Parameter" window and occ. set parameters. The according address area that a module occupies in the TCP data stream is automatically set by the Ethernet coupler.
- As soon as you click on [Apply], a password request takes place. The password request is once per session and coupler. Give the correct password. In delivery state, the password is 00000000. When the password is valid, the data is transferred online to the Ethernet coupler. Repeat this for all listed modules.
- Save your project.

**Note!**

Before having access to the Ethernet slave via your Internet browser, you have to assign a company valid IP address. You can do this like described above, online from WinNCS.

Create res. import an Ethernet project

Create new Ethernet project Start WinNCS.



Functionality Ethernet



By clicking on , you set the functionality "Ethernet".

File > *Create/Open project*



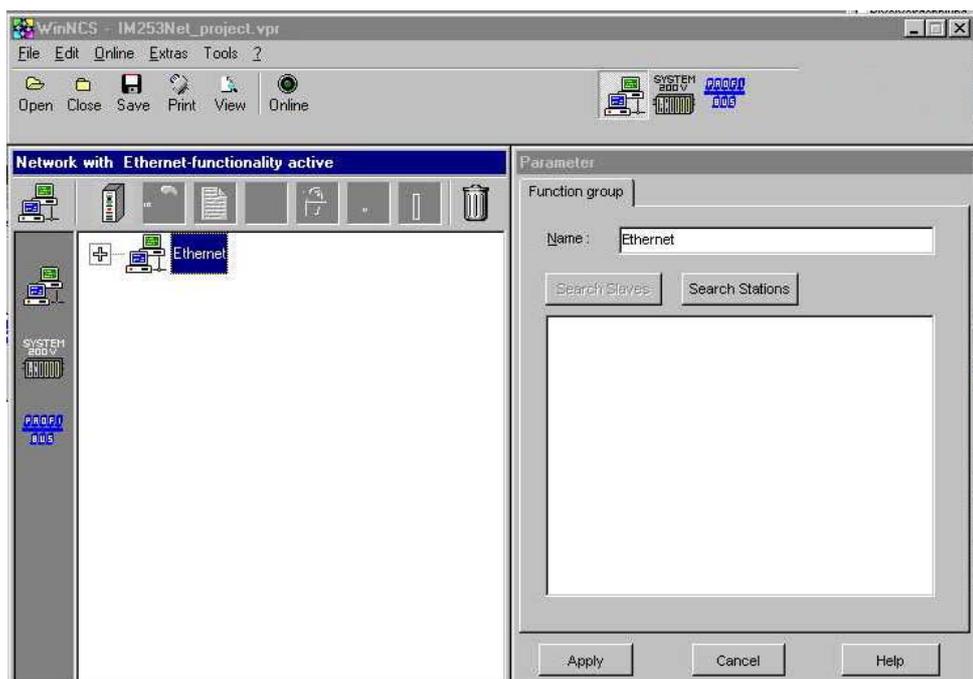
Create a new project with the function group "Ethernet" via **File** > *Create/Open project*.

You get a file selection window where you can type a name for your project file. If you type the name of an already existing file it will be opened.

The project files of WinNCS have "vpr" as extension. The file names of the four last opened projects are listed in the **file** menu and can be opened directly.

As soon as you confirm your entries, the "network" window with the concerning "parameter" window appears.

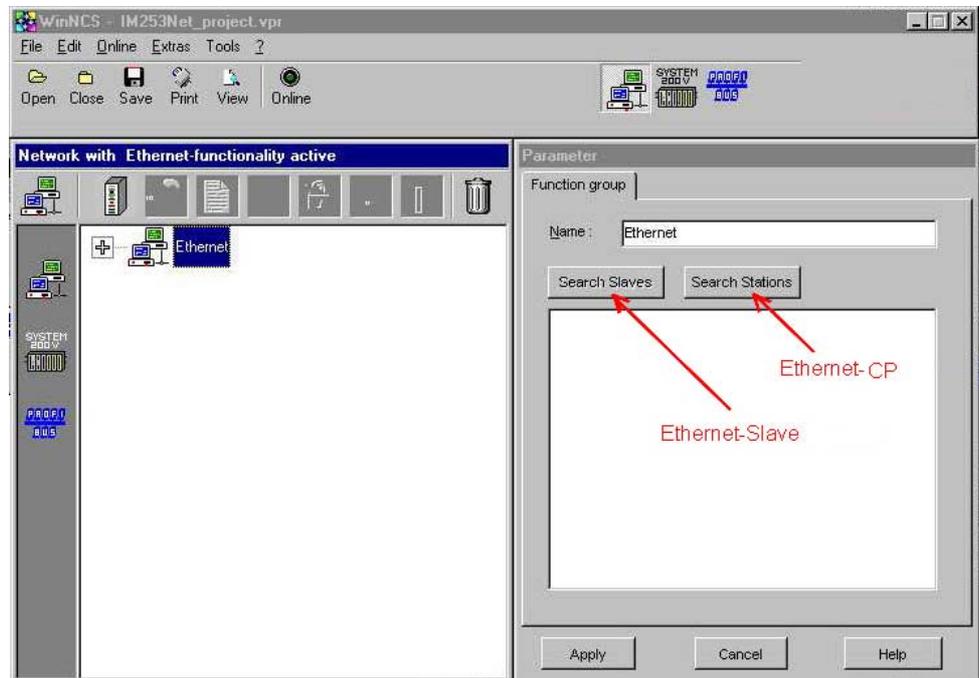
The "network" window shows your new Ethernet net. Additionally to the "network" window, the "parameter" window opens. The "parameter" window serves the parameter setting for the elements of the "network" window. For example you may here assign a symbolic name for the network that is then used in the "network" window.



Search and import an Ethernet project

Starting with WinNCS version V3.12, you have the possibility to search stations in the Ethernet and import their project engineering.

By means of a click on the Ethernet level, you reach the "parameter" window with the search functions.



The search supports the following systems:

- [Search slaves] Search all Ethernet coupler
- [Search stations] Search all Ethernet-CPs

A click on [Search slaves] starts the search for all Ethernet coupler in the network.

The available couplers are listed. Via double click you import the project of the current station and monitor it in the "network" window for further configuration.



The online search is for the complete network up to the gateway.
All listed Ethernet coupler may be engineered online.

Add an Ethernet network



Via a click on  in the "network" window, you may add more networks with the selected "Ethernet" functionality at any time.



Alter an Ethernet project

Preparation

Load the project you want to alter or create a new one.

As soon as you've loaded res. opened your project this is monitored in the "network" window with according "parameter" window.

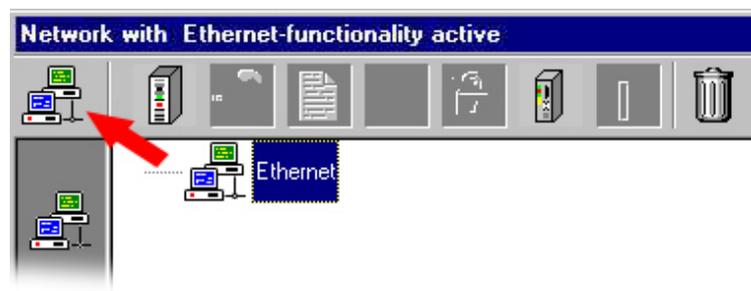
Starting from a network symbol that shows the functionality, the "Ethernet" functionality allows you to set stations, connections or modules and to parameterize them in the concerning "parameter" window.

Difference between Ethernet coupler and Ethernet-CP

WinNCS separates the following groups that can be engineered:

- Ethernet coupler res. slave IM 253NET
- Ethernet-CP stations and CPUs with CP portion

The combination of both groups is not possible but you may create one network for every group within a project.



In basic, both groups are engineered identically.

Online project engineering

For the online project engineering click on [Search slaves] in the "parameter" window. WinNCS now searches all coupler of the network by broadcast. The network is searched up to the gateway. The found couplers are listed in the "parameter" window with IP address. Via double click on the wanted coupler in the list, the coupler evaluates the number of connected modules, their address and parameter area and delivers this information via Port 5048 under its IP address to WinNCS.

WinNCS creates a symbolic network and monitors it in its "network" window. For marking the online status, the network symbol for the Ethernet coupler is green colored.

Depending on the mark in the "network" window, you may parameterize the coupler in the "parameter" window (password required) res. assign real module types to the module symbols in the "network" window and parameterize them.

Online parameterization of the Ethernet coupler

- Mark the Ethernet coupler
- Assign a convenient name to the coupler under "System".
- Type the address data into "network".
- Choose a new password in "Password" if wanted. For this you need the original password.
In delivery state, the password is 00000000 (8xzero).
- Configure the website of the coupler under "Properties".

After you made all entries, you may transfer the parameters online to the Ethernet coupler via [Apply].

**Note!**

You may only return to the "network" window when you confirm your entries via [Apply]. When you click on [Cancel], your station is deleted res. your entries are.

Offline project engineering

Another less convenient method is the offline project engineering. The following steps have to be executed:



- Click on  to add an Ethernet coupler.
- Assign a convenient name to the coupler under "System".
- Type the address data into "network".
- Configure the website of the coupler under "Properties".

As soon as the Ethernet coupler is at the network, you may transfer the data online via the register "Download", giving the destination IP address and password.

**Note!**

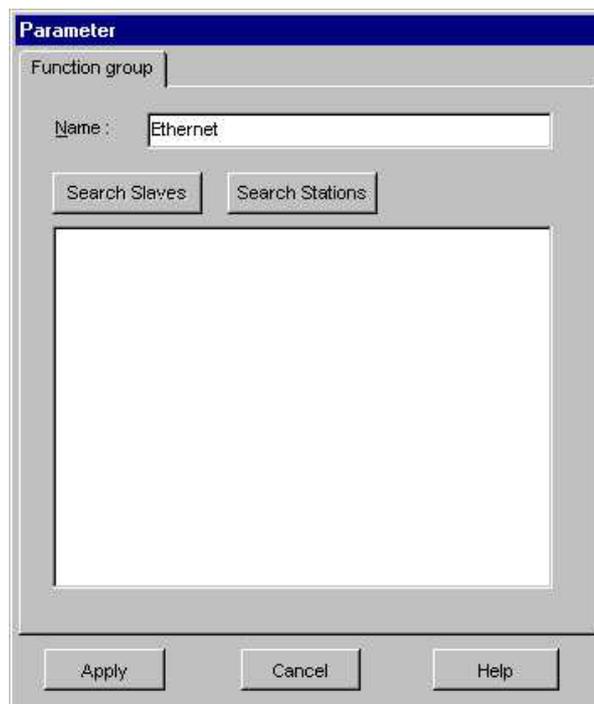
Before a download you should confirm your entries for the project engineering once with [Apply], because the download fetches the database.

You may only return to the "network" window when you confirm your entries via [Apply]. When you click on [Cancel], your station is deleted res. your entries are.

Parameterize Ethernet coupler

Parameter for Ethernet

Register Function group



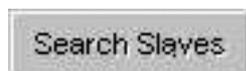
Name

Here you may assign a name for your function group (max. 32 characters). The name is for a better overview. There are no restrictions for the name but it is urgently advised to use unambiguous names for function groups.

As soon as you [Apply] your entries, the name is taken over and shown in the "network" window.



Search all Ethernet coupler



Search all Ethernet-CPs

A click on a search button starts the search for all available stations res. Ethernet coupler in the net.

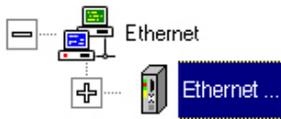
Available stations are listed. Via double click on the wanted station, the according project is imported and monitored in the "network" window for further parameterization.



The online search is for the complete network up to the gateway. All available Ethernet couplers may be engineered online.

With CPs you have to take care that the project engineering computer is within the same IP circle like the CP.

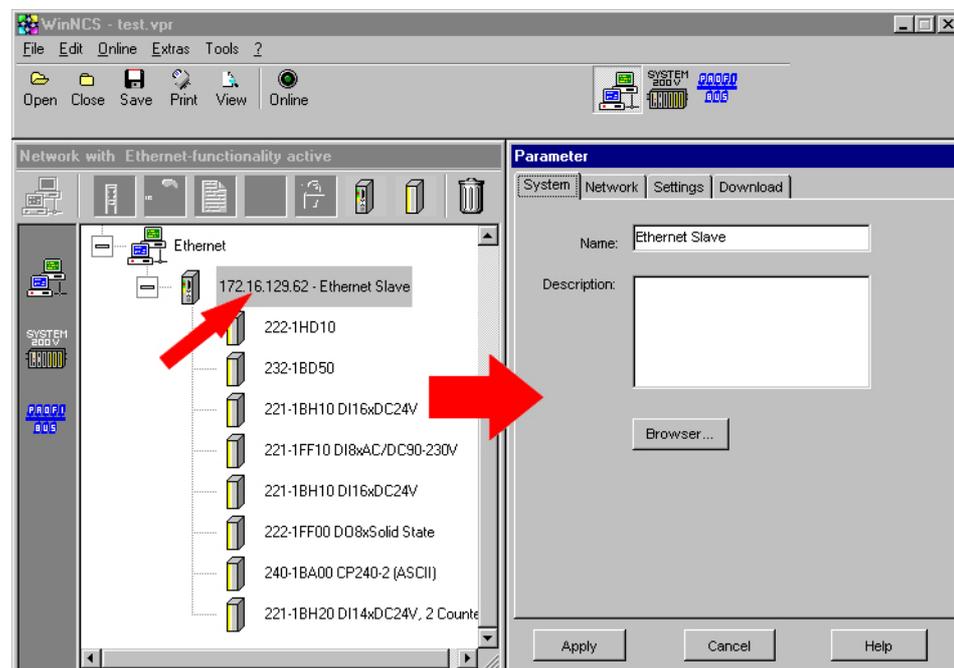
Parameter for Ethernet coupler



You reach the "parameter" window by clicking on an Ethernet coupler in the network list res. by importing a project engineering via online access and [Search slave].

The "parameter" window contains the following registers:

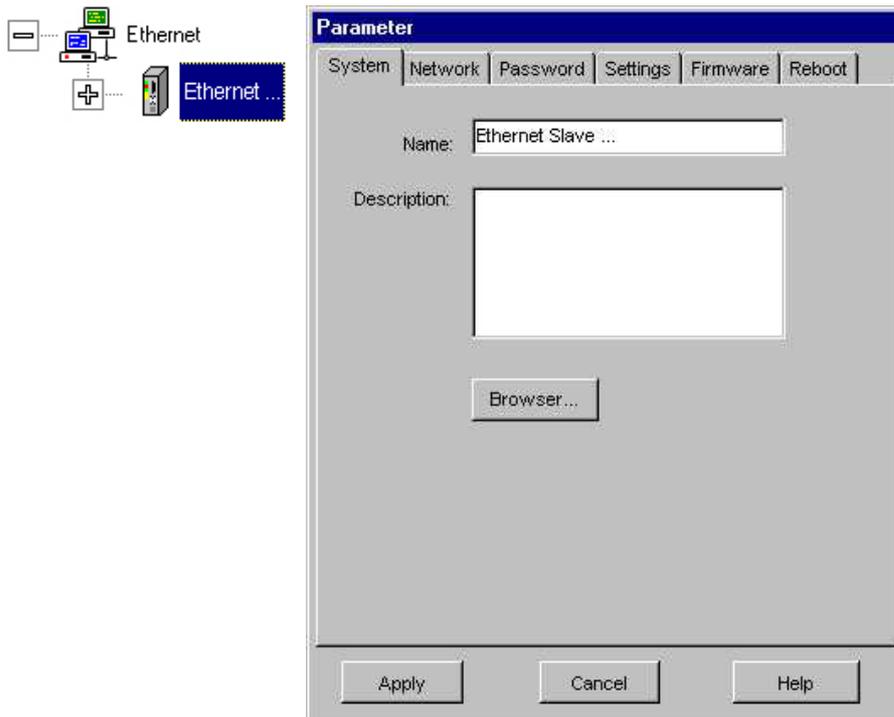
- System (Name assignment with short description)
- Network (basic initialization of the Ethernet coupler)
- Properties (Activation of the server on the Ethernet coupler)
- Download (Download option for the project engineering)



At online access you have additionally this registers:

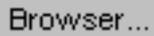
- Password (Password for online access like project engineering, firmware update and reboot)
- Firmware (Online firmware update after password request)
- Reboot (Online reboot after password request)

Register System

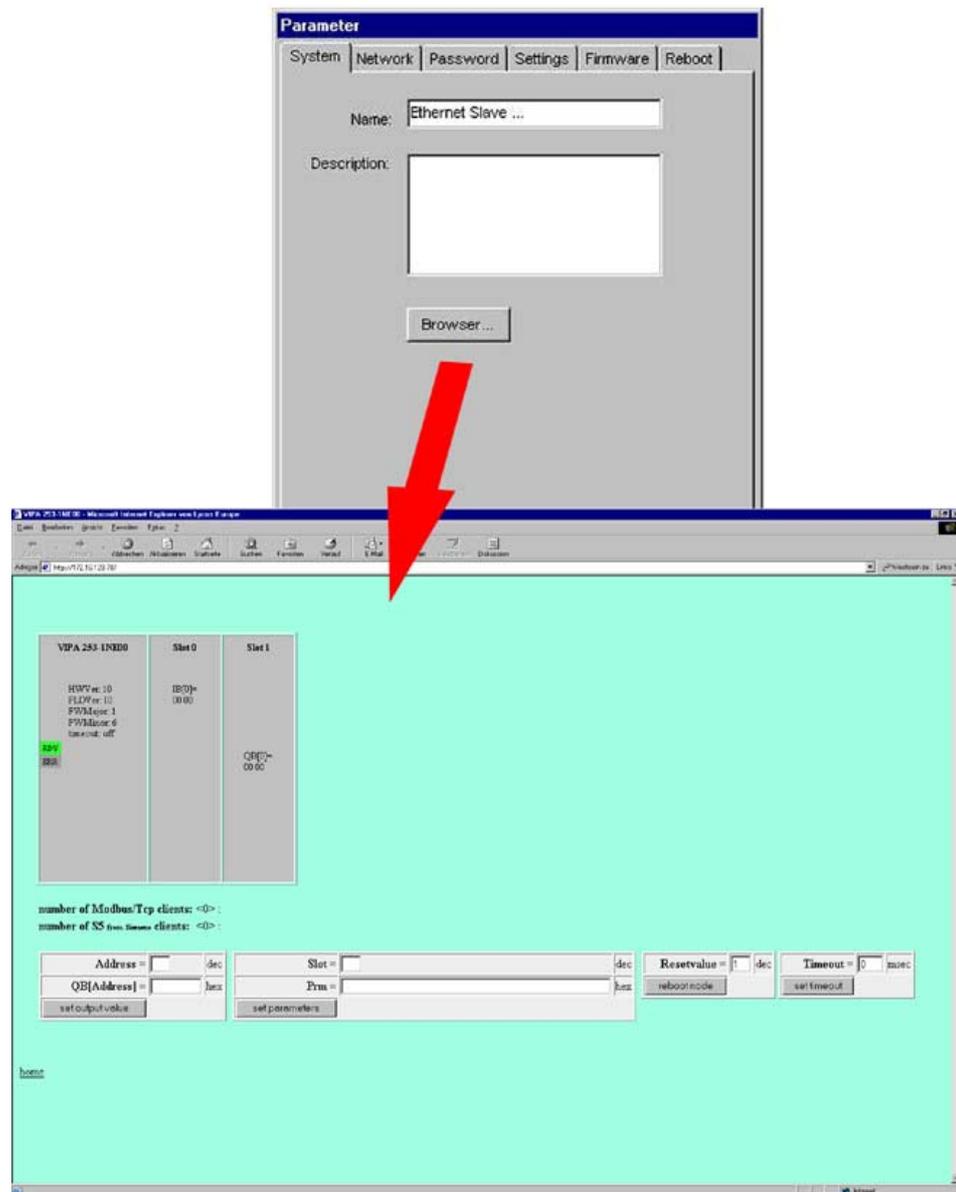


Name Here you may assign a name for the Ethernet coupler also referred to as "slave".

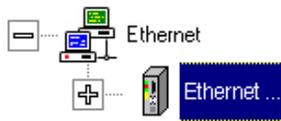
Description Here you may type a description for the Ethernet coupler.



Starts your standard web browser and contacts the web server of the Ethernet coupler that you have to address before via the IP address in the register "Network".



Register Network



This register manages the basic initialization of your Ethernet coupler. Here you parameterize and monitor the addresses and identification parameters of the coupler.

A screenshot of a software window titled 'Parameter'. It has several tabs: 'System', 'Network', 'Password', 'Settings', 'Firmware', and 'Reboot'. The 'Network' tab is selected. Inside the window, there are two main sections: 'Ethernet' and 'ICP / IP'. The 'Ethernet' section contains three fields: 'Mac - Address' with the value '00-20-D5-53-00-02', 'Link Speed' with a dropdown menu set to 'Auto Mode', and 'Duplex Mode' with a dropdown menu set to 'Auto Mode'. The 'ICP / IP' section contains three fields: 'IPAddress' with the value '172.16.129.62', 'Subnet Mask' with the value '255.255.224.0', and 'Default Gateway' with the value '0.0.0.0'. At the bottom of the window are three buttons: 'Apply', 'Cancel', and 'Help'.

Ethernet

MAC address

Inside the Ethernet, every participant can be identified unambiguously via a MAC address (Ethernet address). During online operation, the Ethernet address of the coupler addressed by the IP address is shown.

Link Speed, Duplex Mode

Link Speed and Duplex Mode are reserved for later extensions. Both parameters are set to "Auto Mode" and must not be altered.

TCP/IP**IP address**

Type here the IP address of your Ethernet coupler. More detailed information is in the description of your Ethernet coupler.

The IP address is a 32Bit address that must be unique within the network. The address consists of 4 numbers separated by dots.

To build up private IP networks within the internet, RFC 1597/1918 defines the following address ranges:

Class A:	10.0.0.0	...	10.255.255.255
Class B:	172.16.0.0	...	172.31.255.255
Class C:	192.168.0.0	...	192.168.255.255

The IP address is necessary for the TCP/IP communication. You'll get it from your system operator.

Subnet Mask

The IP subnet mask is a 32Bit filter mask for IP addresses. Deploying subnet masks, you build up subnets by definition of IP number circles. Subnetworks need a router to communicate with each other.

The addresses used for subnet masks have the same structure and value range than the IP address.

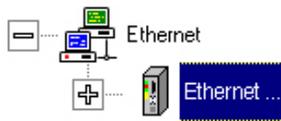
**Note!**

In opposite to the online CP access, the online access to an Ethernet coupler doesn't need an IP circle adjustment at the PC. The access from the PC to the Ethernet coupler happens by means of UDP.

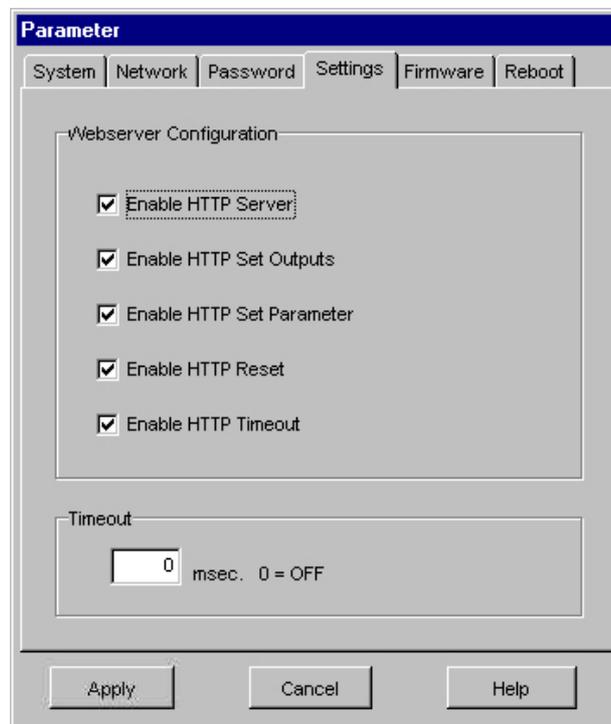
Default Gateway

This field serves for further extensions and is not supported at this time.

Register Settings



This dialog window allows you to configure the website of the Ethernet coupler. With a click on the tick boxes, the according element is monitored at the Ethernet coupler website or not.



Webserver Configuration

Enable HTTP Server

If this option is activated, you may access the Ethernet coupler via a web browser.

Enable HTTP Set Outputs

When activated, you may set outputs from the website.

Enable HTTP Set Parameter

This allows you to monitor/hide the parameter area at the website.

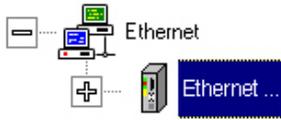
Enable HTTP Reset

Monitors/hides the "Reboot" and "Reset-Value" button on the website.

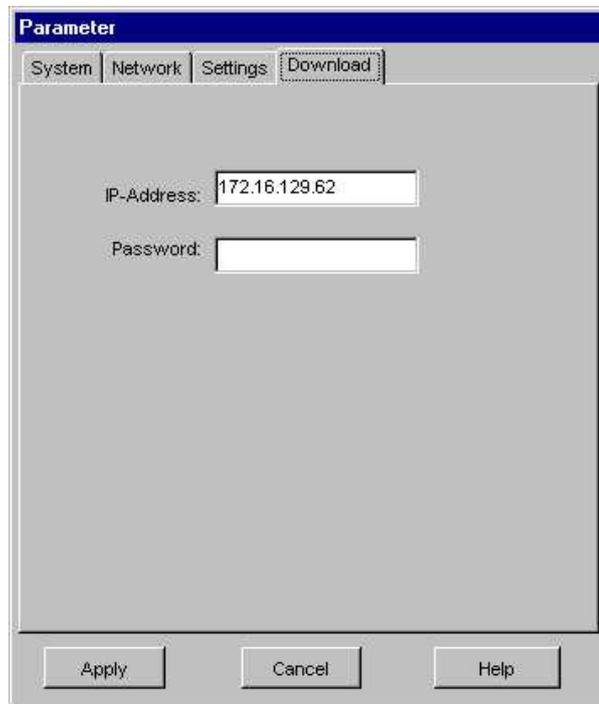
Enable HTTP Timeout

When activated, you may set a timeout in ms via the website. By setting a timeout, you define the maximum time within a data communication must happen. If this time is exceeded, all connections are closed and the output of the connected modules are deactivated.

Register Download



The download window allows you to send your offline engineered projects to the wanted IP address. This option required a password which is preset during online access in the register „Password“.



The screenshot shows a dialog box titled "Parameter" with four tabs: "System", "Network", "Settings", and "Download". The "Download" tab is active. It contains two input fields: "IP-Address:" with the value "172.16.129.62" and "Password:" which is empty. At the bottom, there are three buttons: "Apply", "Cancel", and "Help".

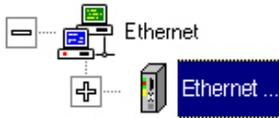
IP address

Type here the destination IP address of your Ethernet coupler.
The IP address is a 32Bit address that has to be unique within the network. The address consists of 4 numbers separated by dots.
Value range: 000.000.000.001 to 255.255.255.254

Password

The online project engineering requires a password that has to be preset online in the register password.

Register Password



The different online access options to the Ethernet coupler are password protected. Every Ethernet coupler is delivered with the password 00000000 (8xzero).

This dialog window allows you to change the password. Enter the recent (old) password and twice the new one.

A click on [Apply] transfers the new password online to the Ethernet coupler.

A screenshot of a software dialog box titled 'Parameter'. It has a tabbed interface with tabs for 'System', 'Network', 'Password', 'Settings', 'Firmware', and 'Reboot'. The 'Password' tab is selected. Inside the dialog, there are three text input fields labeled 'Old Password:', 'New Password:', and 'Repeat:'. At the bottom of the dialog, there are three buttons: 'Apply', 'Cancel', and 'Help'.

Old Password

Enter the recent valid password. Every Ethernet coupler is delivered with the password 00000000 (8xzero).

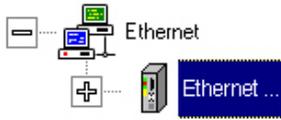
New Password

Type the new password for the Ethernet coupler. The password has to consist of exactly 8 characters.

Repeat

For confirmation of the password, type it a second time.

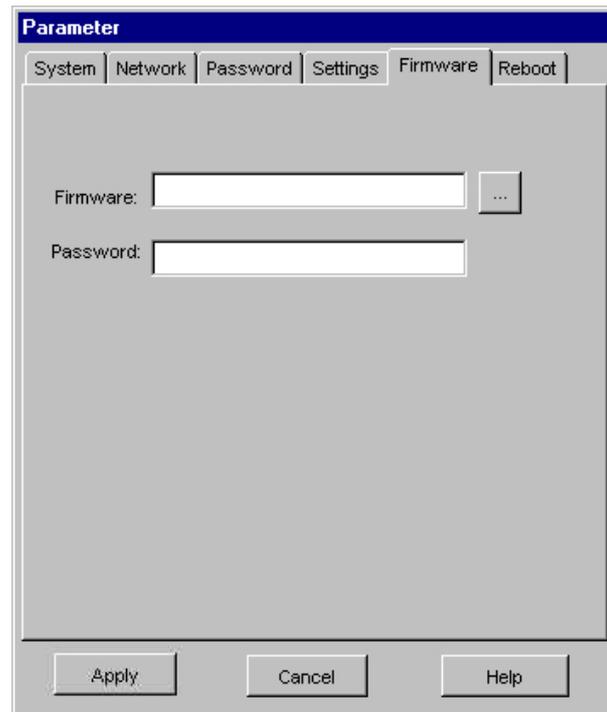
Register Firmware



This register allows you to execute an online firmware update of the Ethernet coupler.

As soon as you have given a firmware file and a valid password and click upon [Apply], the firmware is transferred online to the Ethernet coupler.

This function is password protected. The password is preset in the register Password.



The screenshot shows a dialog box titled "Parameter" with several tabs: System, Network, Password, Settings, Firmware, and Reboot. The "Firmware" tab is selected. Inside the dialog, there are two input fields: "Firmware:" and "Password:". The "Firmware:" field has a small square button with three dots to its right. At the bottom of the dialog, there are three buttons: "Apply", "Cancel", and "Help".

Firmware

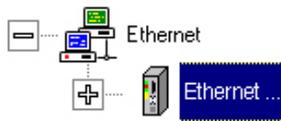
Click on  and choose a valid firmware file. The firmware may only be transferred with a valid password.

Password

Type the valid password for the Ethernet coupler. The password in delivery state is to find in the description of your Ethernet coupler.

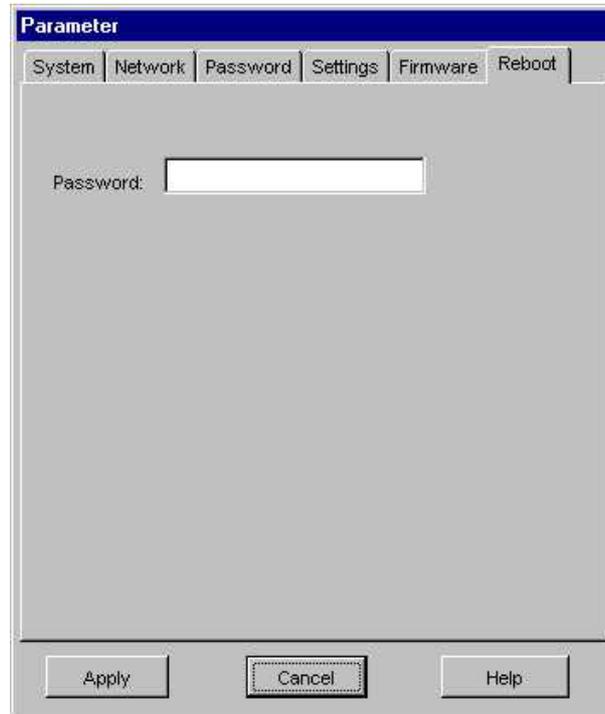
The alteration happens in the register Password.

Register Reboot

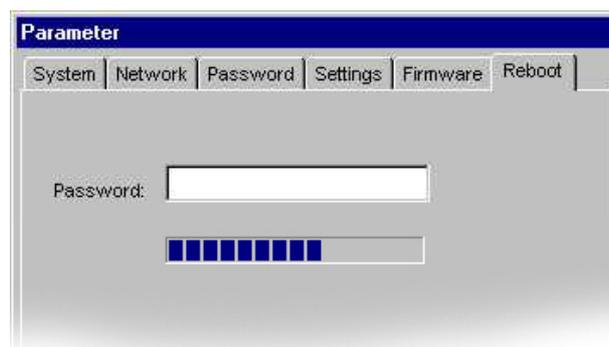


This register allows you to execute an online reboot of the Ethernet coupler.

With a valid password and a click on [Apply], a reboot is executed at the Ethernet coupler. This function is password protected. The password is preset in the register Password.



The progress of the reboot is shown via a progress indicator. When the reboot is ready, there is an acknowledgement.



Password

Type the valid password for the Ethernet coupler. The password in delivery state is to find in the description of your Ethernet coupler.

The alteration happens in the register Password.

Reboot by [Apply]

As soon as you click on [Apply], the Ethernet coupler executes a reboot. Reboot is only possible with valid password.

Project engineering of modules

Preconditions

You've built up an Ethernet network with at least one Ethernet coupler. For the project engineering of the modules, the performance specifications are delivered in form of a GSD-file.

Copy the GSD-file in the GSD directory of WinNCS.

For the online engineering, the Ethernet coupler should be built up with the according modules, connected to the Ethernet and supplied with voltage.

Monitor module online

With the data that WinNCS gets from the Ethernet coupler via [Search Slaves], WinNCS models a symbolic network and monitors it in its "network" window. For indicating the online state, the network symbol for the Ethernet coupler is colored in green.

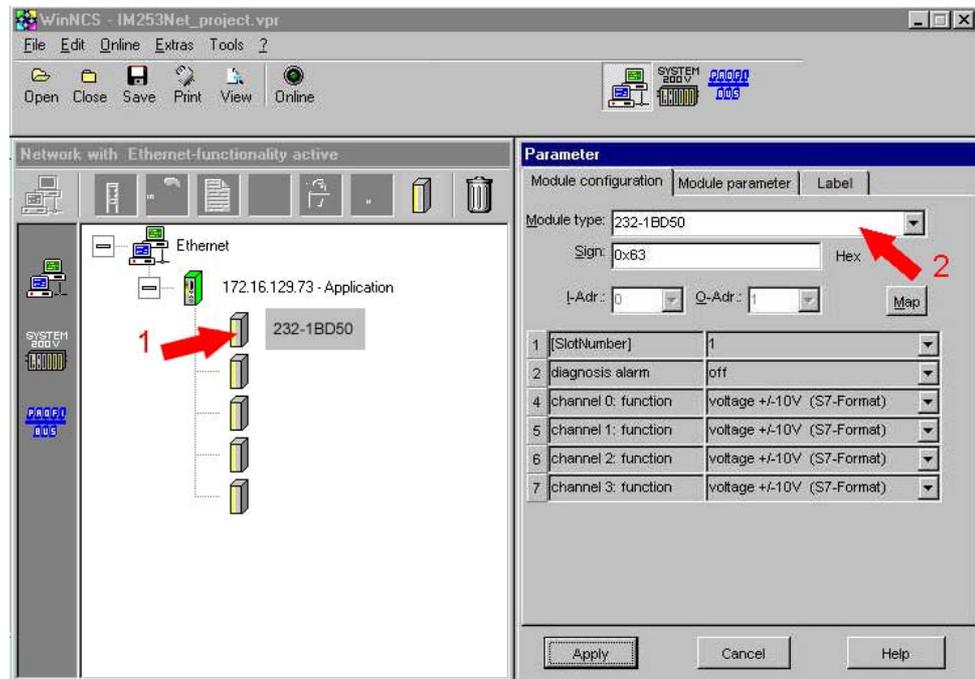
Depending on the mark in the "network" window, you may (password protected) assign real module types to the module symbols in the "network" window and parameterize them if wanted.

Insert module offline

With marked Ethernet coupler, you may insert a new module via .

Parameterize module

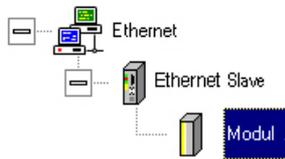
For parameterization you click on your module in the "network" window. The parameters are entered in the "Parameter" window.



As soon as you assign the real module to the symbolic module via "Module type", all parameters for this module are listed. Confirm your entry with [Apply]. At online project engineering, the data is transferred to the coupler after a password request.

Parameterize modules

Register Module configuration



This dialog window allows you to enter module specific parameters. To reach this window, click on a module symbol in the "network" window or insert a new system 200V module via .

The screenshot shows the 'Parameter' dialog window with three tabs: 'Module configuration', 'Module parameter', and 'Label'. The 'Module configuration' tab is active. It contains the following fields and controls:

- Module type:** A dropdown menu showing '232-1BD50'.
- Sign:** A text input field containing '0x63' and a 'Hex' label.
- I-Adr.:** A dropdown menu showing '0'.
- Q-Adr.:** A dropdown menu showing '1'.
- Map:** A button next to the Q-Adr. dropdown.
- Parameter list:** A table with 7 rows, each with a slot number, a parameter name, and a value.

1	[SlotNumber]	1
2	diagnosis alarm	off
4	channel 0: function	voltage +/-10V (S7-Format)
5	channel 1: function	voltage +/-10V (S7-Format)
6	channel 2: function	voltage +/-10V (S7-Format)
7	channel 3: function	voltage +/-10V (S7-Format)

At the bottom of the dialog are three buttons: 'Apply', 'Cancel', and 'Help'.

A parameter set e.g. for FM 254 is only shown for parameterizable modules. For control purposes you find the parameters as Hex value in the register "Module parameter".

Module type

WinNCS uses for the administration of the periphery a module file that is delivered with WinNCS. This file contains all module data for your Ethernet coupler.

Parameter list

With parameterizable modules, the lower part of the window shows a list of the adjustable parameters of the module. The information for that list comes from a module file that should always be up to date!

As soon as you've set the according parameters and transferred them, all parameter are shown in the register "Module parameter" for control.

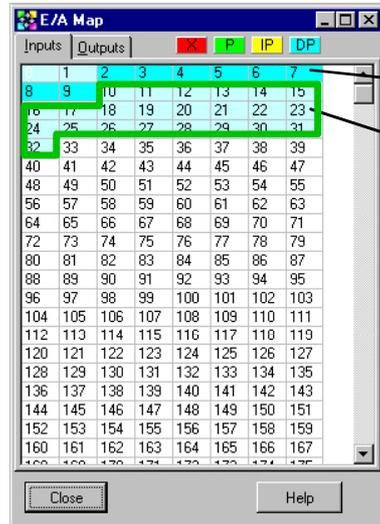
MAP

Via [MAP] you can call a window that shows the address area occupancy of the Ethernet coupler.

Here you may see for example, from which address offset on the in-/output data of the module may be called.

For in- and output area the window has one register each.

The functionality in combination with the Ethernet coupler shall here be explained in a short example.



[1] The address area of the marked module is shown in full color.

1 For example, here the module maps its 8Byte input data starting with address 2.

[2] The module that is the next one at the bus after the marked module creates 23Byte input data starting with address 10.

Rules for automatic address allocation

The address allocation (also called „Mapping“) happens automatically and can not be influenced.

At start-up, the Ethernet coupler assigns automatically addresses to its in-/output periphery, following this rules:

- All modules are mapped from left (Ethernet coupler) to right in ascending sequence starting with address 0.
- It is separated between in- and output area (e.g. if a module has in- and output data, they may be stored at different addresses).
- A separation between digital and analog modules is not realized. The Ethernet coupler creates each a coherent area for in- and output data.

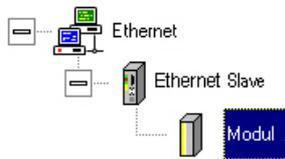


Note!

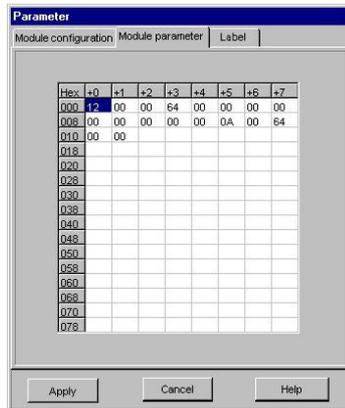
A description of the in- and output areas that a module occupies is to find in the description of the module.

Please take care that modules that occupy more that 1Byte like e.g. analog modules are stored starting with an even address. Otherwise ModbusTCP causes problems at word accesses.

Register Module parameter



The register „Module parameter“ is a monitor for controlling your parameters. This window allows no entries.



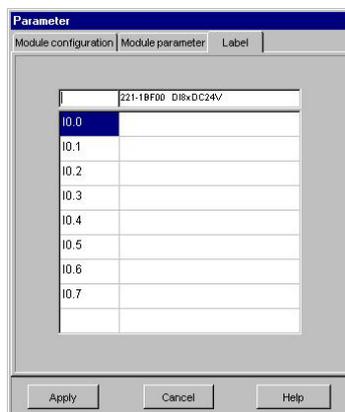
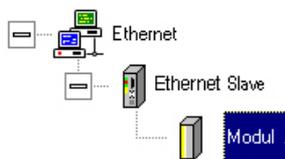
The module parameters have the following structure:

1st Byte Length definition

2nd Byte Plug-in position

Starting with Byte 3 the parameters that you've set via module configuration are stored.

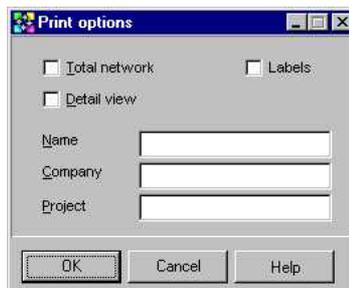
Register Label



This register allows you to superscribe module labels that can be printed. The label mask is free editable except of the module name.

Entered inscriptions are stored after [Apply].

Print label



For printing the labels, you firstly have to activate „Labels“ under **File > Print options**. When you select **File > Print**, the label printout starts for all modules that are in the network of the recent CPU.

The options "Detail view" and "Total network" have no influence on label printout.

Profibus functionality

Overview

Functionality "Profibus"

With the functionality "Profibus" you may engineer your Profibus-DP master. Via the GSD-file that is available for every Profibus slave, your slaves are included in WinNCS and may be parameterized.

Data transfer

There are several possibilities to transfer data to your Profibus-DP master via the online functions:

- Export your project as 2bf-file and transfer this via MMC into the DP master.
- Export your project as 2bf-file and transfer this serial via Green Cable and the online functions into the DP master.
- Transfer your project directly with a DP master PC plug-in module via Profibus into your DP master.

Fast introduction Profibus functionality

Outline

Under WinNCS you have the possibility to engineer your Profibus-DP masters. Export your project as 2bf-file. Transfer this onto MMC or via Green Cable and Profibus interface to the DP master.

Steps of project engineering

- Start WinNCS.
- Choose the functionality "Profibus" with .
- Create a new project with the function group „Profibus“ via **File** > *Project set-up/open*.
- >> Now you reach the "Parameter" window "Function group".
- Type a convenient name under "Function group" for your Profibus network and click on [Apply]. The bus parameters are only calculated after the complete configuration of the bus.
- Add a new Profibus-DP master in the "network" window with .
- Type *Name*, *Profibus address* etc. in the "Parameter" window and click on [Apply].
- Add a **Profibus slave** in the "network" window with . Type the *Profibus address*, the *Family* "I/O" and the *Station type* in the "Parameter" window and click on [Apply].
- Engineer all peripheral modules connected via backplane bus to the Profibus slave by means of .
- [Auto] allows you to address the periphery automatically and monitors the allocation via [MAP].

Please take care that there are no conflicts between automatical address allocation and local periphery addresses!

If you work on an intelligent module like e.g. the CP240, the concerning settable parameters appear.

After having engineered all slaves with concerning periphery, you have to calculate the bus parameters for the Profibus.

- For calculation of the bus parameters, activate the function group „Profibus“ in the "network" window.
- Click on the register „Bus parameter“ in the "Parameter" window.
- Set the wanted baudrate and click on [Calculate].
- >> The bus parameters are calculated - [Apply] them.
Every change in the module combination needs a new bus parameter calculation!
- Activate the function group „Profibus“ in the "network" window and export your project into the file dpm.2bf.

Transfer options

To transfer the 2bf-file, you have the following options:

- Transfer via online functions and Green Cable
- Transfer via MMC

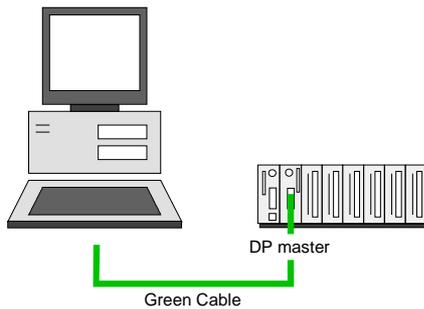


Attention!

Please regard the hints for the deployment of the Green Cable in the description of your Profibus-DP master!

① DP master → Power Off

② Connect PC and DP master via Green Cable



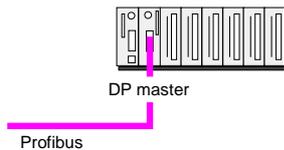
③ DP master → Power On



⑤ Profi PC → 2bf-Transfer into DP master

⑥ Transfer completed → DP master → Power Off

⑦ Disconnect Green Cable and connect Profibus cable



⑧ DP master → Power On → RST MR

- Turn off the voltage supply of your DP master.
- Connect your DP master with a COM interface of your PC by means of the Green Cable.
- **Please regard that not all DP masters are supporting the Green Cable. More detailed information is in the manual of your DP master.**
- Start WinNCS.
- Set the functionality Profibus and activate the online functions with .
- Click on  and set the communication parameters (*Medium* "Serial", *Interface no.* "Nr. of your COM interface")
- Turn on the voltage supply of your DP master.
>> Your DP master can now receive data serial via the Profibus interface.
- Establish a connection between your PC and the Profibus-DP master via . Data can only be exchanged with an active connection.
- With  you may now transfer your 2bf-file into your DP master.
- Turn off the voltage supply of the DP master for a short time and set it to RUN at the Profibus.

Create new res. import a Profibus project

Create new Profibus project

Start WinNCS.



Functionality Profibus



By clicking on , you set the functionality "Profibus".

File > Project set-up/open



Create a project with the function group „Profibus“ via **File > Project set-up/open**.

A file selection window appears where you can type a name for the project file. If you type the name of an already existing project, this is opened.

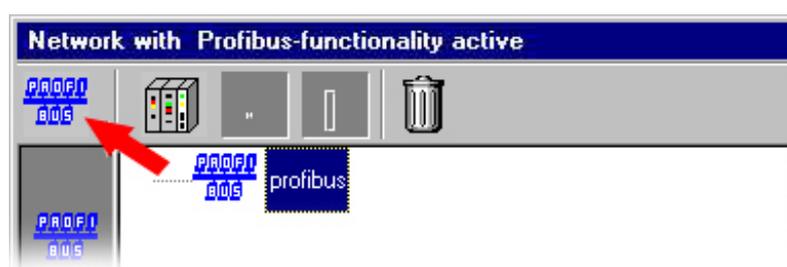
The project file under WinNCS has "vpr" as extension. The file names of the last four opened projects are taken over into the menu **File** and may thus be opened directly.

As soon as you confirm your entries, the "network" window with concerning "Parameter" window is opened.

The "network" window shows your new Profibus net. In the "Parameter" window you may assign a symbolic name to the network.



Click on  in the "network" window to add further networks with the selected "Profibus" functionality to your project.



Additionally to the "network" window, the "Parameter" window appears. The "Parameter" window serves the parameter setting of the elements monitored in the "network" window. For example, you may here assign a symbolic name to the network that is used to list the Profibus network in the "network" window.

Import Profibus project

Starting with WinNCS version V 3.12, you have the comfortable possibility to import a Profibus project from a DP master into WinNCS by using the online functions and the Green Cable.

Connect the Profibus interface of your Profibus-DP master with the COM interface of your PC via Green Cable.

Activate the online functions for Profibus via .



Set the Medium „Serial“ and your PC interface under .

With  a connection between PC and DP master is established. The communication parameters given under „Init“ are used.

For the import, you click on . Choose a destination where the imported file has to be stored and start the import. The progress is shown with a progress indicator in the main window.

After the data transfer you may import the file into WinNCS with .



WinNCS uses for import and export 2bf-files.

Alter Profibus project and engineer DP master

Preconditions

Load a project to alter res. create a new Profibus project.

As soon as the project is loaded res. created, it is opened in the "network" window with concerning "parameter" window.

Starting with a network symbol that shows the functionality, the "Profibus" functionality allows you to place DP master, DP slaves or modules and to parameterize them in the concerning "Parameter" window.

Project engineering

Depending on the position in the network list, the upper part of the window shows symbols that are used to construct the network.



Engineer a DP master by clicking on

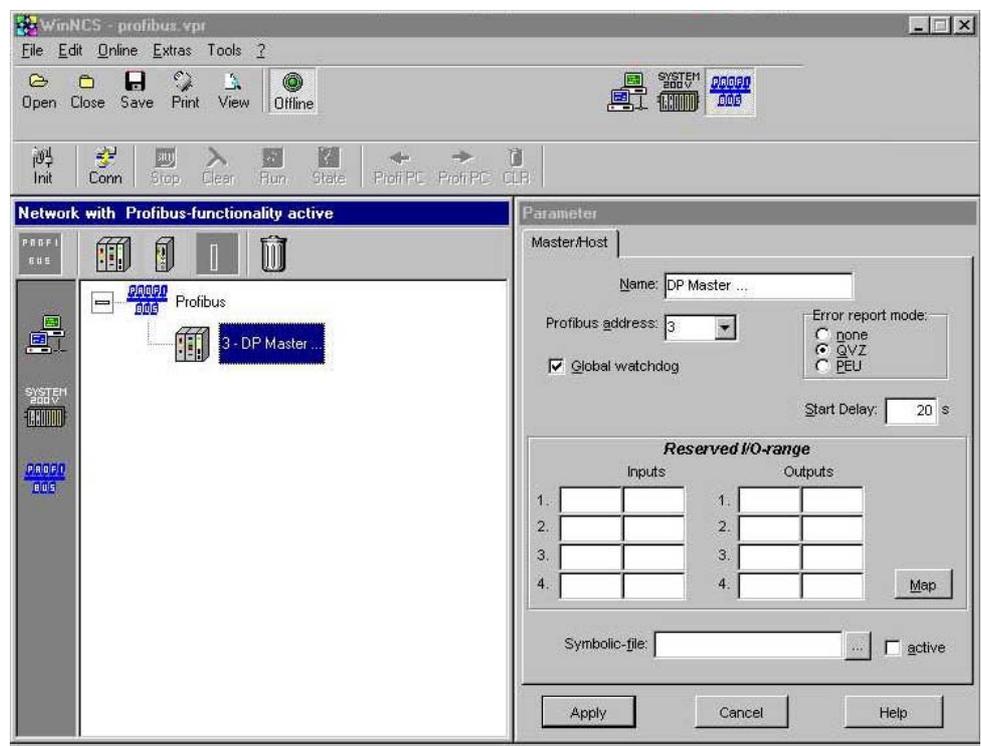
Alter the wanted settings in the "Parameter" window.



Note!

Don't miss to click on [Apply] to confirm your entries before returning to the network window. A click on [Cancel] deletes your DP master again.

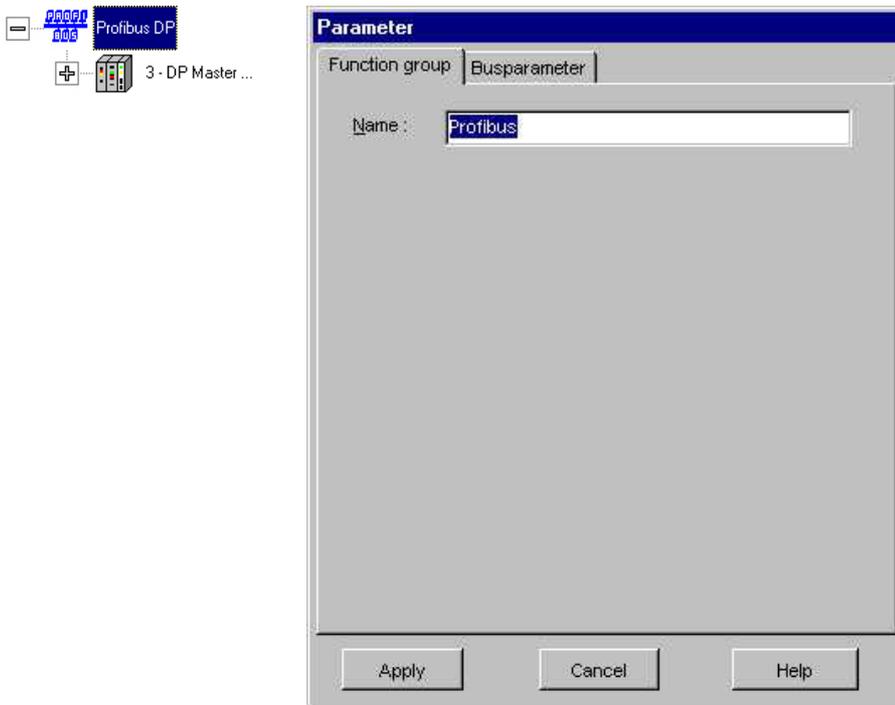
If you now click on the DP master symbol in the "network" window, you can see the network elements available for the DP master.



Parameterize Profibus system

Parameter Profibus network

Register Function group



Name

Here you may assign a name for your function group (max. 32 characters). The name serves the overview. There are no restrictions depending on the name but it is strongly recommended to use unambiguous names for function groups.

As soon as you confirm your entry, the name is applied and shown in the "network" window.

Register Busparameter



This dialog window serves the setting of the physical parameters of the Profibus. The here entered settings are valid for one complete bus.

The calculation of the bus parameters is executed after the parameterization of master and slave modules.

Bus description

Assign a name to your configured bus (max. 32 characters). It is strongly recommended to use unambiguous names for the bus description.

Baudrate

You may set a value between 9.6 and 12000 kbit/s.

T_qui

Quiet time is the time that has to be considered at transformation of signals (NRZ) to other codings. The switching time for repeaters depends on the baudrate. It is: $T_{rdy} > T_{qui}$

T_set

Is the time between the last interrupt and the execution of the according reaction. The setup time is the shorter the higher the performance of the used bus ASIC and the connected processor. The value depends on the baudrate.

T_slot

is the max. time that the initializing system has to wait until the first character/sign is received. The value depends on the baudrate.

HSA

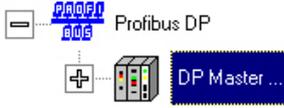
Shows the highest station address in the system.

Poll Timeout	is the max. time after which the response in a master-master communication has to be requested from the repeater.
Watch/TTR	Fixes the factor of multiplication of the time TTR.
Repeater on Bus	Choose this option when repeaters are within your bus.
Tsdr_min	is the time that a slave has at least to wait until it is allowed to answer.
Tsdr_max	is the time after which a slave has to have answered.
Retry Limit	If a master doesn't get an answer from a called slave, it repeats the call acc. to Retry Limit. Afterwards, the slave is provided in further bus cycles in slow poll in case of an error.
Gap-Factor	This factor gives the number of token circles after which every active station proofs the Profibus address lacks in its GAP. Profibus address lacks may occur for example by drop out of masters.
Delta Ttr	is the Delta-Target-Rotation-Time (additional scheduled token circle time). This is the time that has to be taken into account for other masters that are at the Profibus bus but are not part of the project engineering.
Ttr	Target-Rotation-Time (scheduled token circle time). This is the max. time for a token circle. The real time that the master has for sending data telegrams to the slaves depends on the difference between scheduled token circle time and real token circle time.
WD Factor 1, WD Factor 2	The two Watchdog factors depend on the baudrate and are used for the calculation of Data-Exchange.
Watchdog	At the call control, the master polls the slaves. Within the call control time, the master has to call the slave at least one time (token delivery) to reach the state "Data Exchange".
T_rdy	Ready-Time: This is the time that the master has to be ready for reception after it has called an acknowledgement or response.
T_id2	Idle-Time 2 (resting time 2): This is the time that passes after the sender (initiator) sent a call telegram that is not acknowledged (SDN) as idle (= binary "1") on the bus before the first bit of a new telegram is send to the bus. Conditions: T_id2 >= T_id1
T_id1	Idle-Time 1 (resting time 1): This is the time that passes at the sender (initiator) after the reception of the last bit of a telegram as idle (= binary "1") at the bus until the first bit of a new telegram is send to the bus.

- Control time** is calculated with WD 1 and WD 2 and passed on to the Profibus stack.
- Calculate** This button starts the calculation of Ttr, WD Factor 1, WD Factor 2, Watchdog, T_rdy, T_id2, T_id1 and Control time.
After the calculation, you may change the values. With [Apply] the values get valid.

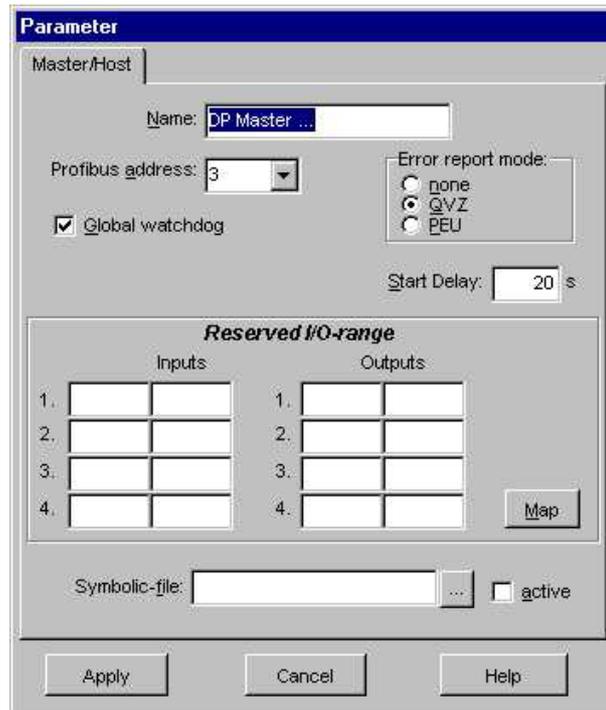
Parameter DP master

Register Master/Host



You reach the "Parameter" window by clicking on  in the network list or by adding a new DP master.

In this dialog window you type the parameters for your DP masters.



Name

Type the name of your master (max. 32 characters). The name serves the overview. There are no restrictions depending on the name but it is strongly recommended to use unambiguous names for function groups. As soon as you confirm your entry, the name is applied and shown in the "network" window.

Profibus address

Choose the Profibus address of the master module.

Global watchdog

When activated, the watchdog is active for all DP slaves of the master system. When a DP slave is not called within the calculated watchdog time, it is set in save state (all outputs are set to "0").



Attention!

If you don't activate a watchdog, in case of an error (Error from the master or interruption of data transfer at the bus) all outputs of the DP slave are not shut down. The outputs are not set to "0", i.e. the last received signal state of the output remains valid!

Start Delay	Start delay allows you to set a time which the Profibus master has to wait with starting until the CPU has been booted. The time window is between 21s and 1200s. If you enter 20, the delay time is 0.
Error report mode	When the master is assigned to a CPU, you may here select the behavior of the CPU at interruption of the bus communication to a slave (station failure). At the slave parameterization, you fix the slaves for reaction to a station failure. The option fields have the following meaning:
<i>none</i>	The CPU switches to RUN without delay also if not all slaves have acknowledged.
QVZ	Receipt confirmation delay happens when a master memory area misses to acknowledge a CPU call with a READY signal within a defined time. <i>Possible error causes:</i> <ul style="list-style-type: none">- Error in the user application- Slave is defect or missing- Bus communication to the slave is interrupted
PEU	Periphery undefined is created when a slave error occurs and the slave can not be called by the master.
Host station type	At this time, the value is fix at "CPU2xx" without interfering other functions. In the future there will be other host types, too.
Reserved I/O range	You may reserve up to 4 address areas for each in- and outputs. These areas are protected at the automatic address allocation.

Map

If you click on [Map], a window is opened that shows the occupancy of the peripheral address area. Here you may see for example, from which address offset on the in- res. output data of the chosen module is stored.

For in- and output area, the window has each one register.

1 — [1] Each one register for in- and output area

2 — [2] Legend

3 — [3] reserved address area

4 — [4] Address area occupied by others than the chosen module (half-tone color).

5 — [5] Address area of the chosen module in full color

6 — [6] Not used address areas are shown in white

Profibus supports the following areas:

-  (red) Shows reserved address areas. You may reserve up to 4 address areas each for in- and outputs. These areas are protected at the automatic address allocation.
-  (blue) Address area occupied in the CPU by the modules connected via Profibus.

Symbolic file

Here you may choose a S5 symbol file from Siemens. As soon as you choose "active", the symbol comments of the symbol file are used for the labels. This must not be altered in WinNCS. Deactivating the symbol file keeps the symbol comments and they can be altered.

Project engineering DP slave

Preconditions

You've created a Profibus network with at least one DP master.

For the project engineering of a slave system, the performance specifications are delivered in form of a GSD-file.

Copy this GSD-file into the GSD directory of WinNCS.

For the project engineering, the DP master has to be build-up with the according slaves, connected via Profibus and supplied with voltage.

Insert DP slave

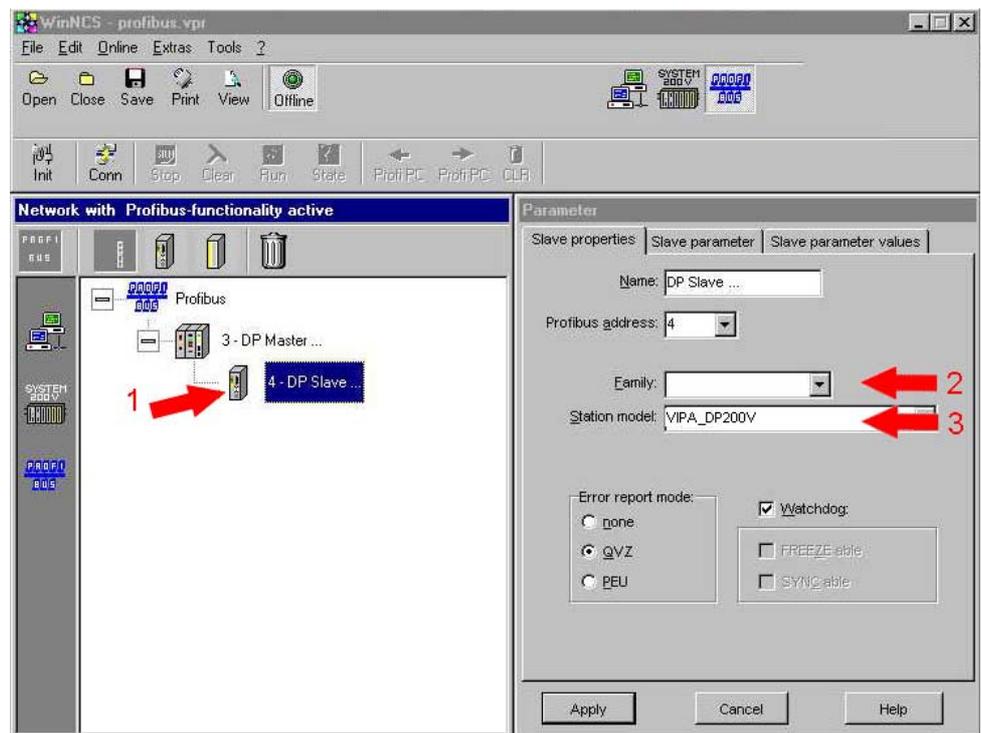


At marked DP master, you may insert a new DP slave with

Parameterize DP slave



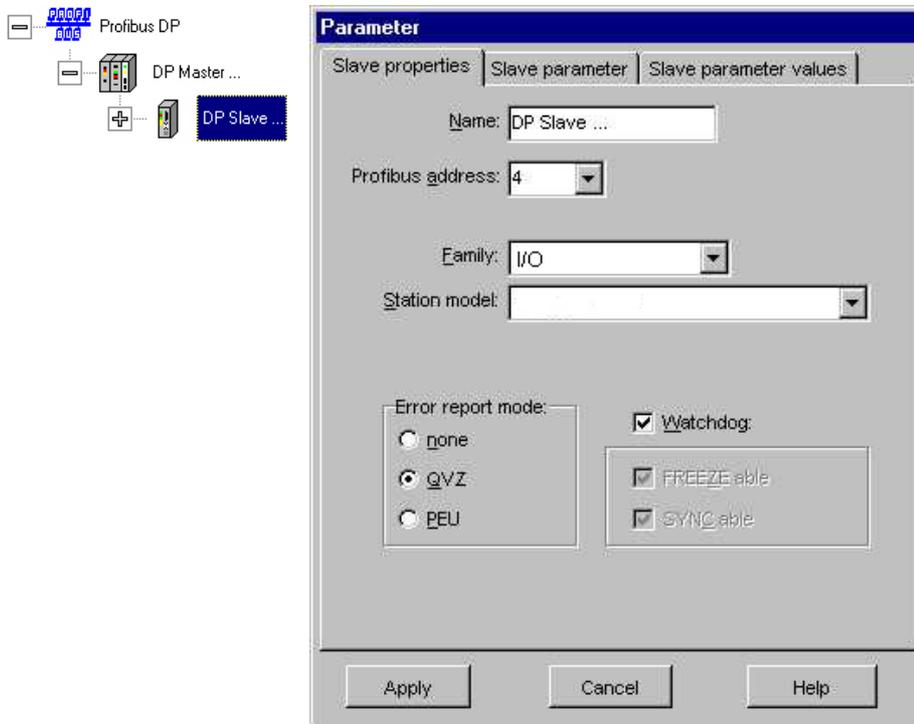
For parameterization, you click on your DP slave in the "network" window. Set the parameters of the slave in the according "Parameter" window.



As soon as you assign the real station type to your slave via "Station type", the register "Slave parameter" shows all parameters for this slave. Confirm your entry with [Apply].

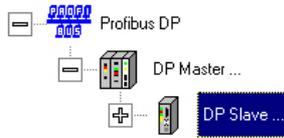
Parameter DP slave

Register Slave properties

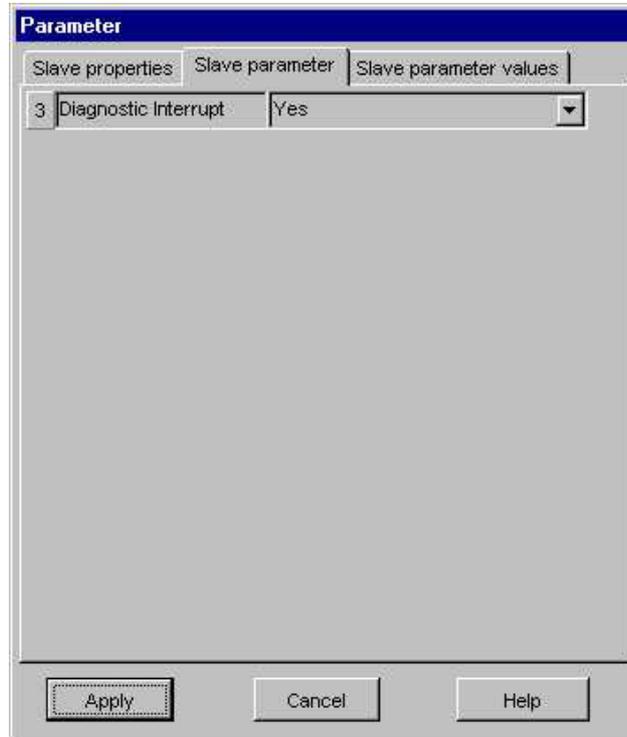


- Name** Type the name of your slave (max. 32 characters). The name serves the overview. There are no restrictions depending on the name but it is strongly recommended to use unambiguous names for function groups. As soon as you confirm your entry, the name is applied and shown in the "network" window.
- Profibus address** Choose the Profibus address of the slave module. This value must be identical to the address set at the slave. Every address has to be unique within the network.
- Family** This selection field assigns a function class to the DP slave. WinNCS takes its function classes from the GSD-files that are in the GSD directory.
- Station model** Depending on the "Family" all available station types are shown that are included in WinNCS via GSD-file.
- Error report mode** According to the project engineering in the dialog window "DP master parameter", register "Master/Host", here the for the master system valid setting of the watchdog is selected per default.
- Watchdog** Choose if the watchdog is valid for this slave or not. If a slave is not called within the calculated request time, it switches to secure state (all outputs are set to "0").

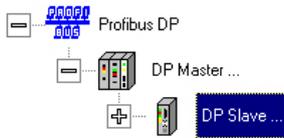
Register Slave parameter



Here you may parameterize the slaves directly. If there are parameters for a slave, these are shown and may be altered. If there are no parameters found, the register window remains empty.

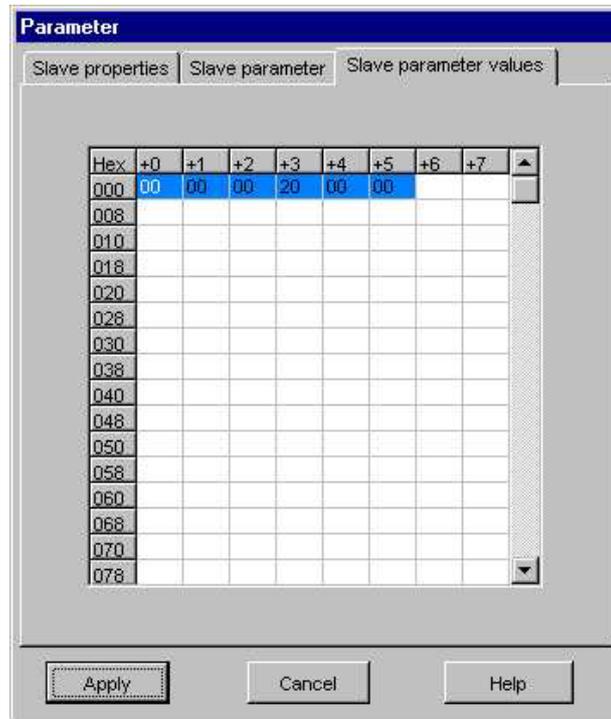


Register Slave parameter values



The register slave parameter serves the control of the parameters for all modules connected subordinated to the slave. The values are not changeable.

The first 3Byte are slave parameters, the following ones are referring to the subordinated modules.



Project engineering modules

Preconditions

You've created a Profibus network with at least one DP master and one DP slave.

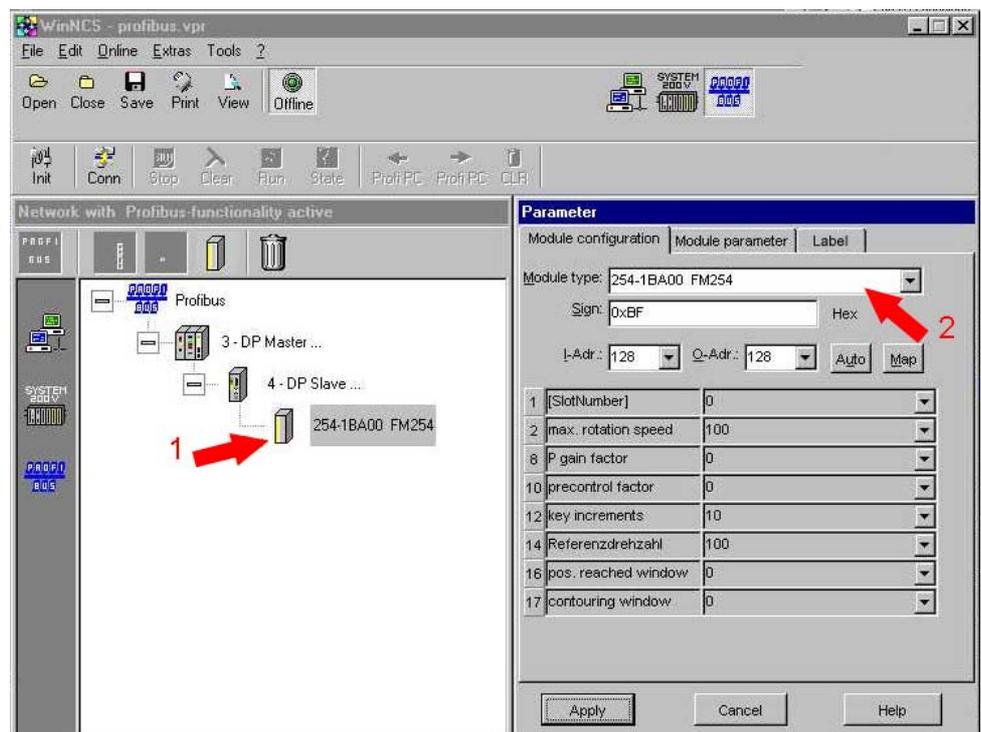
Insert module offline



At marked DP slave, you insert a new module via

Parameterize module

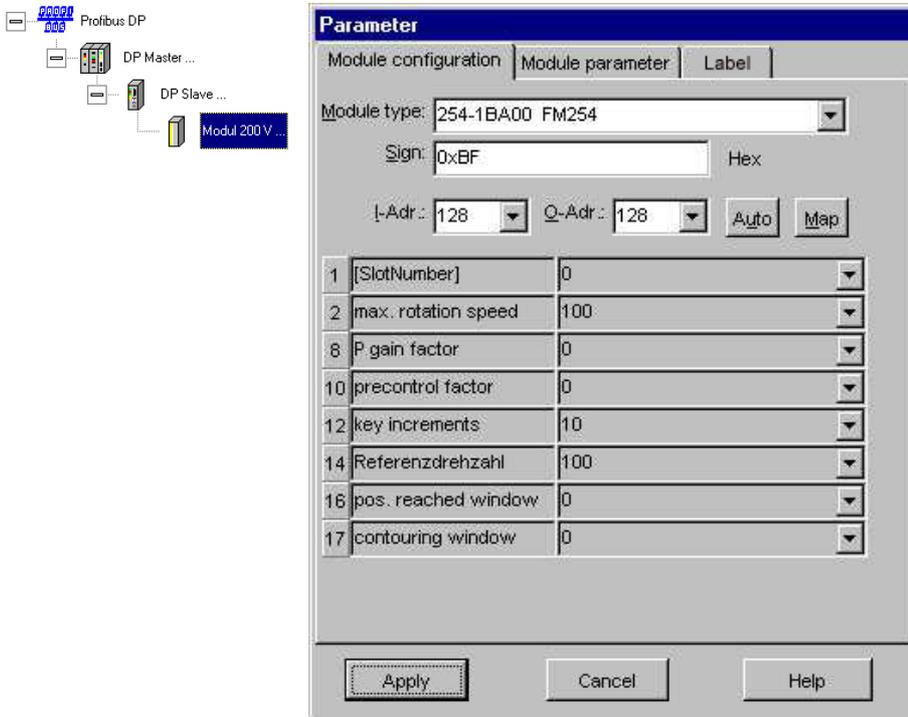
For parameterization you click on your module in the "network" window. Set the parameters in the "Parameter" window.



As soon as you assign the real module type to the symbolic module via "Module type", all parameters for this module are listed. Confirm your entry with [Apply].

Parameterize modules

Register Module configuration



This window allows you to set module specific parameters. Click on a module symbol in the "network" window or insert a new module via  to reach the window.

A parameter record set e.g. for the FM254 is only shown at parameterizable modules. For control purposes, you find the parameters as hex value in the register "Module parameter"

Module type

Starting with the chosen Profibus-DP slave, all modules that are included into WinNCS via a GSD-file are shown.

Sign

Depending on the functionality, every module has an ID, shown as hex value. The meaning of these IDs are defined in the Profibus-Norm. This field is only for information.

I-Addr. or O-Addr.

Set the periphery start address where the mapped module is stored. In-res. outputs are stored in different areas. The address requirement is calculated from the module data.

Auto

The address allocation happens automatically regarding the reserved addresses.

Map

A click on [Map] opens a window that shows the assignment of the peripheral address area. Here you can see from which address offset on the in- res. output data of the selected module is stored.

In- and output area have each one register in the window.

The screenshot shows the 'E/A Map' window with a grid of address assignments. The grid is divided into 'Inputs' and 'Outputs' sections. The legend at the top right indicates: [X] (red) for reserved address areas, [P] (green) for Profibus, [IP] (yellow) for input, and [DP] (blue) for output. The grid shows address ranges from 0 to 167. A legend at the top right identifies colors: [1] Each one register for in- and output area, [2] Legend, [3] reserved address area, [4] Address area of another module than the recent one (half-tone color), [5] Address area of the recent module in full-tone color, [6] Not used addresses are shown in white.

Under Profibus the following areas are supported :

- X (red) Reserved address areas.
You may reserve up to 4 address areas for each in- and outputs. These areas are blocked for the automatic address allocation.
- DP (blue) Address area occupied in the CPU by the modules connected via Profibus.

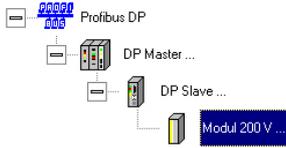
Parameter area

At parameterizable modules like e.g. the Motion Control FM 254, the lower part of the window shows a list of all parameters that are available for this module.

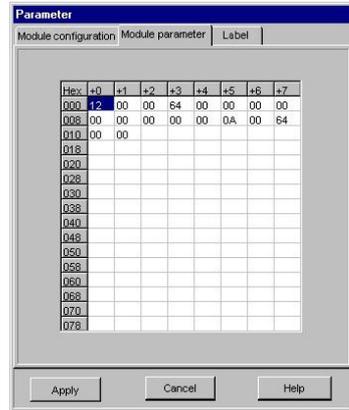
WinNCS takes the data for this area from the GSD-file that should be up-to-date!

As soon as you've set and transferred the according parameters, they are shown in the register "Module parameter" for control purposes.

Register Module parameter



The register module parameter is a monitor for controlling your entered parameters. This window allows no changes.



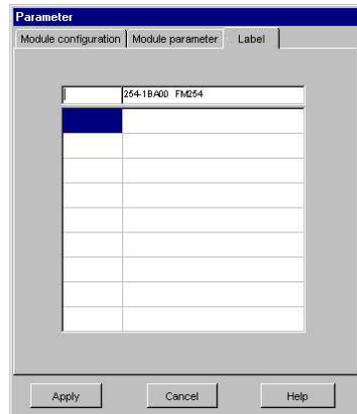
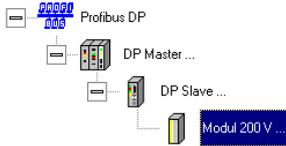
The module parameters have the following structure:

1st Byte Length

2nd Byte plug-in location

Starting with Byte 3 the other parameters that you've entered under module configuration are stored.

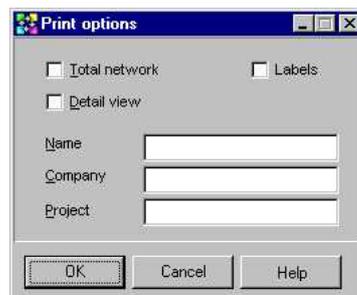
Register Label



This register allows you to print module labels. Except of the module name, the mask is editable.

Entered labels are stored after [Apply].

Print label



To print out the labels, you first have to activate the option "Label" under **File > Print options**. If you now choose **File > Print**, the labels of all modules that are connected to the current CPU are printed.

The options "Detail view" and "Total network" have no influence.

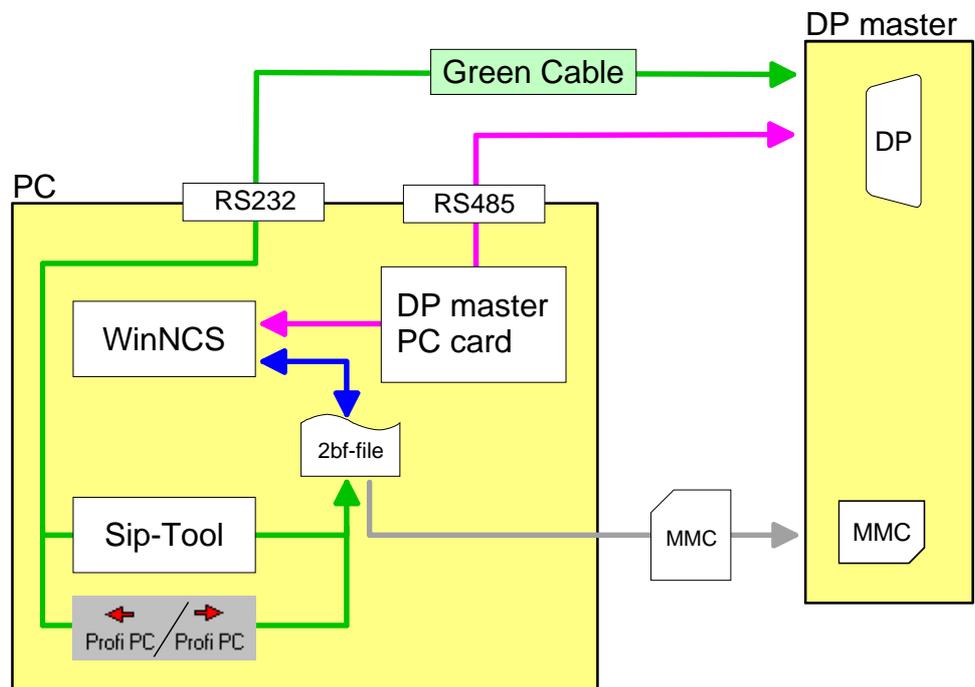
Data transfer between WinNCS and DP master

Outline

You have the following options for data transfer:

- Serial with the Green Cable via online functions
- Transfer via a MMC memory card
- Online transfer by means of a DP master PC plug-in card

Precondition for the serial data transfer and the one via MMC is a *2bf-file* that WinNCS creates with the export function.



Create 2bf-file

- Activate the master level in the "network" window.
- Call the context menu (right mouse button) and choose  export.
- Type a File name and confirm your entry.
- >> WinNCS now exports your project into a 2bf-file.



Please don't forget to calculate the bus parameters before data transfer. Activate the function group "Profibus" in the "network" window. The button for the bus parameter calculation is in the register "Bus parameter".

At every change of the module combination you have to recalculate the bus parameters.

Transfer serial via online functions

Precondition

- Your project is stored in a 2bf-file.
- A serial connection between a COM interface of your PC and the Profibus interface of your DP master via the Green Cable is present.



Important note!

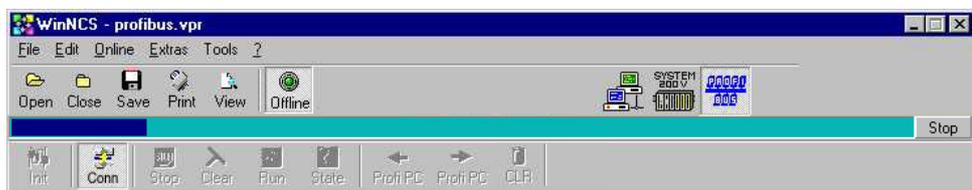
Please regard that not all DP master support the Green Cable. For more detailed information refer to the manual of your DP master.

Approach

- Start WinNCS
- Choose the functionality "Profibus"
- Activate the online functions via **Online** > *Online functions* res. via .
- The buttons for the online functions appear as symbol bar in the lower part of the main window.
- Click on  and adjust the communication parameters. Choose "Serial" at *Medium*, the number of your PC interface under *Serial port* and confirm your entry.
- Turn off the power supply of your Profibus-DP master.
- Push the operating mode lever at your DP master in position MR and turn on the power supply again. Release the operating mode lever.
- Now your DP master can receive serial data via the Profibus interface.
- Establish a connection between PC and Profibus-DP master via . The communication parameters given under "Init" are used. This online connection is the precondition for the following functions.
- Transfer your 2bf-file via  into your DP master.

Transfer progress

The transfer is monitored via a progress indicator and can be terminated at any time via [Stop].



Import a project as 2bf-file via  At running online connection you can now transfer the project in the DP master as 2bf-file into the PC via  and import it into WinNCS via .

Transfer via MMC reading device

Precondition

- Your project is stored as 2bf-file.
- To transfer the project engineering into the Profibus-DP master you need a *MMC* and a *MMC reading device*.

Approach

- Copy the 2bf-file onto the MMC.
- Rename the file into dpm.2bf
- Turn off the power supply of the DP masters
- Plug-in the MMC into the DP master
- Start the MMC transfer in your DP master. For more detailed information please refer to the manual of your DP master.

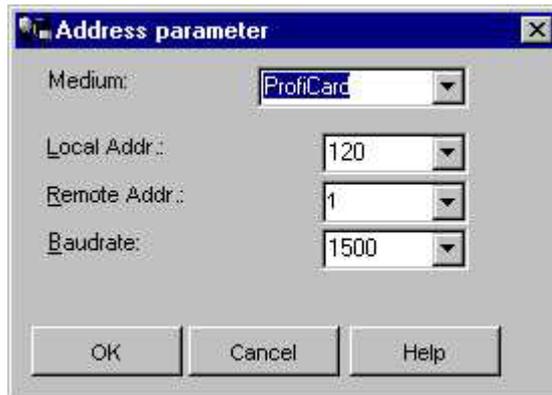
Transfer via DP master PC card



Engineer your Profibus. You can transfer your entries via the *online functions* from the PC directly into the DP master or load it from there into the PC.



After a click on this button, the screen "Address parameter" appears. Here you adjust the addresses for the communication between the two master systems.



Local Addr.

Profibus address of the DP master PC card.

Remote Addr.

Profibus address of the destination system.

Baudrate

Current Baudrate of the Profibus network.



Establishes a *connection* to Profibus.



Requests the status of the master.



Remote control of the master via Profibus.



Transfers the data base from the master into the PC via Profibus.



Transfers the data base from the PC into the master via Profibus.

System 200V functionality

Overview

Functionality System 200V

With the functionality System 200V you may parameterize res. rebuild and documentate CPUs for STEP5 from Siemens and the according periphery.

CPU

Due to the project engineering, a DB1 is emulated for the CPU that can be exported as s5d-file. Additionally you have the option to include and activate a S5 symbol file from Siemens. The names of the symbol file are automatically used for the labels.

Documentation

You may also use the System 200V functionality for documentation purposes. For this you rebuild/clone your system and are now able to print labels, parameter lists etc.

Fast introduction System 200V functionality

Outline

The System 200V functionality is only available for engineering STEP5 von Siemens-CPU's.

You export your project as DB1 in form of a s5d-file.

Steps of project engineering

- Start WinNCS
- Select the functionality "System 200V by clicking on .
- Create a new project with the function group "System 200V" via **File > create/open**.
- >> Now you reach the "Parameter" window "Function group".
- Type a convenient name for your network under "Function group" and click on [Apply].
- Add a new CPU in the "network" window via .
- In the "Parameter" window type *Name* and *CPU-Type* and click on [Apply].
- Engineer all peripheral modules via  that are connected to the CPU via backplane bus.
- Via [Auto] you may start the automatic address allocation for the periphery and monitor it via [MAP].
- Depending on the used CPU-Type, you may enter settings in the register "System parameter" that are mapped as DB1 at export in a s5d-file. The manual creation of a DB1 is not longer necessary.
- Via the register "Process image" you organize the peripheral address area of your CPU by excluding special address ranges from the automatic address allocation.
- Via symbol file you may include and activate a S5 symbol file from Siemens at any time.
- The symbol file is registered at the documentation (label print).
- Activate the function group System 200V in the "network" window and export your project into a s5d-file.

Create new System 200V project

Create new Profibus project

Start WinNCS.



Functionality Profibus



Click on  to activate the functionality "System 200V".

File > Project set-up/open



Create a new project with the function group "System 200V" via **File > Project set-up/open**.

A file selection window appears where you assign a name to your project file. If you type the name of an existing file, this is opened.

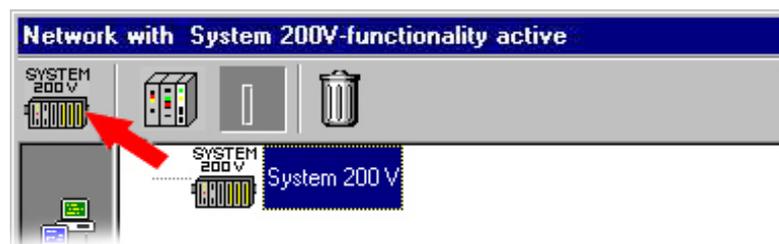
The project file under WinNCS has the extension "vpr". The last 4 opened project files are listed in the **file** menu for direct access.

Confirm your entries to open the "network" window with concerning "Parameter" window.

The "network" window monitors your new "System 200V" network. In the "parameter" window you may assign a symbolic name to your net.



By click on  in the "network" window you may add further networks with the chosen "System 200V" functionality to your project at any time.



Additionally to the "network" window, the "parameter" window opens. The "parameter" window serves the parameter setting for the elements of the "network" window. For example you may assign a symbolic name that is used to monitor the System 200V network in the "network" window.

Alter System 200V project and engineer CPU

Preparation

Load the System 200V project you want to alter res. create a new one.
 A loaded res. created project is opened in the "network" window with concerning "parameter" window.
 On basis of a network symbol that shows the functionality, you may add CPUs or modules with "System 200V" functionality and parameterize them in the concerning "parameter" window.

Project engineering

Depending on the position in the network list, the upper part of the window contains symbols that can be used for the construction of the network.



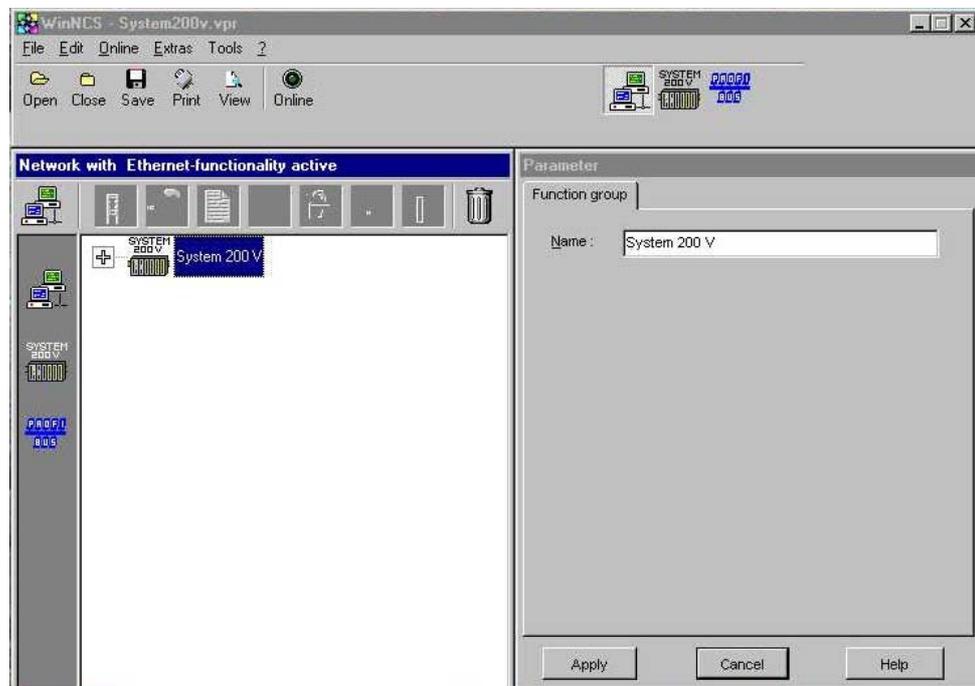
Configure a CPU by clicking on .
 Switch to the "parameter" window for the CPU settings.



Note!

You may only return to the "network" window when you confirm your entries via [Apply]. When you click on [Cancel], your station is deleted res. your entries are.

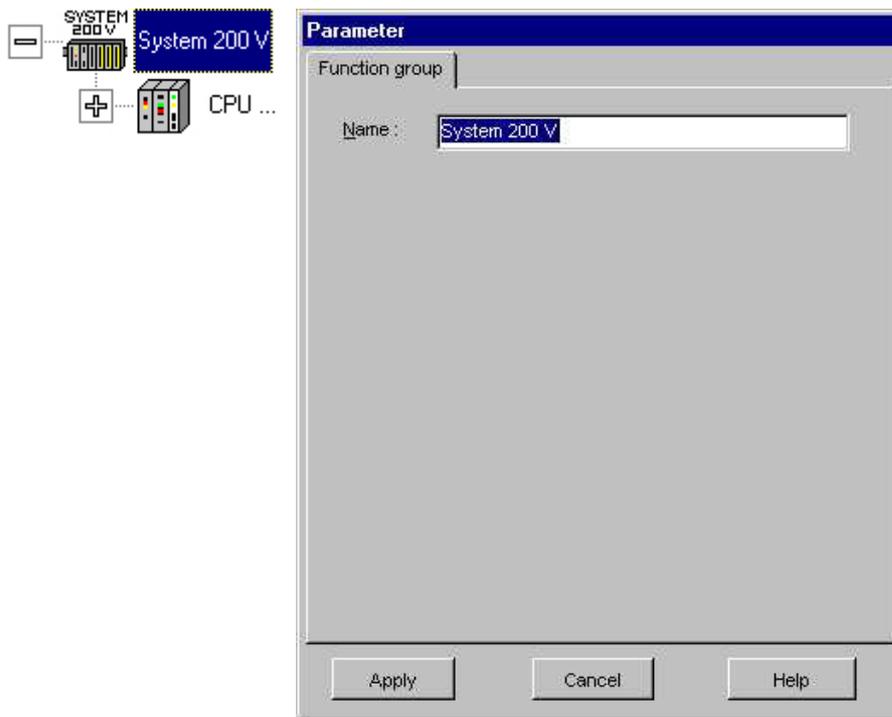
If you now click on the station in the "Network" window, you get a list of network elements useable for this station.



Parameterization of the System 200V

Parameter System 200V network

Register Function group

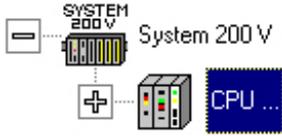


Name

Here you may assign a name for your function group (max. 32 characters). The name is for a better overview. There are no restrictions for the name but it is urgently advised to use unambiguous names for function groups.

As soon as you [Apply] your entries, the name is taken over and shown in the "network" window.

Parameter CPU

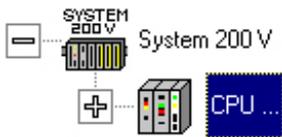


You reach the "parameter" window by clicking on a CPU in the network list res. create a new CPU.

The "parameter" window contains the following registers:

- CPU 200V (CPU type selection)
- System parameter (Parameterization of the selected CPU)
- Process image (Block address areas for the automatic address allocation)

Register CPU 200V



This dialog window allows you to enter CPU specific parameters. You reach this window by clicking on a CPU group in the "network" window or add a new CPU via .

Name

You may assign a name for the CPU that serves a better overview. After [Apply], the name is shown in the "network" window.

Date and time

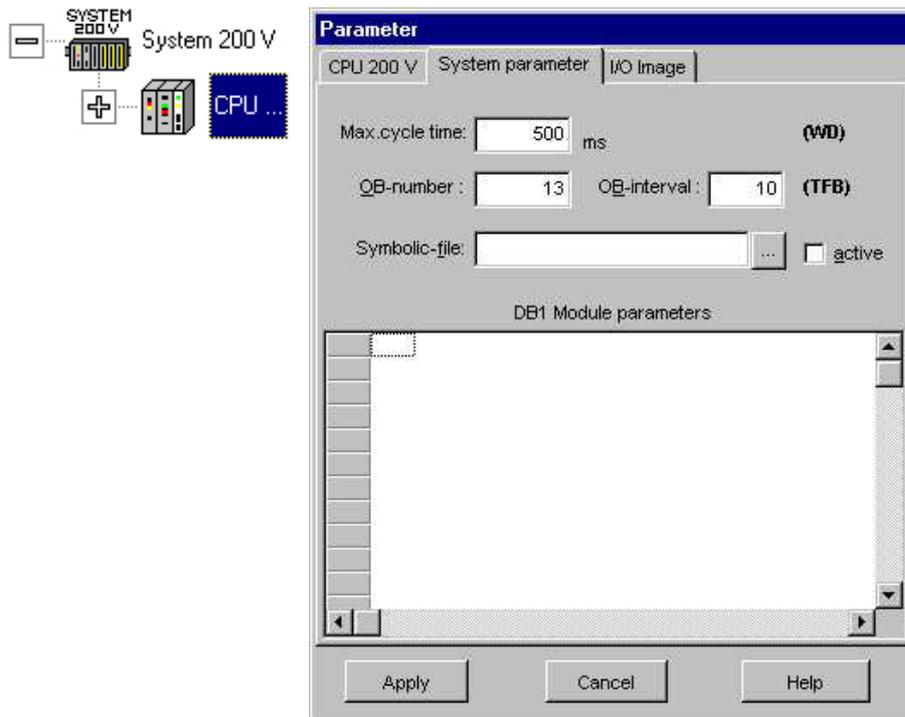
This fields serve the documentation. You can fix the time of the last change.

CPU type

Choose a CPU to parameterize from the selection list.

Depending on the selected CPU type, the content of the register "System parameter" changes.

Register System parameter



In the register System parameter you enter CPU settings that are taken over at export into a s5d-file as DB1.

The manual creation of a DB1 is not longer required.

Max. cycle time

The max. cycle time is the maximum time a cycle may last. If this time is exceeded, the CPU switches to STOP.

OB number OB interval

These parameters allow you to activate a time organisation block (OB 10 to OB 13) that can be cyclically called (TFB). That request interval is to enter into "OB-Interval". Please regard that your entry is multiplied with factor 10ms (Ob-Intervall:10 is 100ms)

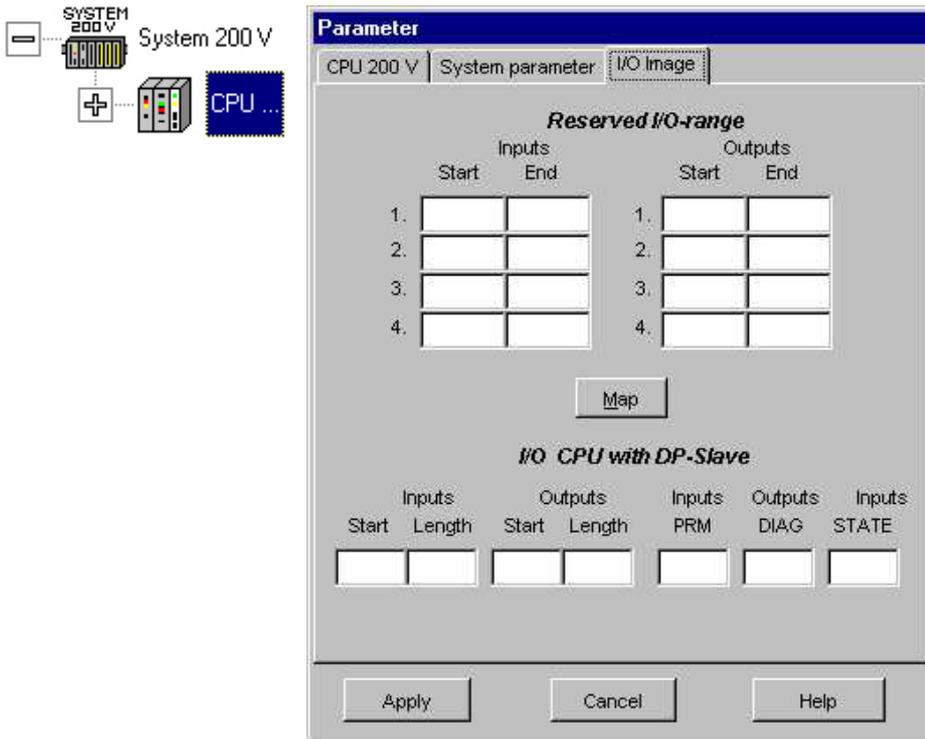
Symbolic file

Here you may choose a S5 symbol file from Siemens. As soon as you choose "active", the symbol comments of the symbol file are used for the labels. These must not be altered in WinNCS. The deactivation of the symbol file keeps the symbol comment but now they can be altered.

DB1 module parameters

This window informs about the current DB1 module parameters. Deploying parameterizable modules, like e.g. analog modules, they appear in the display (P0x:). Additionally you may see which addresses are used to call the modules (UAT:).

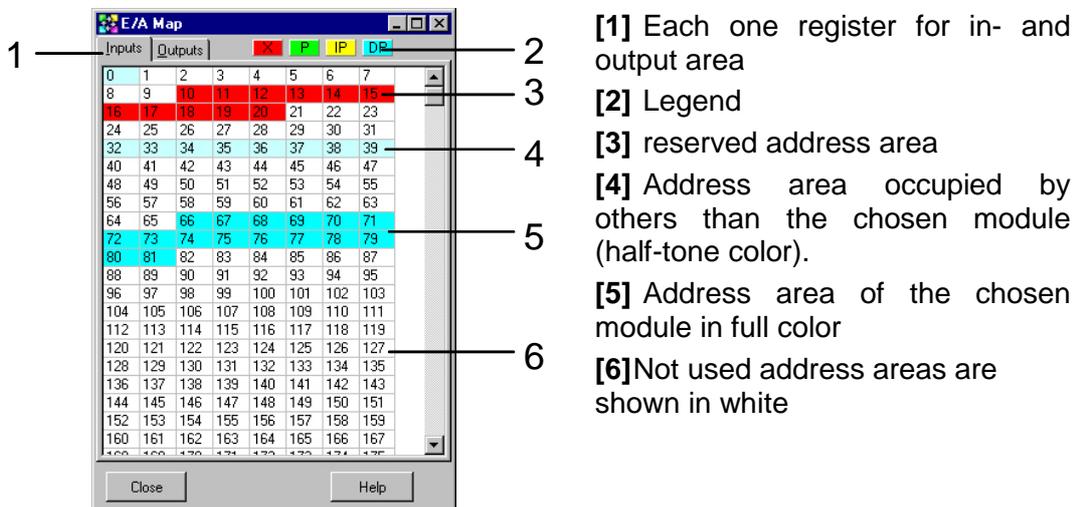
Register I/O Image



Via this register you organize the peripheral address area of your CPU. You may block addresses for the automatic address allocation and monitor the current address allocation via the button [Map].

Reserved I/O range You may reserve up to 4 address areas for each in- and outputs. These areas are protected at the automatic address allocation.

Map If you click on [Map], a window is opened that shows the occupancy of the peripheral address area. Here you may see for example, from which address offset on the in- res. output data of the chosen module is stored. For in- and output area, the window has each one register.

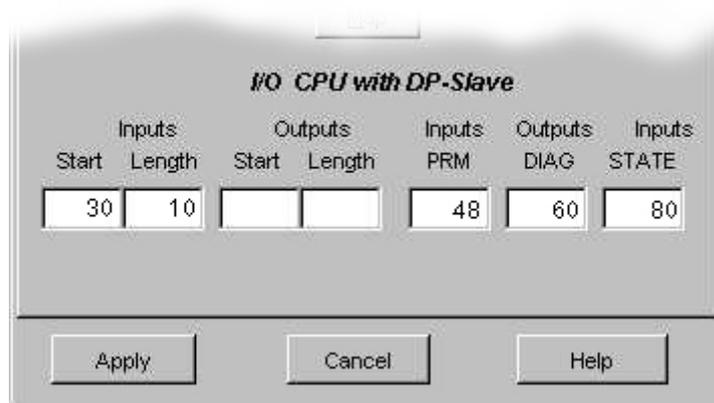


The System 200V supports the following areas:

- X (red) Shows reserved address areas.
You may reserve up to 4 address areas each for in- and outputs. These areas are protected at the automatic address allocation.
- DP (blue) Address area occupied in the CPU by the modules connected via Profibus.
- P (green) Address area occupied by the central plugged modules.
- IP (yellow) Marks the address area occupied by periphery integrated in the CPU.

I/O CPU with DP slave

At deployment of the combined CPU DP you may reserve address areas for the Profibus coupler. The here entered values are shown in the I/O map in yellow as integrated periphery (IP).



For the integrated Profibus coupler, the following address ranges are available:

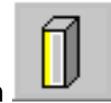
In-/output channels	Default start address	Length
Inputs	from 198	max. 64 Bytes
Outputs	from 198	max. 64 Bytes
Control data		
PRM (Parameter)	from 230	24 Bytes (fix)
DIAG (Diagnosis)	from 230	6 Bytes (fix)
STATE (Status)	from 254	2 Bytes (fix)

Engineer modules

Precondition You've created a network with at least one CPU.

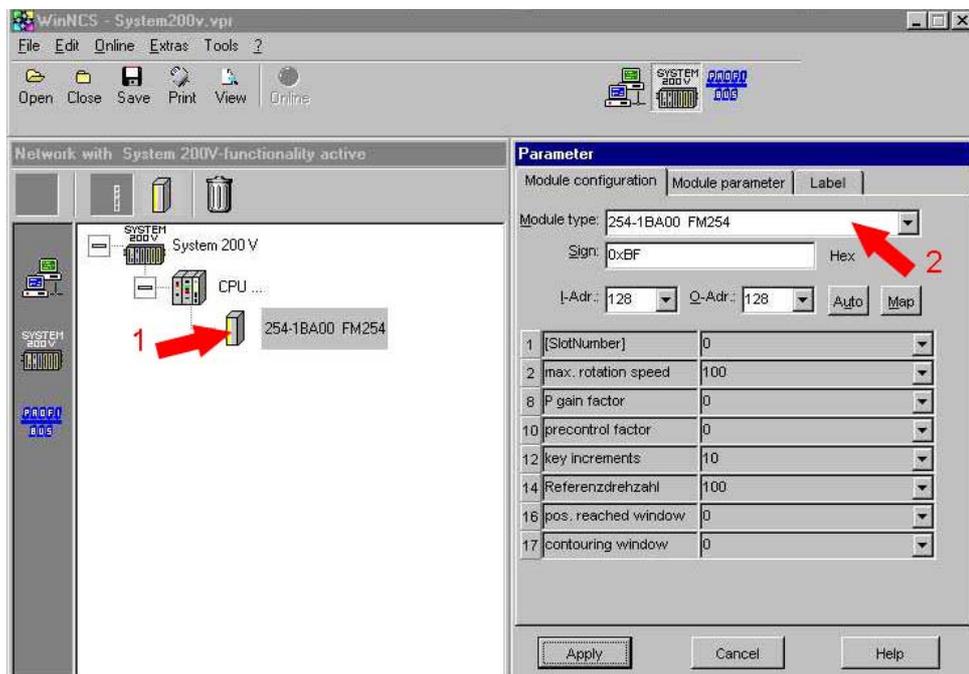
Insert module offline

At selected CPU you may add a new module with



Parameterize module

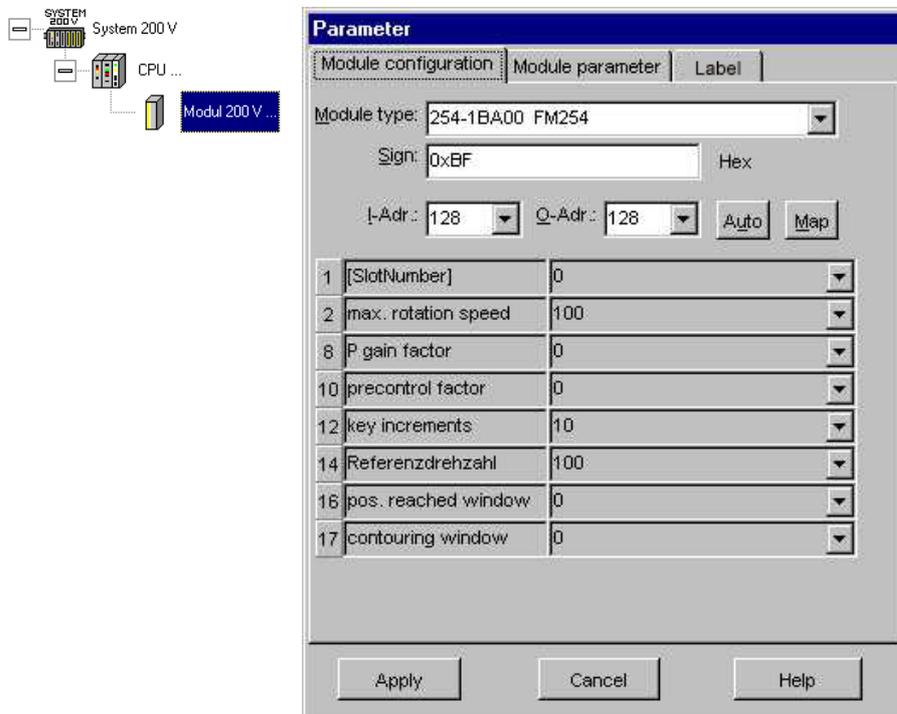
For parameterization you click on your module in the "network" window. Enter the parameters in the "parameter" window.



When you assign the real module type to your module via "Module type", all parameters for this module are listed. Confirm your entry with [Apply].

Parameterize modules

Register Module configuration



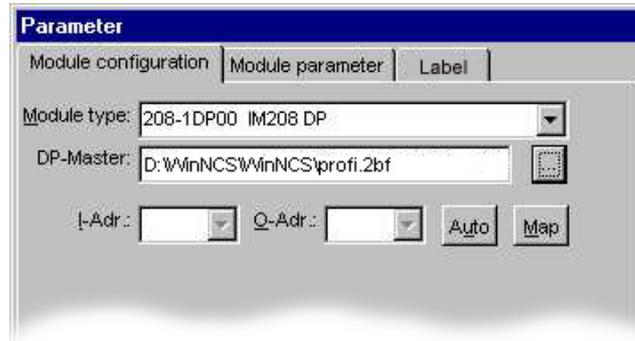
This dialog window allows you to enter module specific parameters. To reach this window, click on a module symbol in the "network" window or insert a new module via . A parameter set e.g. for FM 254 is only shown for parameterizable modules. For control purposes you find the parameters as Hex value in the register "Module parameter".

Module type

WinNCS uses for the administration of the periphery a module file that is delivered with WinNCS.

Reserve address areas for Profibus master

WinNCS gives you the opportunity to reserve addresses for a Profibus project. You just have to enter the 2bf-file that you've created in your Profibus project via *Export*. As soon as you click on [Apply], the addresses are reserved and mapped as DP addresses in the map.



ID DP master

Depending on the functionality, every module has a special *ID*, here shown as hex value. The meaning of this IDs is defined in the Profibus norm. This field has only information purpose.

If you've selected 208-1DP00 as module type, The label *DP Master* appears. Select a 2bf-file for this module that you can search via [...].



Attention!

The addresses of the central and the decentral periphery must not overlap! Please parameterize the decentral periphery first!

I-Addr. or O-Addr.

Select the peripheral start address of the System 200V module mapping. The address need is automatically calculated from the module data.

Auto

The address allocation happens automatically regarding the reserved addresses.

Map

Via [MAP] you can call a window that shows the peripheral address allocation. Here you may see for example, from which address offset on the in-/output data of the module are stored.

1 — [1] For in- and output area one register each

2 — [2] Legend

3 — [3] reserved address area

4 — [4] Address area occupied by others than the chosen module (half-tone color).

5 — [5] Address area of the chosen module in full color

6 — [6] Not used address areas are shown in white

The System 200V supports the following areas:

-  (red) Shows reserved address areas.
You may reserve up to 4 address areas each for in- and outputs. These areas are protected at the automatic address allocation.
-  (blue) Address area occupied in the CPU by the modules connected via Profibus.
-  (green) Address area occupied by the central plugged modules.
-  (yellow) Marks the address area occupied by periphery integrated in the CPU.

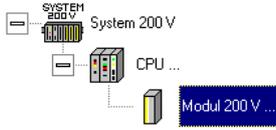
Parameter area

At parameterizable modules like e.g. the Motion Control FM 254, the lower part of the window shows a list of all parameters that are available for this module.

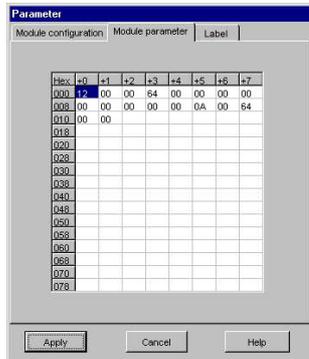
WinNCS takes the data for this area from the GSD-file that should be up-to-date!

As soon as you've set and transferred the according parameters, they are shown in the register "Module parameter" for control purposes.

Register Module parameter



The register module parameter is a monitor for controlling your entered parameters. This window allows no changes.



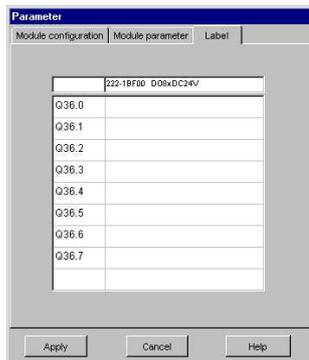
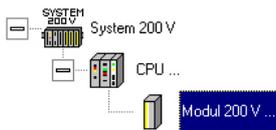
The module parameters have the following structure:

1st Byte Length

2nd Byte plug-in location

Starting with Byte 3 the other parameters that you've entered under module configuration are stored.

Register Label

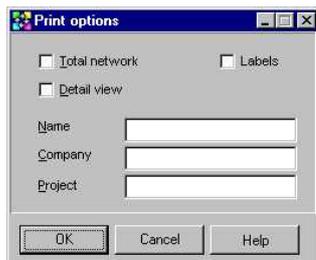


This register allows you to print module labels. Except of the module name, the mask is editable.

Entered labels are stored after [Apply].

You may label your labels automatically by including and activating a *symbol file*. As long as this is active, the label letters consisting of the symbol comments are not alterable. Changes take place in the symbol file.

Print label



To print out the labels, you first have to activate the option "Label" under **File > Print options**. If you now choose **File > Print**, the labels of all modules that are connected to the current CPU are printed.

The options "Detail view" and "Total network" have no influence.

Data transfer

Import/Export

General



With  in the context menu you may *export* your database as file via a station from the network.

Depending on the selected functionality, the export creates a file from the CPU/Station and module data and stores it in a format concerning to the hardware platform. This database can then be transferred to another module.

Export	CPU	s5d-file	Contains the DB1
--------	-----	----------	------------------

Glossar

AP

Application protocol

AG

Automatisierungs-Gerät = automation device

BCD

Binary-Coded Decimal

CP

Communication Processor (H1 and TCP/IP)

DNS

Domain Name System

GSD

Gerätstammdatei = Electronic data sheet

HTB

Handling block

IP

Internet Protocol

IPC

Intelligent process communication

ISO

International Organisation for Standardization

LAN

Local Area Network

Layer

Level in the ISO/OSI layer model (1 to 7)

MMS

Manufacturing Message Specification

NAT

Netzwerk Analyser Treiber = Network analyzing driver

OSI

Open Systems Interconnection

PDU

Process Data Unit

QVZ

Quittungsverzug = Acknowledgement delay

SNMP

Simple Network Management Protocol

TCP

Transport Control Protocol

TP

Transport protocol

TPDU

Transport Protocol Data Unit

TRADA

Transparent data transfer

TSAP

Transport Service Access Point

UDP

User Datagram Protocol

VDE

Database Engine for administration of the database

Index

A

Access control via IP-List50

C

Change IP circle30

Changes1

Clock function51

time format52

Clock master51

Context menu28

CP

Configure online access.....30

Parameter

CP.....43

Ethernet.....40

H1 connections.....81

TCP/IP connections.....62

Project engineering

Fast introduction34

H1 connections.....81

Outline29

Project

alteration39

import.....37

new37

TCP/IP connections.....62

D

DHCP.....58

Directory structure3

DNS57, 59

E

Ethernet coupler

Project engineering

new120

Ethernet address45

Ethernet coupler116

Automatic address allocation.....140

Include GSD.....118, 137, 155, 159, 176

Parameter125

Project engineering

Fast introduction118

import.....120

Ethernet functionality29, 116

Build-up network30

Change IP circle.....30

CP

Project engineering

alter39

H1 connections81

new project37

TCP/IP connections.....62

Fast introduction

CP project engineering.....34

Ethernet coupler engineering118

H1 driver installation.....31

IP address131, 133

Outline29, 116

Parameter40

Ping98

Status and error message.....110

Symbol manager98

System parameter.....88

TRADA67

unspecified parameterization65, 68

Ethernet functionality

CP

Project engineering

Import function38

Export functions23

F

Fast introduction

CP project engineering.....34

Ethernet coupler engineering.....118

Profibus functionality143

System 200V functionality.....168

Firmware update.....47

CP46

Ethernet coupler135

G

Gateway.....60

H

H1 connection82

H1 datagramm connection.....91

H1 driver installation31

H1 multi connection86

H1 transport connection.....82

handling block90

Handling block111

Help system27

I

I/O-Map25

Import functions23

Indicator word73, 89, 106

Indirecte Addressing90

IP address.....45, 131, 133

IPC 58

M

Main window9

Map 25

MAP

Ethernet coupler.....140

Menu bar.....9

Multi connection.....86

- N**
- Network window7, 20
 - Symbol bar21
- O**
- Online functions 17, 96, 164
 - CP95
 - Order types62
- P**
- Page view14
 - Parameter
 - CP43
 - Ethernet40
 - H1 connection.....82
 - H1 datagramm connection91
 - H1 multi connection86
 - H1 system parameters88
 - TCP connection64
 - RFC 1006.....69
 - TCP Multi connection70
 - TCP system parameter.....72
 - UDP connection.....75
 - UDP multi connection79
 - Ethernet coupler127
 - Ethernet125
 - Modules139
 - Profibus-DP master152
 - Profibus network148
 - Profibus-DP slave156
 - Modules160
 - System 200V171
 - CPU172, 173
 - Modules177
 - Parameter window24
 - Parameter window7
 - Password49
 - Ping function27
 - print labels.....13
 - Printer output12
 - Profibus functionality.....142
 - Data transfer.....163
 - DP master parameter.....152
 - Error report mode153
 - Fast introduction.....143
 - Overview142
 - Symbolic file154
 - Program inclusion15
 - Project
 - Page view.....14
 - print12
 - saving12
 - Project file120, 169
 - create, open120, 169
- R**
- Registration.....5
- RFC 1006.....69
 - Router45
- S**
- Scope of delivery2
 - SNMP.....57
 - Subnet mask45
 - Symbol manager26, 99
 - System 200V functionality.....167
 - alter.....171
 - Data transfer.....181
 - Deployment CPU DP.....175
 - Fast introduction168
 - import.....169
 - Module 200V parameter.....139, 177
 - Module 200V parameters160
 - new169
 - Overview.....167
 - System 200V funktionalität
 - alter.....170
 - System parameter.....72
 - System requirements2
- T**
- TCP connection62, 64
 - TCP Multi connection70
- U**
- UDP connection75
 - UDP connection62
 - UDP multi connection79
- W**
- WinNCS
 - Context menu28
 - Environment7
 - Export functions.....23
 - for CPs.....29
 - for Ethernet coupler116
 - for Profibus142
 - for System 200V167
 - Help system.....27
 - Import functions.....23
 - Include programs.....15
 - Installation3
 - Main window.....9
 - Menu bar9
 - Network window20
 - Online functions.....17
 - Page view14
 - Parameter window.....24
 - Project
 - print12
 - saving.....12
 - starting.....4
 - Symbol manager26
 - terminating.....4