Operating Instruction Manual

SyConPB

System Configurator PROFIBUS

PROFIBUS-DP
PROFIBUS-FMS
and PROFIBUS-DP/FMS Combi Master

Edition: 9
Language: English (EN)

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List of Revisions

Index	Date	Version	Chapter	Revision
4	15.09.98	2.530 PROFIBUS.DLL 2.070 SYCON.EXE	all	Created
5	05.01.00	2.620 PROFIBUS.DLL 2.620 SYCON.EXE	all	New structure of chapters, Chapter Installation and Licensing revised, New chapter: Getting started, Device Assignment, Menu now focus dependent / focus controlled, New functions: IO Watch, Message Monitor, DPV1 Extended Device Diagnostic expanded, Error numbers expanded, New chapter: Appendix
6	17.04.00	2.620 PROFIBUS.DLL 2.620 SYCON.EXE	5.2 10.3	Bus Parameters more detailed described New section List of equations
7	12.02.01	2.700 PROFIBUS.DLL 2.638 SYCON.EXE	6.3	New function Automatic Network Scan Additional overview tables: Diagnostic functions, User data transfer
8	02.11.01	2.723 PROFIBUS.DLL 2.638 SYCON.EXE	all	revised CSV Export
9	15.12.03	2.750 PROFIBUS.DLL 2.651 SYCON.EXE	all 3 5.1 5.2.1.1 6.8.5 9.3 10.3	revised 'PROFIBUS MPI Communication' added Section 'Device Assignment' completely revised Section 'Bus Parameters for PROFIBUS-MPI' added Section 'Message Monitor for Testing PROFIBUS-MPI (Client)' new created Section 'CIF TCP/IP Error Numbers' added Section 'DP Slave Diagnostic' created

Table Of Contents

1 Overview SyCon

1.1 Main Functions

The main functions of the PROFIBUS System Configurator are:

Function	Section	Short Description
Configuration	*Overview Communication Types*	Overview communication types and description of the configuration steps
	Automatic Network Scan	Scans the network
Diagnostic	*Diagnostic Functions*	Diagnostic functions, e.g. Life List, Debugger, Global State Field etc.
	User Data Transfer	I/O Monitor, I/O Watch, Message Monitor
Documentation	*Project Information*	Set the project information
	Print	Print out the configuration

Table 1: SyCon Main Functions

1.2 Properties

SyCon is an universal Fieldbus Configurator

This means you can configure the most important Fieldbus systems like PROFIBUS, InterBus, CANopen, DeviceNet, ControlNet, SDS, AS-Interface etc. with the same configuration tool.

SyCon is a global Fieldbus Configurator

You configure all devices with one tool. SyCon checks the dependencies between the devices. SyCon only allows configurations that make sense. In case of doubt SyCon will give you a warning.

To Hilscher devices you can make downloads of the configuration data. For other devices, export functions or documentation possibilities are available.

SyCon documents your Fieldbus system

After the configuration you can print out a detailed documentation of your Fieldbus network. The details can be switched on/off. You can print documentation with details between the bus topology and the detail of one device.

SyCon uses standardized configuration files

Some protocols support standardized files containing information about all features and limitations of the Slave device. SyCon uses these files for the configuration.

SyCon is a diagnostic tool

After the configuration you can switch SyCon into the diagnostic mode. You can watch all status information of Hilscher devices, see protocol dependent diagnostic information, e.g. live list or Slave diagnostic information on PROFIBUS. In this case a Slave not operating correctly will be displayed in a different colour.

SyCon can be extended

SyCon consists of a universal EXE file and several protocol specific DLLs. Most customers demand SyCon only for one bus system.

SyCon can be enlarged later by adding one or more DLLs for any other available protocol. The configuration of the different protocols will be as similar as possible.

2 Installation and Licensing

2.1 System Requirements

- PC with 486-, Pentium processor or higher
- Windows 95/98/ME, Windows NT4.0/2000/XP
- Free disk space: 30 - 80 MByte
- CD ROM drive
- RAM: min. 16 MByte
- Graphic resolution: min. 800 x 600 pixel
- Windows 95: Service Pack 1 or higher
- Windows NT: Service Pack 6 or higher
- COM/DCOM only for OPC Server
- Keyboard and Mouse

2.2 Software Installation

Close all application programs on the system!

Insert the CD in the local CD ROM drive. The installation program will start by itself (Autostart enabled). Otherwise change into the root directory on the CD and start Autorun.exe (Autostart disabled).

Note: Administrator privileges are required on Windows NT/2000/XP systems for installation!

The installation program ask for the components you want to install. Answer these questions with **Yes** or **No**.

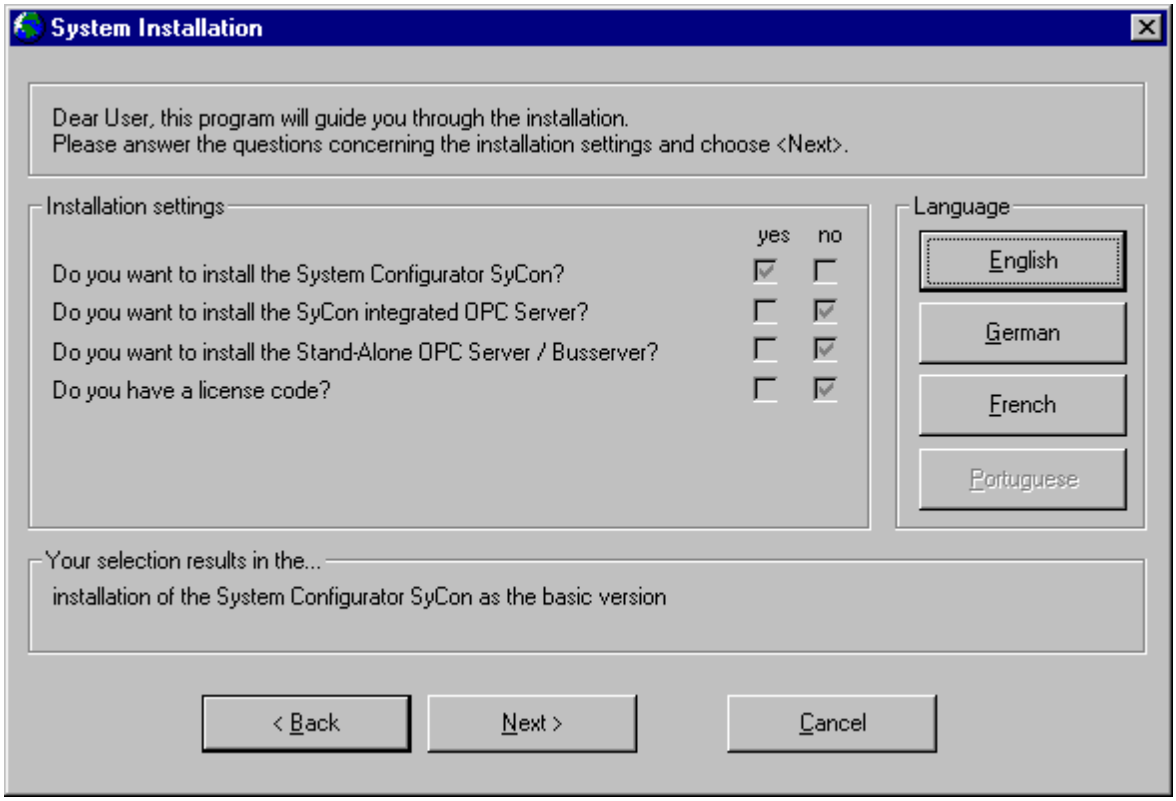


Figure 1: Selection for the Installation of the System Configurator in basic version

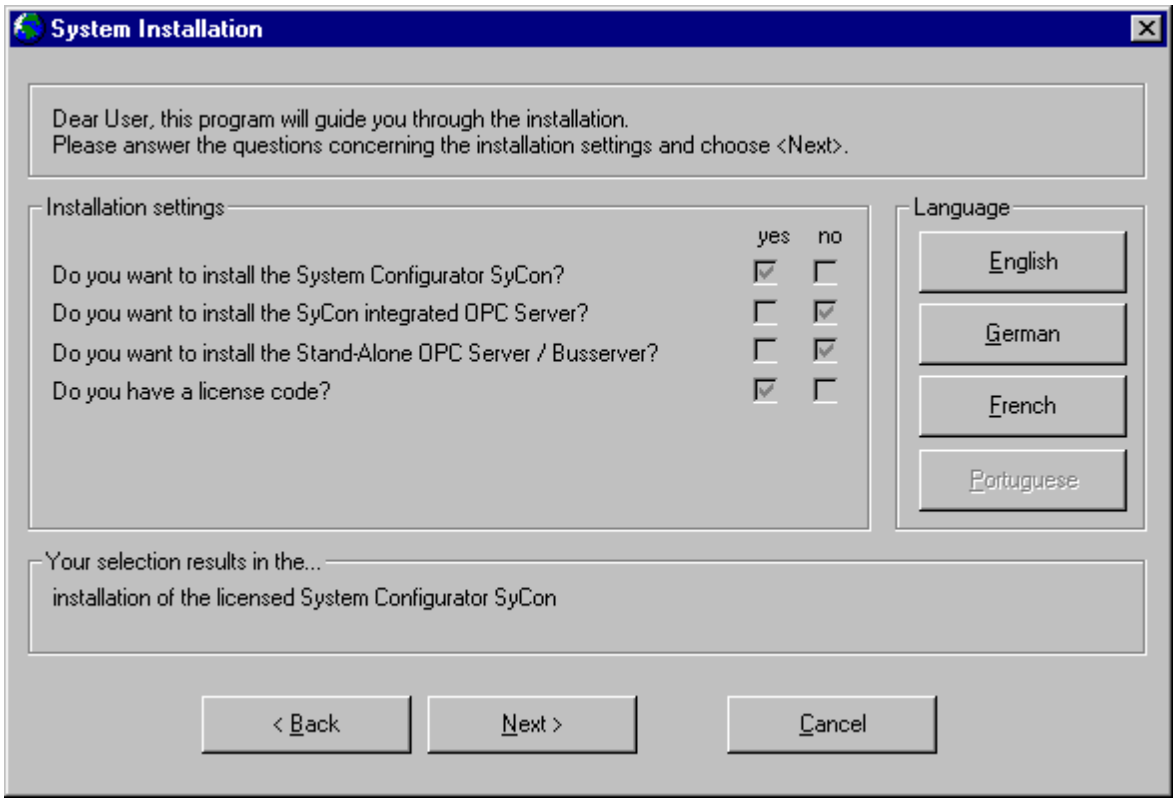


Figure 2: Selection for the Installation of the licensed System Configurator (without OPC)

It can be installed:

- System Configurator SyCon (Configuration and diagnostic tool)
- OPC-Server (For OPC Communication)
- CIF Device Driver (Device Driver for access to the CIF)

If you have a license code or it is print on the label of the CD, then answer the question for an existing license code with yes, otherwise a basic version of the System Configurator will be installed. Enter your name and the company name.

2.3 Installation of the System Configurator SyCon

During the installation the user and the company name must be entered. If you have a license code or it is printed on the label of the CD, it must also be entered now. Otherwise the System Configurator will work as a basic version. In this case, all functions are available, but the configuration is limited to two devices on the network, which is sufficient for Slave devices.

A license can be ordered by filling out the order form under the menu item **Help > Licensing** and fax this order form either to the distributor or directly to us.

Follow the instructions of the installation program by selecting the fieldbus system to be installed and answer all the questions with **OK** or **NEXT**.

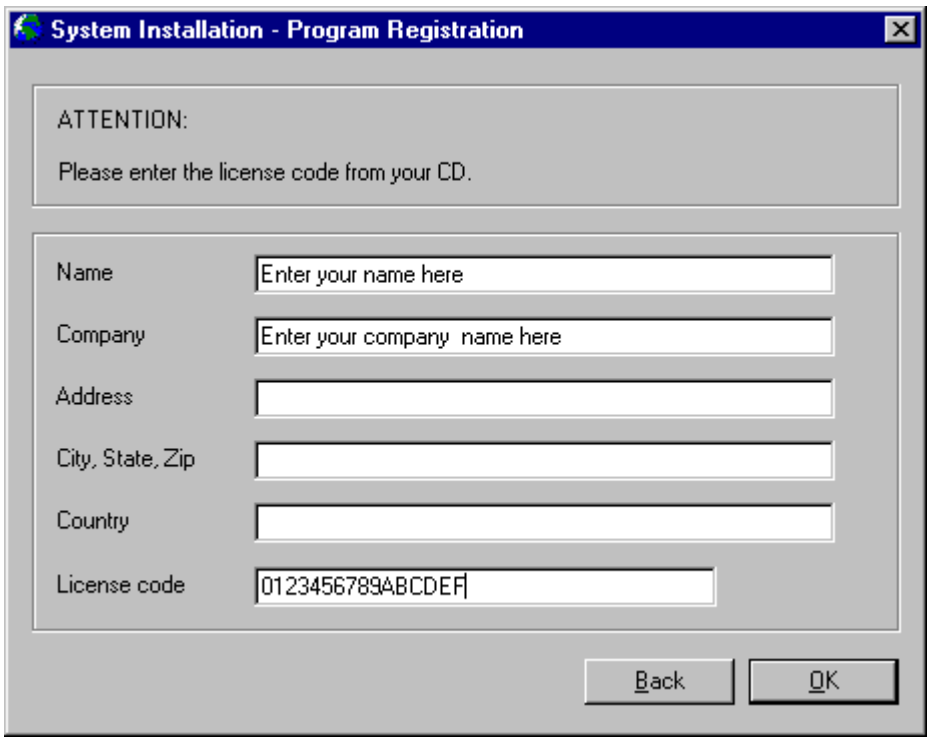


Figure 3: Enter the Name, the Company Name and the License code

Note: The License code 0123456789ABCDEF is no valid code and is only used for explanation.

It is necessary to fill in the Name and the Company Name. It is optional to fill in the Address, the City, State, Zip and Country.

The installation program offers the following selections:

Selection	Default Settings	Meaning
Directory	C:\Programs\Hilscher\SyCon	Directory for Installation of the System Configurator and its Components
AS-Interface	Selected	Program DLL and Components of the Fieldbus System or the Protocol
CANopen	Selected	
ControlNet	Selected	
DeviceNet	Selected	
InterBus	Selected	
PROFIBUS	Selected	
Ethernet/Protocol	Selected	
SDS	Selected	
CIF Device Driver	Selected C:\Programs\CIF Device Driver	CIF Device Driver
Program Menu	SyCon System Configurator	Folder under Start > Programs

Table 2: Selection during installation

The installation program copies the program files, GSD or EDS files and Bitmaps to the PC. Finally

- System DLLs
- The Application
- OLE Controls
- ODBC Components

are entered into the Registry.

2.4 Licensing

This section describes the steps to license the System Configurator from the already installed basic version of the System Configurator. To license the System Configurator during installation was already described above.

Deliveries that contain a license for the System Configurator have a formula with. Fill out this paper (formulary) and fax it to your distributor or directly to us. After you receive the license code enter it as described in section *Enter the* as described below on page *17*.

An order form for a license for the System Configurator can be printed out and is described in the next section.

2.4.1 Ordering a License for the SyCon Configurator

To order the license code for the selected fieldbus systems select the menu **Help > Licensing**. The licensing window will be opened.

Fill in your name, the company name and the address for license information into the fields.

Select one more fieldbus modules. There are three tables to do this. The first table list the modules, which are not licensed. Doubleclick or select a module and click the **Add** button to move them into the table in the middle that are printed on the order form later. The modules, which are already licensed, are shown in the last table.

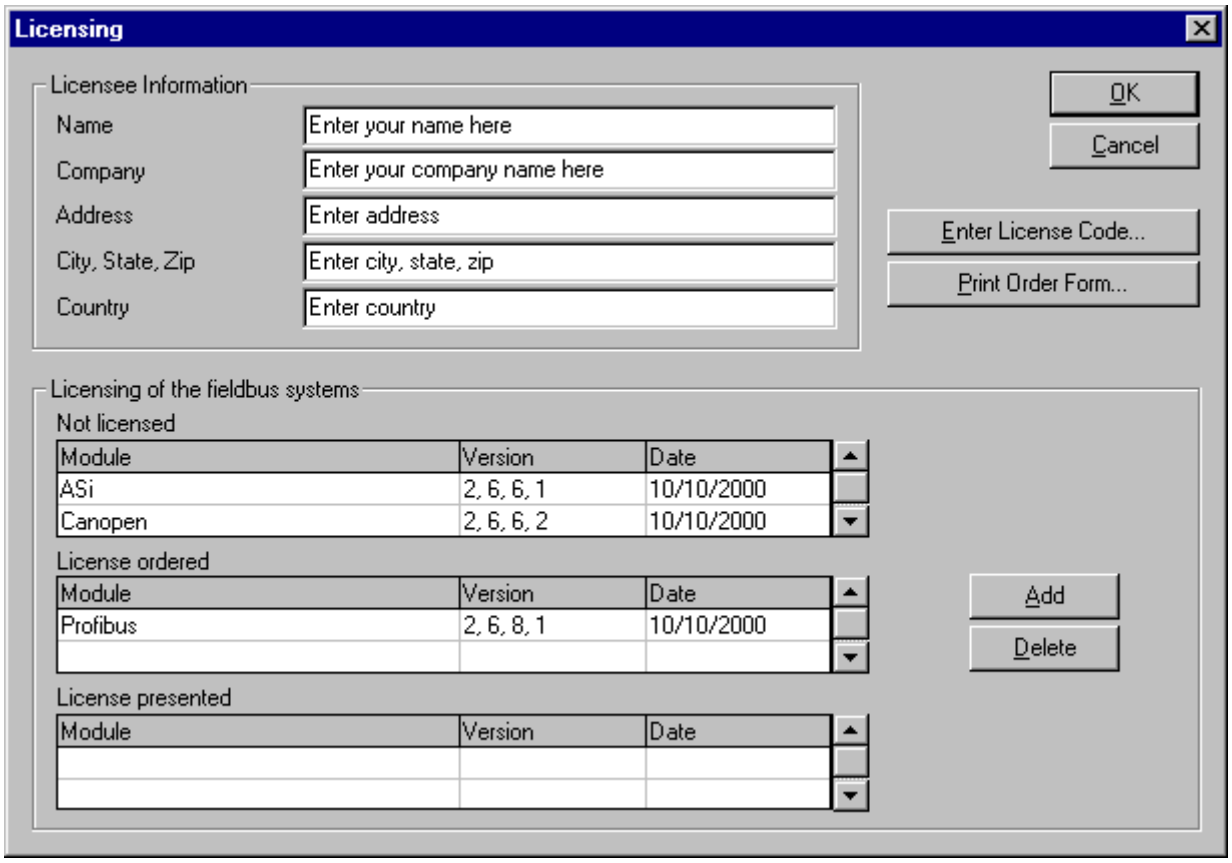


Figure 4: Example for select the Fieldbus Module PROFIBUS

After selecting the modules select the button **Print Order Form** and send us this paper by fax or by mail.

2.4.2 Enter the License code

This section describes the steps to license the System Configurator from the already installed basic version of the System Configurator. To license the System Configurator during installation was already described above.

Select the menu **Help > Licensing**. The licensing window will be opened.

In the table in the middle are listed the fieldbus modules that were already selected for the order form. If this is not the case then select the fieldbus modules from the upper table by double click or by select and **Add**.

Check if the name and the company name was entered exactly as printed on the fax. Observe that the spelling is the same as on the fax, especially the small and capital letters.

Then select the button **Enter License Code**. The following windows appears. Enter the 16 digits of the license code.

Note: License codes with less than 16 digits can only be entered during the installation. In this case uninstall the System Configurator first and then restart the installation and enter the code. Also the System Configurator (license code with less than 16 digits) expects a license in the device.

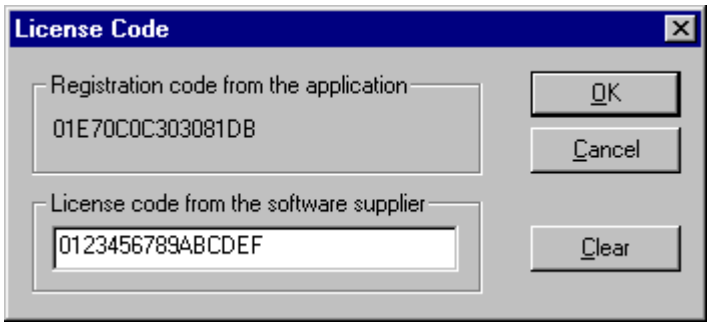


Figure 5: Enter the License Code

Note: The license code showed above is an invalid license code and is only used for explanation.

After you have entered the license code select the button **OK**. The code is verified. If the license code is valid SyCon will ask you to exit and restart the System Configurator to activate the license. If the license code is invalid the following window appears.

Figure 6: Note license code is invalid

In this case check

- the license code with the information on the fax
- the right spelling of the name and the company name with the information on the fax. Check especially for small and capital letters.

2.5 Scope of functions of the basic version and unlicensed Fieldbus Modules

The basic version and unlicensed fieldbus modules have the following functionality:

- Full functionality for configuring up to two devices. For the configuration of a Hilscher Slave device this is enough.
- All diagnostic functions
- Open and download of an existing configuration file. If the configuration file has more than two devices, a modification of this configuration is not possible.

3 Getting Started – Configuration Steps

3.1 Overview Communication Types

Select from the following the communication type that you want to use. The configuration steps are described in the given chapter.

Note: The booklet with the CD ROM contains information for the hardware installation and information to the cable. At this point it is presupposed that the hardware installation was done.

PROFIBUS offers many communication possibilities:

PROFIBUS	Overview in section	Page
PROFIBUS-DP	*PROFIBUS-DP*	*21*
PROFIBUS-FMS	*PROFIBUS-FMS*	*22*
PROFIBUS-FDL	*PROFIBUS-FDL*	*22*
PROFIBUS-MPI	*PROFIBUS-MPI*	*22*

Table 3: Overview Communication Types

3.1.1 PROFIBUS-DP

Communication	Device	Device	Described in section	Page
PROFIBUS-DP (Class 1)	Hilscher DP Master	Any DP Slave	*Configuration Hilscher DP Master to any DP Slave*	*23*
	Any DP Master	Hilscher DP Slave	*Configuration Hilscher DP Slave to any DP Master*	*25*
	Hilscher DP Master	Hilscher DP Slave	*Configuration Hilscher DP Master to Hilscher DP Slave*	*26*
PROFIBUS-DPV1 (Class 1)	Hilscher DPV1 Master	Any DPV1 Slave	*Configuration Hilscher DPV1 Master to any DPV1 Slave*	*28*
	Any DPV1 Master	Hilscher DPV1 Slave	*Configuration Hilscher DPV1 Slave to any DPV1 Master*	*29*
	Hilscher DPV1 Master	Hilscher DPV1 Slave	*Configuration Hilscher DPV1 Master to Hilscher DPV1 Slave*	*30*
PROFIBUS-DP (Class 2)	Hilscher DP Master	Any DP Slave	*Configuration Hilscher DP Master as a Class 2 Master*	*31*

Table 4: Overview Communication Types PROFIBUS-DP

3.1.2 PROFIBUS-FMS

Communication	Device	Device	Described in section	Page
PROFIBUS-FMS	Hilscher FMS Master	Any FMS Master	*Configuration Hilscher FMS Master to any FMS Master*	*32*
	Hilscher FMS Master	Any FMS Slave	*Configuration Hilscher FMS Master to any FMS Slave*	*33*
	Hilscher FMS Master	Hilscher FMS Master	*Configuration Hilscher FMS Master to Hilscher FMS Master*	*34*

Table 5: Overview Communication Types PROFIBUS-FMS

3.1.3 PROFIBUS-FDL

Communication	Device	Device	Described in section	Page
PROFIBUS-FDL	Hilscher FDL Master FDL defined	Any FDL Master FDL defined	*Configuration Hilscher FDL Master to any FDL Master (FDL defined)*	*35*
	Hilscher FDL Master FDL transparent (SDA)	Any FDL Master FDL transparent (SDA)	*Configuration Hilscher FDL Master to any FDL Master (FDL transparent) SDA*	*36*
	Hilscher FDL Master FDL transparent (SDA)	Hilscher FDL Master FDL transparent (SDA)	*Configuration Hilscher FDL Master to Hilscher FDL Master (FDL transparent) SDA*	*37*
	Hilscher FDL Master FDL transparent (SDA/SDN)	Any FDL Master FDL transparent (SDA/SDN)	*Configuration Hilscher FDL Master to any FDL Master (FDL transparent) SDA/SDN*	*38*
	Hilscher FDL Master FDL transparent (SDA/SDN/SRD)	Any FDL Device FDL transparent (SDA/SDN/SRD)	*Configuration Hilscher FDL Master to any FDL Device (FDL transparent) SDA/SDN/SRD*	*39*

Table 6: Overview Communication Types PROFIBUS-FDL

3.1.4 PROFIBUS-MPI

Communication	Device	Device	Described in section	Page
PROFIBUS-MPI	Hilscher MPI Client	Siemens S7 MPI Server	*Configuration Hilscher MPI Client to Siemens S7 as* MPI Server	*40*

Table 7: Overview Communication Types PROFIBUS-MPI

3.2 PROFIBUS-DP

3.2.1 Configuration Hilscher DP Master to any DP Slave

The following table describes the steps to configure a Hilscher DP Master to any DP Slave as it is typical for many cases.

#	Action	Menu in the System Configurator	Detail information in section	Page
1	Create a new project	**File > New > PROFIBUS**	*Setting up the PROFIBUS Configuration*	*41*
2	Copy GSD file of the DP Slave, if the Slave is not in the selection list	**File > Copy GSD**	*GSD Files*	*41*
3	Choose Hilscher DP Master and provide bus address	**Insert > Master**	*Insert Master*	*43*
4	Choose DP Slave and provide bus address	**Insert > Slave**	*Insert DP Slave*	*48*
5	Assign the input and output modules **(*1)**	Mark the Slave (left Mouse click), then **Settings > Slave Configuration**	*Slave Configuration*	*50*
6	Assign the offset addresses			
7	Assign the DP Slave Parameter data, if the Slave needs Parameter data	Mark the Slave (left Mouse click), then **Settings > Parameter Data**	*Parameter Data*	*102*
8	Set the bus parameter	Mark the Master (left Mouse click), then **Settings > Bus Parameters**	*Bus Parameters*	*85*
9	Set device assignment if no automatic assignment has occurred	Mark the Master (left Mouse click), then **Settings > Device Assignment**	*Device Assignment*	*75*
10	Save project	**File > Save**	*Save and Save As*	*159*
11	Download	Mark the Master (left Mouse click), then **Online > Download**	*Downloading the Configuration*	*113*
12	Live List	Mark the Master (left Mouse click), then **Online > Live List**	*Live List*	*125*
13	Start Debugger	Mark the Master (left Mouse click), then **Online > Start Debug Mode**	*Debug Mode (PROFIBUS-DP)*	*126*
14	Device diagnostic	Mark the Slave (left Mouse click), then **Online > Device Diagnostic**	*PROFIBUS DP Device Diagnostic*	*127*
15	Stop Debugger	**Online > Stop Debug Mode**	*Debug Mode (PROFIBUS-DP)*	*126*
16	Global Diagnostic	Mark the Master (left Mouse click), then **Online > Global State Field**	*Global State Field*	*134*
17	Transfer user data: Write output, read input	Mark the Master (left Mouse click), then **Online > I/O Monitor**	*I/O Monitor* or **(*2)** alternatively: *I/O Watch*	*141* *142*

Table 8: Steps for Configuration Hilscher DP Master to any DP Slave

Notes see next page.

Note (*1): The Offset addresses assigned in the Slave configuration are always related to the Hilscher DP Master.

Note (*2): Alternatively the CIF Device Driver Test program can be used for the test. After Board Select: Data Transfer > I/O Data > DevExchangeIO.

3.2.2 Configuration Hilscher DP Slave to any DP Master

The following table describes the steps to configure a Hilscher DP Slave to any DP Master as it is typical for many cases.

#	Action	Menu in the System Configurator	Detail information in section	Page
1	Create a new project	**File > New > PROFIBUS**	*Setting up the PROFIBUS Configuration*	*41*
2	Choose Hilscher DP Master and provide bus address **(*1)**	**Insert > Master**	*Insert Master*	*43*
3	Choose Hilscher DP Slave and provide bus address	**Insert > Slave**	*Insert DP Slave*	*48*
4	Assign the input and output modules **(*2)**	Mark the Slave (left Mouse click), then **Settings > Slave Configuration**	*Slave Configuration*	*50*
5	Set device assignment if no automatic assignment has occurred	Mark the Slave (left Mouse click), then **Settings > Device Assignment**	*Device Assignment*	*75*
6	Save project	**File > Save**	*Save and Save As*	*159*
7	Download	Mark the Slave (left Mouse click), then **Online > Download**	*Downloading the Configuration*	*113*
8	Configuration diagnostic	Mark the Slave (left Mouse click), then **Online > Extended Device Diagnostic > SPC3CTRL Slave Config**	Extended Device Diagnostic *SPC3CTRL Slave Config*	*222*
9	Configuration diagnostic	Mark the Slave (left Mouse click), then **Online > Extended Device Diagnostic > SPC3CTRL Master Config**	Extended Device Diagnostic *SPC3CTRL Master Config*	*223*
10	Transfer user data: Write output, read input	Mark the Slave (left Mouse click), then **Online > I/O Monitor**	*I/O Monitor* **(*3)**	*141*

Table 9: Steps for Configuration Hilscher DP Slave to any DP Master

Note (*1): Insert a Hilscher DP Master. This Master is a place holder and it is not necessary to match the connected Master.

Note (*2): The Offset addresses assigned in the Slave configuration are always related to the Hilscher DP Master and have no meaning here.

Note (*3): Alternatively the CIF Device Driver Test program can be used for the test. After Board Select: Data Transfer > I/O Data > DevExchangeIO.

3.2.3 Configuration Hilscher DP Master to Hilscher DP Slave

The following table describes the steps to configure a Hilscher DP Master to a Hilscher DP Slave as it is typical for many cases.

#	Action	Menu in the System Configurator	Detail information in section	Page
1	Create a new project	**File > New > PROFIBUS**	*Setting up the PROFIBUS Configuration*	*41*
2	Choose Hilscher DP Master and provide bus address	**Insert > Master**	*Insert Master*	*43*
3	Choose Hilscher DP Slave and provide bus address	**Insert > Slave**	*Insert DP Slave*	*48*
4	Assign the input and output modules **(*1)**	Mark the Slave (left Mouse click), then **Settings > Slave Configuration**	*Slave Configuration*	*50*
5	Assign the offset addresses			
6	Set the bus parameter	Mark the Master (left Mouse click), then **Settings > Bus Parameters**	*Bus Parameters*	*85*
7	Set device assignment for the Master if no automatic assignment has occurred	Mark the Master (left Mouse click), then **Settings > Device Assignment**	*Device Assignment*	*75*
8	Set device assignment for the Slave if no automatic assignment has occurred	Mark the Slave (left Mouse click), then **Settings > Device Assignment**		
9	Save project	**File > Save**	*Save and Save As*	*159*
10	Download to the Master	Mark the Master (left Mouse click), then **Online > Download**	*Downloading the Configuration*	*113*
11	Download to the Slave	Mark the Slave (left Mouse click), then **Online > Download**		
12	Live List	Mark the Master (left Mouse click), then **Online > Live List**	*Live List*	*125*
13	Start Debugger	Mark the Master (left Mouse click), then **Online > Start Debug Mode**	*Debug Mode (PROFIBUS-DP)*	*126*
14	Device diagnostic	Mark the Slave (left Mouse click), then **Online > Device Diagnostic**	*PROFIBUS DP Device Diagnostic*	*127*
15	Stop Debugger	**Online > Stop Debug Mode**	*Debug Mode (PROFIBUS-DP)*	*126*
16	Global Diagnostic	Mark the Master (left Mouse click), then **Online > Global State Field**	*Global State Field*	*134*
17	Transfer user data: Write output, read input	Mark the Master (left Mouse click), then **Online > I/O Monitor** Mark the Slave (left Mouse click), then **Online > I/O Monitor**	*I/O Monitor* or **(*2)** alternatively: *I/O Watch*	*141* *142*

Table 10: Steps for Configuration Hilscher DP Master to Hilscher DP Slave

Notes see next page.

Note (*1): The Offset addresses assigned in the Slave configuration are always related to the Hilscher DP Master.

Note (*2): Alternatively the CIF Device Driver Test program can be used for the test. After Board Select: Data Transfer > I/O Data > DevExchangeIO.

3.2.4 Configuration Hilscher DPV1 Master to any DPV1 Slave

The following table describes the steps to configure a Hilscher DPV1 Master to any DPV1 Slave as it is typical for many cases.

#	Action	Menu in the System Configurator	Detail information in section	Page
1	Create a new project	**File > New > PROFIBUS**	*Setting up the PROFIBUS Configuration*	*41*
2	Copy GSD file of the DP Slave, if the Slave is not in the selection list	**File > Copy GSD**	*GSD Files*	*41*
3	Choose Hilscher DPV1 Master and provide bus address	**Insert > Master**	*Insert Master*	*43*
4	Choose DPV1 Slave and provide bus address	**Insert > Slave**	*Insert DP Slave*	*48*
5	Set DPV1 Parameter **(*1)**	Mark the Slave (left Mouse click), then **Settings > Slave Configuration > DPV1 Parameterdata**	*Parameter Data*	*102*
6	Set the bus parameter	Mark the Master (left Mouse click), then **Settings > Bus Parameters**	*Bus Parameters*	*85*
7	Set device assignment if no automatic assignment has occurred	Mark the Master (left Mouse click), then **Settings > Device Assignment**	*Device Assignment*	*75*
8	Save project	**File > Save**	*Save and Save As*	*159*
9	Download	Mark the Master (left Mouse click), then **Online > Download**	*Downloading the Configuration*	*113*
10	Live List	Mark the Master (left Mouse click), then **Online > Live List**	*Live List*	*125*
11	Transfer user data: Read and write data	Mark the Master (left Mouse click), then **Online > Message Monitor**	*Message Monitor for Testing of DPV1 (at Master)*	*152*

Table 11: Steps for Configuration Hilscher DPV1 Master to any DPV1 Slave

Note (*1): Please see for configuration hints in the manual of the Slave.

3.2.5 Configuration Hilscher DPV1 Slave to any DPV1 Master

The following table describes the steps to configure a Hilscher DPV1 Slave to any DPV1 Master as it is typical for many cases.

#	Action	Menu in the System Configurator	Detail information in section	Page
1	Create a new project	**File > New > PROFIBUS**	*Setting up the PROFIBUS Configuration*	*41*
2	Choose Hilscher DPV1 Master and provide bus address **(*1)**	**Insert > Master**	*Insert Master*	*43*
3	Choose Hilscher DPV1 Slave and provide bus address	**Insert > Slave**	*Insert DP Slave*	*48*
4	Set DPV1 parameter	Mark the Slave (left Mouse click), then **Settings > Slave Configuration** **DPV1 Parameterdata**	*DPV1 Parameter*	*104*
5	Set DPV1 buffer size	Mark the Slave (left Mouse click), then **Settings > Slave Settings**	*Slave Settings*	*99*
6	Set device assignment if no automatic assignment has occurred	Mark the Slave (left Mouse click), then **Settings > Device Assignment**	*Device Assignment*	*75*
7	Save project	**File > Save**	*Save and Save As*	*159*
8	Download	Mark the Slave (left Mouse click), then **Online > Download**	*Downloading the Configuration*	*113*
9	Transfer user data: Read and write data	Mark the Slave (left Mouse click), then **Online > Message Monitor**	*Message Monitor for Testing of DPV1 (at Slave)*	*153*

Table 12: Steps for Configuration Hilscher DPV1 Slave to any DPV1 Master

Note (*1): Insert a Hilscher DPV1 Master. This Master is a place holder and it is not necessary to match the connected Master.

3.2.6 Configuration Hilscher DPV1 Master to Hilscher DPV1 Slave

The following table describes the steps to configure a Hilscher DPV1 Master to a Hilscher DPV1 Slave as it is typical for many cases.

#	Action	Menu in the System Configurator	Detail information in section	Page
1	Create a new project	**File > New > PROFIBUS**	*Setting up the PROFIBUS Configuration*	*41*
2	Choose Hilscher DPV1 Master and provide bus address	**Insert > Master**	*Insert Master*	*43*
3	Choose Hilscher DPV1 Slave and provide bus address	**Insert > Slave**	*Insert DP Slave*	*48*
4	Set DPV1 parameter	Mark the Slave (left Mouse click), then **Settings > Slave Configuration** **DPV1 Parameterdata**	*DPV1 Parameter*	*104*
5	Set DPV1 buffer size	Mark the Slave (left Mouse click), then **Settings > Slave Settings**	*Slave Settings*	*99*
6	Set the bus parameter	Mark the Master (left Mouse click), then **Settings > Bus Parameters**	*Bus Parameters*	*85*
7	Set device assignment for the Master if no automatic assignment has occurred	Mark the Master (left Mouse click), then **Settings > Device Assignment**	*Device Assignment*	*75*
8	Set device assignment for the Slave if no automatic assignment has occurred	Mark the Slave (left Mouse click), then **Settings > Device Assignment**		
9	Save project	**File > Save**	*Save and Save As*	*159*
10	Download to the Master	Mark the Master (left Mouse click), then **Online > Download**	*Downloading the Configuration*	*113*
11	Download to the Slave	Mark the Slave (left Mouse click), then **Online > Download**		
12	Live List	Mark the Master (left Mouse click), then **Online > Live List**	*Live List*	*125*
13	Transfer user data: Read and write data	Mark the Master (left Mouse click), then **Online > Message Monitor** Mark the Slave (left Mouse click), then **Online > Message Monitor**	*Message Monitor for Testing of DPV1 (at Master)* *Message Monitor for Testing of DPV1 (at Slave)*	*152* *153*

Table 13: Steps for Configuration Hilscher DPV1 Master to Hilscher DPV1 Slave

3.2.7 Configuration Hilscher DP Master as a Class 2 Master

The following table describes the steps to configure a Hilscher DP Master as a class 2 Master as it is typical for many cases.

#	Action	Menu in the System Configurator	Detail information in section	Page
1	Create a new project	**File > New > PROFIBUS**	*Setting up the PROFIBUS Configuration*	*41*
2	Choose Hilscher DP Master and provide bus address	**Insert > Master**	*Insert Master*	*43*
3	Set the bus parameter	Mark the Master (left Mouse click), then **Settings > Bus Parameters**	*Bus Parameters*	*85*
4	Set device assignment if no automatic assignment has occurred	Mark the Master (left Mouse click), then **Settings > Device Assignment**	*Device Assignment*	*75*
5	Save project	**File > Save**	*Save and Save As*	*159*
6	Download	Mark the Master (left Mouse click), then **Online > Download**	*Downloading the Configuration*	*113*
7	Live List	Mark the Master (left Mouse click), then **Online > Live List**	*Live List*	*125*
8	Call DP class 2 function	Mark the Hilscher Master (left Mouse click), then **Online > Message Monitor**	**(*1)**	-

Table 14: Steps for Configuration Hilscher DP Master as a Class 2 Master

Note (*1): The functions for DP class 2 are activated by messages or by the application program.

3.3 PROFIBUS-FMS

3.3.1 Configuration Hilscher FMS Master to any FMS Master

The following table describes the steps to configure a Hilscher FMS Master to any FMS Master as it is typical for many cases. The Hilscher FMS Master is used as a Client and the FMS coupling partner as FMS Server.

#	Action	Menu in the System Configurator	Detail information in section	Page
1	Create a new project	**File > New > PROFIBUS**	*Setting up the PROFIBUS Configuration*	*41*
2	Choose Hilscher FMS Master (Client) and provide bus address	**Insert > Master**	*Insert Master*	*43*
3	Choose 'Other FMS Device' (Server) and provide bus address	**Insert > Master** **Other FMS Device**		
4	Set communication relation	Mark the Hilscher FMS Master (left Mouse click), then **Settings > Communication Reference List (CRL)**	*Master Master Acyclic Communication*	*57*
5	Set objects (Only necessary for the test)	Mark the Other FMS Master (left Mouse click), then **Settings > Object Dictionary (OD)**	*Object Directory (OD)*	*66*
6	Set the bus parameter	Mark the Hilscher FMS Master (left Mouse click), then **Settings > Bus Parameters**	*Bus Parameters*	*85*
7	Set device assignment if no automatic assignment has occurred	Mark the Hilscher FMS Master (left Mouse click), then **Settings > Device Assignment**	*Device Assignment*	*75*
8	Save project	**File > Save**	*Save and Save As*	*159*
9	Download to the Master (Client)	Mark the Hilscher FMS Master (left Mouse click), then **Online > Download**	*Downloading the Configuration*	*113*
10	Live List	Mark the Hilscher FMS Master (left Mouse click), then **Online > Live List**	*Live List*	*125*
11	Transfer user data: Read and write data	Mark the Hilscher FMS Master (left Mouse click), then **Online > FMS Monitor**	*FMS-Monitor*	*145*

Table 15: Steps for Configuration Hilscher FMS Master to any FMS Master

3.3.2 Configuration Hilscher FMS Master to any FMS Slave

The following table describes the steps to configure a Hilscher FMS Master to any FMS Slave as it is typical for many cases.

#	Action	Menu in the System Configurator	Detail information in section	Page
1	Create a new project	**File > New > PROFIBUS**	*Setting up the PROFIBUS Configuration*	*41*
2	Choose Hilscher FMS Master (Client) and provide bus address	**Insert > Master**	*Insert Master*	*43*
3	Set communication relation and insert the FMS Slave	Mark the Hilscher FMS Master (left Mouse click), then **Settings > Communication Reference List (CRL)**	*Master Slave Acyclic Communication*	*62*
4	Set objects (Only necessary for the test)	Mark the Other FMS Slave (left Mouse click), then **Settings > Object Dictionary (OD)**	*Object Directory (OD)*	*66*
5	Set the bus parameter	Mark the Hilscher FMS Master (left Mouse click), then **Settings > Bus Parameters**	*Bus Parameters*	*85*
6	Set device assignment if no automatic assignment has occurred	Mark the Hilscher FMS Master (left Mouse click), then **Settings > Device Assignment**	*Device Assignment*	*75*
7	Save project	**File > Save**	*Save and Save As*	*159*
8	Download to the Master (Client)	Mark the Hilscher FMS Master (left Mouse click), then **Online > Download**	*Downloading the Configuration*	*113*
9	Live List	Mark the Hilscher FMS Master (left Mouse click), then **Online > Live List**	*Live List*	*125*
10	Transfer user data: Read and write data	Mark the Hilscher FMS Master (left Mouse click), then **Online > FMS Monitor**	*FMS-Monitor*	*145*

Table 16: Steps for Configuration Hilscher FMS Master to any FMS Slave

3.3.3 Configuration Hilscher FMS Master to Hilscher FMS Master

The following table describes the steps to configure a Hilscher FMS Master to a Hilscher FMS Master as it is typical for many cases. One Hilscher FMS Master is used as a Client and the other Hilscher FMS Master Server.

#	Action	Menu in the System Configurator	Detail information in section	Page
1	Create a new project	**File > New > PROFIBUS**	*Setting up the PROFIBUS Configuration*	*41*
2	Choose Hilscher FMS Master (Client) and provide bus address	**Insert > Master**	*Insert Master*	*43*
3	Choose Hilscher FMS Master (Server) and provide bus address	**Insert > Master**		
4	Set communication relation	Mark the Hilscher FMS Master (left Mouse click), then **Settings > Communication Reference List (CRL)**	*Master Master Acyclic Communication*	*57*
5	Set objects for the Server	Mark the Hilscher FMS Master (Server) (left Mouse click), then **Settings > Object Directory (OD)**	*Object Directory (OD)*	*66*
6	Set the bus parameter	Mark the Hilscher FMS Master (left Mouse click), then **Settings > Bus Parameters**	*Bus Parameters*	*85*
7	Set device assignment for the Hilscher FMS Master (Client) if no automatic assignment has occurred	Mark the Hilscher FMS Master (Client) (left Mouse click), then **Settings > Device Assignment**	*Device Assignment*	*75*
8	Set device assignment for the Hilscher FMS Master (Server) if no automatic assignment has occurred	Mark the Hilscher FMS Master (Server) (left Mouse click), then **Settings > Device Assignment**		
9	Save project	**File > Save**	*Save and Save As*	*159*
10	Download to the Master (Client)	Mark the Hilscher FMS Master (Client) (left Mouse click), then **Online > Download**	*Downloading the Configuration*	*113*
11	Download to the Master (Server)	Mark the Hilscher FMS Master (Server) (left Mouse click), then **Online > Download**		
12	Live List	Mark the Hilscher FMS Master (left Mouse click), then **Online > Live List**	*Live List*	*125*
13	Transfer user data: Read and write data	Mark the Hilscher FMS Master (Client) (left Mouse click), then **(*1)** **Online > FMS Monitor**	*FMS-Monitor*	*145*

Table 17: Steps for Configuration Hilscher FMS Master to Hilscher FMS Master

Note (*1): Start the Server application program before.

3.4 PROFIBUS-FDL

3.4.1 Configuration Hilscher FDL Master to any FDL Master (FDL defined)

The following table describes the steps to configure a Hilscher FDL Master to any FDL Master as it is typical for many cases. PROFIBUS-FDL defined is used therefore to read and write. The used coupling partner (typically an S5-95U) has to

- receive a command telegram,
- then has to interpret the 8 byte large telegram header, perform a read or write to its memory and create an answer telegram and
- finally send this answer telegram to the Hilscher FDL master.

#	Action	Menu in the System Configurator	Detail information in section	Page
1	Create a new project	**File > New > PROFIBUS**	*Setting up the PROFIBUS Configuration*	*41*
2	Choose Hilscher FDL Master and provide bus address	**Insert > Master**	*Insert Master*	*43*
3	Choose 'Other FMS Device' and provide bus address **(*1)**	**Insert > Master** **Other FMS Device**		
4	Set communication relation	Mark the Hilscher Master (left Mouse click), then **Settings > Communication Reference List (CRL)**	*PROFIBUS-FDL Defined*	*68*
5	Set objects (Only necessary for the test)	Mark the Other FMS Master (left Mouse click), then **Settings > Object Dictionary (OD)**	*Object Directory (OD)*	*66*
6	Set the bus parameter	Mark the Hilscher Master (left Mouse click), then **Settings > Bus Parameters**	*Bus Parameters*	*85*
7	Set device assignment if no automatic assignment has occurred	Mark the Hilscher Master (left Mouse click), then **Settings > Device Assignment**	*Device Assignment*	*75*
8	Save project	**File > Save**	*Save and Save As*	*159*
9	Download to the Master	Mark the Hilscher Master (left Mouse click), then **Online > Download**	*Downloading the Configuration*	*113*
10	Live List	Mark the Hilscher Master (left Mouse click), then **Online > Live List**	*Live List*	*125*
11	Transfer user data: Read and write data	Mark the Hilscher Master (left Mouse click), then **Online > FMS Monitor**	*FMS-Monitor*	*145*

Table 18: Steps for Configuration Hilscher FDL Master to any FDL Master (FDL defined)

Note (*1): Select 'Other FMS Device' for the FDL coupling partner.

3.4.2 Configuration Hilscher FDL Master to any FDL Master (FDL transparent) SDA

The following table describes the steps to configure a Hilscher FDL Master to any FDL Master as it is typical for many cases. PROFIBUS-FDL transparent is used therefore to send and/or receive data. The used PROFIBUS service is SDA (Send Data with Acknowledge).

#	Action	Menu in the System Configurator	Detail information in section	Page
1	Create a new project	**File > New > PROFIBUS**	*Setting up the PROFIBUS Configuration*	*41*
2	Choose Hilscher FDL Master and provide bus address	**Insert > Master**	*Insert Master*	*43*
3	Choose 'Other FMS Device' and provide bus address **(*1)**	**Insert > Master** **Other FMS Device**		
4	Set communication relation	Mark the Hilscher Master (left Mouse click), then **Settings > Communication Reference List (CRL)**	*PROFIBUS-FDL Transparent SDA*	*71*
5	Set the bus parameter	Mark the Hilscher Master (left Mouse click), then **Settings > Bus Parameters**	*Bus Parameters*	*85*
6	Set device assignment if no automatic assignment has occurred	Mark the Hilscher Master (left Mouse click), then **Settings > Device Assignment**	*Device Assignment*	*75*
7	Save project	**File > Save**	*Save and Save As*	*159*
8	Download to the Master	Mark the Hilscher Master (left Mouse click), then **Online > Download**	*Downloading the Configuration*	*113*
9	Live List	Mark the Hilscher Master (left Mouse click), then **Online > Live List**	*Live List*	*125*
10	Transfer user data: Send and receive data	Mark the Hilscher Master (left Mouse click), then **Online > Message Monitor**	*Message Monitor for Testing of PROFIBUS-FDL transparent SDA*	*154*

Table 19: Steps for Configuration Hilscher FDL Master to any FDL Master (FDL transparent) SDA

Note (*1): Select 'Other FMS Device' for the coupling partner.

3.4.3 Configuration Hilscher FDL Master to Hilscher FDL Master (FDL transparent) SDA

The following table describes the steps to configure a Hilscher FDL Master to a Hilscher FDL Master as it is typical for many cases. PROFIBUS-FDL transparent is used therefore to send and/or receive data. The used PROFIBUS service is SDA (Send Data with Acknowledge).

#	Action	Menu in the System Configurator	Detail information in section	Page
1	Create a new project	**File > New > PROFIBUS**	*Setting up the PROFIBUS Configuration*	*41*
2	Choose Hilscher FDL Master (device 1) and provide bus address	**Insert > Master**	*Insert Master*	*43*
3	Choose Hilscher FDL Master (device 2) and provide bus address	**Insert > Master**		
4	Set communication relation	Mark the Hilscher FDL Master (Device 1) (left Mouse click), then **Settings > Communication Reference List (CRL)**	*PROFIBUS-FDL Transparent SDA*	*71*
5	Set the bus parameter	Mark the Hilscher Master (left Mouse click), then **Settings > Bus Parameters**	*Bus Parameters*	*85*
6	Set device assignment for Hilscher FDL Master (device 1) if no automatic assignment has occurred	Mark the Hilscher Master (device 1) (left Mouse click), then **Settings > Device Assignment**	*Device Assignment*	*75*
7	Set device assignment for Hilscher FDL Master (device 2) if no automatic assignment has occurred	Mark the Hilscher Master (device 2) (left Mouse click), then **Settings > Device Assignment**		
8	Save project	**File > Save**	*Save and Save As*	*159*
9	Download to the FDL Master (device 1)	Mark the Hilscher FDL Master (device 1) (left Mouse click), then **Online > Download**	*Downloading the Configuration*	*113*
10	Download to the FDL Master (device 2)	Mark the Hilscher FDL Master (device 2) (left Mouse click), then **Online > Download**		
11	Live List	Mark the Hilscher Master (left Mouse click), then **Online > Live List**	*Live List*	*125*
12	Transfer user data: Send and receive data	Mark the Hilscher Master (left Mouse click), then **Online > Message Monitor**	*Message Monitor for Testing of PROFIBUS-FDL transparent* SDA	*154*

Table 20: Steps for Configuration Hilscher FDL Master to Hilscher FDL Master (FDL transparent) SDA

3.4.4 Configuration Hilscher FDL Master to any FDL Master (FDL transparent) SDA/SDN

The following table describes the steps to configure a Hilscher FDL Master to any FDL Master as it is typical for many cases. PROFIBUS-FDL transparent is used therefore to send and/or receive data. The used PROFIBUS service is SDA (Send Data with Acknowledge) or SDN (Send Data with No acknowledge).

#	Action	Menu in the System Configurator	Detail information in section	Page
1	Create a new project	**File > New > PROFIBUS**	*Setting up the PROFIBUS Configuration*	*41*
2	Choose Hilscher FDL Master and provide bus address	**Insert > Master**	*Insert Master*	*43*
3	Set communication relation	Mark the Hilscher Master (left Mouse click), then **Settings > Communication Reference List (CRL)**	*PROFIBUS-FDL Transparent SDA/SDN*	*72*
4	Set the bus parameter	Mark the Hilscher Master (left Mouse click), then **Settings > Bus Parameters**	*Bus Parameters*	*85*
5	Set device assignment if no automatic assignment has occurred	Mark the Hilscher Master (left Mouse click), then **Settings > Device Assignment**	*Device Assignment*	*75*
6	Save project	**File > Save**	*Save and Save As*	*159*
7	Download to the Master	Mark the Hilscher Master (left Mouse click), then **Online > Download**	*Downloading the Configuration*	*113*
8	Live List	Mark the Hilscher Master (left Mouse click), then **Online > Live List**	*Live List*	*125*
9	Transfer user data: Send and receive data	Mark the Hilscher Master (left Mouse click), then **Online > Message Monitor**	*Message Monitor for Testing of PROFIBUS-FDL transparent SDA/SDN*	*155*

Table 21: Steps for Configuration Hilscher FDL Master to any FDL Master (FDL transparent) SDA/SDN

3.4.5 Configuration Hilscher FDL Master to any FDL Device (FDL transparent) SDA/SDN/SRD

The following table describes the steps to configure a Hilscher FDL Master to any FDL Master as it is typical for many cases. PROFIBUS-FDL transparent is used therefore to send and/or receive data. The used PROFIBUS service is SDA (Send Data with Acknowledge), SDN (Send Data with No acknowledge) or SRD (Send and Request Data).

#	Action	Menu in the System Configurator	Detail information in section	Page
1	Create a new project	**File > New > PROFIBUS**	*Setting up the PROFIBUS Configuration*	*41*
2	Choose Hilscher FDL Master and provide bus address	**Insert > Master**	*Insert Master*	*43*
3	Set the bus parameter	Mark the Master (left Mouse click), then **Settings > Bus Parameters**	*Bus Parameters*	*85*
4	Set device assignment if no automatic assignment has occurred	Mark the Master (left Mouse click), then **Settings > Device Assignment**	*Device Assignment*	*75*
5	Save project	**File > Save**	*Save and Save As*	*159*
6	Download	Mark the Master (left Mouse click), then **Online > Download**	*Downloading the Configuration*	*113*
7	Live List	Mark the Master (left Mouse click), then **Online > Live List**	*Live List*	*125*
8	Call PROFIBUS-FDL services	Mark the Hilscher Master (left Mouse click), then **Online > Message Monitor**	**(*1)**	-

Table 22: Steps for Configuration Hilscher FDL Master to any FDL Device (FDL transparent) SDA/SDN/SRD

Note (*1): Send and receive PROFIBUS-FDL services SDA/SDN/SRD is done via messages.

3.5 PROFIBUS-MPI

3.5.1 Configuration Hilscher MPI Client to Siemens S7 as MPI Server

The following table describes the steps to configure a Hilscher MPI Client to a Siemens S7 as MPI Server as it is typical for many cases.

#	Action	Menu in the System Configurator	Detail information in section	Page
1	Create a new project	**File > New > PROFIBUS**	*Setting up the PROFIBUS Configuration*	*41*
2	Choose Hilscher MPI Client (DP Master) and provide bus address	**Insert > Master**	*Insert Master*	*43*
3	Set the bus parameter	Mark the Master (left Mouse click), then **Settings > Bus Parameters**	*Bus Parameters for PROFIBUS-MPI*	*88*
4	Set device assignment if no automatic assignment has occurred	Mark the Master (left Mouse click), then **Settings > Device Assignment**	*Device Assignment*	*75*
5	Save project	**File > Save**	*Save and Save As*	*159*
6	Download	Mark the Master (left Mouse click), then **Online > Download**	*Downloading the Configuration*	*113*
7	Live List	Mark the Master (left Mouse click), then **Online > Live List**	*Live List*	*125*
8	Call DP class 2 function	Mark the Hilscher Master (left Mouse click), then **Online > Message Monitor**	*Message Monitor for Testing of MPI (Client)*	*157*

Table 23: Configuration Hilscher MPI Client to Siemens S7 as MPI Server

4 Configuration of PROFIBUS with SyCon

4.1 Setting up the PROFIBUS Configuration

To create a new configuration, choose the **File > New** menu. This will offer a selection list of fieldbus systems. Choose the **PROFIBUS**. If only the PROFIBUS fieldbus system is installed, the configuration window will open directly.

The name of the configuration file can be allocated when the configuration is finished or with **File > Save As**.

4.2 GSD Files

GSD (Electronic data sheet of a device) files contain and describe the functions and characteristics of PROFIBUS devices. The abbreviation GSD means 'Gerätestammdaten' (Device Base Files). All the available GSD files together form the device database.

When the program is started, the System Configurator automatically retrieves all the GSD files stored in the GSD directory. The device names are placed into an internal list. During the configuration, the device-specific data is retrieved directly from the GSD files.

If a DP Slave device does not appear in the selection list, a corresponding GSD file can be copied into the GSD directory with **File > Copy GSD**. Another possibility is to copy the GSD file into the SyCon GSD directory with the Windows Explore and then retrieve the GSD files into the GSD directory with **Settings > Path** and **OK**.

The GSD files can be viewed with the **Tools > GSD Viewer** menu.

Figure 7: GSD files and bitmaps directory

- **Hilscher Devices:** The GSD files for Hilscher devices are already included and installed.
- **Other Devices:** The respective device manufacturer provides the GSD files for other devices.

The GSD files of many vendors are available on the PROFIBUS user organization home page.

http://www.profibus.com

Note: GSD files are only used for PROFIBUS-DP.

The GSD directory is adjustable. In order to alter the directory from a previous setting in another directory, use the **Settings > Path** menu. All GSD files must be placed in this directory.

No GSD files are used for **PROFIBUS-FMS**. Hilscher PROFIBUS-FMS devices as well as **Other FMS Devices** for all vendors are available in the selection list of the Master.

The GSD files for PROFIBUS-FMS specified by the PNO (PROFIBUS User Organization) are not supported by the System Configurator.

4.3 Master

4.3.1 Insert Master

In order to insert a (Hilscher) Master into the configuration, choose the **Insert > Master** menu, in order to open the selection window, or click on the symbol:

Symbol **Insert > Master**


Table 24: Symbol Insert > Master

The mouse pointer automatically changes into the Insert Master pointer.

Mouse pointer **insert Master**


Table 25: Mouse pointer insert Master

Click on the position where the Master is to be inserted. The dialog box, from which one or more Masters can be chosen, opens.

The following types of Masters can be selected:

PROFIBUS Kombi Master (PROFIBUS-FMS and PROFIBUS-DP)	PB
PROFIBUS-FMS Master	FMS
PROFIBUS-DP Master	DPM
Other FMS Device	

Table 26: Selectable Master types

Note: The PROFIBUS FMS Master devices can also be utilized for PROFIBUS-FDL communication.

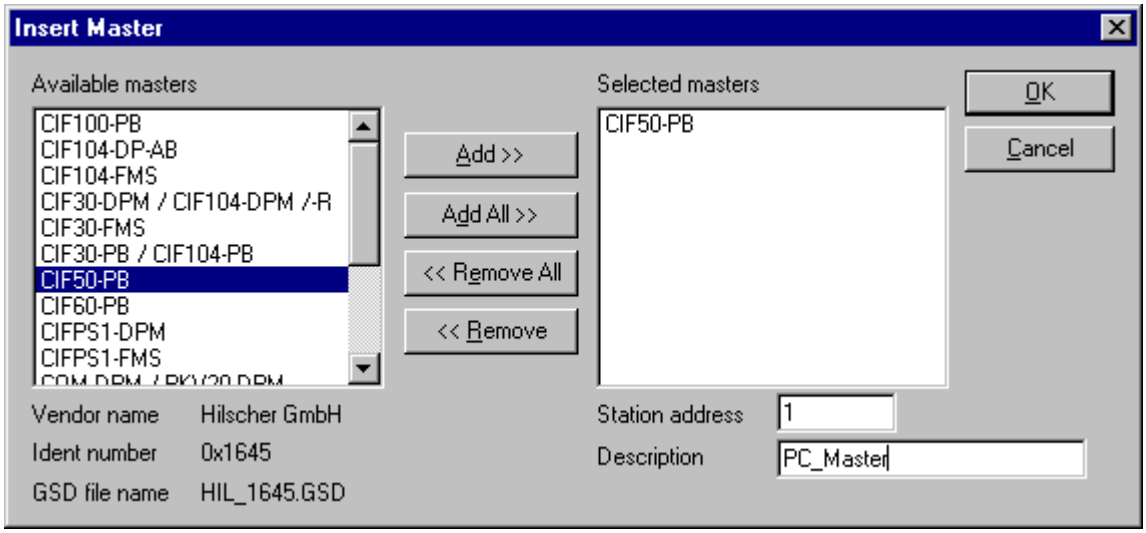


Figure 8: Insert > Master

In this window you select the Master you want by clicking on it in the list **Available Masters** and then click the **Add** button to put the Master to **Selected Masters**. With **OK** you confirm the selection and the Master will be insert.

This example shows a CIF 50-PB that is inserted with the **Station address 1** and the **Description PC_Master.**

4.3.1.1 Hardware Assignment

If you have configured the CIF Device Driver Setup for your hardware and you insert the correct Master in the SyCon it detects this hardware. SyCon displays at which board and which driver was detected and ask if the hardware should be assigned.

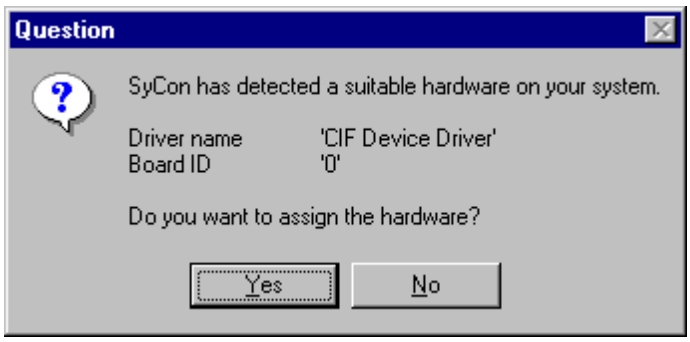


Figure 9: Assign hardware Master

If you answer with **Yes**, the hardware is assigned. If you answer with **No** you have to assign this hardware with **Settings > Device Assignment** (look in section *Device Assignment* at page *75*).

4.3.2 Master Configuration

The Master-specific configuration is carried out in the following window.

Set the focus on the Master (left mouse click) and then select the **Settings > Master Configuration** menu

or

make a double click on the symbol of the Master to be configured the following window will open.

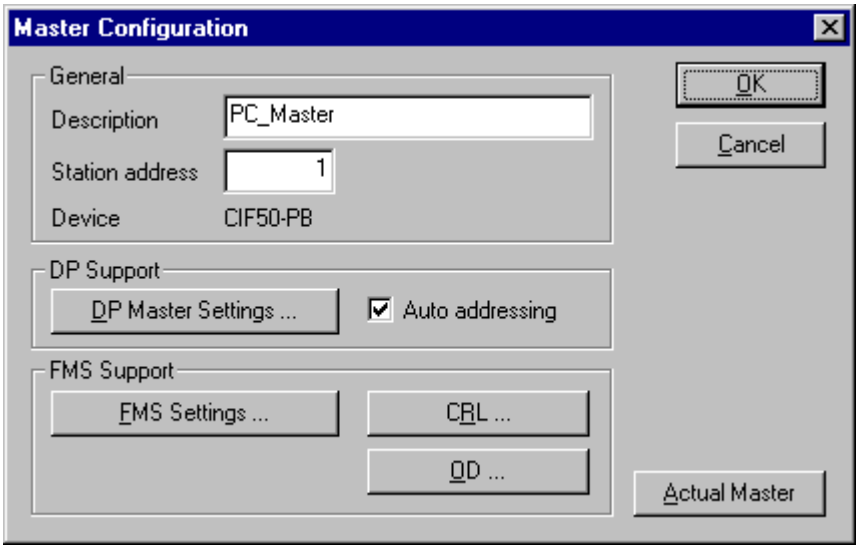


Figure 10: Settings > Master Configuration

The following can be set in this Master Configuration window:

- A (symbolic) **Description** of the Master
- The **Station address** of the Master
- Selection of the Master as the **Actual Master** (for example, for carrying out a Download)

For PROFIBUS-DP can be set

- open the **DP Master Settings** window
- activate or deactivate the automatic addressing (**Auto addressing**) for this DP Master.

For PROFIBUS-FMS can be set

- open the **FMS Settings** window
- open the communication reference list (**CRL**) window
- open the window for the Object Directory (**OD**)

4.3.3 Auto Configuration (PROFIBUS-DP)

The Auto Configuration can be used to configure a Slave. The parameter data cannot be retrieved from a PROFIBUS-DP Slave. These, if the Slave requires parameter data, can only be provided by the user.

The following is the procedure for Auto Configuration:

#	Action	Menu in the System Configurator	Detail information in section	Page
1	Create a new project	**File > New > PROFIBUS**	*Setting up the PROFIBUS Configuration*	*41*
2	Copy GSD file of the DP Slave, if the Slave is not in the selection list	**File > Copy GSD**	*GSD Files*	*41*
3	Choose Hilscher DP Master and provide bus address	**Insert > Master**	*Insert Master*	*43*
4	Choose DP Slave and provide bus address	**Insert > Slave**	*Insert DP Slave*	*48*
5	Set the bus parameter	Mark the Master (left Mouse click), then **Settings > Bus Parameters**	*Bus Parameters*	*85*
6	Set device assignment if no automatic assignment has occurred	Mark the Master (left Mouse click), then **Settings > Device Assignment**	*Device Assignment*	*75*
7	Save project	**File > Save**	*Save and Save As*	*159*
8	Download	Mark the Master (left Mouse click), then **Online > Download**	*Downloading the Configuration*	*113*
9	Live List	Mark the Master (left Mouse click), then **Online > Live List**	*Live List*	*125*
10	Start Debugger	Mark the Master (left Mouse click), then **Online > Start Debug Mode**	*Debug Mode (PROFIBUS-DP)*	*126*
11	Device diagnostic	Mark the Slave (left Mouse click), then **Online > Device Diagnostic**	*PROFIBUS DP Device Diagnostic*	*127*
12	Compare Configuration	**Compare Configuration**	-	-
13	Automatic configuration	**Automatic Configuration**	-	-
14	Stop Debugger	**Online > Stop Debug Mode**	*Debug Mode (PROFIBUS-DP)*	*126*
15	Save project	**File > Save**	*Save and Save As*	*159*
16	Download	Mark the Master (left Mouse click), then **Online > Download**	*Downloading the Configuration*	*113*
17	Start Debugger	Mark the Master (left Mouse click), then **Online > Start Debug Mode**	*Debug Mode (PROFIBUS-DP)*	*126*
18	Device diagnostic	Mark the Slave (left Mouse click), then **Online > Device Diagnostic**	*PROFIBUS DP Device Diagnostic*	*127*
19	Stop Debugger	**Online > Stop Debug Mode**	*Debug Mode (PROFIBUS-DP)*	*126*
20	Transfer user data: Write output, read input	Mark the Master (left Mouse click), then **Online > I/O Monitor**	*I/O Monitor* or alternatively: *I/O Watch*	*141* *142*

Table 27: Auto Configuration (PROFIBUS-DP)

4.3.4 Replace Master

If a Master already exists in the configuration and should be replaced against another Master, you first have to set the focus on the Master (left mouse click at the Master) and then choose the menu **Edit > Replace**

or

make a right mouse click at the Master and select **Replace**.

In the now opened window the question appears if the Master should be replaced.

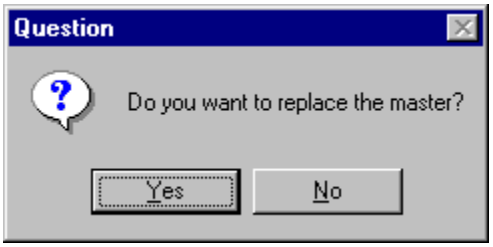


Figure 11: Security question replace Master

If you click the **Yes** button a new window opens, where you can replace the Master against another one.

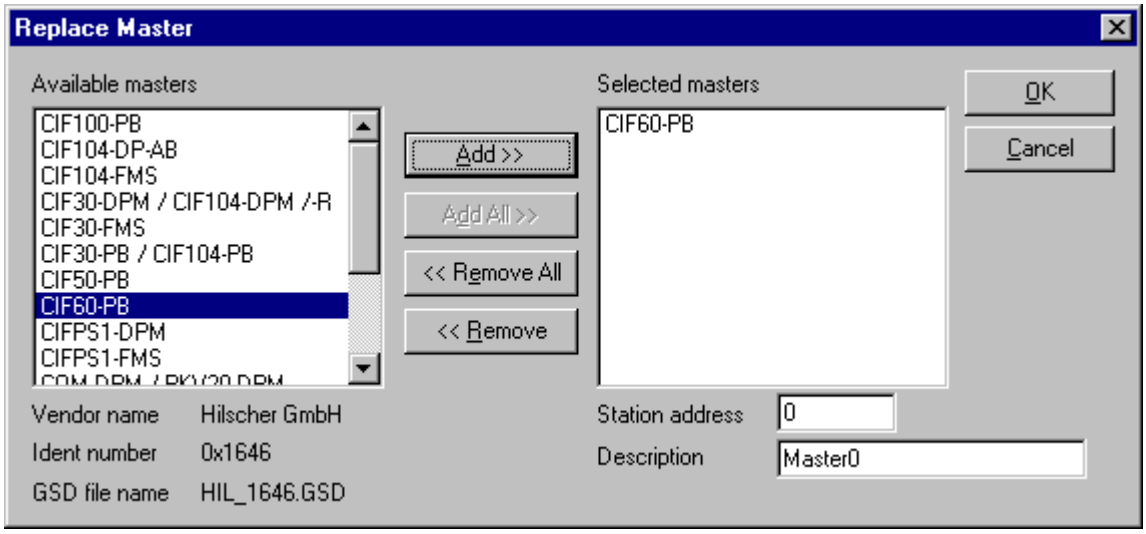


Figure 12: Edit > Replace Master

In this window you select the Master you want by clicking on it in the list **Available Masters**. By clicking the **Add** button you put the Master in the list **Selected Masters**. With **OK** you confirm the selection and the Master will be replaced.

4.4 DP Slave

4.4.1 Insert DP Slave

In order to insert a PROFIBUS-DP Slave into the configuration, choose the **Insert > Slave** menu to open the selection window, or click on the symbol:

Symbol **Insert > Slave**


Table 28: Symbol Insert > Slave

The mouse pointer automatically changes to the Insert Slave pointer.

Mouse pointer insert Slave


Table 29: Mouse pointer insert Slave

Click on the position where the Slave is to be inserted. The dialog box, from which one or more Slaves can be selected opens.

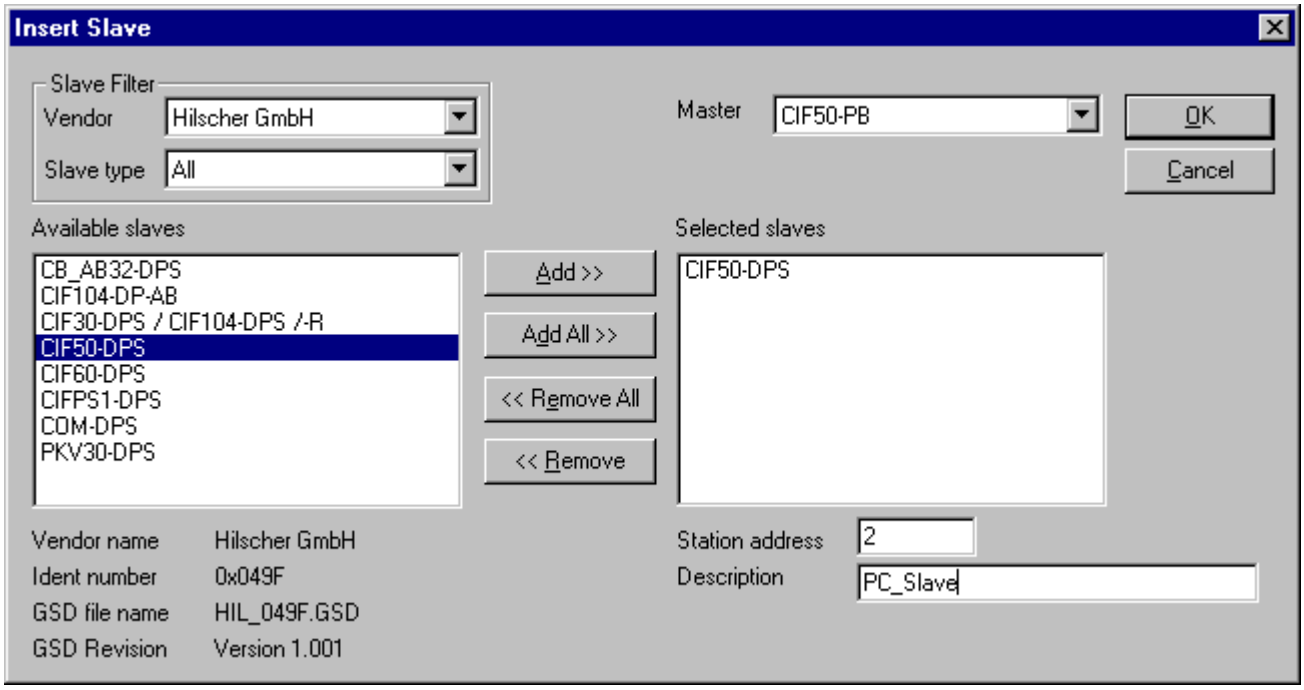


Figure 13: Insert > Slave

The list on the left displays for selection all the Slave devices whose GSD files have been put in the GSD directory. A filter can be used to limit the selection list to **Slave type** and **Vendor** (manufacturer). Further information on a Slave is shown below the selection list (**Available Slaves**) when it is selected (a mouse click). The Slave appears in the list **Selected Slaves** with a double click or with the **Add** button.

All devices in the right-hand list are assigned to the current **Master** that is also shown in this window. If the Slaves in the right-hand list are chosen one after the other (a mouse click), then every Slave can be allocated a **Station address** as well as a name in the **Description** field.

For every Slave accepted into the right-hand list, the station address count is automatically raised by one but can be overwritten by the user in the **Station address** field.

Note: It is permissible to choose a Slave several times. However, each Slave must possess its own (unique) station address in order to distinguish it in the network.

4.4.1.1 Hardware Assignment

If you have configured the CIF Device Driver Setup for your hardware and you insert the correct Slave in the SyCon it detects this hardware. SyCon displays at which board and which driver was detected and ask if the hardware should be assigned.

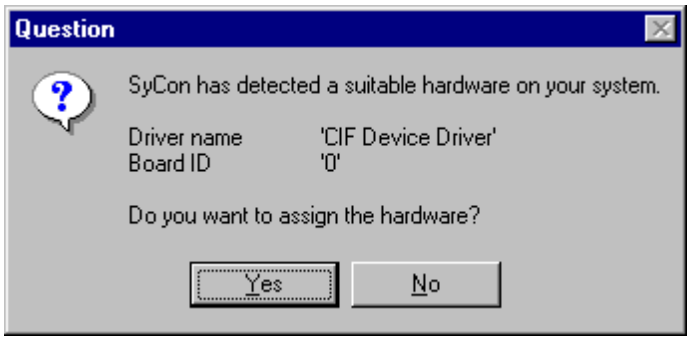


Figure 14: Hardware Assignment Slave

If you answer with **Yes**, the hardware is assigned. If you answer with **No** you have to assign this hardware with **Settings > Device Assignment** (look in section *Device Assignment* at page *75*).

4.4.2 Select Settings

When a Slave can be used as a DP or as a FMS Slave then a window appears to select, if DP or FMS settings should be made. Select **DP settings** an **OK**.

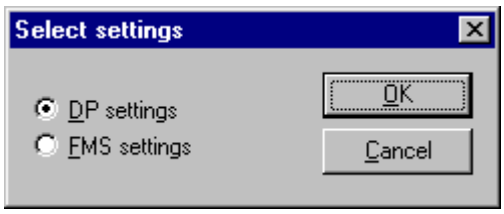


Figure 15: Select settings

4.4.3 Slave Configuration

First click at the symbol of the Slave with the left mouse button and then choose the **Settings > Slave Configuration** menu.

or

Open the Slave configuration window by double clicking on the PROFIBUS-DP Slave device.

The Slave-specific configuration is carried out in this window. Here, the modules and their addresses are allocated in the process data memory in the Master. Note that the address must agree with that in the PC application program.

Note 1: The information of the offset addresses refers to the addressing of the data in the Hilscher Master! The address information does not refer to the addressing of the data in the Slave! The Slave organizes its own data addressing.

Note 2: With the Hilscher Slave, the input or output data at the bus are taken over directly into the Dual-port memory. The offset addresses refer to the Hilscher Master.

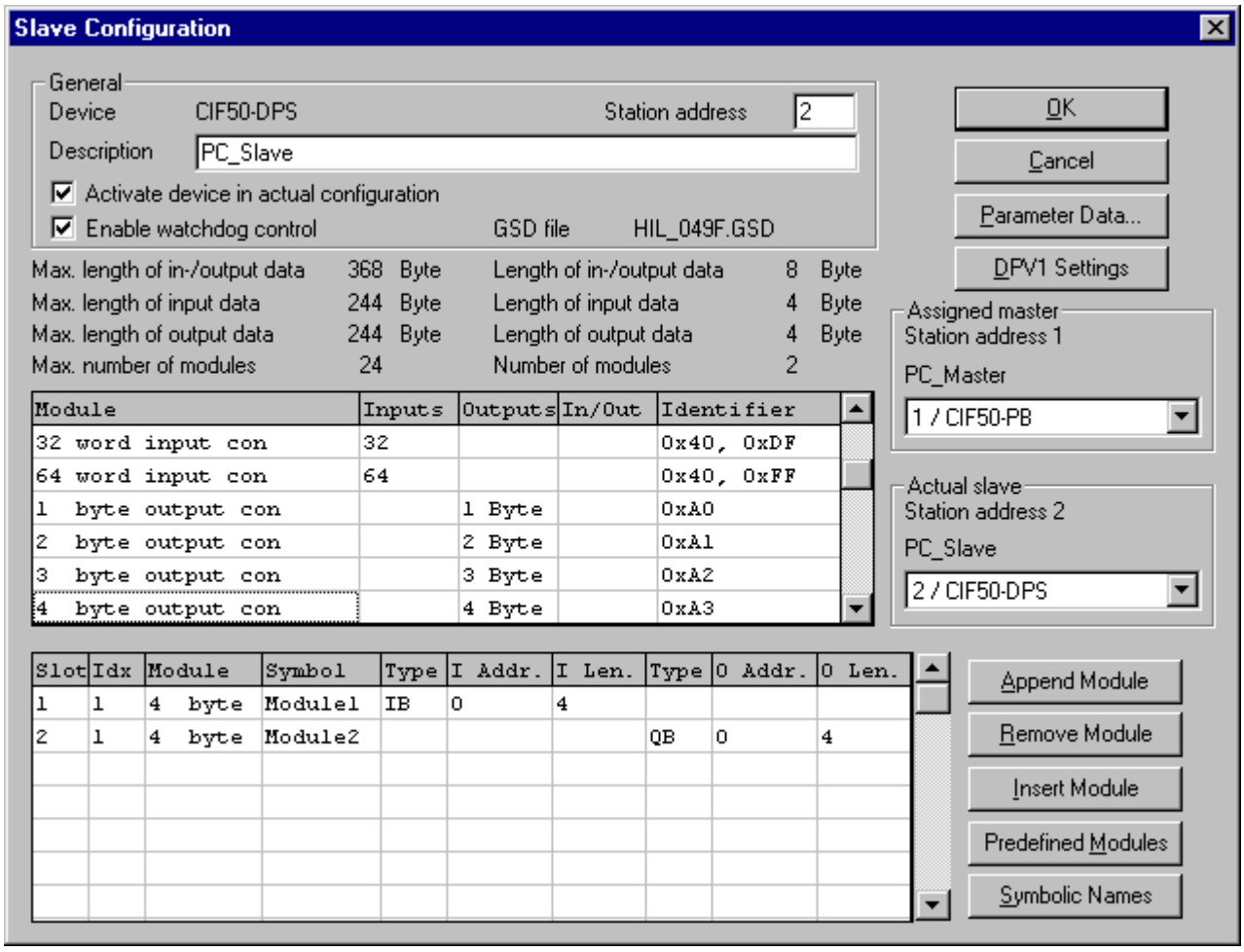


Figure 16: Settings > Slave Configuration

4.4.3.1 General

Depending on the **Addressing mode**, which can be set in the **DP Master Settings**, the addresses are either Byte or Word addresses. For further details of this, see the description in section *Addressing Mode* at page *96*.

The DP Slaves utilize the **Enable Watchdog Control** setting in order to detect communication errors to the assigned DP Master. When the DP Slave finds an interruption of an already operational communication, defined by a Watchdog time, then the Slave carries out an independent Reset and places the outputs into the secure condition.

Caution: When the monitoring by means of the **Enable Watchdog Control** has been deactivated, it is possible that the outputs are not reset by the Slave, even though the communication has been interrupted.

If **Activate device in actual configuration** is selected, the process memory for this Slave is occupied in the Master and at the bus a data exchange is carried out from the bus to this Slave. If this setting is switched off, the process memory for this Slave is occupied in the Master and at the bus no data exchange is carried out from the bus to this Slave.

4.4.3.2 Module Configuration

There are two types of Slaves. A **simple Slave** has a fixed data length. The data length of a **modular Slave** is configurable. A modular Slave can be understood as a combination of a simple Slave with a Station address.

The selection list (upper list) shows all possible modules of the Slave. In the case of a simple Slave, one module is shown and this is automatically copied into the configuration list (lower list).

- **Module Configuration of a simple Slave**

  In the case of a simple Slave, one module is shown and it is copied automatically into the bellower list of the configured modules.

Note: If the Slave device has only one module, this module is taken over automatically in the table configuration list (lower list) and can not be deleted.

- **Module Configuration of a modular Slave**

  In case of a modular Slave, the user has to select the required modules manually.

  If a module consists of several sub-modules, then the identifier of the sub-modules are shown in the column **Identifier**. A description of the module configuration identifier can be found in section *Identifier Bytes* on page *234*.

  In the column **Slot** the number of the module is shown. If a module consists of several sub-modules, more rows of this table can be used for display. This is shown by the number in the column **Index**.

For configuration of the modules (selection of the modules) of a Slave, proceed as follows:

Transfer all the required modules from the selection list (upper list) into the configuration list (lower list). This is done by a double click on a module or selecting the **Insert Module** or respectively the **Append Module** button.

The sequence of the modules in the configuration list (lower list) is important and must be in agreement with the Slave. Typically, the sequence follows the actual physical sequence. There are Slaves to which this rule does not apply and where first analogue modules and then digital modules must be entered, independent of their actual sequence.

In the configuration list (lower list) allocate the address of each module to the process depiction memory. The address is entered separately in the **Type** and **Addr** columns for Inputs and Outputs.

The I/O addresses can be allocated by the user or can be automatically assigned by SyCon. For this purpose **Auto addressing** must be activated or deactivated in the **Master Configuration** window.

Auto addressing activated	Auto addressing deactivated
Auto addressing (by SyCon)	Manually addressing (by the user)
The addresses will be allocated beginning with 0 and incremented in accordance with the entry sequence of the Slaves before downloading and can be viewed and checked in the menu **View > Address Table**. An update is carried out first when saving the configuration, viewing the address table or respectively before a download.	The address 0 is shown in the **I Addr** or **O Addr** and must be overwritten by the user.

Table 30: Auto addressing activated / deactivated

For further information about the modules of the used Slave see the manual of the hardware manufacturer.

Click on the **OK** button to confirm your selection. If the selection should not be taken over, click the **Cancel** button.

4.4.4 Inserting Predefined Device – PDD

In order to insert predefined devices, choose **Insert > PDD**. This function is used for simple copying or re-using already configured devices. Before this function can be used, a PDD Export must be carried out as described in section *PDD Export* on page *165*.

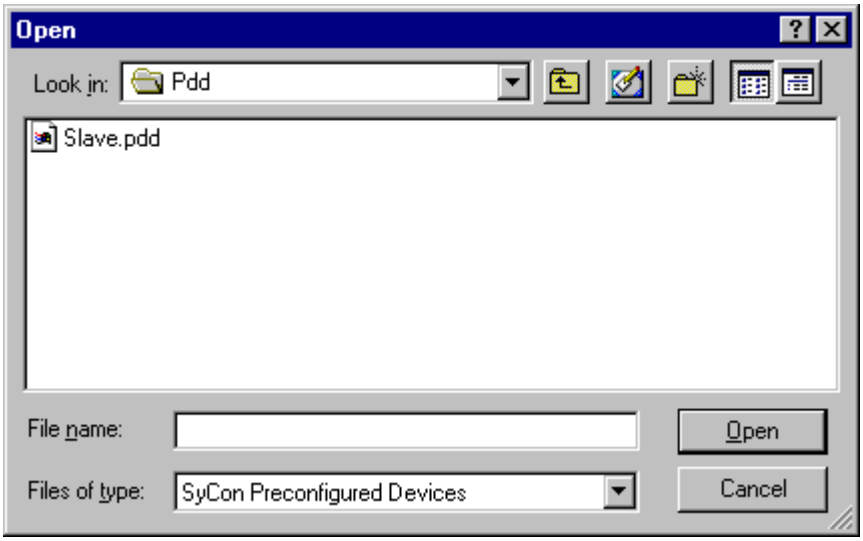


Figure 17: Inserting predefined device – PDD (1)

Select the PDD file and then **Open**. The following window appears.

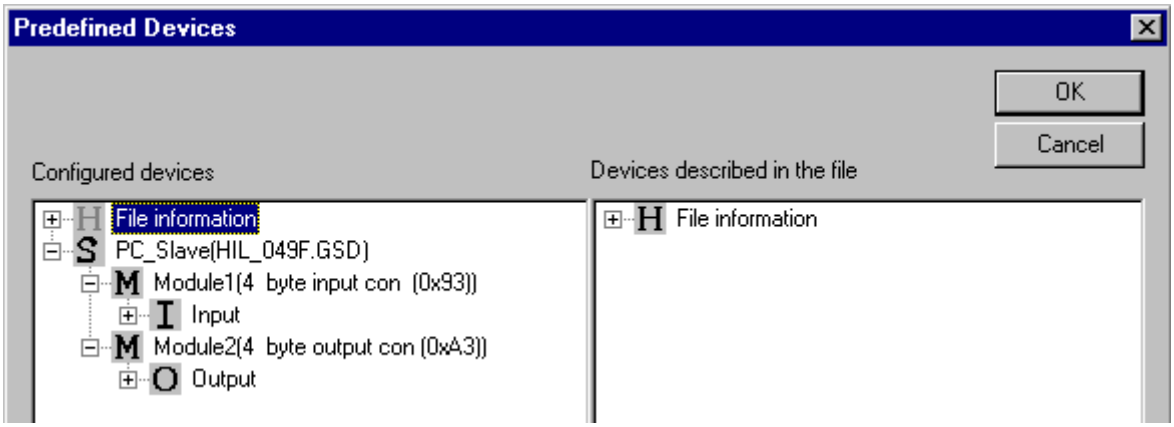


Figure 18: Inserting predefined device – PDD (2)

Select the device or devices of the **Found predefined devices** (left-hand side) and pull this over to the **Selected predefined** devices (right-hand side) and release the left mouse button (drag and drop). The following picture will appear.

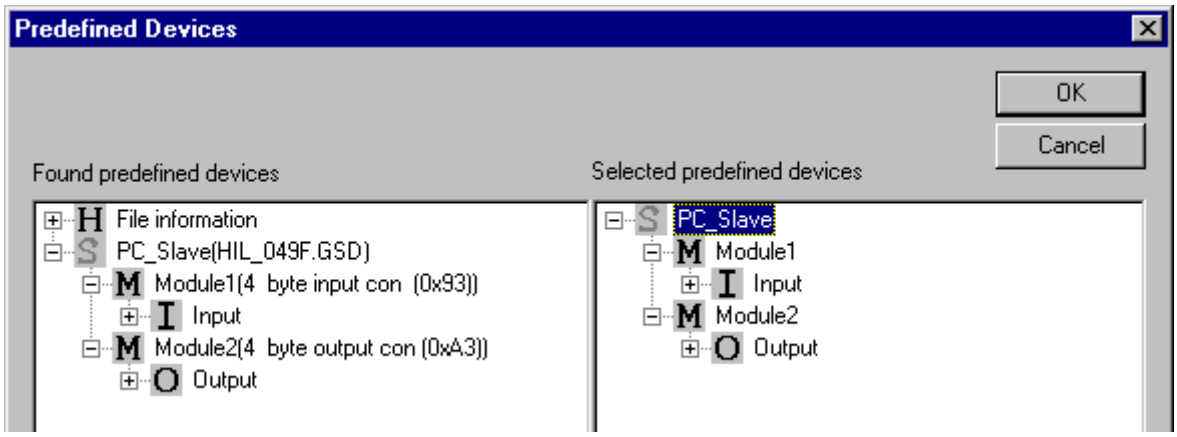


Figure 19: Inserting predefined device – PDD (3)

The figure shows a device with the description PC_Slave consisting of two modules with the description Module1 and Module2.

Choose **Ok** in order to insert the device into the configuration.

Subsequently the station address of the device can be altered.

4.4.5 Replace Slave

If a Slave already exists in the configuration and should be replaced against another Slave, you first have to set the focus on the Slave (left mouse click at the Slave) and then choose the menu **Edit > Replace**

or

make a right mouse click at the Slave and select **Replace**.

In the now opened window the question appears if the Slave should be replaced.

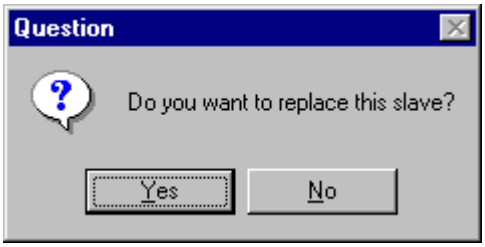


Figure 20: Security question replace Slave

If you click the **Yes** button a new window opens, where you can replace the Slave against another one.

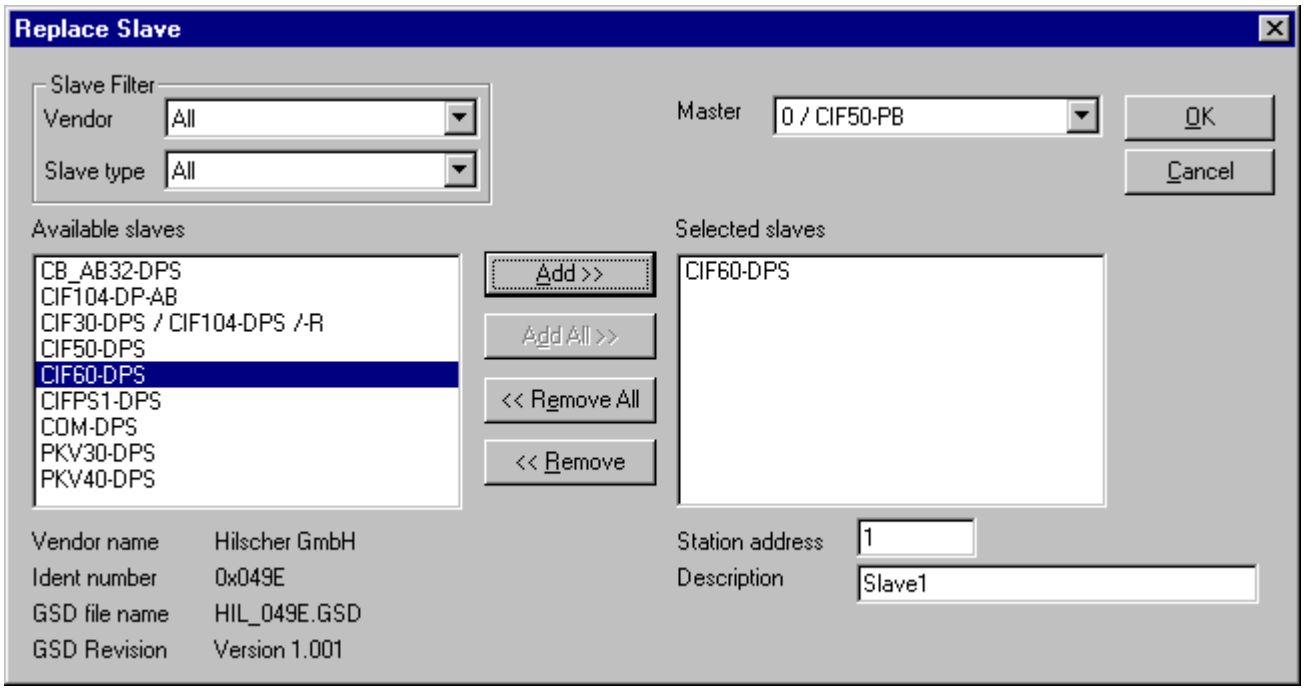


Figure 21: Edit > Replace Slave

In this window you select the Slave you want by clicking on it in the list **Available Slaves**. By clicking the **Add** button you put the Slave in the list **Selected Slaves**. With **OK** you confirm the selection and the Slave will be replaced.

4.5 PROFIBUS-FMS

4.5.1 Communication Reference List (CRL)

Communication between two FMS devices is only possible when a communication relationship between both devices has been configured. This means that both devices receive information how to communicate with the other device. This information is stored in a database known as the communication reference list (CRL).

SyCon checks to ensure that the configured communication relationships between the various devices are suited to one another.

4.5.1.1 Master Master Acyclic Communication

There are several possibilities of determining a communication relationship.

One possibility of defining the communication relationship is to open the communication reference list of a FMS Master. A double click on the symbol of the device first opens the **Master Configuration** window.

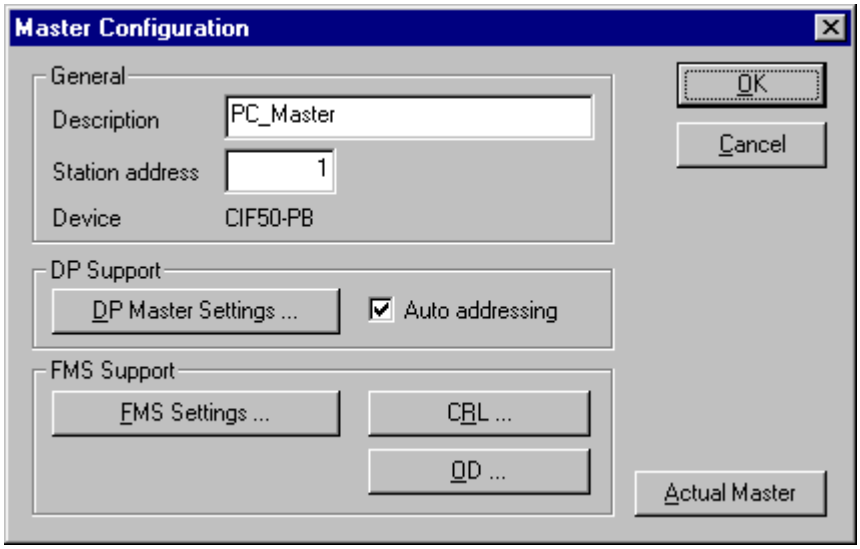


Figure 22: Master Configuration PROFIBUS-FMS MMAZ (1)

Then click on the **CRL** button. Alternatively, by clicking with the right mouse button on the symbol of the device, the **Communication Reference List (CRL)** can be selected. The following dialog appears:

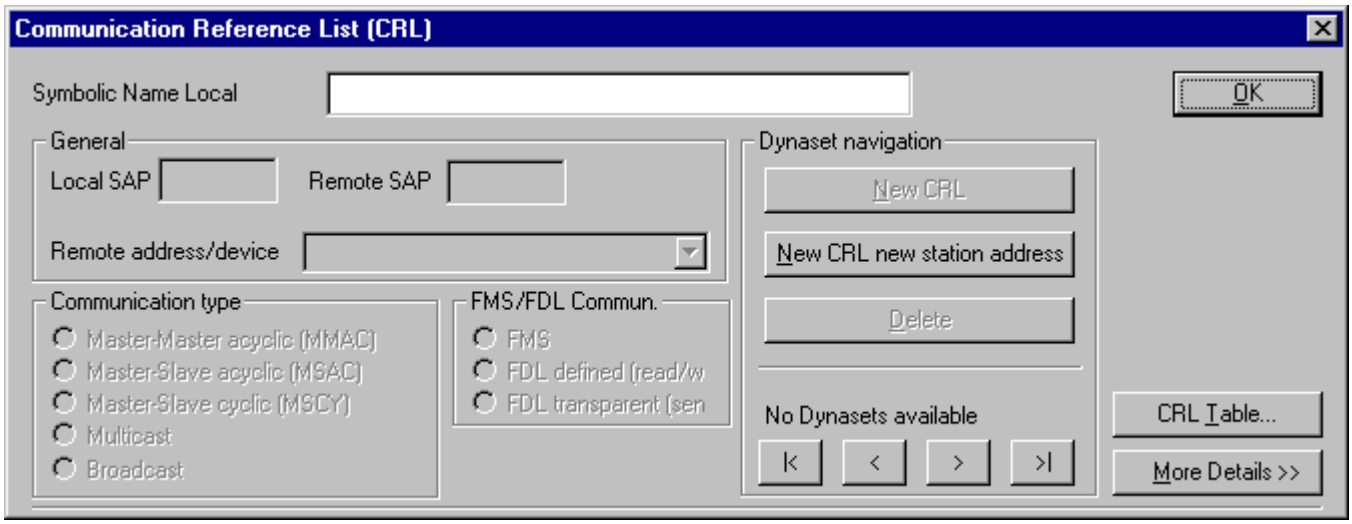


Figure 23: Master Configuration PROFIBUS-FMS MMAZ (2)

Now click on the **New CRL new station address** to add a new communication relationship to another station. The following dialog with a pre-definition/pre-selection appears:

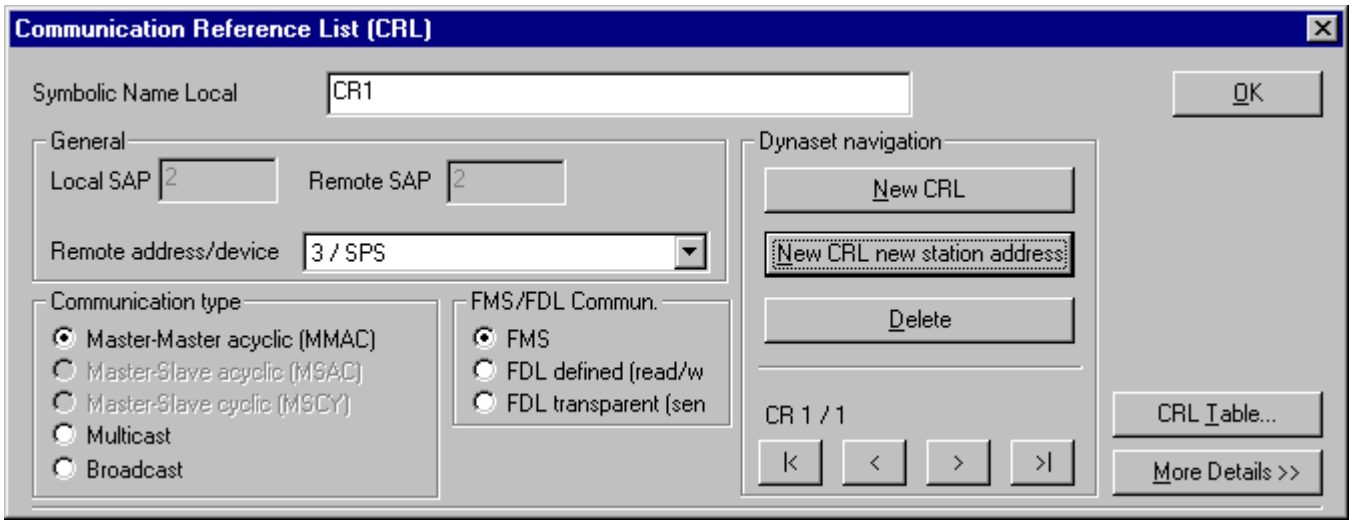


Figure 24: Master Configuration PROFIBUS-FMS MMAZ (3)

First select Remote address/device. For example: Station 3.

Now select the type of communication **Master-Master acyclic (MMAZ)** by clicking on it. Thereupon the **Local SAP** and the **Remote SAP** can be edited.

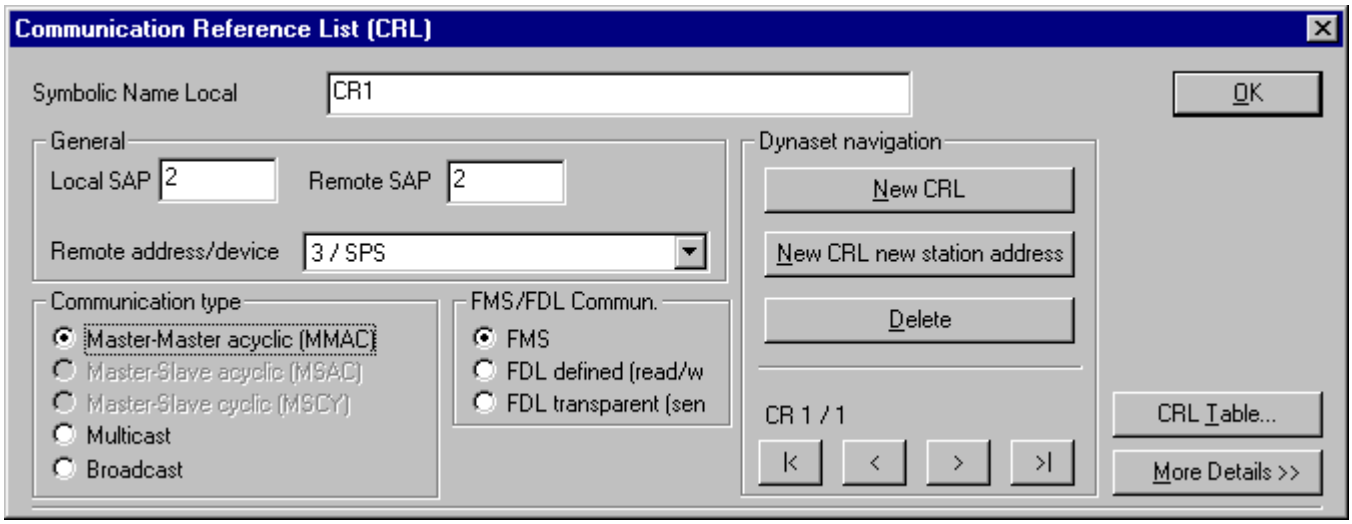


Figure 25: Master Configuration PROFIBUS-FMS MMAZ (4)

Enter the **Local SAP** and the **Remote SAP**.

Further PROFIBUS-FMS settings appear by clicking on the **More Details** button.

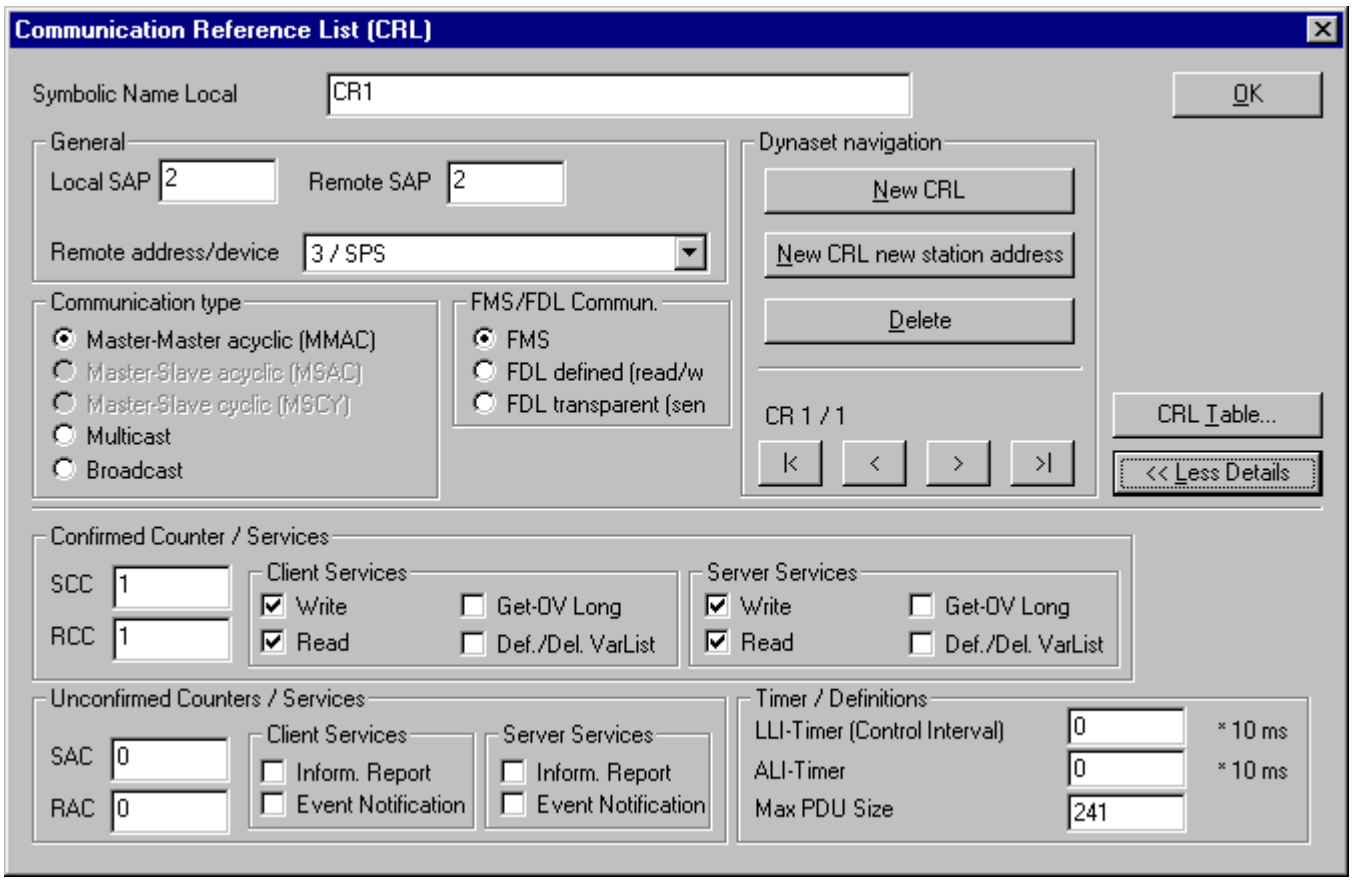


Figure 26: Master Configuration PROFIBUS-FMS MMAZ (5)

The figure shows typical settings for a PROFIBUS-FMS coupling. These values are checked by both FMS devices during the communication build-up. The control interval (LLI Timer) entry must be the same for both FMS devices. For S7 devices a typical value is 3000 and for S5 a typical value is 500.

In the field **Max PDU Size** the maximum size of a send PDU for low priority set. The following rules are for the PDU sizes:

PDU	Value in SyCon	Value to be set in the FMS coupling partner
Max PDU send high priority	0 preselected, not changeable	0
Max PDU send low priority	64 .. 241 settable in field **Max PDU size**	greater or equal to value set in SyCon
Max PDU receive high priority	0 preselected, not changeable	0
Max PDU receive low priority	241 preselected, not changeable	64 .. 241

Table 31: Communication reference list > PDU sizes

SyCon automatically inserts a CR to the remote device within this configuration.

If a communication relationship is to be defined to a device not yet available in the configuration, choose **Other device** from the **Remote address/device** selection list. A dialog appears in which the station address of the new device can be entered. The device appears later as a symbol.

In this example CR 1/1 (Communication reference 1 of 1) has been chosen. This information (CR 1) is later used by the application for activating telegrams.

Note: The communication reference is not the station address it is a reference number.

Note: The number of the communication reference is the key for the communication.

The other possibility of defining a communication reference is:

Select the **Insert > Communication Reference Connection** menu or click on the following symbol:

 (Insert > Communication Reference Connection)

The mouse pointer changes to  . Select the first of the two FMS devices between which a communication relationship is to be defined. After a successful selection the mouse pointer changes to  and shows that the second device has to be selected. Choose the second device.

The following dialog now appears:

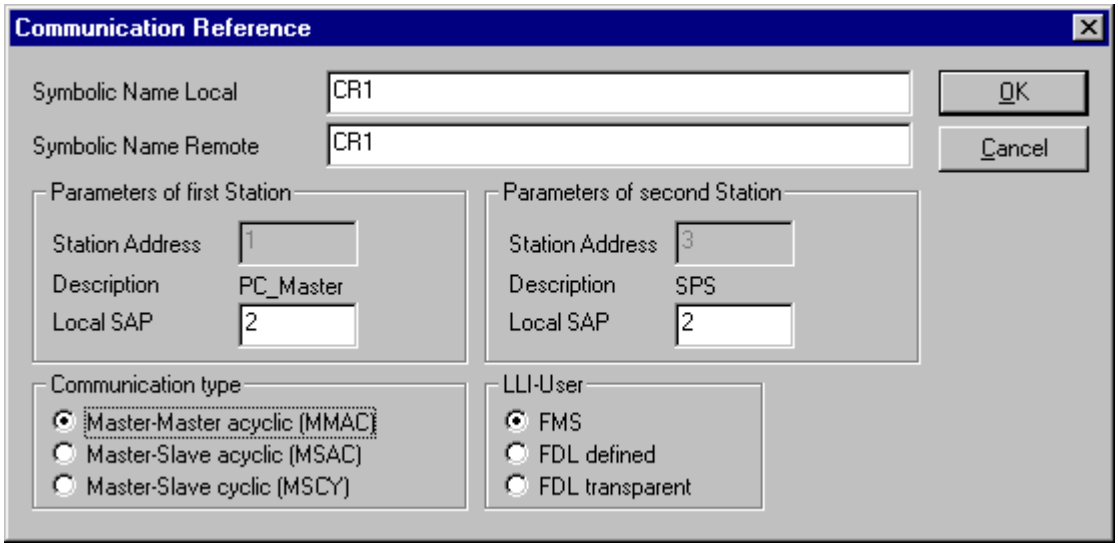


Figure 27: Inserting Communication Reference MMAZ

SyCon checks the free resources within this configuration of both devices and displays useful values. The user has the possibility of altering these values at any time. Exit the window with **OK**.

This simplified insertion of a communication reference is used for providing standard values for all further FMS settings. These can be controlled or altered with **Settings > Master Settings > CRL > More Details**.

4.5.1.2 Master Slave Acyclic Communication

In order to define a communication relationship, first open the window of the Master configuration by means of double click on the symbol of the FMS Master and select the **CRL** button.

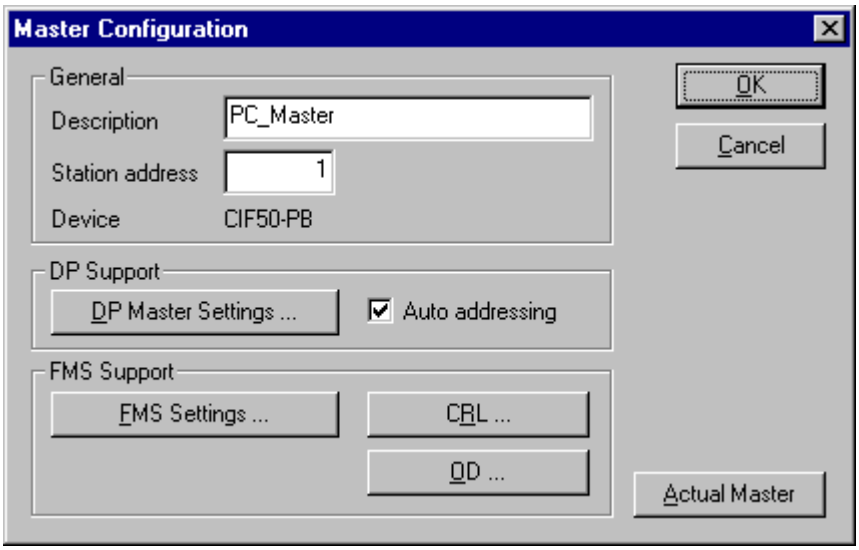


Figure 28: Master Configuration PROFIBUS-FMS MSAZ (1)

or click with the right mouse button on the symbol of the FMS Master and select **Communication Reference List (CRL)**. The following dialog appears:

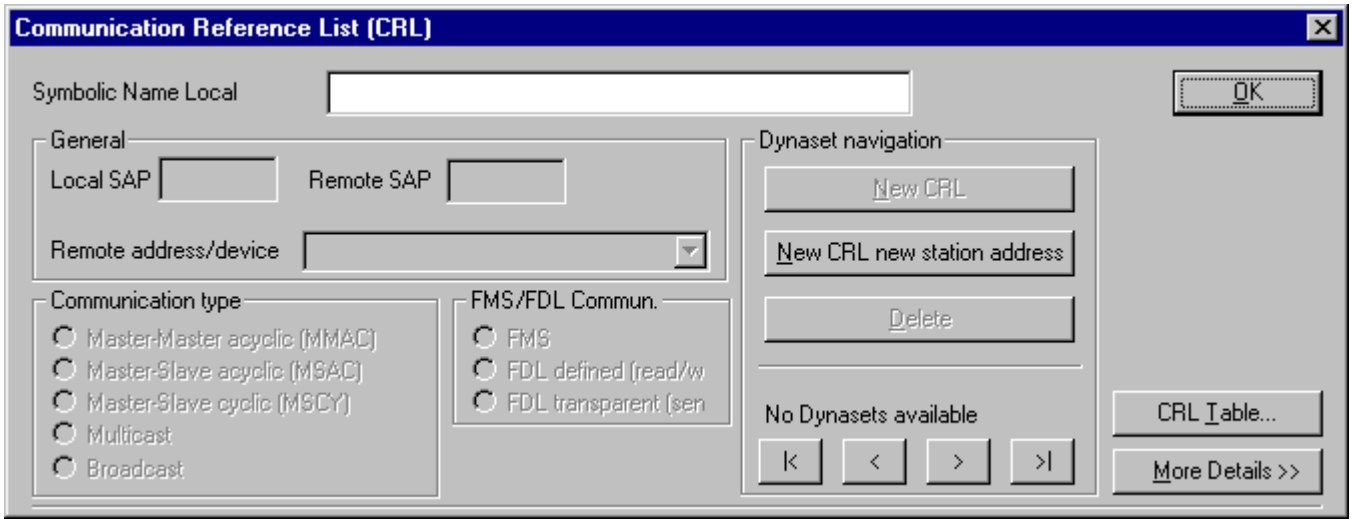


Figure 29: Master Configuration PROFIBUS-FMS MSAZ (2)

Now select the **New CRL new station address** button in order to insert a new communication relationship to another station. The following dialog appears with a pre-definition/pre-selection:

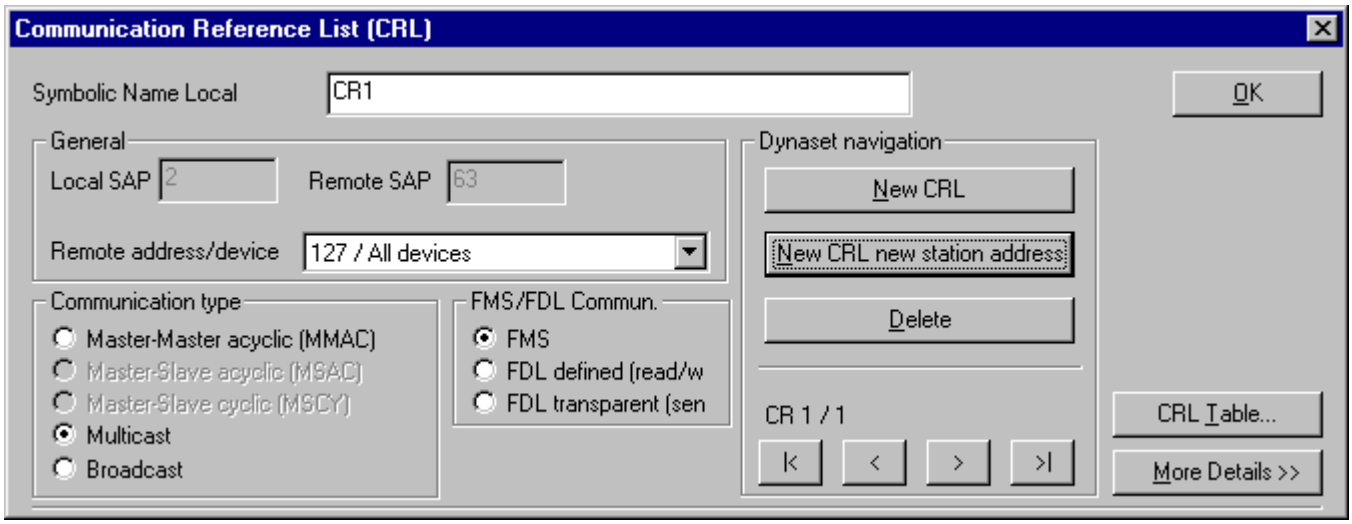


Figure 30: Master Configuration PROFIBUS-FMS MSAZ (3)

First select the Remote address/device. Open the selection list and choose

--- / Other device

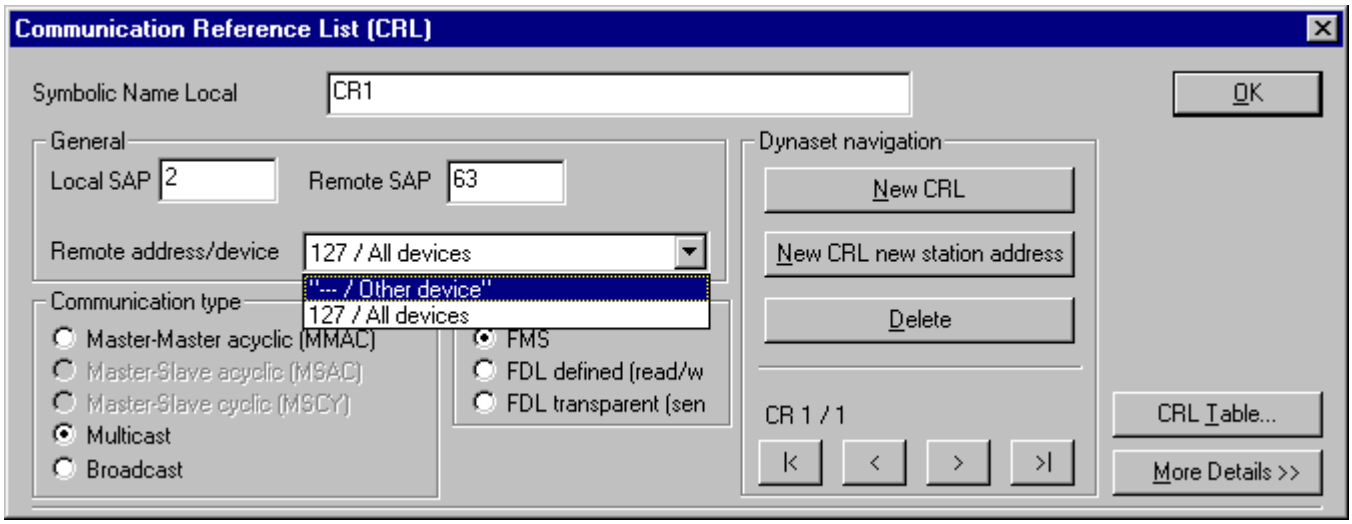


Figure 31: Master Configuration PROFIBUS-FMS MSAZ (4)

A window opens and the station address of the remote device and its description can be assigned. Choose FMS Slave.

Caution: Enter the description of the device here and now. **This cannot be altered later.**

Figure 32: Master Configuration PROFIBUS-FMS MSAZ (5) (Slave address)

Then choose the type of communication **Master-Slave acyclic (MSAC)**. Enter the remote SAP.

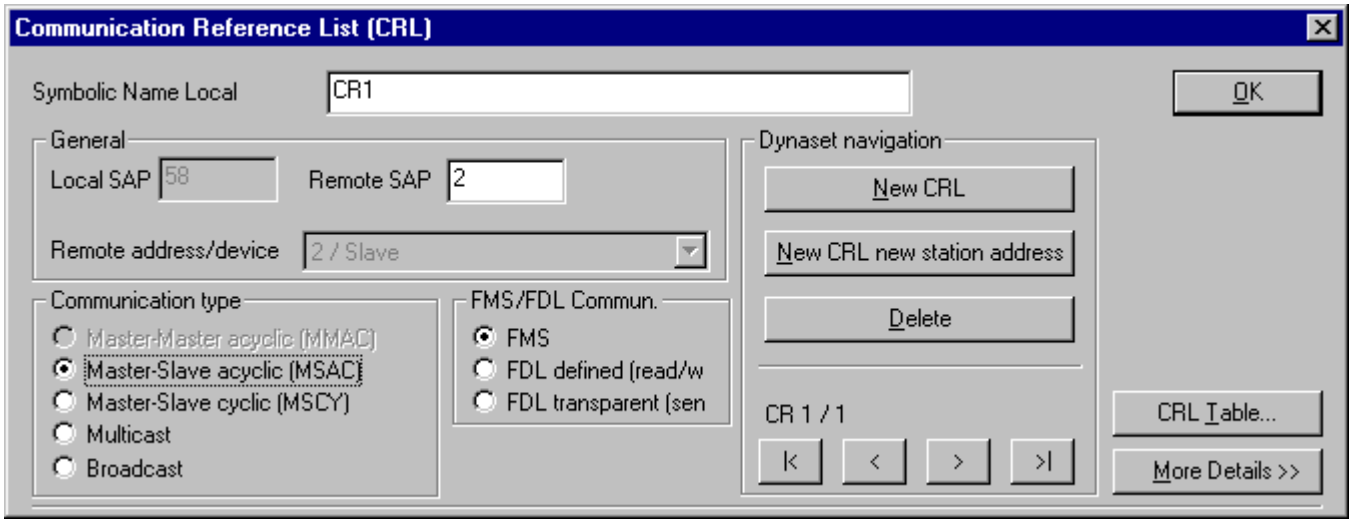


Figure 33: Master Configuration PROFIBUS-FMS MSAZ (6)

Further PROFIBUS-FMS settings appear with the **More Details** button.

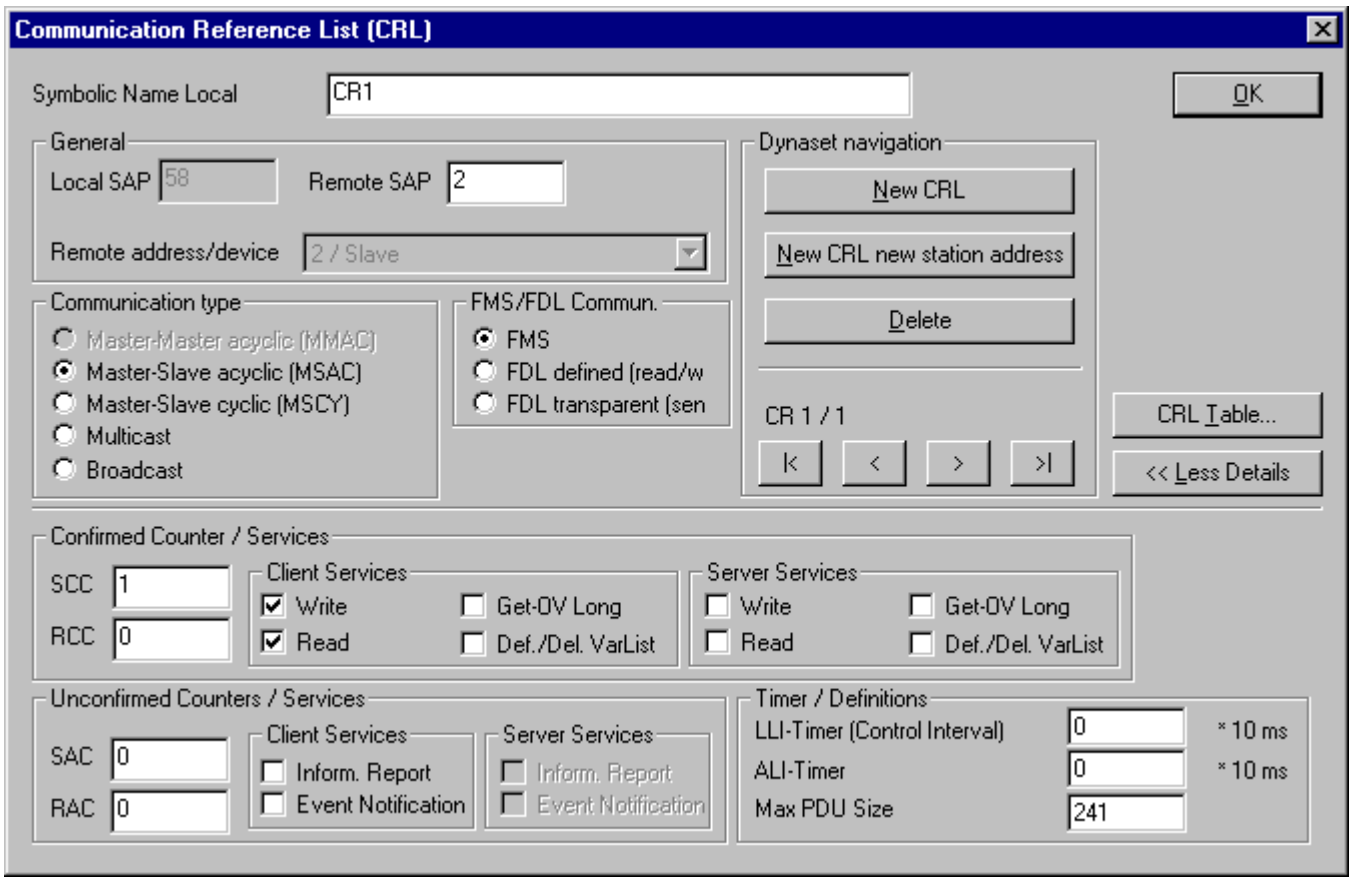


Figure 34: Master Configuration PROFIBUS-FMS MSAZ (7)

The figure shows typical settings for a PROFIBUS-FMS connection. These values are checked by both FMS devices during a connection is built up. The entry of the control interval (LLI Timer) must be the same for both FMS devices.

SyCon automatically inserts a CR to the remote device within during this configuration.

In this example CR 1/1 (Communication reference 1 of 1) has been chosen. This information (CR 1) is later used by the application for activating telegrams.

Note: The communication reference is not the station address it is a reference number.

Note: The number of the communication reference is the key for the communication.

The following comment will appear with a double click on the FMS Slave.

Figure 35: Note FMS Slave not implemented yet

The Station Address of the FMS Slave cannot be altered later in the configuration. The Station Address must be entered as described further above in this section.

4.5.1.3 Master Slave Cyclic Communication

See section *Master Slave Acyclic Communication* on page *62*, but select **Master-Slave cyclic (MSCY)**.

4.5.2 Object Directory (OD)

The Object Directory must be entered at the PROFIBUS-FMS Server. If the Hilscher device is only utilized as PROFIBUS-FMS Client, then the purpose of the information of the Objects in the configuration is only for testing with the FMS Monitor. If the Hilscher device is utilized as PROFIBUS-FMS Server, then the Objects must be entered in the Object directory and are transferred during downloading.

Open the Object Directory by double clicking on the symbol of the device and select the **OD** button or, by clicking the right mouse button on the symbol of the FMS device and selecting the **Object Directory (OD)** button. The following dialog appears:

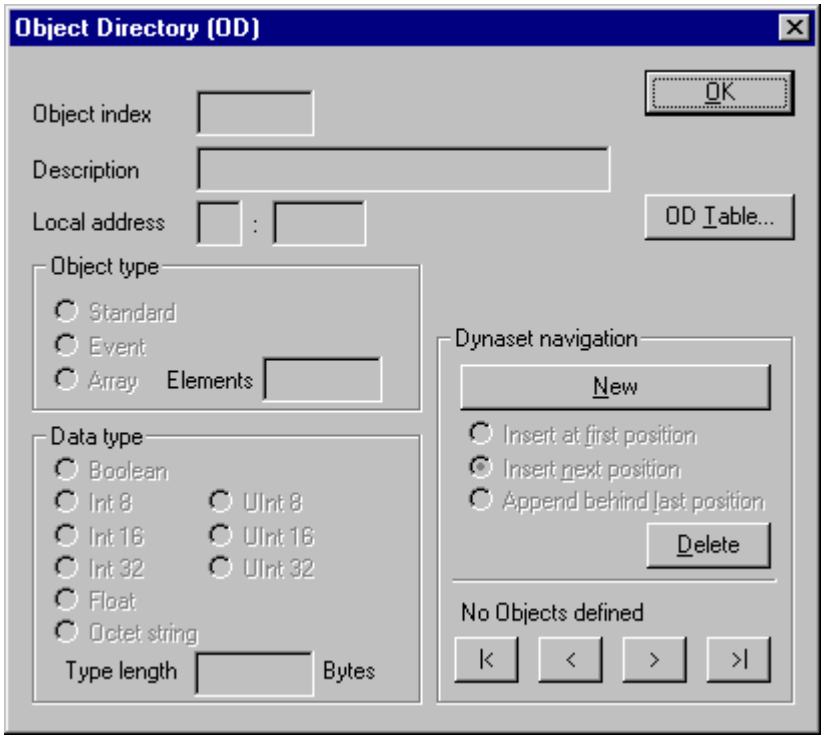


Figure 36: Object Directory (OD)

For the **Object index** the number of the object is given. In the field **Description** a symbolic description can be typed in.

Insert the Objects by clicking on the **New** button.

- SyCon suggests every time the actual **object index** plus one as new object
- SyCon suggests every time the actual **object type** and data type as the new object

The field **Local address** is only of importance for the device COP102-PB (Quantum SPS). With this the address of the State RAM of the SPS is given, where the object is mapped. The representation corresponds to the Schneider Electric notation with Separator (4:00001). Here the information in front of the colon is the range and the information behind the colon is the address (Range:Address). The following ranges are defined: 0 = Output/Holding Bits, 1 = Input Bits, 3 = Input Registers, 4 = Output/Holding Registers.

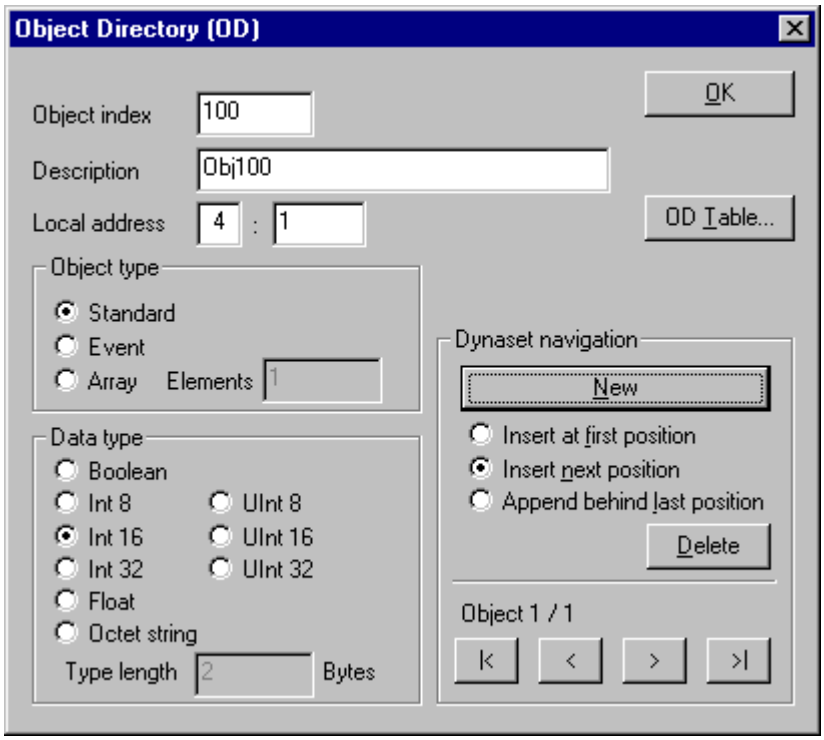


Figure 37: Object Directory (OD) – single element

A single element (**Standard**) is given by the **Object type** Standard and information on the **Data type**.

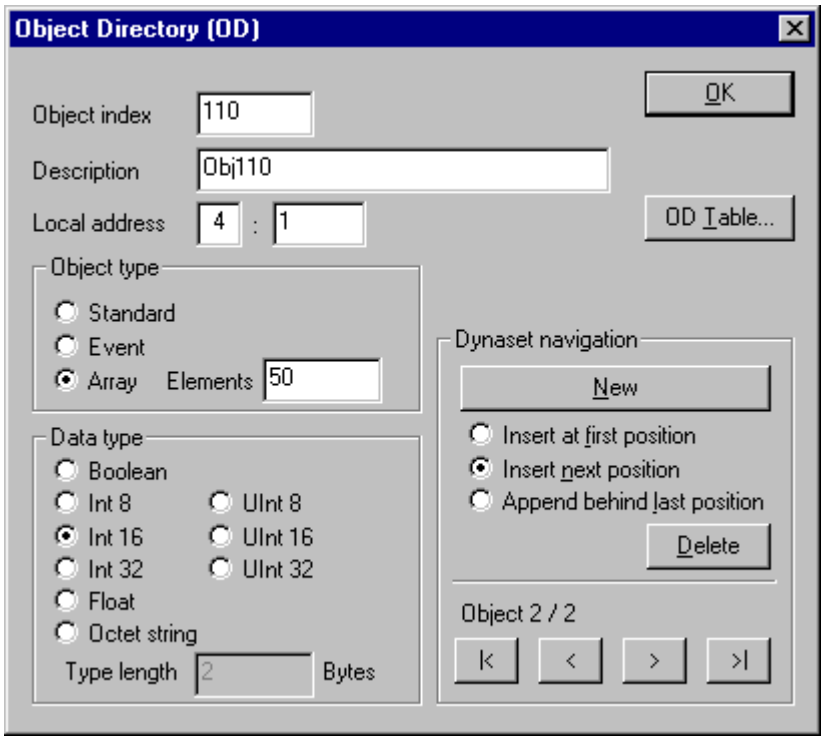


Figure 38: Object Directory (OD) Field (Array)

A **Field** (Array) is given by the **Object type** Array and information of the **Data type**. For **Elements** the size of the array/field is given.

4.6 PROFIBUS-FDL

4.6.1 PROFIBUS-FDL Defined

'PROFIBUS-FDL Defined' offers read and write functionality.

There are several possibilities of determining a communication relationship.

One possibility of defining a communication relationship is to open the communication reference list of a FMS Master. A double click on the symbol of the device first opens the window of the **Master Configuration**.

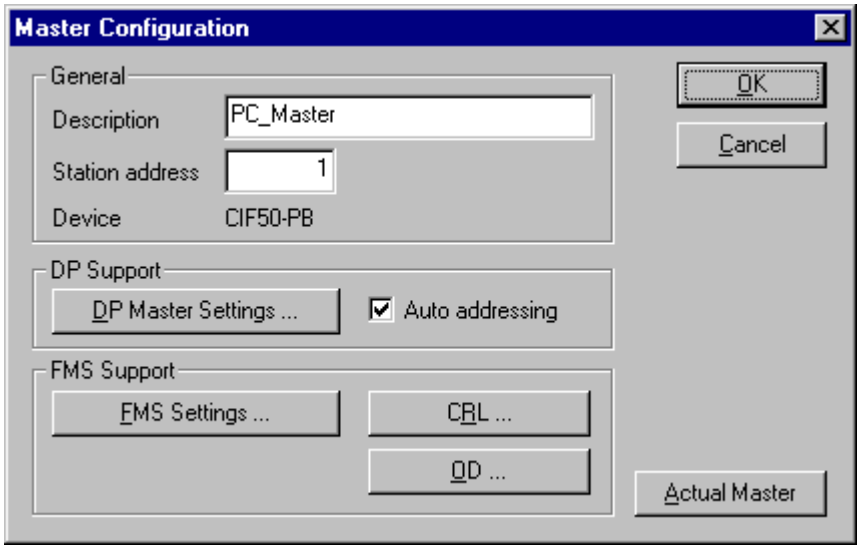


Figure 39: Master Configuration PROFIBUS-FDL Defined (1)

Then click on the **CRL** button. Alternatively, by clicking with the right mouse button on the symbol of the device, the selection **Communication relationship list (CRL)** can be chosen. The following dialog appears:

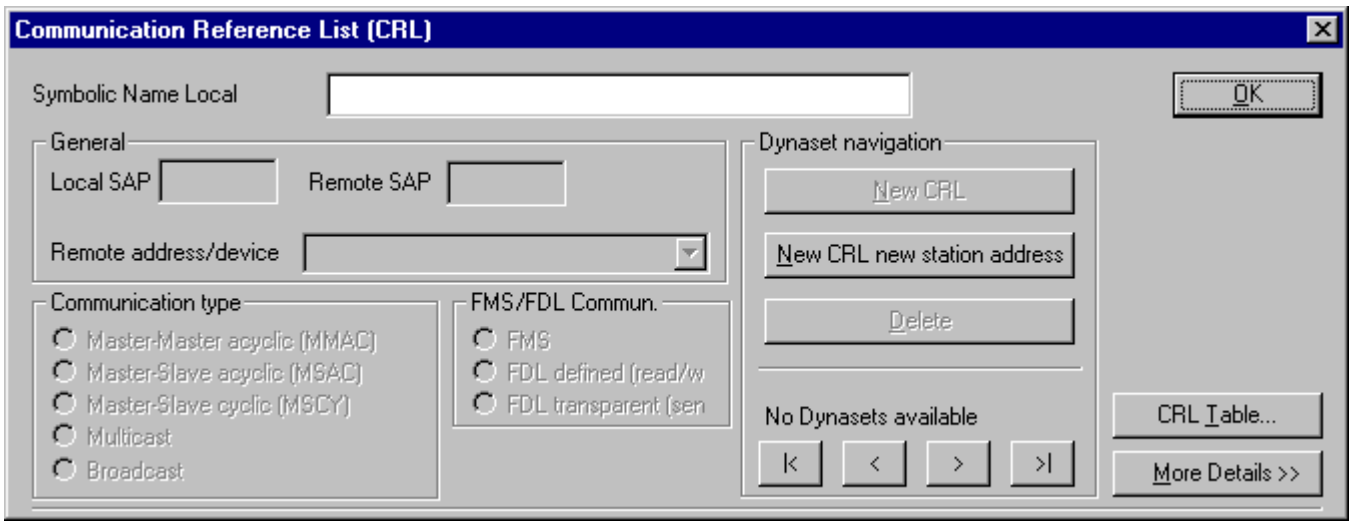


Figure 40: Master Configuration PROFIBUS-FDL Defined (2)

Now click on the **New CRL new station address**, in order to insert a new communication relationship to another station. There now appears the following dialog with a pre-definition/pre-selection:

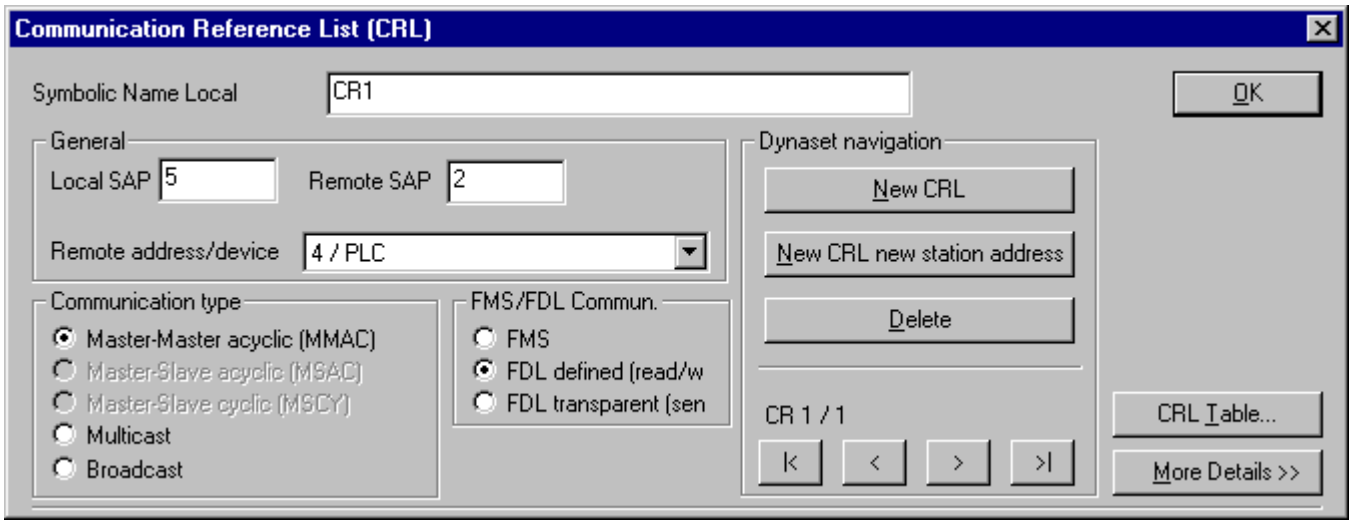


Figure 41: Master Configuration PROFIBUS-FDL Defined (3)

First choose the Remote address/device. For example: Station 4.

Then, at FMS/FDL Communication, choose the **FDL defined (read/write)** by clicking on it. Now the Local SAP and the Remote SAP can be edited.

The following 4 settings are important with PROFIBUS-FDL: the remote address, the local and the remote SAP as well as the information FDL defined. The settings reached via the **More Details** button are only relevant for the PROFIBUS-FMS.

SyCon automatically inserts a CR to the remote device within this configuration.

If a communication relationship is to be defined to a device not yet available in the configuration, choose **Other device** from the **Remote address/device** box. A dialog box appears in which the station address of the new device can be entered. The device appears later as a symbol.

In this example CR 1/1 (Communication reference 1 of 1) has been chosen. This information (CR 1) is later used by the application for activating telegrams.

Note: The communication reference is not the station address it is a reference number.

Note: The number of the communication reference is the key for the communication.

The other possibility of defining a communication reference is:

Select the **Insert > Communication Reference Connection** menu or click the following symbol

 (Insert > Communication Reference Connection)

The mouse pointer changes to  . Select the first of the two FMS devices (FDL devices) for which a communication relationship is to be defined.

After a successful selection the mouse pointer changes to  and shows that the second device has to be selected. Choose the second device.

The following dialog now appears:

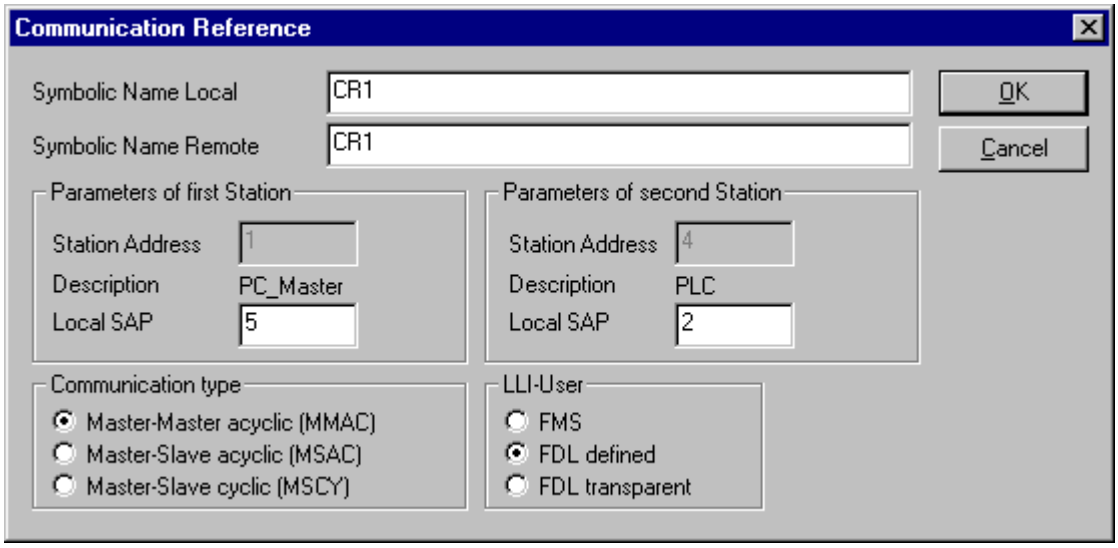


Figure 42: Insert Communication Reference PROFIBUS-FDL Defined

Insert the **FDL defined** at **LLI-User** as well as the **SAP**s.

SyCon checks the free resources of both devices and displays useful values. The user has the possibility of altering these values at any time. Exit the window with **OK**.

4.6.2 PROFIBUS-FDL Transparent SDA

The purpose of 'PROFIBUS-FDL Transparent' (SDA) is the sending or receiving of data via PROFIBUS-FDL. Here, the user defines the meaning of the data. These data are transparent for the Hilscher device.

The configuration is described in section *PROFIBUS-FDL Defined* on page *68*, but select **FDL transparent (send/receive)**, as is shown in the two following figures.

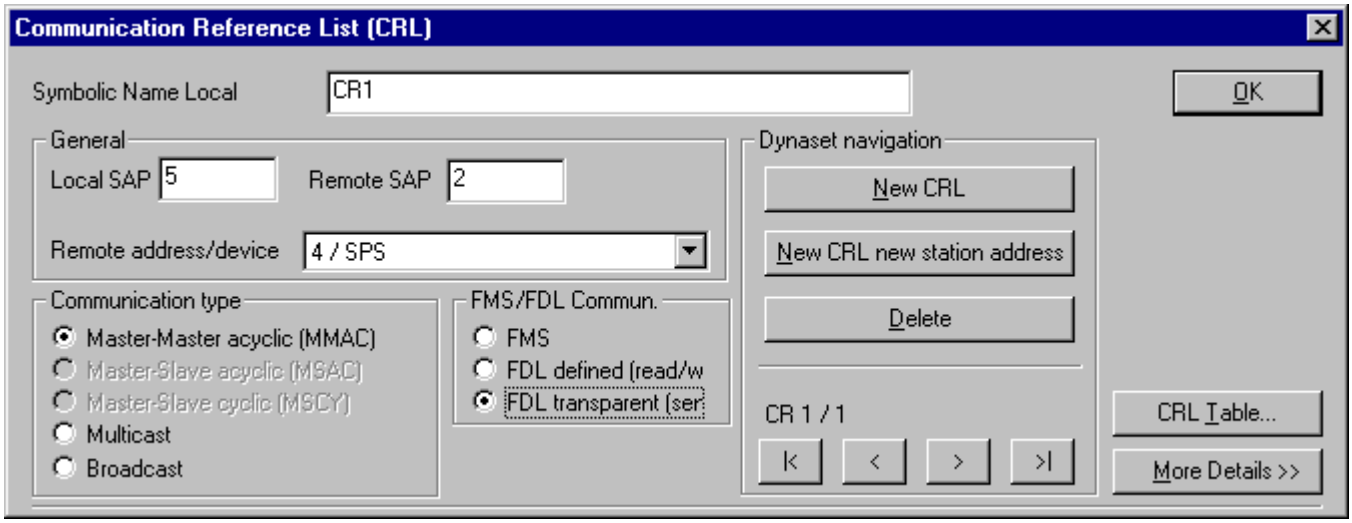


Figure 43: Master Configuration PROFIBUS-FDL Transparent SDA

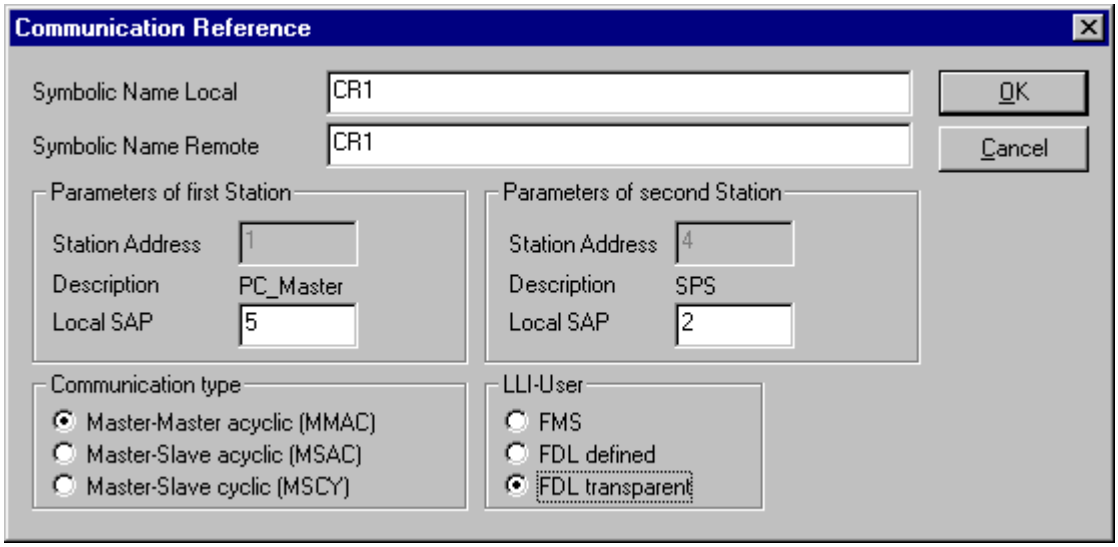


Figure 44: Insert communication reference PROFIBUS-FDL Transparent

4.6.3 PROFIBUS-FDL Transparent SDA/SDN

The purpose of 'PROFIBUS-FDL Transparent' (SDA/SDN) the sending or receiving of data via PROFIBUS-FDL. Here, the user defines the meaning of the data. These data are transparent for the Hilscher device. The PROFIBUS-FDL services SDA (Send Data with Acknowledge) and SDN (Send Data with No acknowledge) can be used.

A double click on the symbol of the device first opens the window of the **Master Configuration**.

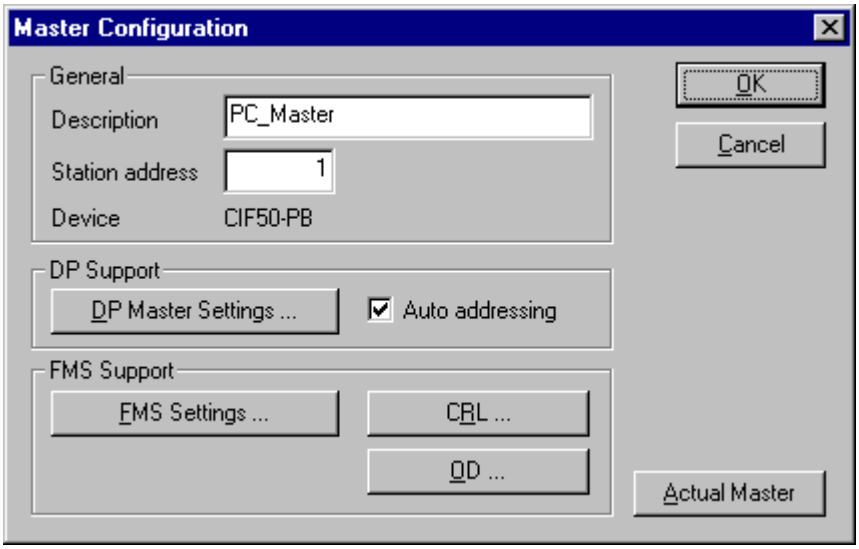


Figure 45: Master Configuration PROFIBUS-FDL Transparent SDA/SDN (1)

Then click on the **CRL** button. Alternatively, by clicking with the right mouse button on the symbol of the device, the selection **Communication relationship list (CRL)** can be chosen. The following dialog appears:

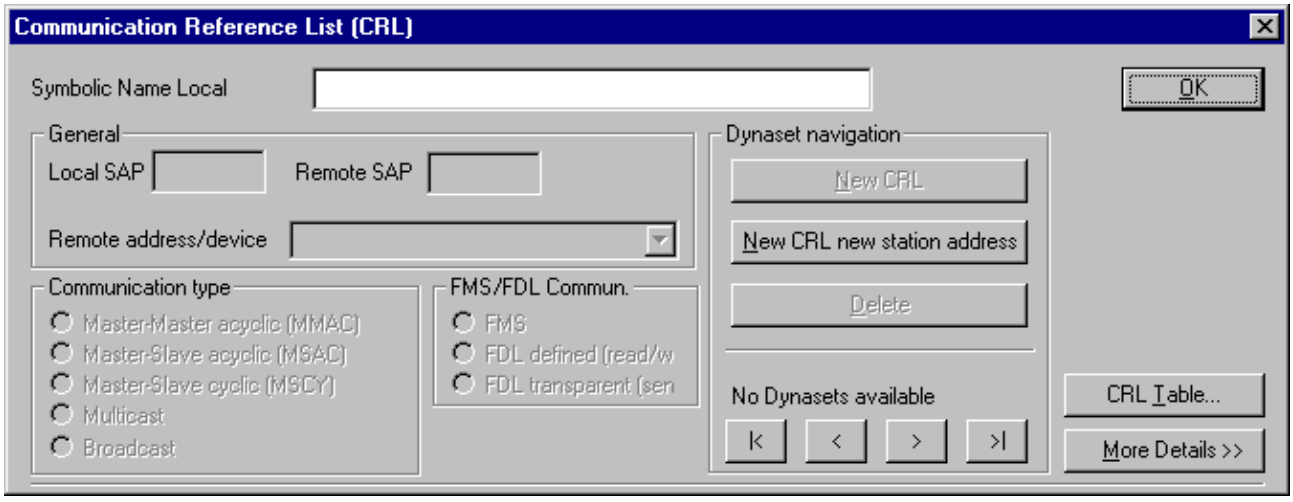


Figure 46: Master Configuration PROFIBUS-FDL Transparent SDA/SDN (2)

Now click on the **New CRL new station address**, in order to insert a new communication relationship to another station. There now appears the following dialog with a pre-definition/pre-selection:

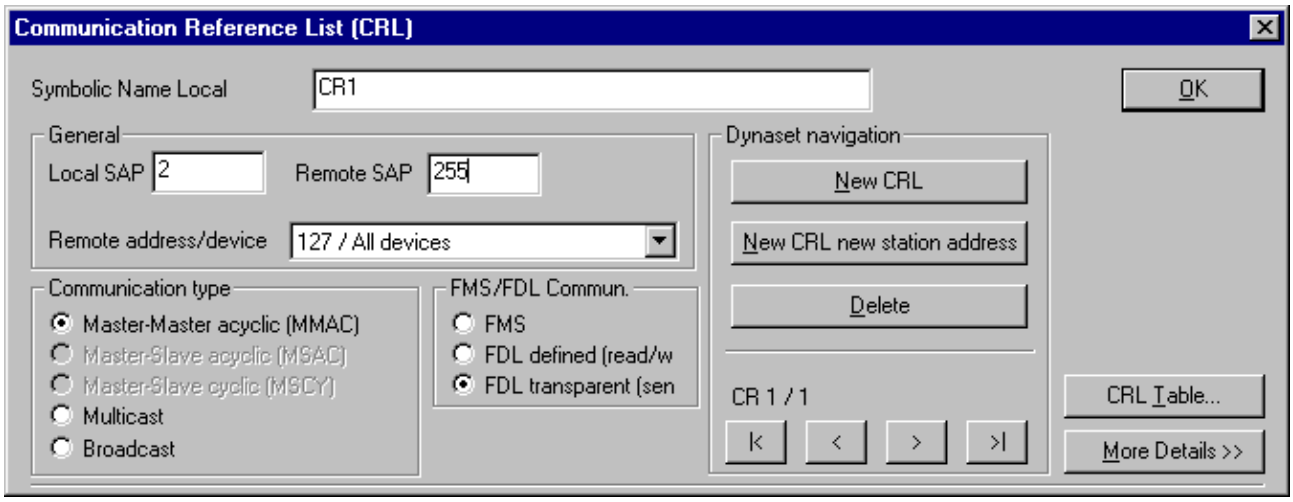


Figure 47: Master Configuration PROFIBUS-FDL Transparent SDA/SDN (3)

First choose the **Remote address/device 127/All Devices**.

Then, at **FMS/FDL Communication**, choose the **FDL transparent (send/receive)** by clicking on it. Now the Local SAP and the Remote SAP can be edited.

Now select the type of communication **Master-Master acyclic (MMAZ)** by clicking on it. Thereupon the Local SAP and the Remote SAP can be edited.

Set the **Local SAP**, e.g. 2.

The following 4 settings are important with PROFIBUS-FDL: the remote address 127, the local SAP (0, 2..50, 52, 53, 55..61), the remote SAP 255 as well as the information FDL defined. The settings reached via the **More Details** button are only relevant for the PROFIBUS-FMS.

In this example CR 1/1 (Communication reference 1 of 1) has been chosen. This information (CR 1) is later used by the application for activating telegrams.

Note: The communication reference is not the station address it is a reference number.

Note: The number of the communication reference is the key for the communication.

4.6.4 PROFIBUS-FDL Transparent SDA/SDN/SRD

The purpose of 'PROFIBUS-FDL Transparent' (SDA/SDN/SRD) the sending or receiving of data via PROFIBUS-FDL. Here, the user defines the meaning of the data. These data are transparent for the Hilscher device. The PROFIBUS-FDL services SDA (Send Data with Acknowledge), SDN (Send Data with No acknowledge) and SRD (Send and Request Data) can be used.

The Hilscher Device only needs the bus parameter.

All other parameters for the communication like SAP, PROFIBUS service and Station address are transferred by messages.

5 Settings

5.1 Device Assignment

The Device Assignment setting determines how the System Configurator communicates with the device. This is selected in the device arrangement via the menu **Settings > Device Assignment**.

5.1.1 Driver Selection

Calling up the **Device Assignment**, firstly a dialog window opens, where a driver has to be selected.

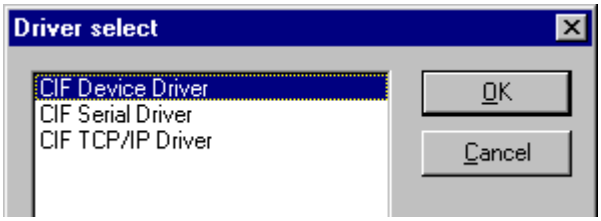


Figure 48: Driver Selection

With the selection of the driver, it is determined, how the System Configurator communicates with the device. The following drivers are available:

- **CIF Device Driver**

  The System Configurator communicates with the Hilscher device via the Dual-port memory of the device.

  This communication is utilized when the System Configurator is used on the same PC on which the Hilscher device is installed.

Note: The CIF Device Driver has to be installed and it must have access to the Hilscher device.

- **CIF Serial Driver**

  The System Configurator communicates with the Hilscher device via a serial connection. In this case a COM port of the PC must be connected with the diagnostic interface of the Hilscher device via a diagnostic cable.

Note: The pin assignment of the diagnostic cable is described in the hardware documentation of the device manufacturer.

This communication is utilized when the System Configurator has to access the device via the diagnostic interface of the Hilscher device. The following two application cases are possible:

Application case 1: The System Configurator is installed on another PC (e.g. a notebook) than the Hilscher device.

Application case 2: The System Configurator is installed on the same PC on which the Hilscher device is situated. Then the application can use the Dual-port memory to access the Hilscher device and the diagnostic interface can be used at the same time to communicate with the device (diagnostic data).

- **CIF TCP/IP Driver**

  The System Configurator communicates with the Hilscher device via an Ethernet TCP/IP connection.

  This communication is utilized when the System Configurator is installed on a PC and the PC and the Hilscher device is connected via Ethernet.

  It has to be distinguished:

  1. The Hilscher device is installed in a PC and the TCP/IP connection is built up to the PC, which means the IP address of the PC is used as IP address.

  2. The Hilscher device has an own Ethernet connection and the TCP/IP connection is built up to the Hilscher device, that means the IP address of the Hilscher device is used as IP address.

Select the favored driver for the communication between the System Configurator and the used device from the lower table.

You find a detailed instruction about the selection of the several drivers in the denoted section:

Driver	Described in section	Page
CIF Device Driver	*CIF Device Driver*	*77*
CIF Serial Driver	*CIF Serial Driver*	*79*
CIF TCP/IP Driver	*CIF TCP/IP Driver*	*81*

Table 32: Driver Selection

To select a driver, mark the favored driver by clicking on it in the dialog window **Driver Select** and confirm your selection with **OK**.

The configuration window of the favored driver opens.

5.1.2 CIF Device Driver

The CIF Device Driver supports up to four Hilscher devices in one PC, and they are accessed via the Dual-port memory.

Driver Description

Figure 49: CIF Device Driver - Driver Description

In the upper part of the **CIF Device Driver** dialog the actual used CIF Device Driver and its version number are displayed.

This display is only for information purposes and is not editable by the user.

Board Selection

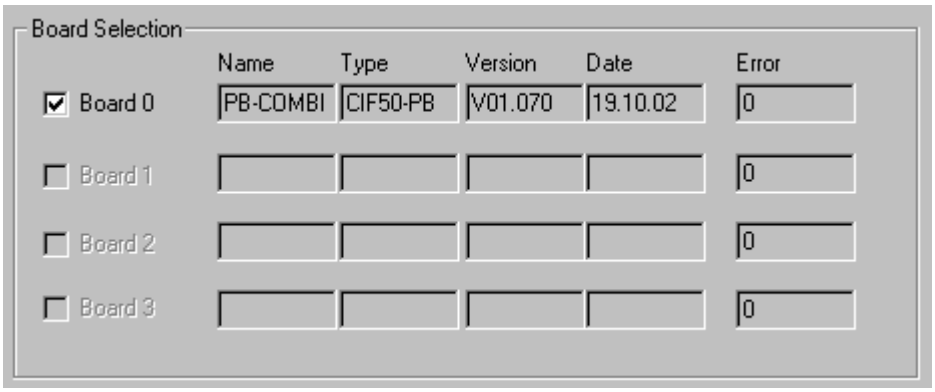


Figure 50: CIF Device Driver - Board Selection

If an assignable device is found by the CIF Device Driver, the checkbox next to the board number is selectable. To select the device, you have to enable it by clicking in the checkbox located left of the desired board and confirm this selection with **OK**.

Checkbox	Description
☐	Device is still not assigned and it can be selected.
☑	Device is assigned. The Assignment can be abrogated by deselecting.
☐	The assignment of the device is not possible.
☑	The device is still assigned in another open configuration and can not be selected here.

Table 33: Device Assignment - Checkboxes of the CIF Device Driver

Now the device is connected with the System Configurator via the CIF Device Driver and the Device Assignment dialog is closed.

By clicking the **Cancel** button, the Device Assignment is closed without an assignment has been completed or respectively changed.

More Details of the CIF Device Driver

Next to the field **Board Selection** there is a button with the name **more>>**. Selecting this button, a dialog opens which displays further information about the CIF Device Driver.

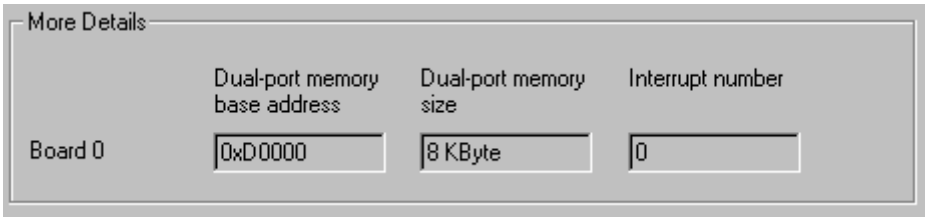


Figure 51: CIF Device Driver - More Details

In this dialog the used **Dual-port memory base address**, the **Dual-port memory size** and the **Interrupt number** of the selected board are displayed. Interrupt number 0 means polling mode.

This display is only for information purposes and is not editable by the user.

5.1.3 CIF Serial Driver

The CIF Serial Driver supports the interfaces COM1 to COM 4 of the PC, in order to get the configuration or to do diagnostic serially via the diagnostic interface of the Hilscher device.

Driver Description

Figure 52: CIF Serial Driver - Driver Description

In the upper part of the **CIF Serial Driver** dialog the actual used driver is displayed.

This display is only for information purposes and is not editable by the user.

Board Selection

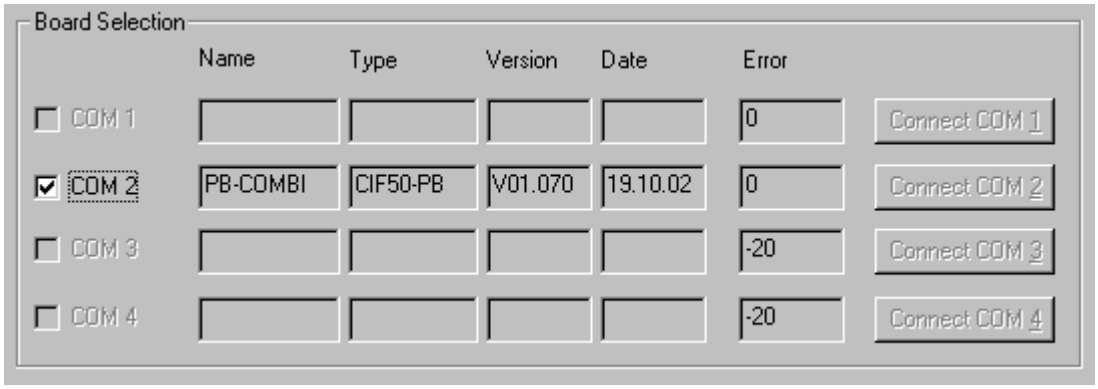


Figure 53: CIF Serial Driver - Board Selection

First the connection must be established by clicking on the button **Connect COM1** or **Connect COM2** or **Connect COM3** or **Connect COM4**.

They can be used depending on which COM interfaces are installed and free on the PC.

The System Configurator sends a request to the corresponding COM Port and polls the Firmware of the device. If the device is connected, the Firmware of the device is displayed and the checkbox of the corresponding COM interface is selectable.

Checkbox	Description
	Device is still not assigned and it can be selected.
	Device is assigned. The Assignment can be abrogated by deselecting.
	The assignment of the device is not possible.
	The device is still assigned in another open configuration and can not be selected here.

Table 34: Device Assignment - Checkboxes of the CIF Serial Driver

This selection has to be confirmed by clicking the **OK** button. Now the device is connected with the System Configurator via the serial driver and the Device Assignment dialog is closed. If the assignment is not possible or if the assignment has failed, this is displayed by an error number in the **Error** column.

If the error number **(-51)** appears after activating one of the buttons, a timeout error has occurred. That means no device is connected to this COM port.

The error number **(-20)** indicates that this COM port is not available or not free (already in use).

By clicking the **Cancel** button, the Device Assignment is closed without an assignment has been completed or respectively changed.

5.1.4 CIF TCP/IP Driver

The CIF TCP/IP Driver builds up a connection to the Hilscher device via Ethernet TCP/IP.

This communication is utilized when the System Configurator is installed on a PC and the PC and the Hilscher device are connected via Ethernet.

It is distinguished between two application possibilities:

1. The Hilscher device is installed in a PC and the TCP/IP connection is built up to the PC, which means the IP address of the PC is used as IP address.

This PC is called Remote PC in the following. The following two requirements have to be accomplished to get access to the Hilscher device via Ethernet TCP/IP:

Note: The CIF Device Driver has to be installed and it must have access to the Hilscher device. Additionally the TCP/IP Server has to be started on the Remote PC.

2. The Hilscher device has an own Ethernet connection and the TCP/IP connection is built up to the Hilscher device, that means the IP address of the Hilscher device is used as IP address.

Driver Description

Figure 54: CIF TCP/IP Driver - Driver Description

In the upper part of the **CIF TCP/IP Driver** dialog the actual used driver and its version number are displayed.

This display is only for information purposes and is not editable by the user.

Build up TCP/IP Connection

There are two possibilities to enter the IP address to build up a TCP/IP connection between the Hilscher device and the PC.

- **Scan network for devices**

  Clicking on the **NetIdent Rescan** button, the local Ethernet network is scanned for Hilscher devices. This devices need to support the identification by the Hilscher NetIdent Protocol.

  Devices found during the network scan and which are connectable to the PC are displayed in the table **Board Selection**.

- **Type in IP Address manually**

  If the device to be connected is not located in the local Ethernet network, it is necessary to type in the IP address of the device manually.

  Also some devices do not support the identification by the Hilscher NetIdent Protocol. In this case the IP address of the device has to be typed in manually, too.

Figure 55: CIF TCP/IP Driver - Type in IP Address manually

The IP address of the device to be connected need to be typed in the field **Add IP Address**. Clicking the **Add** button, it is tried to build up a CIF TCP/IP connection between the PC and the device.

If a device with the typed in IP address was found, it is displayed in the table **Board Selection**.

Board Selection

In the table **Board Selection** the devices are displayed, which were found via inserting the IP address or via the Hilscher NetIdent Protocol and which can be connected to the PC.

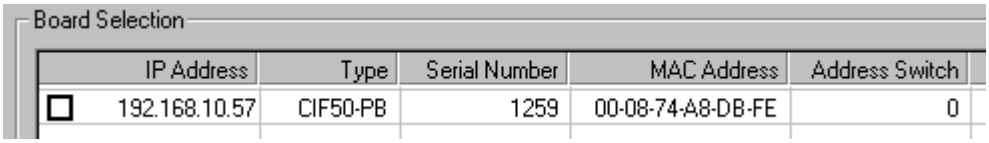


Figure 56: CIF TCP/IP Driver - Board Selection - Found Device

When the device already has an IP address, this is shown in the field **IP Address**.

If the shown IP address is 0.0.0.0, an IP address has to be assigned to the device with the button **Set IP Address**. Further information for changing the IP address you find in section *Change IP Address* on page *84*.

Connect Device

To connect a device to the PC, the checkbox of the favored device has to be selected in front of the **IP Address** field.

Checkbox	Description
☐	Device is still not assigned and it can be selected.
☑	Device is assigned. The Assignment can be abrogated by deselecting.

Table 35: Device Assignment - Checkboxes of the CIF TCP/IP Driver

Note: A connection can be build up to exactly one device.

The following picture shows an assigned device:

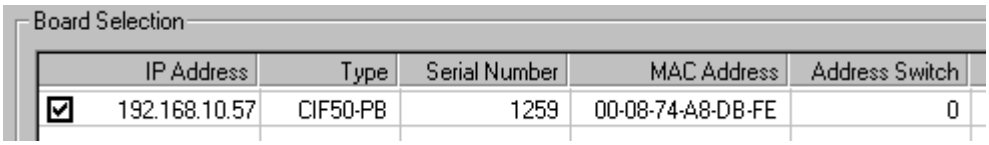


Figure 57: CIF TCP/IP Driver - Board Selection - Assigned Device

This selection has to be confirmed by clicking the **OK** button. Now the device is connected with the System Configurator via the CIF TCP/IP Driver and the Device Assignment dialog is closed.

By clicking the **Cancel** button, the Device Assignment is closed without an assignment has been accomplished or respectively changed.

Filtered Devices

Filtered Device(s)

IP Address	Type	Serial Number	MAC Address	Address Switch
192.168.10.161	NN40/42	5	00-02-A2-0A-00-05	0
192.168.10.155	NL-MPI	13	00-02-A2-0C-00-0D	0
192.168.10.160	NN40/42	11	00-02-A2-0A-00-0B	0

Figure 58: CIF TCP/IP Driver - Filtered Devices

Devices listed in the table **Filtered Device(s)** were found during the network scan in the local Ethernet network, but they can not be assigned, because they belong to another device family.

5.1.4.1 Change IP Address

A new IP address is assigned to a device or respectively an existing IP address of a device is changed via the button **Change IP Address**.

Note: The IP address can only be changed in case of Hilscher devices which are connected directly to the Ethernet and which support the function 'Change IP Address'. These are for example: NL-MPI, NN40, NN42, CIF 104-EN, COM-C-EN, COM-EN.

Therefore the device has to be selected in the table Board Selection by activating the checkbox. Via the **Change IP Address** button the following dialog opens:

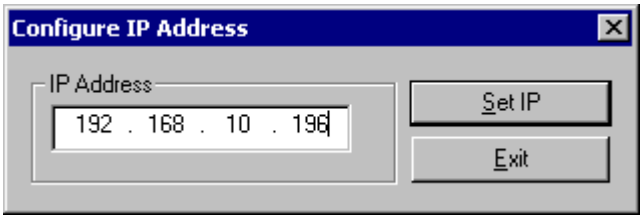


Figure 59: Set IP Address

Type in the IP address for the device and confirm the entry by clicking on the **Set IP** button.

Note: The IP address set by clicking the **Set IP button** is only temporarily adjusted. A permanent storage of the IP address takes place with a download of the configuration from the framework.

5.2 Bus Parameters

The Bus Parameters are the foundations of a functioning data exchange. This section contains information for setting the Bus Parameters as well as the descriptions of the individual parameters.

Basic Rule: The Bus Parameters must be set the same for all devices. The Station Address, on the other hand, must be different from device to device.

For PROFIBUS Master devices (PROFIBUS-DP, PROFIBUS-FMS, PROFIBUS-FDL):

- The Bus Parameters are set.

Most of the PROFIBUS-DP Slave devices

- recognize the Baud rate automatically and adapt themselves to it. This is especially the case when the ASIC SPC3 is used.
- however, there are also PROFIBUS-DP Slave devices, in which the Bus Parameters must be set by the user.

For PROFIBUS-FMS Slave devices

- the Bus parameters are set.
- only the Baud rate can be selected for some PROFIBUS-FMS Slave devices. The other Bus Parameters are already set and the Master device or devices must be adapted or set to them.
- a few PROFIBUS-FMS devices recognize the Baud rate automatically.

5.2.1 Setting the Bus Parameters and Profiles

The Baud rate can be set in the **Settings > Bus Parameters** menu. Furthermore, the optimizing or profile can be selected.

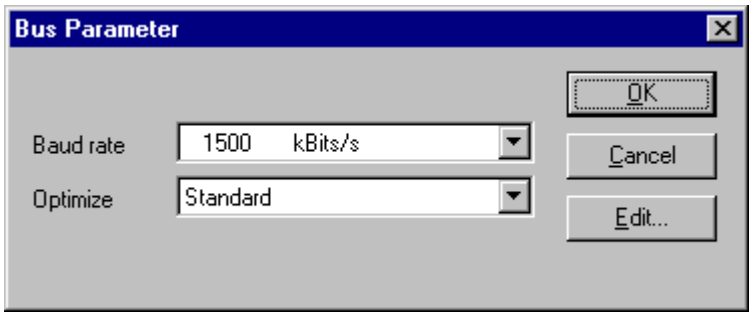


Figure 60: Settings > Bus Parameters

The Bus Parameters can be viewed with the **Settings > Bus Parameters** menu and can be edited by clicking on the **Edit** button. The Bus Parameters are either editable or not editable depending on the optimizing or profile.

The optimizing standard provides each Baud rate with default Bus Parameters for PROFIBUS-DP systems.

For PROFIBUS-FMS, the profiles FMS profile Siemens S5 and FMS profile Siemens S7 can be selected.

By changing the settings in the **Optimizing** field from **Standard** to **User defined**, all Bus Parameters become editable.

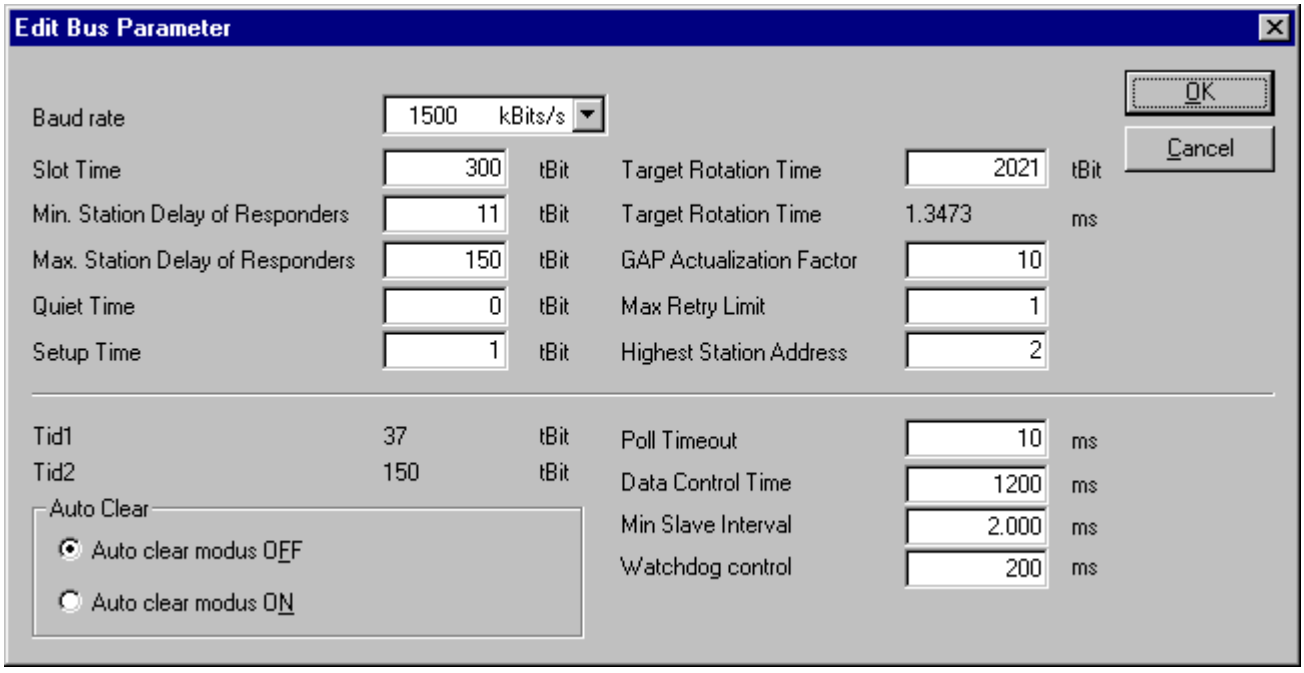


Figure 61: Editing Bus Parameters

Caution: The changing of Bus Parameters can cause communication interruptions.

Note: The offline Bus Parameters are displayed. The Bus Parameters are only accepted by the Hilscher device after the download of the configuration.

The **Baud rate** must be set to be the same for all devices on the bus. The result of changing the Baud rate is that all other parameters must be re-calculated. The System Configurator tests whether the Baud rate is supported by all configured PROFIBUS-DP Slave devices, on the basis of entries in the GSD files. If the System Configurator recognizes at least one device that does not support the selected Baud rate, then an error message will appear.

The **highest station address** is the highest bus address up to which a Master searches for another Master at the bus in order to pass on the Token. This station address must on no account be smaller than the Master station address.

For PROFIBUS-DP, the field **Access monitoring time** is used for the entry of the monitoring time of the Slave. If the time chosen for this is too short for a low Baud rate, then it is possible that the Slaves will set their outlets to zero. If the time chosen is too long, it is possible that if an interruption occurs, the Slaves will take a long time to set their outlets to zero.

For PROFIBUS-DP, the **Auto Clear** setting is provided for global error handling. The DP Master monitors the user data exchange (DataExchange) to all DP Slaves by means of a timer. If no data exchange occurs to at least one DP Slave, or an existing data exchange takes place after the expiration of a monitoring time, and the **Auto clear mode** option is **ON**, then the Master leaves the DataExchange and sets the outlets of **all** assigned DP Slaves into a secure condition.

Two profiles are available for PROFIBUS-FMS:

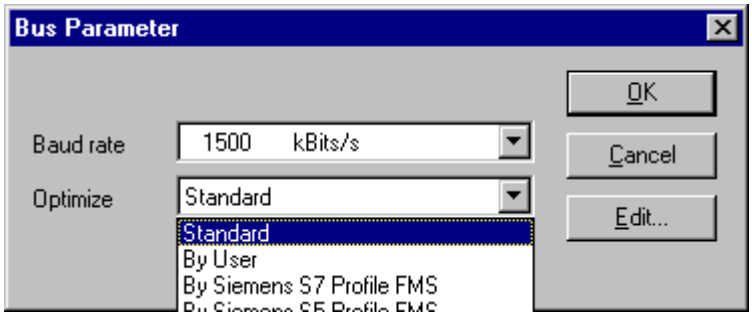


Figure 62: Bus Parameters PROFIBUS-FMS profiles

- FMS Profile Siemens S7
- FMS Profile Siemens S5

Choose the Profile S5, when a Siemens SPS S5 is used at the PROFIBUS-FMS network and a Profile S7, when it is a Siemens SPS S7.

For other PROFIBUS-FMS devices, the selection must be **User Defined** and the bus parameters of all devices must be suited to each other.

5.2.1.1 Bus Parameters for PROFIBUS-MPI

To set the bus parameters for PROFIBUS-MPI, first the **Profile** 'By User' has to be selected.

For a MPI communication the bus parameters typically have to be set to the following values:

Bus Parameters	Value
Slot time	415
Min. Station Delay of Responders	60
Max. Station Delay of Responders	400
Quiet Time	1
Setup Time	1
GAP Actualization Factor	20
Highest Station Address	31

Table 36: Bus Parameters for PROFIBUS-MPI

5.2.2 Descriptions of the Individual Parameters

All times for the Bus parameters are given in Bit times.

The Bit time t_{Bit} is the result of the reciprocal of the Baud rate:

t_{Bit} = 1 / Baud rate (Baud rate in Bit/s)

Formula 1: Bit time t_{Bit}

The conversion from milliseconds into a Bit time is shown in the following formula:

Bit time = Time [milliseconds] * Baud rate,

Formula 2: Conversion into Bit time t_{Bit}

The Bus parameters and their meanings:

- Baud rate

  Transfer speed: number of Bits per second.

Baudrate	Bit time (t_{Bit})	Max cable length (type A)
9,6 kBaud	104,2 us	1200 m
19,2 kBaud	52,1 us	1200 m
93,75 kBaud	10,7 us	1200 m
187,5 kBaud	5,3 us	1000 m
500 kBaud	2 us	400 m
1,5 MBaud	666,7 ns	200 m
3 MBaud	333,3 ns	100 m
6 MBaud	166,7 ns	100 m
12 MBaud	83,3 ns	100 m

Table 37: Baud rates, Bit times and cable lengths

Note: The maximum cable length is dependent on the Baud rate.

- Minimum Station Delay of Responders (min T_{SDR})

  This is the shortest time period that must elapse before a remote recipient (Responder) may send an acknowledgement of a received query telegram. The shortest time period between receipt of the last Bit of a telegram to the sending of the first Bit of a following telegram.

  Value range: 1 .. 65535

- Maximum Station Delay of Responders (max T_{SDR})

  This is the longest time period that must elapse before a Sender (Requestor) may send a further query telegram. Greatest time period between receipt of the last Bit of a telegram to the sending of the first Bit of a following telegram.

The Sender (Requestor, Master) must wait at least for this time period after the sending of an unacknowledged telegram (e.g. Broadcast only) before a new telegram is sent.

Value range: 1 .. 65535

- Slot Time (T_{SL})

  'Wait for receipt' – monitoring time of the Senders (Requestor) of telegram for the acknowledgement of the recipient (Responder). After expiration, a retry occurs in accordance with the value of 'Max. telegram retries'.

  Value range: 52 .. 65535

- Quiet Time (T_{QUI})

  This is the time delay that occurs for modulators (Modulator-trip time) and Repeaters (Repeater-switch time) for the change over from sending to receiving.

  Value range: 0 .. 255

- Setup Time (T_{SET})

  Minimum period “reaction time” between the receipt of an acknowledgement to the sending of a new query telegram (Reaction) by the Sender (Requestor).

  Value range: 1 .. 255

- Target Rotation Time (T_{TR})

  Pre-set nominal Token cycling time within the Sender authorization (Token) will cycle around the ring. How much time the Master still has available for sending data telegrams to the Slaves is dependent on the difference between the nominal and the actual token cycling time.

  Value range: 1 .. 16.777.215

- GAP Update Factor (G)

  Factor for determining after how many Token cycles an added participant is accepted into the Token ring. After expiry of the time period $G*T_{TR}$, the Station searches to see whether a further participant wishes to be accepted into the logical ring.

  Value range: 1 .. 100

- Max number of telegram retries (Max_Retry_Limit)

  Maximum number of repeats in order to reach a Station.

  Value range: 1 .. 8

- Highest Station Address (HSA)

  Station address of the highest active (Master) Station.

  Value range: 2 .. 126

Further, there are:

- Ready time (T_{RDY})

  This is the time period, after the Master has sent out a query, during which it must be ready for the respective acknowledgement or answer.

- Synchronization time (T_{SYN})

  This is the minimum time that must be available to each device as a rest condition before it is allowed to accept the start of a query. It is defined at 33 Bit times.

The following parameters are applicable only for PROFIBUS-DP:

- Data Control Time (Data_Control_Time)

  This parameter defines the time within the Data_Transfer_List is updated at least once. After the expiration of this period, the Master (class 1) reports its operating condition automatically via the Global_Control command.

  Value range: 1 .. 65535 (time basis 10ms)

- Min Slave Interval (Min_Slave_Interval)

  This parameter defines the minimum time period between two Slave list cycles. The maximum value that the active Stations require is always given.

  Value range: 1 .. 65535 (time basis 100us)

- Access Monitoring (T_{WD})

  Access monitoring T_{WD} at the Slave ensures that when an interruption of the DP Master occurs, the outlets are placed in a secure condition after this time period.

- Poll Timeout (Poll_Timeout)

  This parameter defines the maximum time period in a Master-Master relationship within which the answer must be fetched by the Requestor.

  Value range: 1 .. 65535 (time basis 1ms)

- T_{ID1} and T_{ID2}

  This is the time that the Sender spends at idle after the receipt of the last Bit of a telegram on the Bus, until the first Bit of a new telegram is sent on the Bus.

  Depending on the type of the telegram:

  T_{ID1} starts after the Initiator has received an acknowledgement, answer or a Token telegram.

$$T_{ID1} = \max (T_{QUI} + 2 * T_{SET} + 2 + T_{SYN}, \min T_{SDR}). \quad (*)$$

Formula 3: T_{ID1}

  T_{ID2} starts after the Initiator has sent a telegram that is not acknowledged.

$$T_{ID2} = \max (T_{QUI} + 2 * T_{SET} + 2 + T_{SYN}, \max T_{SDR}). \quad (*)$$

Formula 4: T_{ID2}

  These times cannot be set directly, they result from the given calculations.

  (*) Depending on the ASIC and Baud rate utilized, the T_{ID1} and T_{ID2} can take on somewhat different values due to the ASIC software.

5.2.3 Rules

For min T_{SDR}, max T_{SDR} and T_{SL} the following rule applies:

$0 < \text{min } T_{SDR} < \text{max } T_{SDR} < T_{SL}$

Formula 5: Min T_{SDR}, Max T_{SDR} and T_{SL}

For T_{QUI}, T_{RDY} and min T_{SDR} the following rule applies:

$T_{QUI} < T_{RDY} < \text{min } T_{SDR}$.

Formula 6: T_{QUI}, T_{RDY} and min T_{SDR}

For access monitoring (T_{WD}) and Target Rotation Time (T_{TR}):

$T_{WD} > T_{TR}$

Formula 7: T_{WD} and T_{TR}

For the Data_Control_Time the following rule applies:

$\text{Data\_Control\_Time} > 6 * T_{WD}$

Formula 8: Data_Control_Time

For PROFIBUS-FMS and PROFIBUS-FDL devices valid the Bus Parameters must be equalized.

If the devices used have different values for min T_{SDR} then the greatest of these values is used for all devices.

$\text{Min } T_{SDR} = \text{max (min } T_{SDR \text{ device } 1}, \text{ min } T_{SDR \text{ device } 2}, \ldots, \text{ min } T_{SDR \text{ device } N})$

Formula 9: Min T_{SDR}

Example: If for device 1 the value for min T_{SDR} 200, for device 2 the values 75 and for device 3 the value 125, then the value of 200 must be used for all devices.

The same applies also for the Bus parameters max T_{SDR}, T_{SL}, T_{QUI}, T_{SET} and T_{TR}.

5.3 DP Master

5.3.1 Master Settings

To enter the DP Master settings, choose the **Settings > Master Settings** or click with the right mouse button on the corresponding Master symbol and select **Master Settings** from the list that opens. The **DP Master Settings** is also available in the **Master Configuration** window.

The DP Master settings contain parameters that determine the behaviour of the Master device as well as the user interface. These settings are only valid for Hilscher devices and are included in the download of the configuration.

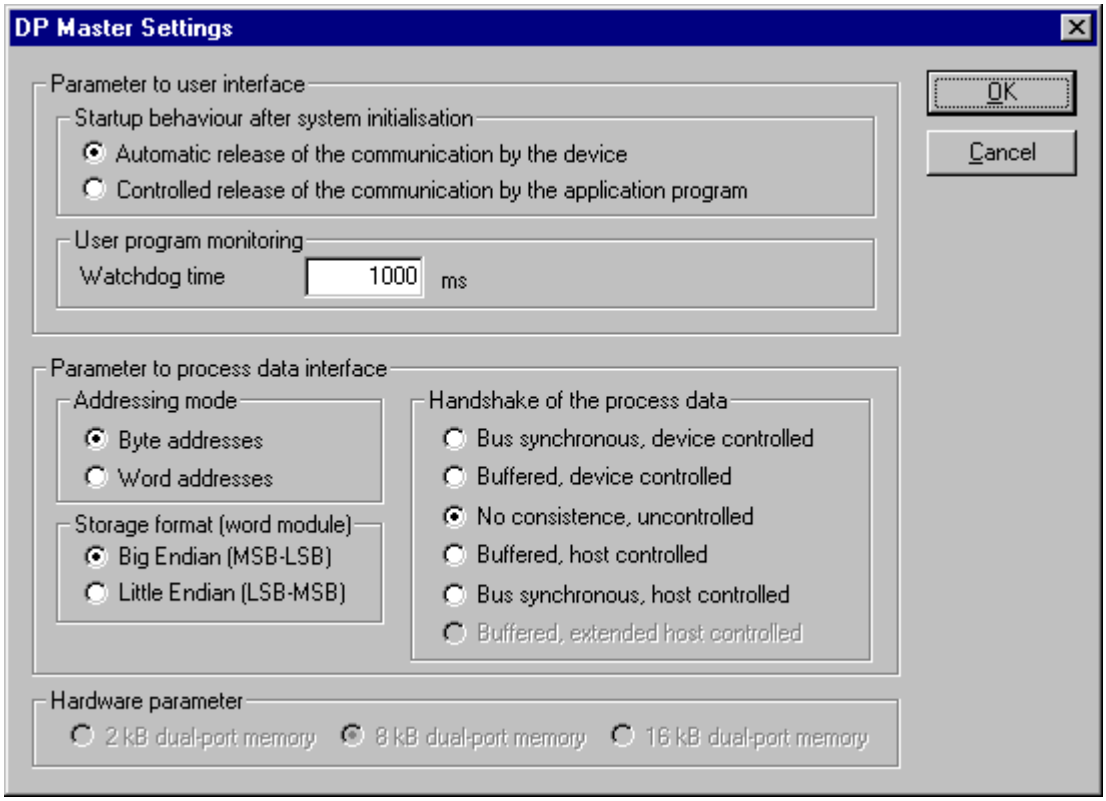


Figure 63: DP Master Settings

- **Startup behaviour after system initialization**

  When **Automatic release of the communication by the device** has been set, the Master device starts with the data exchange at the Bus after the initializing has been ended. When **Controlled release of communication by the application program** has been set, the application program must activate the data exchange at the Bus.

- **User program monitoring**

  The **Watchdog time** determines how long the device waits for a triggering of the software Watchdog by the application program until it sets the outputs of the Slave devices to zero. This behaviour must be activated by the user program and does not start automatically.

Note: This is not a special PROFIBUS function.

An example of the use of this function can be a SoftSPS.

- **Addressing mode**

  The addressing mode of the process data image determines how the addresses (Offsets) of the process data are interpreted. Either of the addressing modes **Byte addresses** or **Word addresses** are possible. See also details on the next page.

- **Storage format (word module)**

  The storage format determines how the data words are laid down in the process image. For the Word data type it is possible to choose **higher/lower value Byte** or **lower/higher value Byte**.

- **Handshake of the process data**

  These various types are used for setting the handshake of the process data between the application and the Hilscher device. The choice of used type is important for the correct data exchange between the application program and the device.

  The used handshake of the process data needs to be supported by the application program. Mostly the buffered, host controlled handshake is supported. The setting no consistence, uncontrolled works without handshake and the processes run free.

  A detailed description is provided in the manual for the Toolkit or the manual for the device driver.

- **Hardware parameter**

  This parameter displays the size of the dual-port memory. The value enlarges or reduces the permissible address area for the process data addresses.

  For PB cards the general size of the dual-port memory is 8K, whereby 7K are process data.

  For DPM cards general size of the dual-port memory is 2K, whereby 1K are process data.

5.3.2 Addressing Mode

The addresses in the configuration of the Nodes define the starting point of the data in the process depiction. This can work in a Word or Byte oriented method by means of the **Addressing mode** parameter.

Addresses	Meaning
Byte addresses	The process image has a Byte structure and each Byte has its own address.
Word addresses	The process image has a Word structure and each Word has its own address.

Table 38: Addressing Mode

This has nothing to do with the physical size of the Dual-port memory – this is always Byte-oriented! When the application makes a Word access, it is automatically divided by the PC into two sequential Byte accesses.

The following table shows the different storing of the various data types in the Byte- or Word-oriented process image:

IEC addresses in Byte mode	IEC addresses in word mode	Offset addresses in the dual-port memory	Data in the process image	Output to an I/O Module
QB 0	QB 0	0	0000 0000	
QB 1		1	0000 0000	
QB 2	QB 1	2	1110 0010	Output of QB2 / QB1 to a single Byte module: D7 D6 D5 D4 D3 D2 D1 D0 1 1 1 0 0 0 1 0
QB 3		3	0000 0000	
QB 4 QB 5	QB 2	4 5	1111 1000 0000 0111	Output of two Bytes beginning from QB4 / QB2 to a module that is defined as a Byte module with the data count 2 (no differentiation between the two memory formats as the data are of Byte type): D7 D6 D5 D4 D3 D2 D1 D0 D7 D6 D5 D4 D3 D2 D1 D0 1 1 1 1 1 0 0 0 0 0 0 0 0 1 1 1
QB 6 QB 7	QW 3	6 7	1111 1111 0100 0100	Output of QW6 / QW3 in the data format lower/higher value Byte: D15 D14 D13 D12 D11 D10 D9 D8 D7 D6 D5 D4 D3 D2 D1 D0 0 1 0 0 0 1 0 0 1 1 1 1 1 1 1 1 Output of QW6 / QW3 in the data format higher/lower value Byte: D15 D14 D13 D12 D11 D10 D9 D8 D7 D6 D5 D4 D3 D2 D1 D0 1 1 1 1 1 1 1 1 0 1 0 0 0 1 0 0

Table 39: Example for data in the process data image

The following table is meant to clarify the method of addressing:

Byte addressing		
Byte 0	IB 0	IW 0
Byte 1	IB 1	
Byte 2	IB 2	IW 2
Byte 3	IB 3	
Byte 4	IB 4	IW 4
Byte 5	IB 5	

Word addressing		
Word 0	IB 0	IW 0
	-	
Word 1	IB 1	IW 1
	-	
Word 2	IB 2	IW 2
	-	

Figure 64: Image of the method of addressing for input

Byte addressing		
Byte 0	QB 0	QW 0
Byte 1	QB 1	
Byte 2	QB 2	QW 2
Byte 3	QB 3	
Byte 4	QB 4	QW 4
Byte 5	QB 5	

Word addressing		
Word 0	QB 0	QW 0
	-	
Word 1	QB 1	QW 1
	-	
Word 2	QB 2	QW 2
	-	

Figure 65: Image of the method of addressing for output

5.3.3 Master Configuration

The Master configuration is described further above in section *Master Configuration* on page *45*.

5.3.4 Group Membership

After the Master has been assigned, the Slaves can be assigned to up to eight different groups. These groups can then be assigned here. Mark the Master and choose the **Settings > Group membership** menu. Choose the group that is to support the DP-Freeze and DP-Sync commands.

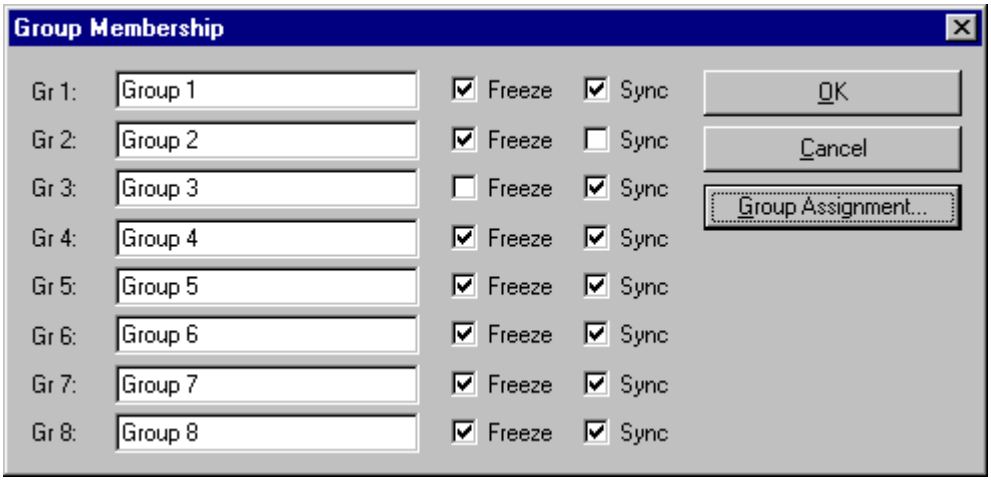


Figure 66: Settings > Group Membership (1)

In the **Group Membership** the Slaves can be assigned to the groups with the desired characteristics. The table shows all configured Slave devices from the main editor window. Here it can be selected to which eight possible groups the Slave is assigned. The selected group membership is transferred to the Slaves during their start-up sequence. The group membership acts as a filter for the Sync and Freeze global commands. These are output as Broadcast telegrams in order to synchronize the input and output data of several Slaves. Only those Slaves in whose group these commands have been released react on it.

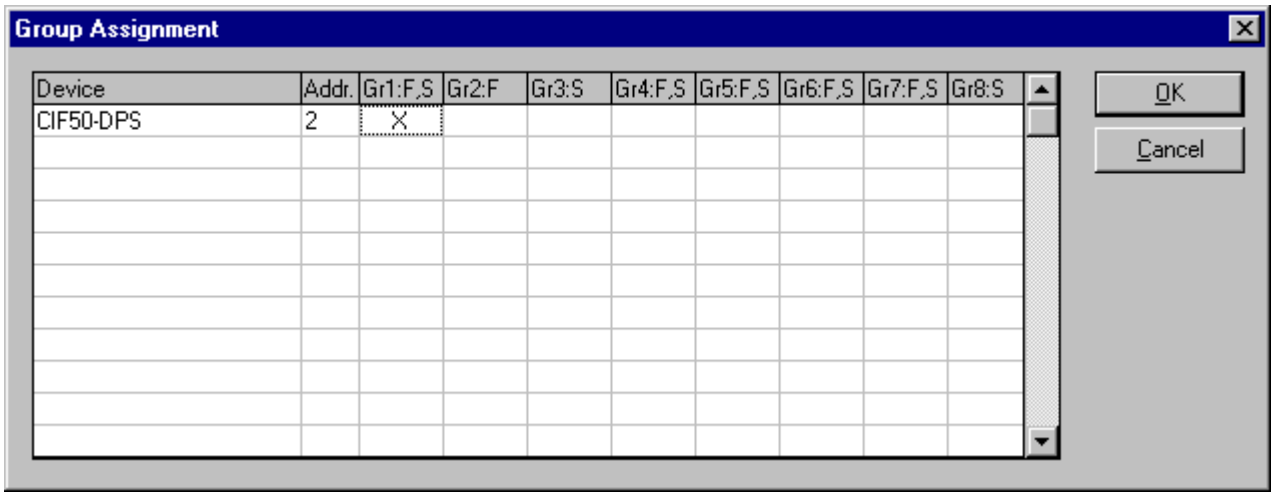


Figure 67: Settings > Group Membership (2)

5.4 DP Slave

5.4.1 Slave Settings

The DP Slave Settings contain parameters that define the behaviour of the device at its user interface, which does not belong to the DP configuration. This menu point is applicable only to Hilscher devices. These settings are transferred with the download of the DP configuration to the device.

In order to open the DP Slave settings menu, first choose the Slave by clicking on it and then open the window in the **Settings > DP Slave Settings** menu.

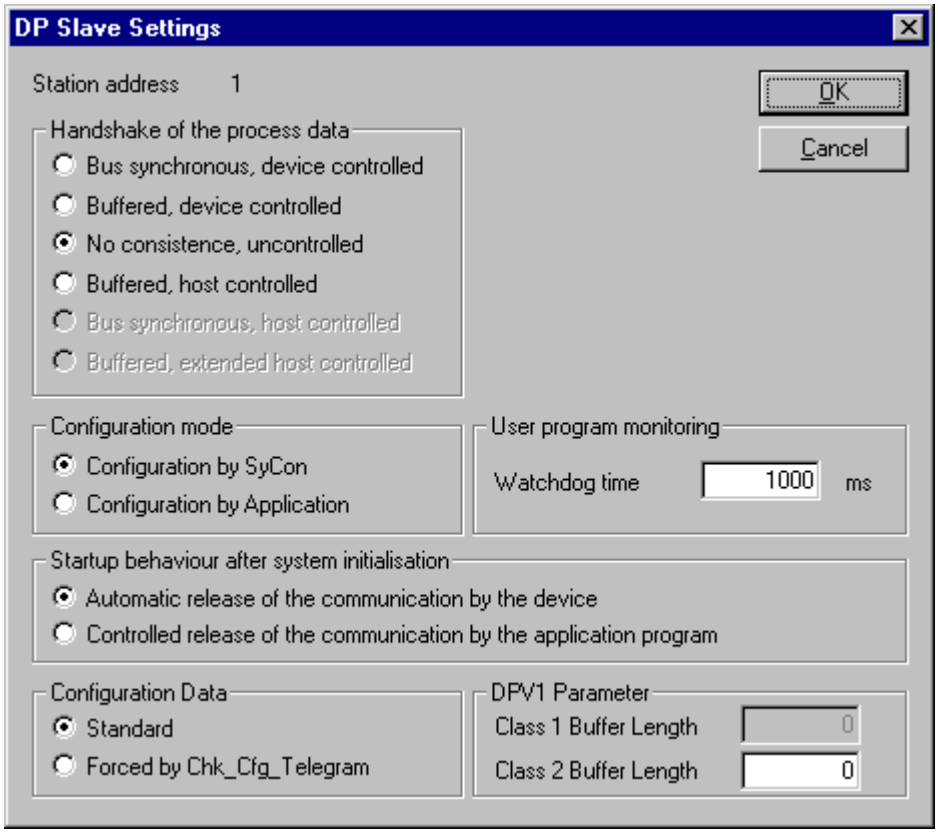


Figure 68: DP Slave Settings

- **Handshake of the process data**

  These various functions select the Handshake of the process data of the Slave. The selection of the function is important for the correct data exchange between the application and the device. Please make use of the Toolkit- or Device driver manual in order to obtain detailed descriptions of the various functions.

- **Configuration mode**

  If the Slave device is to use the parameters of the configuration that is downloaded from SyCon then the **Configuration by SYstem CONfigurator** mode must be selected for the **Configuration mode**. If the DP configuration is written online from an application into the Dual-port memory, then the **Configuration by Application** mode must be selected.

- **User program monitoring**

  The **Watchdog time** determines how long the device will wait for an application triggering until it resets all outputs to zero. This must be activated from the application.

- **Start-up behaviour after system initialization**

  When **Automatic release of the communication by the device** has been chosen, then the Slave is ready to communicate with the Master. When **Controlled release of the communication by the application program** has been chosen, then the user must release the communication by means of a defined release procedure.

- **Configuration data**

  For **Standard**, the configuration of the Slave is compared with that from CHK_CFG_TELEGRAM from the Master.

  For **Forced by CHK_CFG_TELEGRAM**, the configuration of the Slave is transferred from the Master to the Slave with the CHK_CFG_TELEGRAM.

- **DPV1 Parameter**

  Class 1 Buffer length: This setting defines the size of the buffer for DPV1 class 1 services in the DP Slave. The length determines the maximum data count that can be transferred in a DPV1 class 1 telegram. From the buffer size set here, 4 Bytes are reserved for the transfer of the DPV1 administration data and these are not available for transfer of user data.

  Valid values for the length of class 1 buffer are in the range of 4 .. 244. Alterations of the size of the buffer can only be set in the Slave configuration dialog, if the DPV1 services for the Slave have been activated.

  Class 2 Buffer length: The length of the DPV1 class 2 buffer that is to be established must be defined in this field. Analogue to the treatment of the class 1 buffer, here, 4 Bytes of the given buffer length are reserved for the transfer of the DPV1 administration data too. The maximum transferable user data count is reduced by these 4 Bytes. Values in the range 48 .. 244 can be defined for the DPV1 class 2 buffer length. If the value 0 is entered, then the DP Slave lays down no DPV1 class 2 buffer. In this case the DPV1 class 2 services of the Slave are not available.

Note: Please note that the settings of the class 1 and class 2 buffer lengths influence the usable data width in the cyclical I/O region. This limitation is caused by the restricted memory space in the PROFIBUS-ASIC (SPC3) of the device.

The purpose of the examples in the following table is to provide the possibility of estimating the usable buffer length and I/O data width.

Example	Cyclic I/O data	DPV1 class 1 buffer	DPV1 class 2 buffer
Maximum I/O data	368	60	0
Maximum DPV1 class 1 buffer	304	244	0
Maximum DPV1 class 2 buffer	296	0	244
Maximum DPV1 class 1 buffer and Maximum DPV1 class 2 buffer	200	244	244
128 Bytes for DPV1 class 1 buffer	344	128	0
128 Bytes for DPV1 class 2 buffer	328	0	128
128 Bytes for DPV1 class 1 buffer and 128 Bytes for DPV1 class 2 buffer	280	128	128

Table 40: Buffer length for DPV1

In the case that the given lengths for buffer and I/O data exceeds the memory space available, the DP Slave will report an error after the configuration download. This error message can be seen in the extended device diagnosis of the Slave in the 'SPC3' section under 'LastError'. If the error code 75 is entered there, more memory has been requested in the PROFIBUS-ASIC than is available. Therefore, the DPV1 buffer length or I/O data width should be reduced and the configuration download should then be carried out again.

5.4.2 DP Slave Configuration

The Slave Configuration is described further above in section *Slave Configuration* on page *50*.

5.4.3 Parameter Data

The Parameter Data can be edited in the **Settings > Parameter Data** menu.

If default parameters are configured in the GSD file of the Slave, then these are automatically inserted when the menu is called up for the first time.

Some of the DP Slave devices require further Parameter data, for instance in order to change a measuring limit or a value range. This type of data is Slave specific and their functionality cannot be described here.

The meaning of the parameters are determined by the device manufacturer. The explanations can be taken from the manufacturers' manual.

The window below gives an example of parameter data of a Slave.

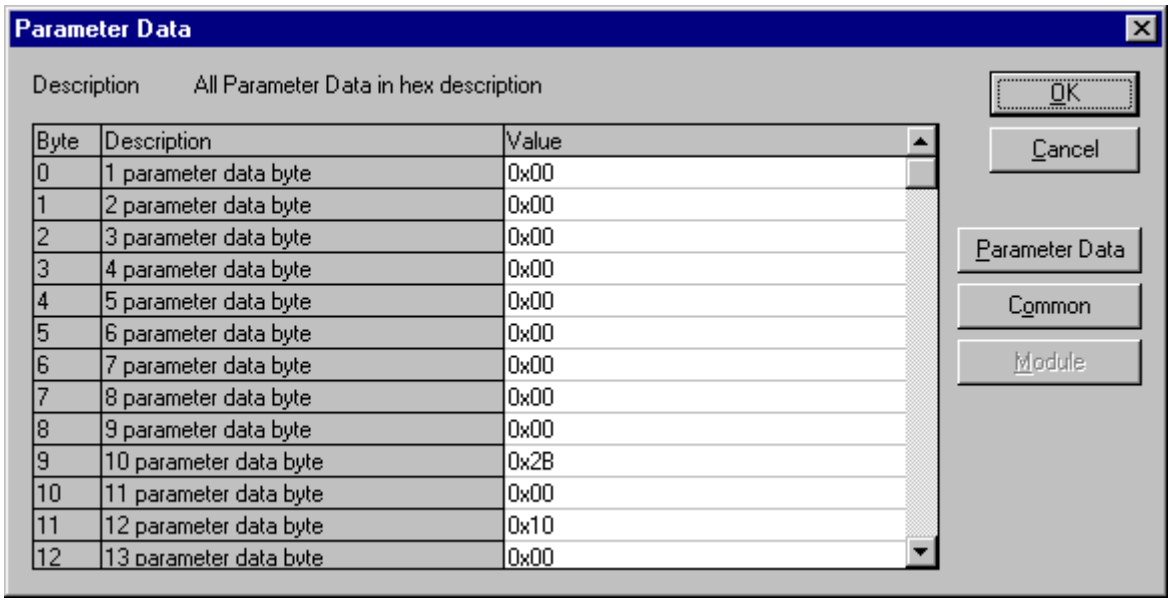


Figure 69: Parameter Data (Hexadecimal depiction)

A modular PROFIBUS-DP Slave station could require parameter data for one or more modules and for the Slave station itself (main station). There are three possibilities:

- Parameter data. These are all the parameters of a Slave station
- Common. Parameter Data of the main station
- Module. Parameter Data form on of the modules

After the choice of the text button, the following window with the text parameter data appears. These parameters are for the main station.

Example for parameter data:

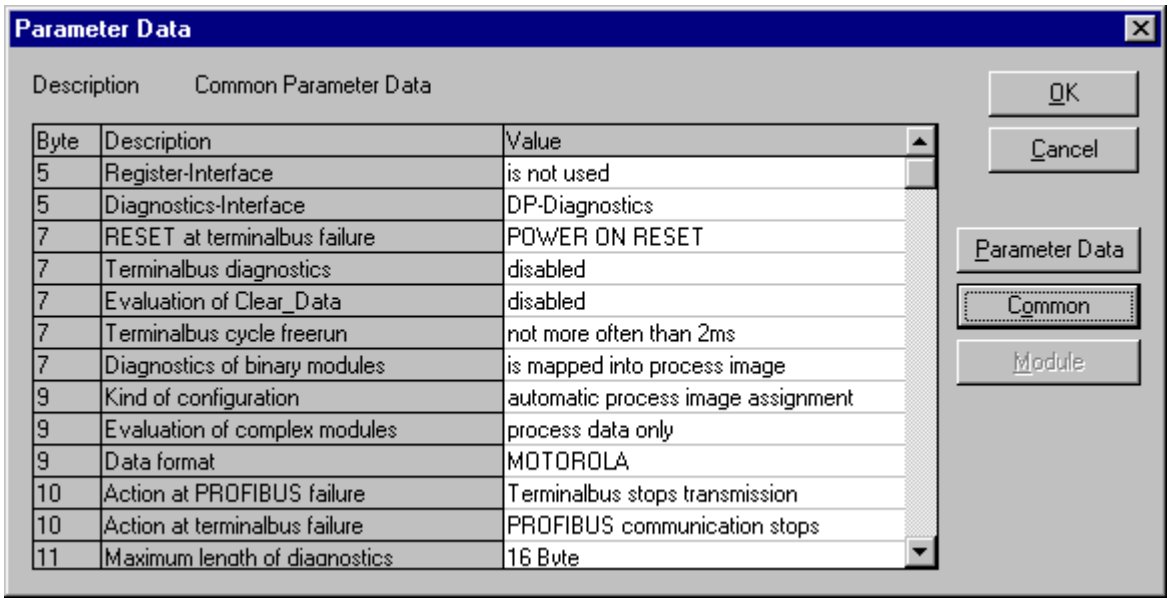


Figure 70: Parameter Data (Text depiction)

It is possible to return to the hex depiction by pressing the Hex button.

It is possible to edit the value by means of a double click on a row of parameter data.

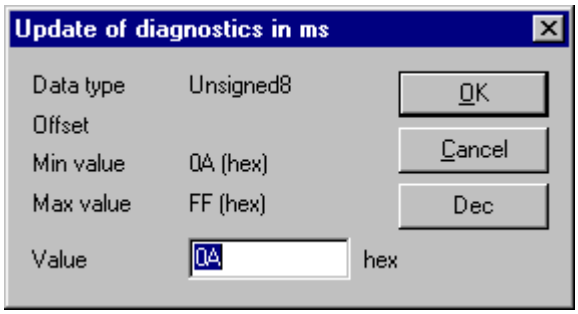


Figure 71: Parameter Data (individual depiction)

or to change the description via the text setting.

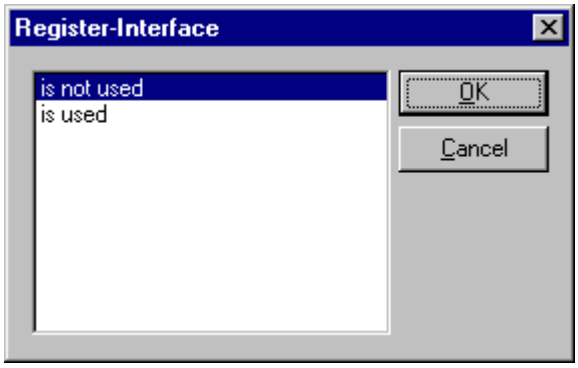


Figure 72: Parameter Data

When several modules in the Slave configuration have been selected, then it is also possible to change the module parameters by means of a double click on its associated line.

5.5 DPV1 Parameter

DPV1 serves for acyclic data exchange and offers read, write and alarm processing functions.

The following information refer to Hilscher devices.

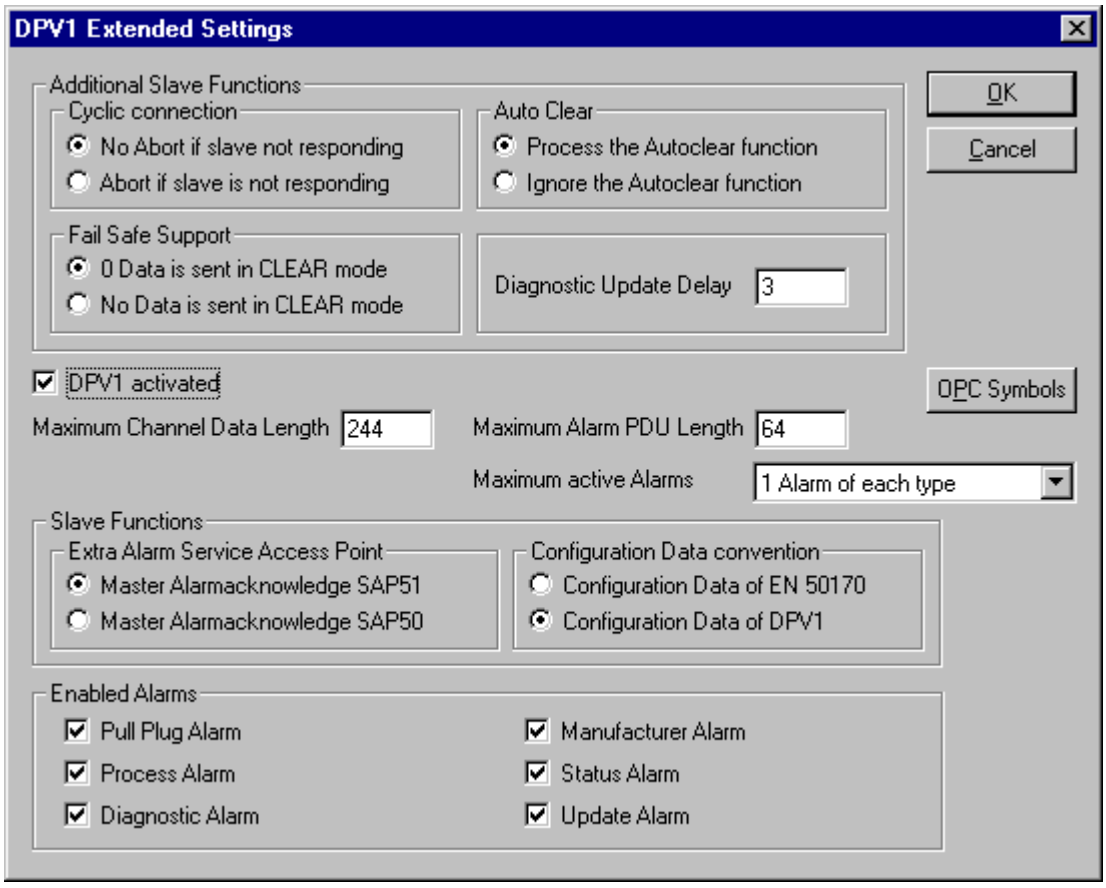


Figure 73: DPV1 Settings

Additional Slave Functions

- **Cyclic Connection**

  When **Abort if Slave is not responding** is chosen, the Master does not remain in the DATA_EXCHANGE condition for the affected Slave if the Slave has been recognized as incorrect, but breaks off the connection to the Slave. The Slave will in any case delete the outputs even when the connection in the direction of the Slave is still functionally correct but the return for the answer telegram to the Master is interrupted.

- **Fail Safe Support**

  This mode indicates to the Master that the affected Slave is working in a so-called Fail_Safe mode. If the mode is activated, the Master will send in the condition CLEAR instead of the zero output data, output data of length = 0. On the basis of this process, the Slave immediately recognizes that the Master is in the CLEAR condition even if a previous CLEAR command was destroyed on the Bus.

- **Ignore Auto Clear**

  The global Auto Clear function is carried out or ignored when the connection to the Slave is interrupted.

- **Diagnostic Update Delay**

  Some Slave devices which are newer require more time for the consistency testing for the processing of the SET_PRM parameterizing telegrams. Often, therefore, a simple diagnosis cycle is insufficient until the participant can inform the Master of the release for the DATA_EXCHANGE. With the diagnostic delay, the number of diagnosis cycles that is the maximum that the Master expects in order to obtain this release is increased before it reports an error.

DPV1 activated

- **Maximum Channel Data Length**

  Defines the maximum length of the DPV1 telegrams. The Slave will adapt its buffer size for the respective data count.

- **Maximum Alarm PDU Length**

  Determines the maximum length of the DPV1 Alarm telegrams.

- **Maximum Active Alarms**

  Determines the maximum quantity of active alarms: one alarm of each type or 2, 4, 8, 12, 16, 24 or 32 alarms in total.

Slave Functions

- **Extra Service Access Point for Alarm acknowledgement**

  Lays down, if the DPV1 Master receipts an alarm to the DPV1 Salve via SAP 51 or 50.

- **Configuration Data convention**

  Determines whether the configuration data are interpreted according to EN 50170 or DPV1.

Enabled Alarms

Activates or deactivates the alarms (Module pulled), Process Alarm, Diagnostic Alarm, Manufacturer Alarm, Status Alarm and Update Alarm.

5.5.1 OPC Symbols

The settings from this window are for the symbols for the OPC communication. More information about this can be found in the manual for the OPC server.

5.6 FMS

5.6.1 FMS Settings

To open the FMS Settings, select the **Settings > FMS Settings** menu or click with the right mouse button on a FMS Master device and select the menu point. A **FMS Master Settings** button is also available in the **Master Configuration** window.

The FMS Master Settings include parameters that define the behaviour of the device at its user interface that is not a part of the FMS configuration. This menu only applies to our devices and is downloaded with the FMS configuration.

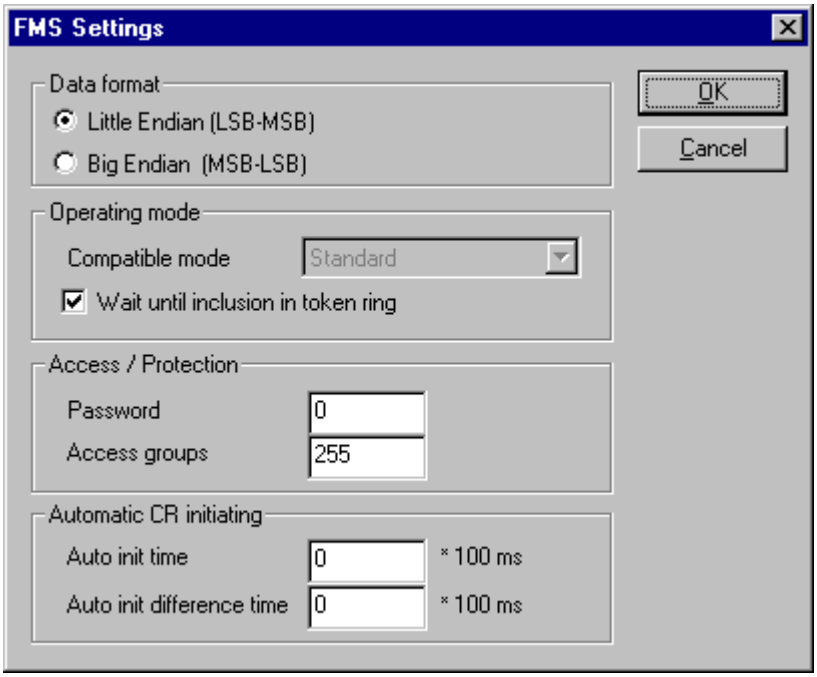


Figure 74: FMS Settings

- **Data Format**

  For defining the sequence of Words, Double Words at sliding decimal point numbers.

- **Operating mode**

  For activating/deactivating whether the card waits for the inclusion in the Token Ring or not.

- **Access / protection**

  The password and the access group are entered here. At present, no alterations can be carried out.

- **Automatic CR initialing**

  For activating/deactivating the automatic initialization of all communication references.

5.6.2 Communication Reference List (CRL)

A double click on the PROFIBUS-FMS device opens the Master configuration window in which the CRL can be selected. The same window will open if one first left-clicks on the Master and then selects the **Settings > Communication Reference List (CRL)** menu.

The communication reference list is described further above in section *Communication Reference List (CRL)* on page *57*.

5.6.3 Object Directory (OD)

A double click on the PROFIBUS-FMS device opens the Master configuration window in which, by selecting the **OD** button, the Object Directory can be selected. The same window will open if one first left-clicks on the Master and then selects the **Settings > Object Directory (OD)** menu.

The Object Directory is described further above in section *Object Directory (OD)* on page *66*.

5.7 Project Information

If the user creates his own project, the project information can be typed in into the **Settings > Project Information** menu. Anybody can then read this entry when this menu is called up.

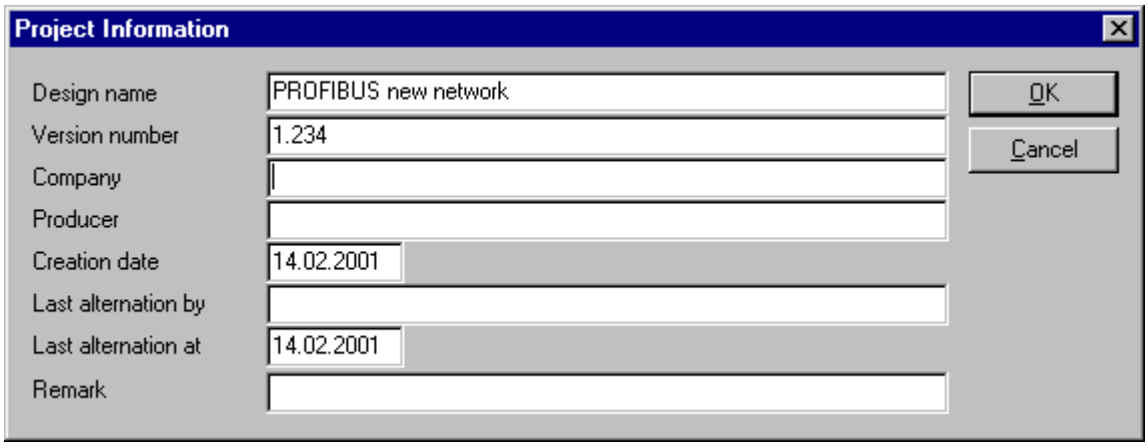


Figure 75: Settings > Project Information

5.8 Path

When the **Settings > Path** menu is selected, the search path for GSD files is displayed.

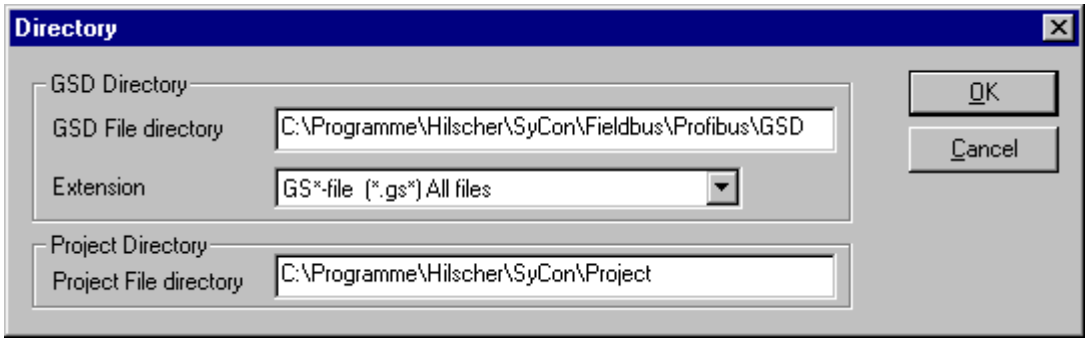


Figure 76: Settings > Path

If you click the **OK** button all GSD files are read in.

5.9 Language

Choose the **Settings > Language** menu and the following window opens:

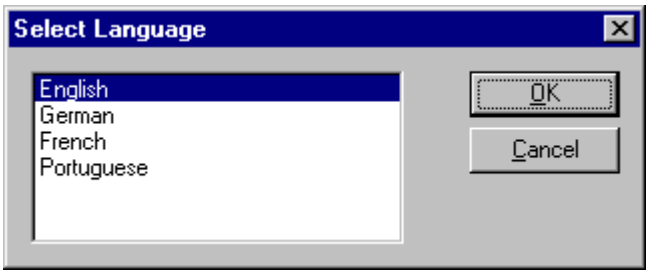


Figure 77: Settings > Language

Here can be set the language of the System Configurator. Select the desired language and confirm with the **OK** button.

A message appears that the System Configurator must be started again in order to activate the selected language. Please carry this out.

After restarting the System Configurator, the language will have changed to the one selected.

Note: Up to now not all languages are available for all fieldbuses!

5.10 Start Options

Starting from the window Network View (menu **Window > Network View**) the menu **Setting > Start...** opens the window **Start Options**. The different start options or modes can be set. Some of these settings are only for the OPC server.

Note: This menu option Start Options is only displayed in the selection Settings, if a project is loaded.

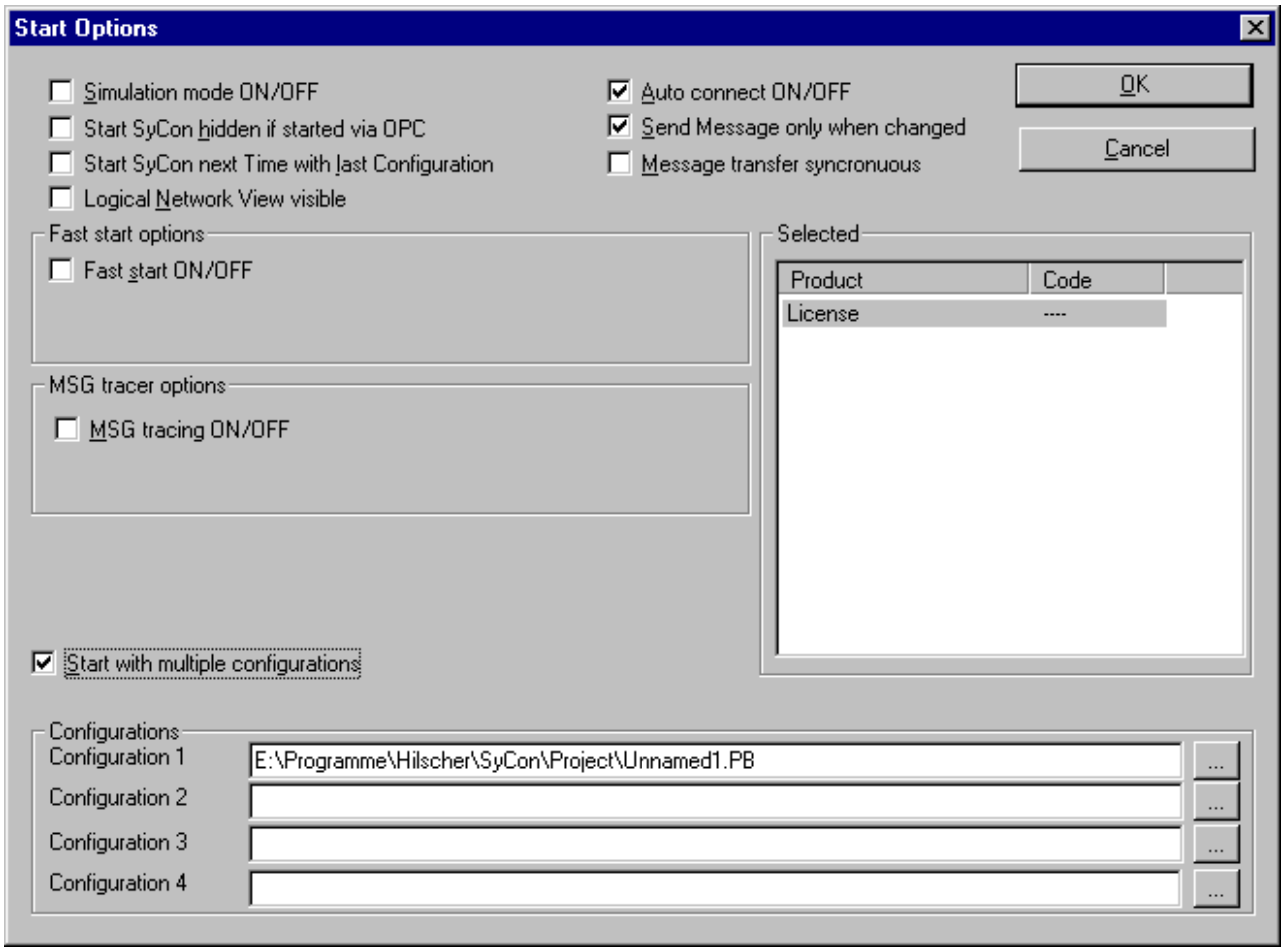


Figure 78: Settings > Start Options

- **Simulation mode ON/OFF**

  Only valid for the OPC Server.

- **Start SyCon hidden if started via OPC**

  Only valid for the OPC Server.

- **Start SyCon next time with last Configuration**

  When this is marked the last saved configuration in the SyCon is automatically loaded when the SyCon is started again.

- **Logic Network View visible**

  When this is marked, there is the possibility of diverting to the network mode without having to install the SyCon with OPC. It is also possible to use the Watch List from the network mode.

- **Fast start ON/OFF**

  Only valid for the OPC Server.

- **MSG tracing ON/OFF**

  Only valid for the OPC Server.

- **Auto connect ON/OFF**

  If this is marked, when opening a configuration automatically a connection to that Hilscher devices is manufactured without the device assignment additionally have to be executed.

- **Send Message only when changed**

  Only valid for the OPC Server.

- **Message transfer synchronous**

  Only valid for the OPC Server.

- **Start with multiple configurations**

  If this option is selected you have the possibility to start SyCon with up to four configurations simultaneously. The path is shown in the window and they are changeable there.

6 Online Functions

6.1 Introduction

In this section, all the functions that directly influence Hilscher PROFIBUS devices, e.g. CIF 30-PB, PKV 20-DPM, are presented.

Note: Please note that this also permits an interruption of the running communication or that input and output can be switched On or Off.

6.2 Online to the CIF

6.2.1 Downloading the Configuration

First, the desired device must be chosen for downloading by a left mouse click on the symbol of the device.

In order to release the configuration and network access, a transfer (Download) to the CIF/COM/PKV devices must be carried out on the **Online > Download** menu. A warning will appear that the communication on the PROFIBUS will be interrupted. This warning must be confirmed.

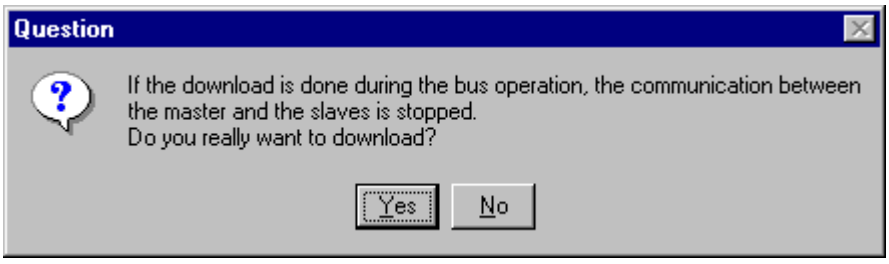


Figure 79: Security question before Download

Attention: The download overwrites the configuration in the device and the connection with the connected devices is interrupted.

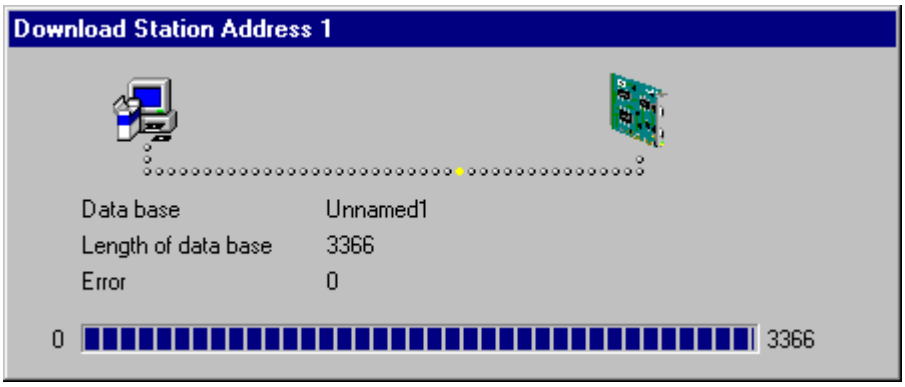


Figure 80: Online > Download

Before the Download is executed, the configuration is checked by the Configurator. The most common cause of error is overlapping of addresses in the process data image. This can be checked by calling up the address table with the **View > Address Table** menu point.

If the issue of addresses in the process data image should be carried out automatically, then the **Auto Addressing** button in the **Master Configuration** window must be activated.

The configuration is transferred into the selected device and stored there in FLASH memory in a zero voltage manner so that the configuration is available when the voltage supply is switched off and on again.

After the download, the device carries out an internal restart and begins with the communication if in **DP Master Settings** the **Automatic Release of Communication by the Device** menu point has been set.

6.2.2 Firmware Download

If a Firmware download is to be carried out, proceed as follows: first choose the desired device for Firmware downloading. Then, call up the **Online > Firmware Download** menu. Select the new Firmware and retrieve it with **Download** into the device. The Firmware is now retrieved.

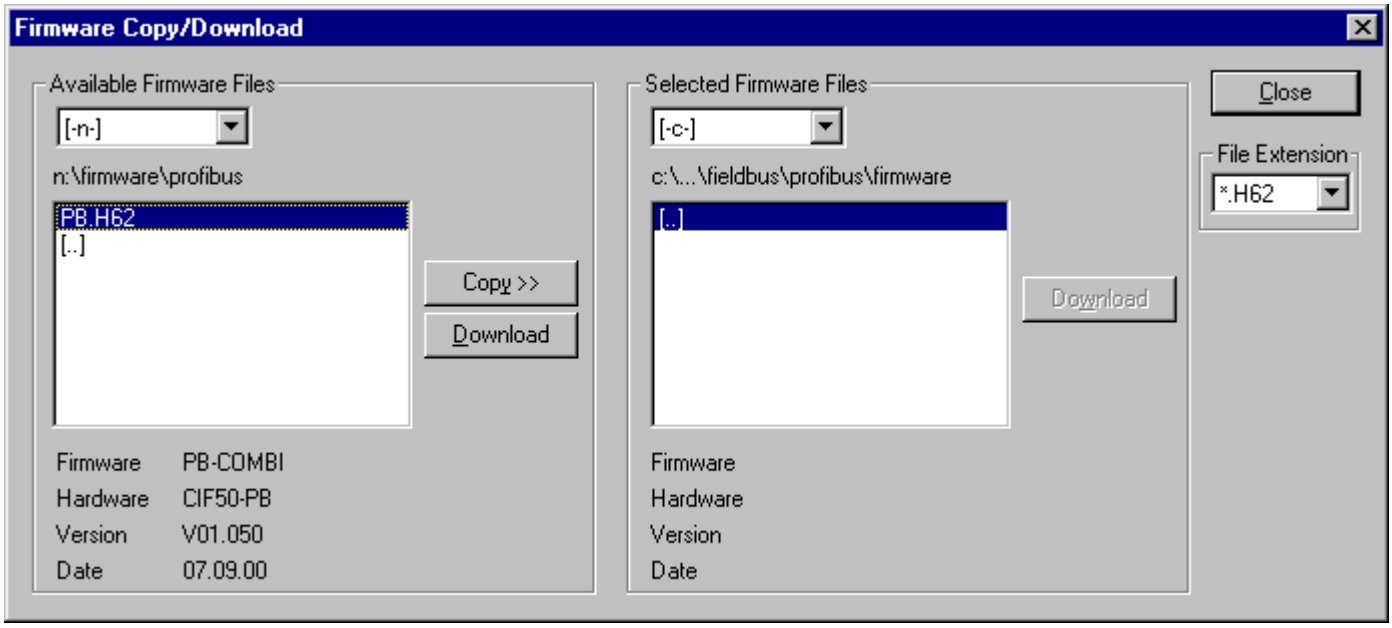


Figure 81: Online > Firmware Download

6.2.3 Firmware / Reset

First the desired device must be chosen with a left mouse click on the symbol of the device. Then the **Online > Firmware / Reset** menu must be called up and the name and the version of the Firmware are displayed.

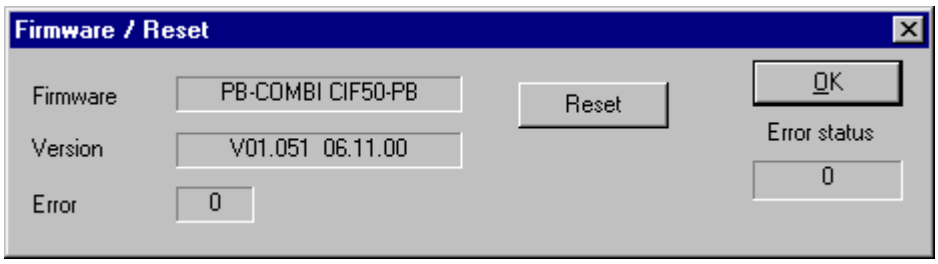


Figure 82: Online > Firmware / Reset

The device can be reset with the **Reset** button.

6.2.4 Device Info

First the desired device must be chosen with a left mouse click on the symbol of the device. Then select the **Online > Device Info** menu in order to obtain further information on the selected device.

The manufacturer date, the device number and the serial number of the device is retrieved and shown.

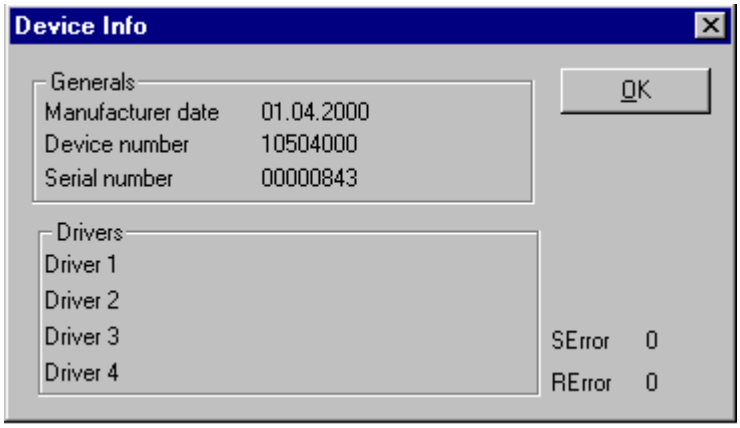


Figure 83: Online > Device Info

6.2.5 Activate Driver – Driver Licensing

The driver has to be licensed, if the software PLC or SyCon OEM is used. If the driver was ordered by buying the SyCon, you don't need to license it because this was done before.

First the desired device must be chosen with a left mouse click on the symbol of the device. Then select the **Online > Activate Driver** menu.

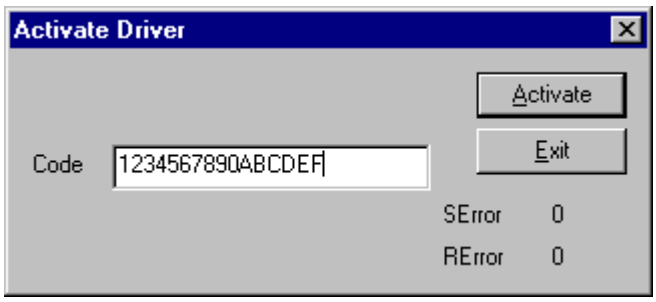


Figure 84: Online > Activate Driver

Note: The code 01234567890ABCDEF is not a valid code and is only shown as an example.

6.3 Automatic Network Scan

This function scans the network structure. During the scan it will be detected which devices are connected to this PROFIBUS network and how these devices are configured. Therefore the following steps are necessary:

- Create a new project: Select the menu **File > New** and PROFIBUS.
- Select the Master: Select the Master from the menu **Insert > Master**.
- Set the Baudrate: Select the menu **Settings > Bus parameter** and set the Baudrate.
- Load these settings to the Master: Select the menu **Online > Download** to download these settings into the Master device.
- Save: Select **File > Save** to save the settings.
- Scan the network: Select the menu **Online > Automatic Network Scan**.

Note: This function detects the connected devices on the PROFIBUS network and can read out how these devices are configured. This function can not read out the parameters, because this is not possible from the PROFIBUS principle. Parameter data have always to be set by the user to the Master device and the Master devices transfer the parameter data to the Slave device.

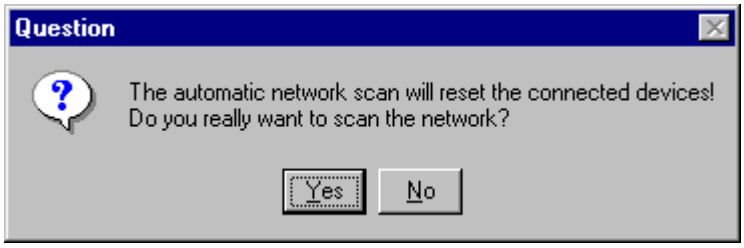


Figure 85: Online > Automatic Network Scan (security question)

Answer this question with **Yes**, if the connected PROFIBUS network should be scanned. Answer this question with **No**, if these functions should not be performed.

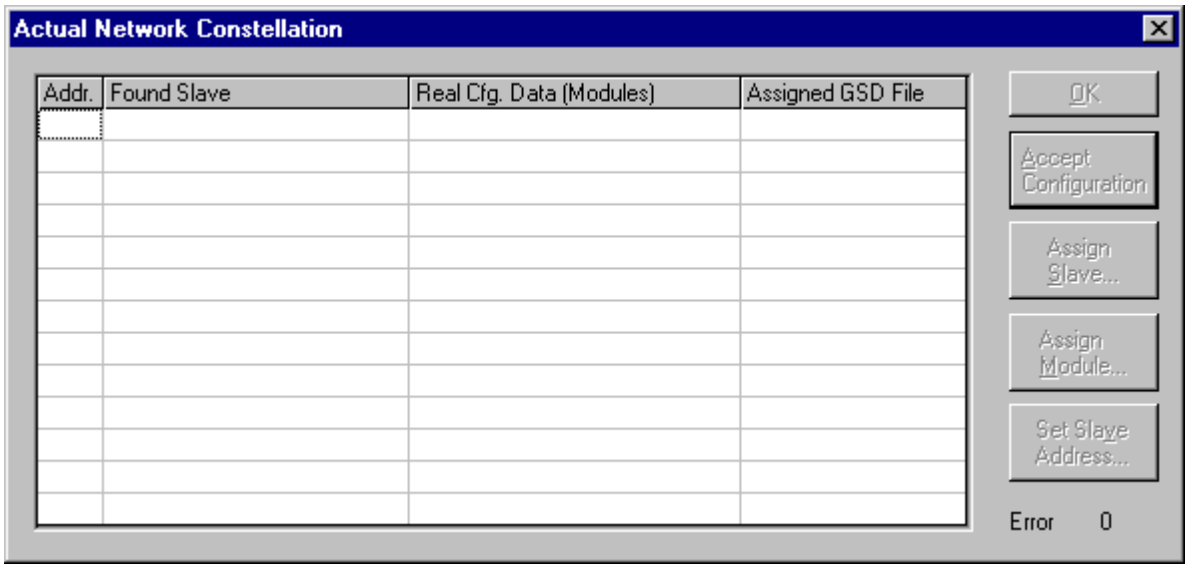


Figure 86: Online > Automatic Network Scan (During the Scan)

All buttons are grey during the network scan.

The System Configurator detects in the first step which devices are connected to the PROFIBUS network. The System Configurator then reads the Identcode from each Slave. The configuration data (identifier bytes) is read out from each Slave and these configuration data is searched in the corresponding GSD file (if GSD file is available) and the module is displayed in the column **Real Cfg. Dat (Modules)**.

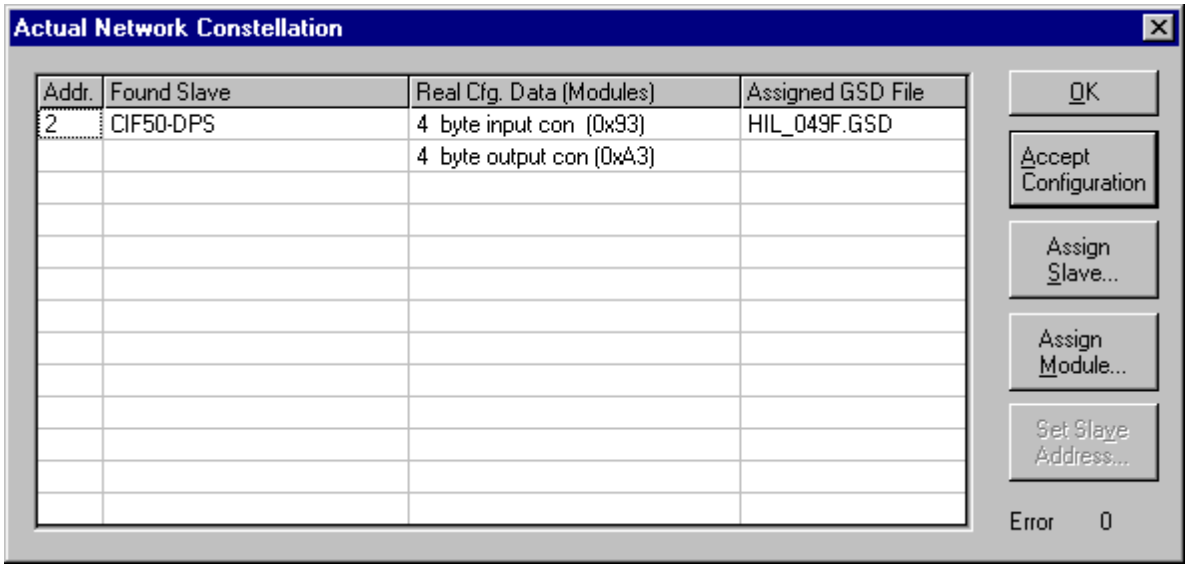


Figure 87: Online > Automatic Network Scan (After the Scan)

Note: Some Slave devices only allows reading out the default configuration.

In the window **Actual Network Constellation** the texts in the columns **Found Slave** and **Real Configuration Data** can be displayed in the following colors.

	Colour	Found Slave	Real Configuration Data
0	orange	For this device no suitable GSD file was found	No suitable module was found in the GSD file
1	black	For this device exactly one suitable GSD file was found	Exactly one module was found in the GSD file
≥2	blue	For this device more than one suitable GSD file was found	More than one module was found in the GSD file

Table 41: Network scan - Description of the displayed window

If a device is colored **red** in the **Actual Network Constellation** an error has occurred. For example a Slave with the Station Address 126 was detected. In this case the Ident number can not be read out. Further information you find in section *Slave with Station Address 126* on page *122*.

When you exit the window **Actual Network Constellation** the System Configurator asks if this constellation should be taken into the configuration or not.

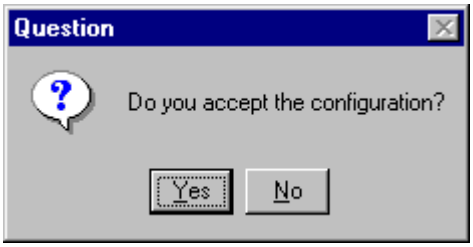


Figure 88: Online > Automatic Network Scan > Accept Configuration

Example:

This example shows a scanned Network Constellation with more than one suitable module for the GSD file. The modules (**Real Cfg. Data**) are colored blue, which means, that you can assign or change an assignment of the modules by clicking the **Assign Module** button.

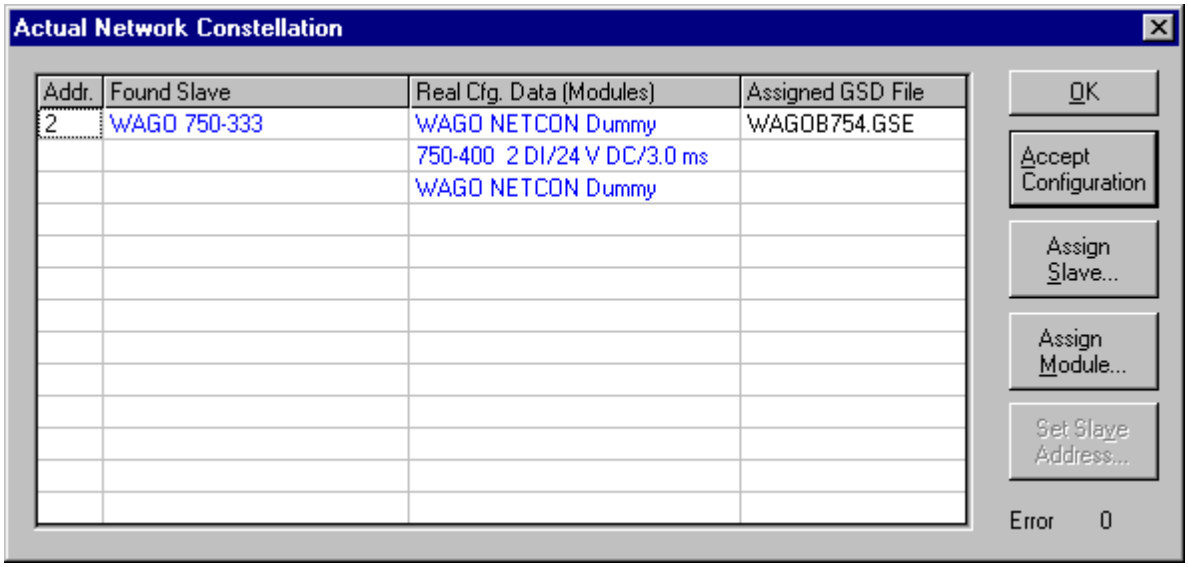


Figure 89: Online > Automatic Network Scan - Example for Assignment

6.3.1 Assign Slave

The Ident Number is read out from the Slave device during the network scan. If more than one GSD file is available with this Ident Number in the window **Assign Slave**, a list is displayed and the user can select the correct Slave device from this list.

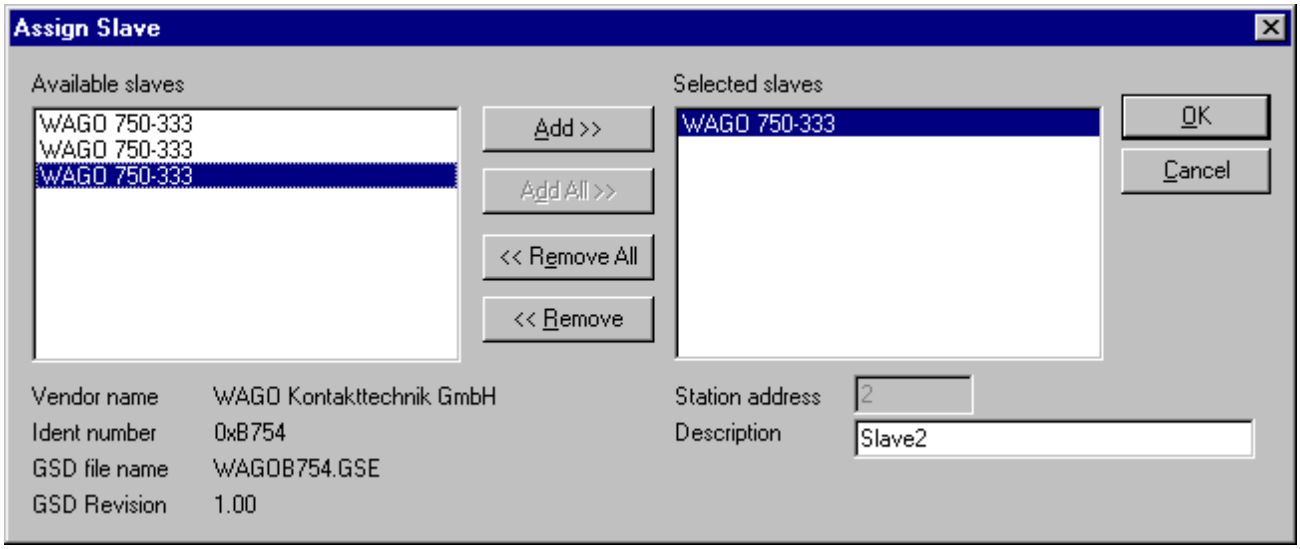


Figure 90: Online > Automatic Network Scan > Assign Slave

In the list **Selected Slaves** the device which was found during the Automatic Network Scan is selected. By clicking the **Remove** button the device is removed and another device can be insert in the Actual Network Constellation.

For this select a device by clicking on it. Click the **Add** button to put it into the right list. By pressing the **OK** button the device is assigned to the Actual Network Constellation.

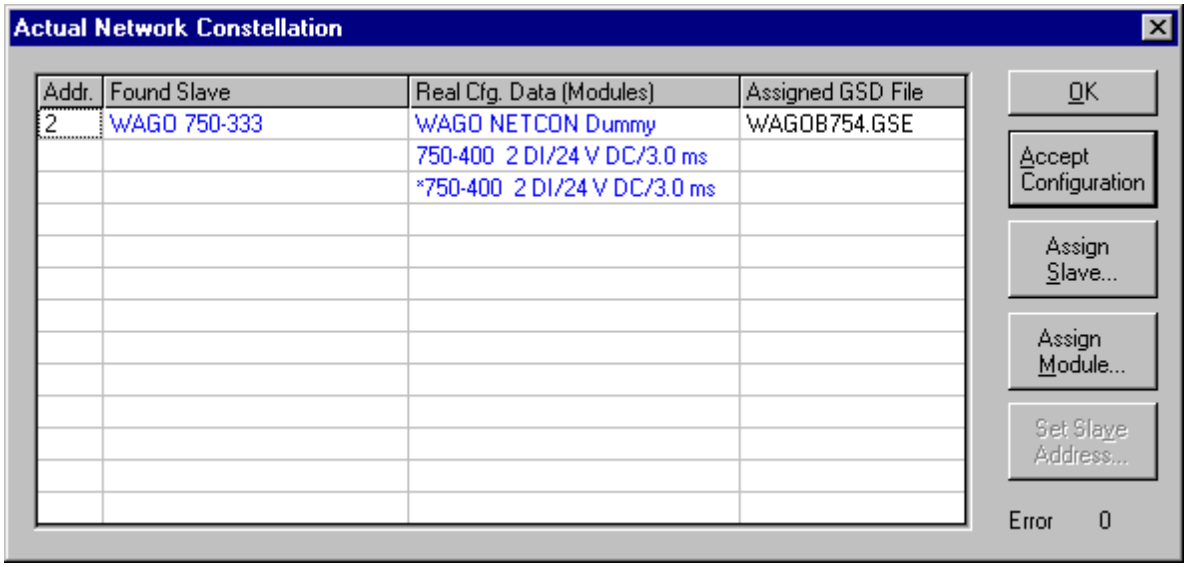


Figure 91: Change of the GSD against a GSE file

This picture shows a change of the WAGOB754.GSD against the WACOB754.GSE.

6.3.2 Assign Module

It can be that more than one similar Configuration Data for a device was found during the network scan. By clicking the button **Assign Module** in the Network Scan window you get a selection of suitable modules for the assigned EDS file which you can assign here.

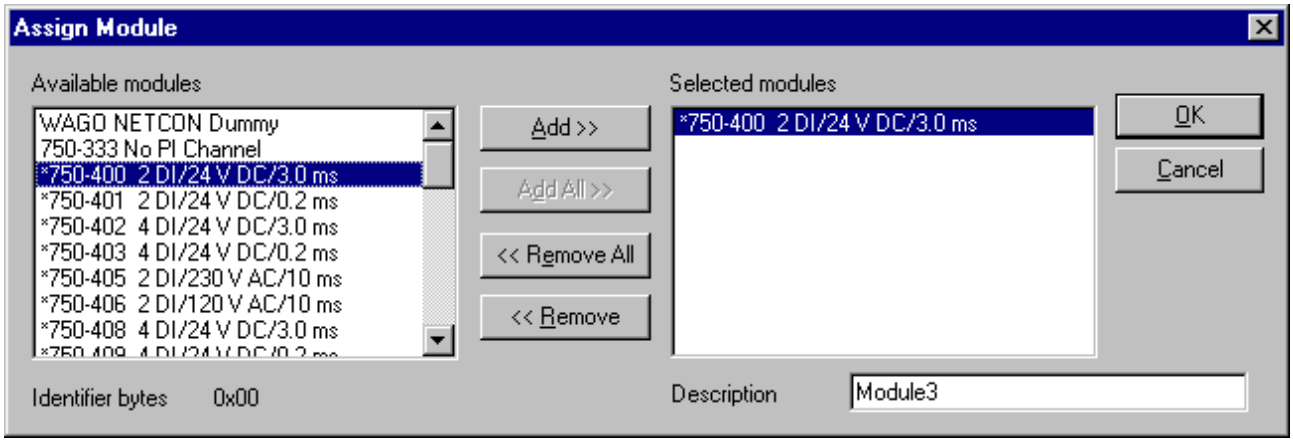


Figure 92: Online > Automatic Network Scan > Assign Module

In the list **Available modules** the module which was found during the Automatic Network Scan is selected. By clicking the **Remove** button the module is removed and another module can be insert in the Actual Network Constellation.

Select a module by clicking on it and press the button **Add** to put it into the right list. The module is assigned by clicking the **OK** button.

Note: The available modules all have the identifier byte 0x00.

6.3.3 Slave with Station Address 126 - Determination of the Ident Number

The Ident Number from Slave devices with station address 126 can not be read out via the PROFIBUS. Therefore

- select the GSD file from the list of Slave devices or
- enter the ident number manually.

6.3.3.1 Select GSD File

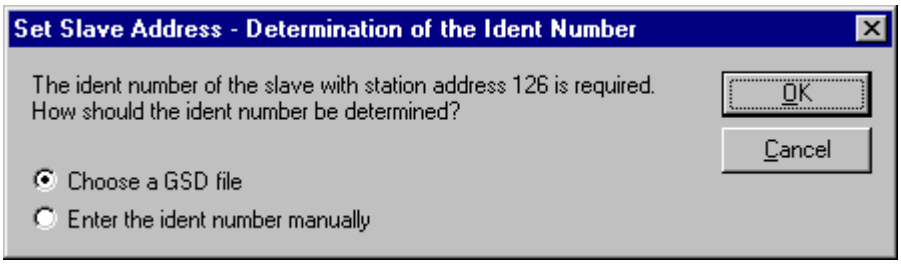


Figure 93: Online > Automatic Network Scan > Set Slave Address

A window opens where a Slave device can be selected. There you have to select one.

Then a station address between 0 and 125 is assigned with **Set Slave Address** and then you have to scan the network again.

6.3.3.2 Ident Number

If you enter the ident number manually the following window appears. The ident number has to be entered in hexadecimal format.

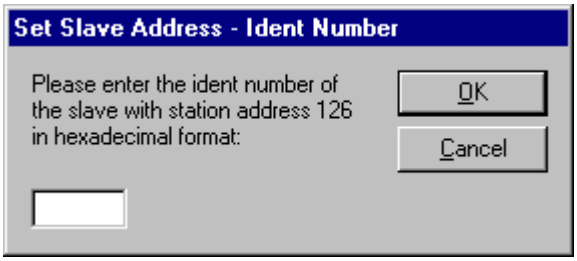


Figure 94: Online > Automatic Network Scan > Enter Ident Number

Then a station address between 0 and 125 is assigned with **Set Slave Address** and then you have to scan the network again.

6.4 Start/Stop Communication

The communication between PROFIBUS-DP Master and PROFIBUS-DP Slave can be manually started or stopped.

First the desired device must be chosen with a left mouse click on the symbol of the device. Then select the **Online > Communication start** or **Online > Communication stop** menu.

6.5 Diagnostic Functions

The following table shows diagnostic functions and the usability for

- Hilscher PROFIBUS-DP Master devices
- Hilscher PROFIBUS-DP Slave devices
- Hilscher PROFIBUS-FMS Master devices
- Hilscher PROFIBUS-MPI devices.

Diagnostic function	Usage	Hilscher PROFIBUS-DP Master devices	Hilscher PROFIBUS-DP Slave devices	Hilscher PROFIBUS-FMS devices	Hilscher PROFIBUS-FDL devices	Hilscher PROFIBUS-MPI devices
I/O Monitor	Detect, which devices are connected to the Hilscher PROFIBUS Master device	Yes	No	Yes	Yes	Yes
Debug Mode (PROFIBUS-DP)	Detect, to which PROFIBUS-DP Slave devices the Hilscher DP Master device has communication	Yes	No	No	No	No
Global State Field	Status information from the Hilscher PROFIBUS DP Master	Yes	No	No	No	No
Extended Device Diagnostic	Statistic information and status information from the Hilscher PROFIBUS device	Yes	Yes	Yes	Yes	Yes, but no special MPI diagnostic

Table 42: Overview Diagnostic Functions

Note: Use **Online > FMS Monitor** to test a PROFIBUS-FMS connection.

6.5.1 Live List

First the desired device must be chosen with a left mouse click on the symbol of the device. Then select the **Online > Live List** menu to get an overview over all active devices at the PROFIBUS network.

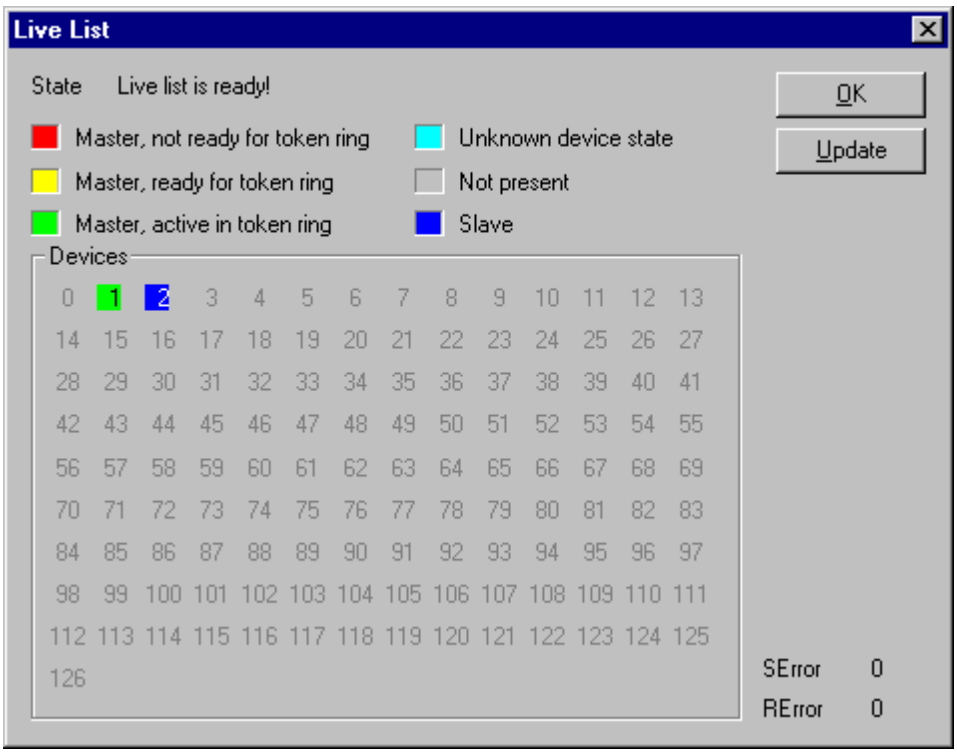


Figure 95: Online > Live List

A green number shows a Master and a blue number a Slave, whereby the number indicates the Station address. The meaning of the other colors is given in the list above the table.

A click on a colored number brings up its device type and status of the station.

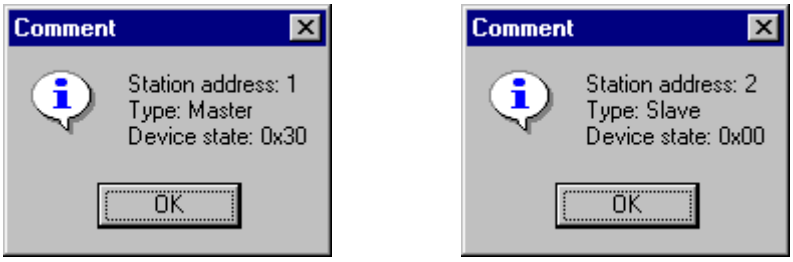


Figure 96: Device type and device status of a Master and a Slave

The display is not automatically updated as this function loads the PROFIBUS network. However, the Live List can be renewed with the **Update** button.

6.5.2 Debug Mode (PROFIBUS-DP)

First the Master device must be chosen with a left mouse click on the symbol of the Master device. Then select the **Online > Start Debug Mode** menu. The System Configurator cyclically interrogates the status of the network communication on the CIF, COM, PKV or KPO and the individual condition of the devices.

To end the Debug Mode select the menu **Online > Stop Debug Mode**.

Note: The debug mode is only for PROFIBUS-DP communication. For testing PROFIBUS-FMS use the FMS monitor.

6.5.2.1 Debug Window

When the debug session is started the configuration window changes into the debug window. The devices and the line between them are displayed in green or red colour depending on the established network communication.

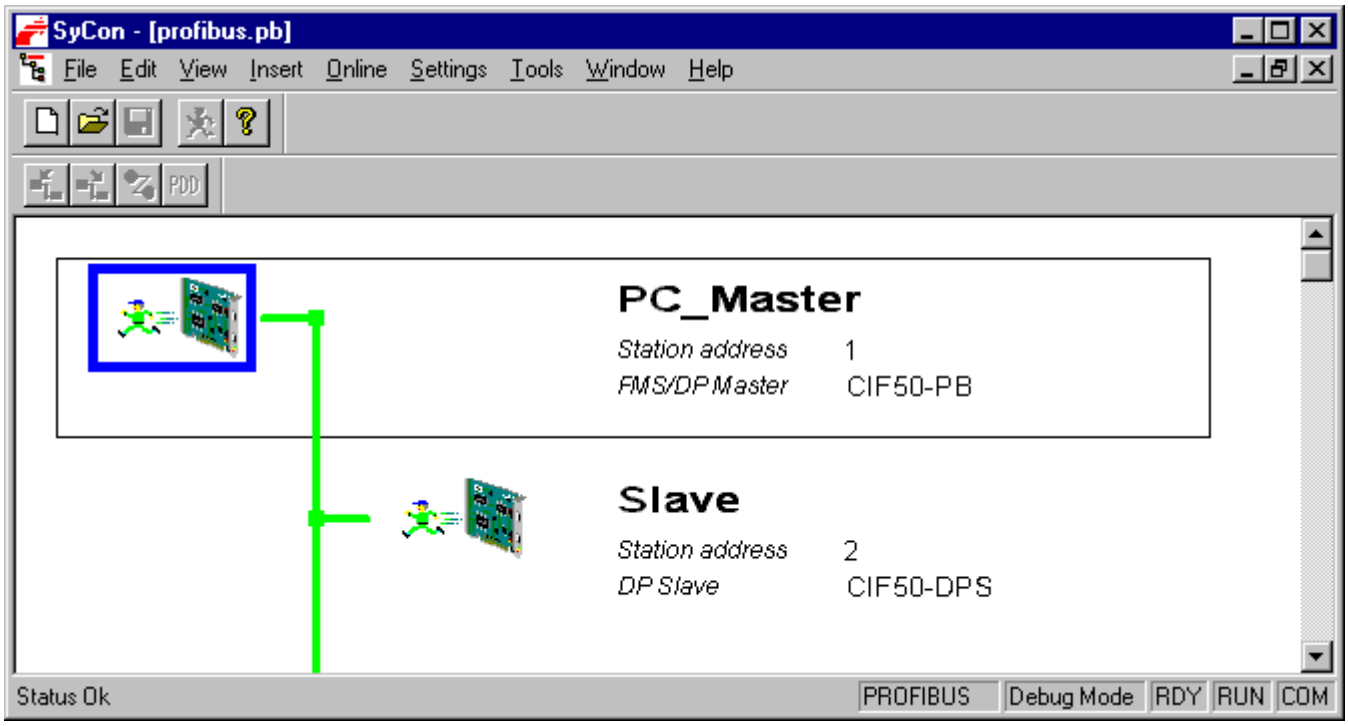


Figure 97: The Debug Window

If diagnostic information is available for a specific device, the text **Diag** appears in red next to the device icon. To get further device specific diagnostic information then double-click on the device itself or set the focus to the device and select **Online > Device Diagnostic**.

The Master icon has the  sign to show the stop mode.

In run mode the Master icon has the sign  .

6.5.2.2 PROFIBUS DP Device Diagnostic

To activate the Debug Mode select the menu **Online > Start Debug Mode**. Then mark a Slave (left mouse click) and then the menu **Online > Device Diagnostic** to open the diagnostic window for this Slave. Alternatively make a double click at the symbol of the device to open this window. To end the Debug Mode select the menu **Online > Stop Debug Mode**.

After the debugger was started SyCon requests the state of all devices from the Master. If there is an error on a device, the bus line to this Slave is displayed in red colour, otherwise it is green. SyCon also displays the letters **Diag**, if the device signals diagnostic information or the master holds diagnostic information in its internal diagnostic buffer. This information is displayed closer if you click with the mouse onto the corresponding device in Debug Mode.

The diagnostic information of a DP Slave can be 6 to 100 bytes. The first 6 bytes are standard diagnostic information (specification). The meaning of these 6 bytes is according to the PROFIBUS specification and contains the **Station Status 1**, **2** , **3**, the **assigned master address** and the **ident number** of the Slave.

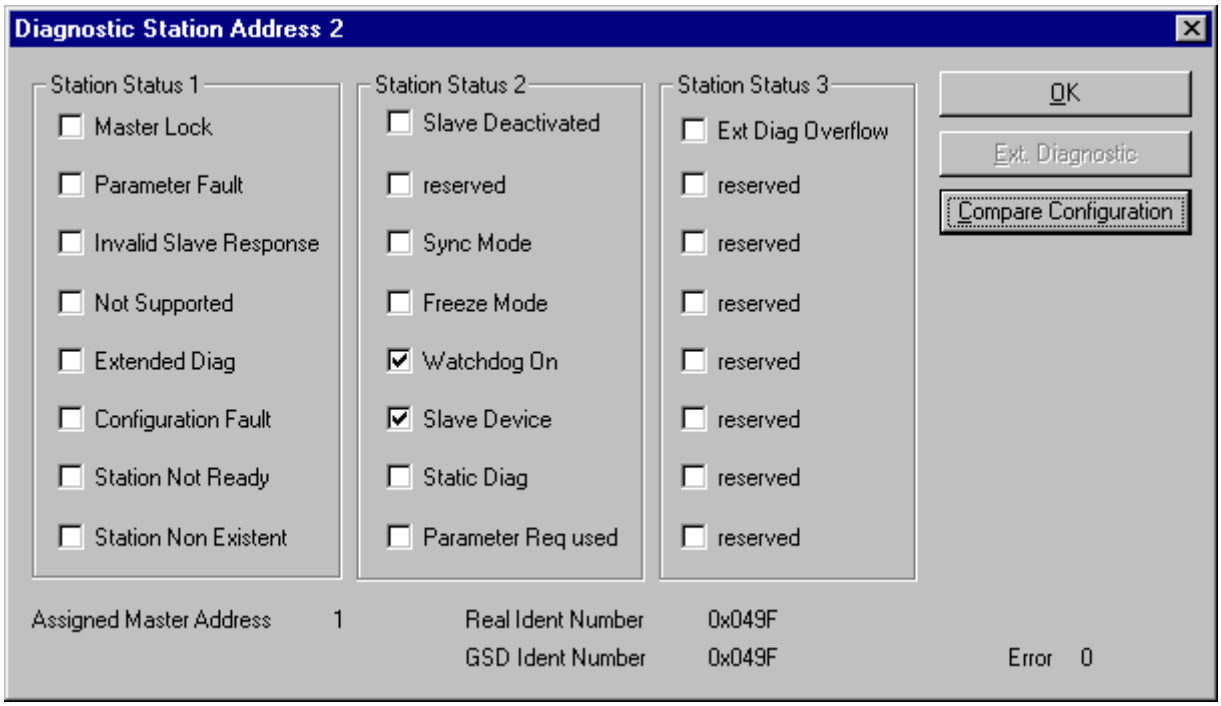


Figure 98: Online > Device Diagnostic

Station Status 1, 2 and 3 is described on the next page.

At **Assigned Master Address** the address of the master is shown, that has parameterized and configured this Slave. If the value 255 is displayed, it means that the Slave reports that

- it is not parameterized or configured yet or
- that the received parameter information and configuration information are rejected because of an error.

At **Real Ident Number** the ident number from the DP Slave is displayed. At **GSD Ident Number** the ident number is displayed, that the System Configurator has read out in the used GSD file. Both ident numbers have to agree. When they are different the reason could be

- the wrong GSD file is used or
- a wrong DP Slave was connected to the PROFIBUS.

When the **Real Ident Number** shows 0000, then the master still has no connection via the PROFIBUS to the DP Slave.

The meaning of **Station Status 1**:

Station-Status 1	Set by	Meaning and Remedy
Master Lock (Bit 7)	Master	**Meaning:** The Slave has already been parameterized by another Master and is locked in its access. **Remedy:** This is security mechanism of PROFIBUS-DP. First clarify which master should have access to this Slave. Then add this Slave to the configuration of the master that should have access to this Slave and remove this Slave from the configuration of the other master.
Parameter Fault (Bit 6)	Slave	**Meaning:** This bit is set by the Slave automatically, when the parameters sent by the Master are containing wrong or insufficient data. On every received parameter telegram the Slave executes a check routine on the whole parameter telegram. If the Slave detects a faulty parameter value or illegal data during its check, it will report the **parameter fault**. During the check routine the Slave compares its Ident Number with the one sent by Master. **Remedy:** So if the Slave reports this error, first compare the **Real Ident Number** shown in the Slave diagnostic field in debugger mode with the one shown at **GSD Ident Number**. If this two Ident numbers are the same, check the parameter data. If they are different, either a wrong GSD file is used or a wrong device was connected to the bus.
Invalid Slave Response (Bit 5)	Master	**Meaning:** This bit is set by the Master, when the Master receives an invalid answer from the Slave. So the physical contact to the Slave works principally, but the logical answer was not understood. **Remedy:** An error at the physical transmission line could have appeared like twisted cable, missing bus termination or missing shield connection. Use standardized DP Slave. This also can happen, for example if a PROFIBUS-FMS Slave is connected to the DP-Master instead of a DP Slave. So the Slave do not understand the DP-Telegram and rejects it. It's handled as 'Invalid Slave Response'.
Function not supported (Bit 4)	Slave	**Meaning:** This bit is set by the Slave, when a function should be performed which is not supported. Newer releases of Slave stations normally support the Sync and Freeze-Mode for I/O data. This is fixed in the GSD-File and read out by SyCon and sent to the Slave in the parameter telegram. **Remedy:** If this error occurs the GSD-File declares at least one of these commands as supported, but the Slave does not. In this case contact the manufacturer of the Slave device for the right GSD-File for the used Slave.

Table 43: PROFIBUS-DP Diagnostic Station state 1 (Bit 7 to 4)

Station-Status 1	Set by	Meaning and Remedy
Extended Diag (Bit 3)	Slave	**Meaning:** This bit is set by the Slave, if extended diagnostic data are a read out. Extended diagnostic data is optionally and normally used by a Slave to hand out manufacturer specific diagnostic information. **Remedy:** Click on the button **Extended Diagnostic** to get a Hex-dump of the diagnostic data and read about their meaning in the manual of the manufacturer. If the GSD-File contains information about the Extended Device Diagnostic it can be analyzed with the System Configurator.
Configuration Fault (Bit 2)	Slave	**Meaning:** During the PROFIBUS-DP startup procedure the Slave compares its internal I/O configuration with the configuration of the Master. If the Slave detects differences it will report a configuration error. That means that the Master has another I/O module constellation as the Slave. **Remedy:** So first compare visually all configured I/O modules in the configuration data of SyCon for this Slave with its real physical constellation. Note that the order of the module has to agree. Some Slaves need virtual I/O modules to be configured first or empty slot modules to get an even number of modules to run. This Slave specific I/O module behaviour has to be written down in the Slave documentation because it can not be read out from the GSD file. Please read the configuration notes of the manufacturer. Another possibility to get the Slave module constellation is to read out its constellation by a PROFIBUS-DP command **Compare Configuration**. So click on this button in the diagnostic field and you will get a Hex-Dump of the real Slave configuration data and the configured one (**Real Configuration and SyCon Configuration**). Note, that the DP configuration is coded in a very compact form. The code for the modules is shown in the **Slave Configuration**.
Station Not Ready (Bit 1)	Slave	**Meaning:** The DP Slave is still not ready for the data exchange. **Remedy:** When or at which event the Slave sets this bit is not defined in the specification. That means it can have several Slave specific reasons. Usually the bit is set in combination with one the other fault bits. Check especially the parameter and the configuration. Often the report 'Station not Ready' results in case of parameter fault or configuration faults. It is possible that the supply voltage at the Slave was just first switched on. Wait until the device is initialized.
Station not existent (Bit 0)	Master	**Meaning:** This bit is set by the Master automatically, if this Slave does not answer or is not reachable on the bus. **Remedy:** Please check your PROFIBUS cable. Both signal wires need to be connected correctly between all devices. In addition the connectors at the end of the cable need to be provided with termination resistors. Check that the device is connected to the bus cable. Check the power supply at the Slave device. Compare the station address at the Slave with the configuration of the Master. With the menu **Online > Live List** you can check which Slaves are available respectively connected to the PROFIBUS. Check, if the Slave supports the configured baud rate. Some Slaves only work with up to 1.5 MBaud or need to be set for a PROFIBUS-DP conform behaviour. Check the connectors intermediated LWL (optical) converters and repeaters.

Table 44: PROFIBUS-DP Diagnostic Station state 1 (Bit 3 to 0)

The meaning of **Station State 2**:

Station-Status 2	Set by DP	Meaning
Slave Deactivated (Bit 7)	Master	This bit is set by the Master, if the Slave in its parameter set is marked as inactive, so that it is taken out from the cyclic I/O exchange.
Reserved (Bit 6)	-	-
Sync Mode (Bit 5)	Slave	This bit is set by the Slave, when it has received the sync control command.
Freeze Mode (Bit 4)	Slave	This bit is set by the Slave, when is has received the freeze control command.
Watchdog ON (Bit 3)	Slave	This bit is set by the DP-Slave, when its Watchdog control is active to supervise its corresponding Master connection.
Slave Device (Bit 2)	Slave	This bit is always set by the Slave.
Static Diag (Bit 1)	Slave	The Slave sets this bit to indicate the Master to be not operative because of a general error. Typically the DP Slave is not ready for an I/O data transfer. In a case of a set static diagnostic bit the Master has to collect diagnostic information as long as this bit is active. On which events or at what time this bit can be set by a Slave device, is not defined in the norm description and can not be mentioned here.
Parameter Req used (Bit 0)	Slave	The Slave sets this bit to force the Master system to do a new parameterization. This bit is set as long as new parameterization must be performed. In case of this error you should compare firstly the **real ident number** with the **GSD ident number** in this window. This numbers need to be the same. Furthermore you have to check the parameter data.

Table 45: PROFIBUS-DP Diagnostic Station state 2

The meaning of **Station State 3**:

Station-Status 3	Set by	Meaning
Ext Diag Overflow (Bit 7)	Master Slave	This bit is set, if there is more extended diagnostic information to report to the Master than can be given to the Master in one diagnostic telegram. The DP-Slave sets this bit for example if there is more diagnostic channel information than the Slave can hold down in its diagnostic buffer.
Reserved (Bit 6 to 0)	-	-

Table 46: PROFIBUS-DP Diagnostic Stations status 3

6.5.2.3 Compare Configuration

The configuration can be read out from the DP Slave via the PROFIBUS in the debug mode. This information is displayed in the upper part of the window **Compare Configuration**.

In the lower part of the window the configuration is displayed and compared as set in the System Configurator.

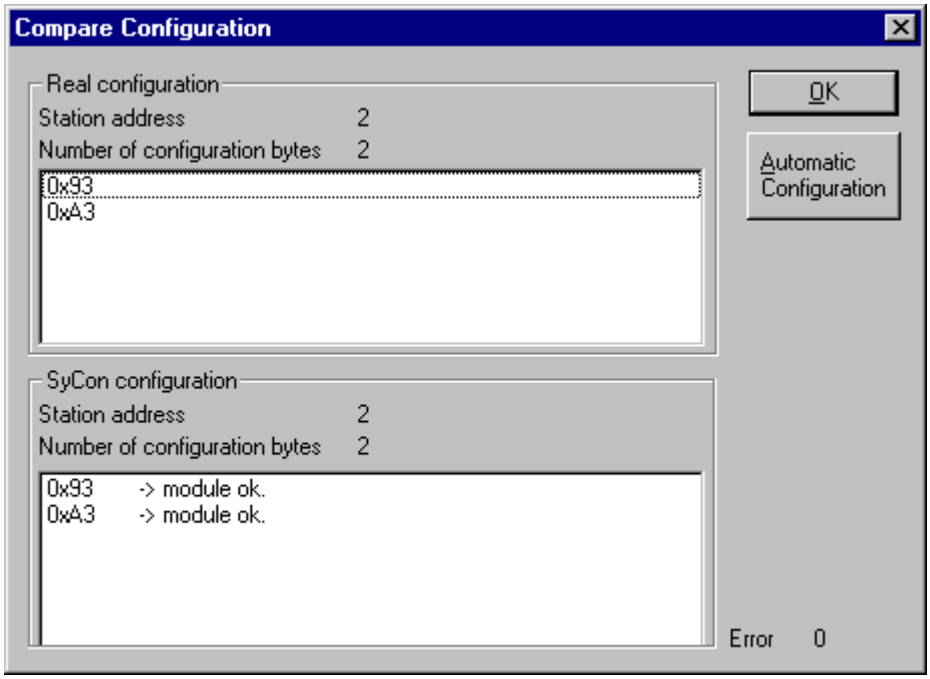


Figure 99: Online > Device Diagnostic > Compare Configuration

Note: Some DP Slaves only gives their default configuration when reading it out via the PROFIBUS. To use this function the DP Slave has to support it.

The meaning of the identifier bytes is described in section *Identifier Bytes* on page *234*.

6.5.2.4 Extended DP Slave Diagnostic

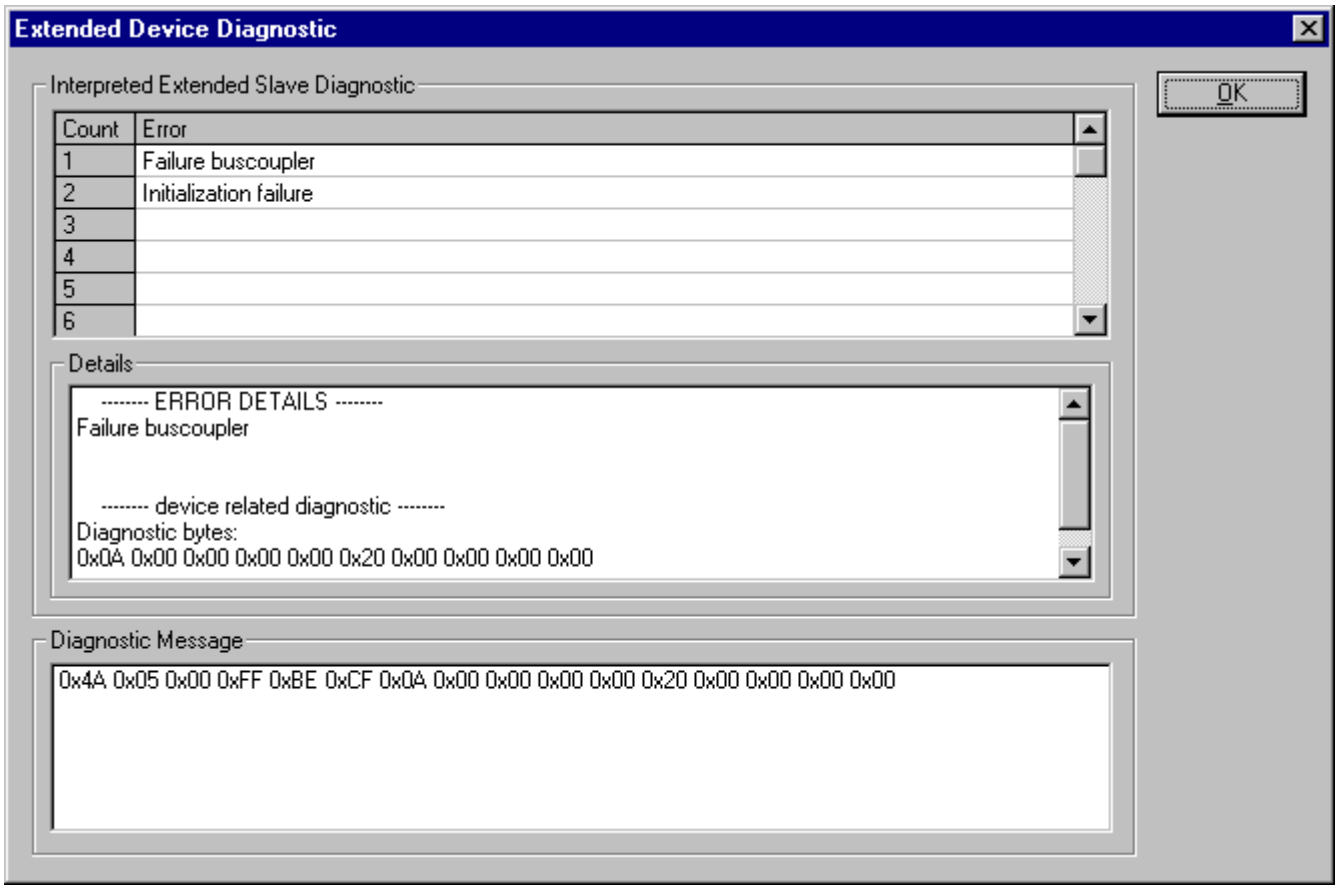


Figure 100: Device Diagnostic (PROFIBUS-DP extended diagnostic)

In the **Extended Device Diagnostic** window, a diagnostic telegram is shown as a Hex dump. Here, the first 6 Bytes are the standard diagnostic Bytes like described in section *PROFIBUS DP Device Diagnostic* at page *127*.

The Extended Device Diagnostic starts at the 7th Byte. This is manufacturer specific and can contain the following three categories of diagnostic:

- **Device related diagnostic**

  The **Device related diagnostic** contains manufacturer specific information about the status of the device.

- **Identifier related diagnostic (Module related)**

  The **Identifier related diagnostic** indicates in which module a diagnostic is present. The **Byte position** gives the relevant **Module Configuration Identifier** and the name of the associated module.

- **Channel related diagnostic.**

  The **Cannel related diagnostic** gives information about diagnosed channels and diagnostic causes. The **Byte position** gives the relevant **Module Configuration Identifier** and the channel type.

A detailed description about the device related, identifier related and channel related diagnostic can be found in the sections given in the following table:

Diagnostic	Section	Page
Device related diagnostic	*Device Related Diagnostic*	*230*
Identifier related diagnostic (Module related)	*Identifier Related (Module) Diagnostic*	*231*
Channel related diagnostic.	*Channel Related Diagnostic*	*232*

Table 47: Extended DP-Slave Device Diagnostic

Note: An analysis of the extended device diagnostic can only takes place, if texts are provided for the analysis in the GSD by the device manufacturer. To evaluate the manufacturer specific diagnostic read the device description of the manufacturer.

6.5.3 Global State Field

First the desired device must be chosen with a left mouse click on the symbol of the device. Then select the **Online > Global State Field** menu. A display window opens in which the cyclic statuses on the Bus condition and the connected devices are shown.

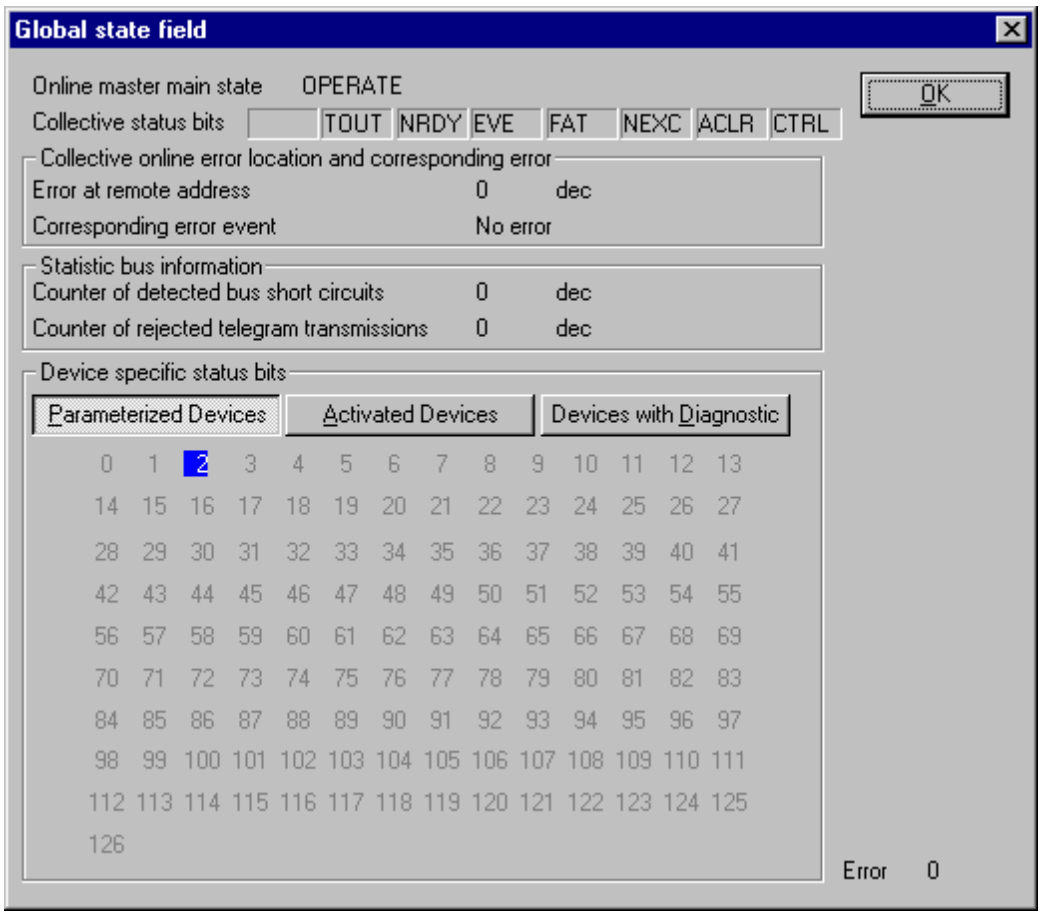


Figure 101: Online > Global State Field

The first row displays the main state of the Master. It can have the status **OPERATE**, **STOP**, **OFFLINE** or **AUTO CLEAR**.

The next row displays individual bus errors. A pending error is displayed in a red field. The meanings of the individual abbreviations are shown in the following.

Status Bits	Meaning
TOUT	TIMEOUT-ERROR the device has detected a skipped timeout supervision time because of rejected PROFIBUS telegrams. It's an indication for bus short circuits while the Master interrupts the communication. The number of detected timeouts are fixed in the statistic bus information variable. The bit will be set when the first timeout was detected and will not be deleted any more.
NRDY	HOST-NOT-READY-NOTIFICATION shows, if the application is ready or not. If this bit is set, the application is not ready to receive data.
EVE	EVENT-ERROR the device has detected bus short circuits. The number of detected events are fixed in the statistic bus information variable. The bit will be set when the first event was detected and will not be deleted any more.
FAT	FATAL-ERROR because of heavy bus error, no further bus communication is possible.
NEXC	NON-EXCHANGE-ERROR at least one Slave has not reached the data exchange state and no process data exchange is done.
ACLR	AUTO-CLEAR-ERROR device stopped the communication to all Slaves and reached the auto-clear end state.
CTRL	CONTROL-ERROR parameterization error.

Table 48: Meaning of collecting status bits in the Global State Field

Further displays are:

Collective online error location and corresponding error gives the station address and the error text.

Statistic bus information displays the number of the detected bus short circuits and the number of rejected telegrams.

Device specific status bits:

Parameterized Devices, Activated Devices and **Devices with Diagnostic** are shown if you click at that button. The activated addresses are colored numbers.

This application updates online the status in the global state field.

You can see the diagnostic by double-clicking at a highlighted station address of a device.

6.5.4 Extended Device Diagnostic

The Extended Device Diagnostic helps to find bus and configuration errors when the SyCon menu functions are of no further help.

First the desired device must be chosen with a left mouse click on the symbol of the device. Then select the **Online > Extended Device Diagnostic** menu.

This menu opens a list of diagnostic structures. These contain online counters, states and parameter information:

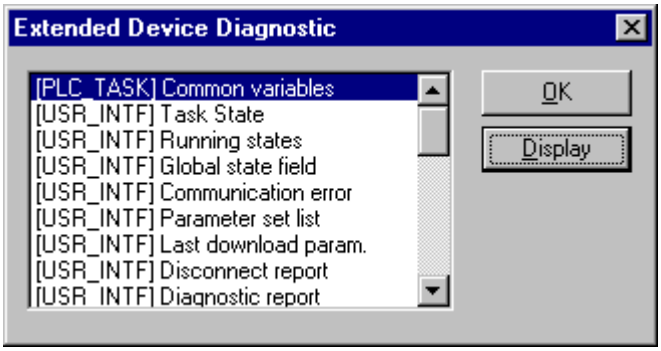


Figure 102: Extended Device Diagnostic as and example for the PROFIBUS-DP/FMS Kombimaster

6.5.4.1 PROFIBUS-DP and/or PROFIBUS-FMS Master

USR_INTF (User-Interface): DP administration

ALI_TASK: Application interface (PROFIBUS-FMS)

FDL_TASK: PROFIBUS Transmission

No	Task / Task state	Page	PB	DPM	FMS
1	*PLC_TASK Common Variables*	*195*	X	X	
2	*USR_INTF Task State*	*196*	X	X	
3	*USR_INTF Running States*	*197*	X	X	
4	*USR_INTF*	*197*	X	X	
5	*USR_INTF Communication Error*	*199*	X	X	
6	*USR_INTF Parameter Set List*	*199*	X	X	
7	*USR_INTF Last Download Param*	*200*	X	X	
8	*USR_INTF Disconnect Report*	*201*	X	X	
9	*USR_INTF Diagnostic Report*	*202*	X	X	
10	*USR_INTF DPV1 Data*	*203*	X	X	
11	*FDL_TASK Task State*	*204*	X	X	X
12	*FDL_TASK Act. Bus* parameter	*205*	X	X	X
13	*FDL_TASK DDLM Requests Class 1*	*206*	X	X	
14	*FDL_TASK DDLM Requests Class 2*	*207*	X	X	
15	*FDL_TASK FDL Requests*	*208*	X		X
16	*FDL_TASK FMA Requests*	*209*	X		X
17	*FDL_TASK DP Retry for Slave*	*210*	X	X	
18	*FDL_TASK DP Activated Slave*	*211*	X	X	
19	*ALI_TASK VFD Status*	*211*	X		X
20	*ALI_TASK Confirmed FMS Services*	*212*	X		X
21	*ALI_TASK Unconfirmed FMS Services*	*213*	X		X
22	*ALI_TASK FDL Services*	*214*	X		X
23	*ALI_TASK Error Counter*	*215*	X		X
24	*ALI_TASK Client Parallel Services*	*216*	X		X
25	*ALI_TASK Server Parallel Services*	*217*	X		X
26	*ALI_TASK Status ComReference*	*218*	X		X
27	*ALI_TASK Timer ComReference*	*219*	X		X

Table 49: PROFIBUS-DP/FMS Master Task State

6.5.4.2 PROFIBUS-DP Slave

PLC_TASK

SPC3CTRL (SPC3 Control)

No	Task / Task state	Page	
1	*PLC_TASK Variables*	*220*	
2	*SPC3CTRL SPC3*	*221*	
3	*SPC3CTRL Slave Config*	*222*	
4	*SPC3CTRL Master Config*	*223*	
5	*SPC3CTRL Param Data*	*224*	
6	*SPC3CTRL DPM*	*225*	
7	*SPC3CTRL DPV1 Class 1*	*226*	
8	*SPC3CTRL DPV1 Class 2*	*228*	
9	*SPC3CTRL Code Diagnostic*	*229*	

Table 50: PROFIBUS-DP Slave Task State

6.5.5 FMS Diagnostic

The FMS device processes an internal error buffer that can store the last eight errors. This is retrieved with the **Online > FMS Diagnostic** menu function when first the Master has been selected with a left mouse click.

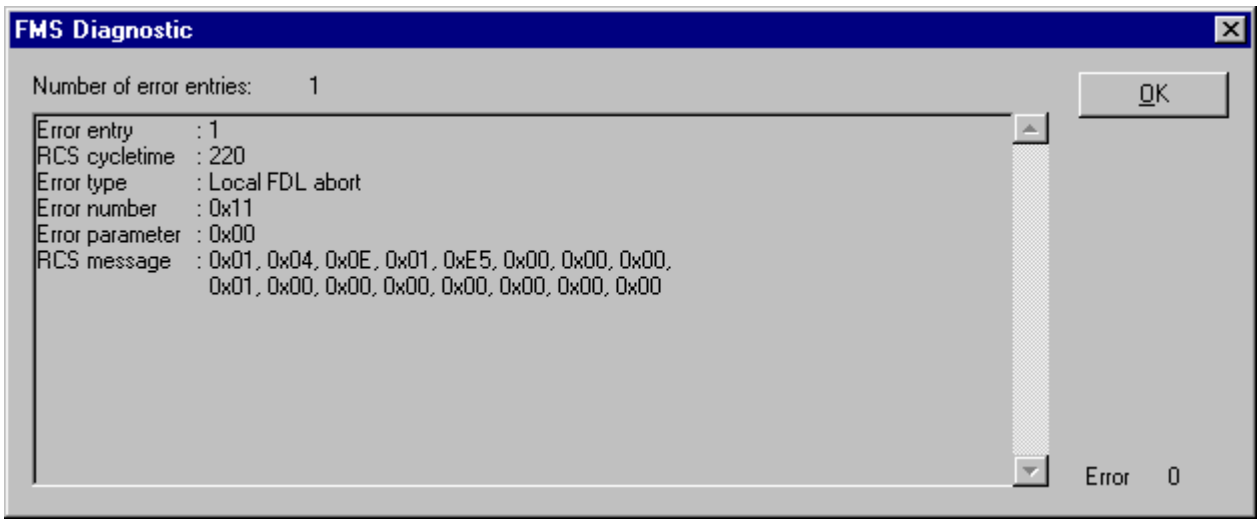


Figure 103: Online > FMS Diagnostic

Max. 8 Diagnostic entries can be saved. The internal buffer of the device is deleted after the diagnostic entries have been read out.

Error entry: number of the entry

RCS cycle time: time unit of the device

Error type: shows the layer

Error number

Error Parameter

RCS Message: message

6.6 User Data Transfer

The following table show test functions with user data transfer and the usability for

- Hilscher PROFIBUS-DP Master devices
- Hilscher PROFIBUS-DP Slave devices
- Hilscher PROFIBUS-FMS Master devices.

User data transfer function	Usage	Hilscher PROFIBUS-DP Master devices	Hilscher PROFIBUS-DP Slave devices	Hilscher PROFIBUS-FMS devices	Hilscher PROFIBUS-FDL devices	Hilscher PROFIBUS-MPI devices
I/O Monitor	Read input data and set output data (cyclic I/O data exchange)	Yes	Yes	No	No	No
I/O Watch	Read input data and set output data (cyclic I/O data exchange)	Yes	Yes	No	No	No
FMS-Monitor	Read or write data (objects)	No	No	Yes	No	No
Message Monitor	Communication specific request	Yes	Yes	Yes	Yes	Yes

Table 51: Overview User Data Transfer

Note: The FMS Monitor has only client functionality and does not work as a server.

Additional test functions with user data transfer are available for:

- Read or write via the PROFIBUS-DPV1 Master in section *Message Monitor for Testing of DPV1 (at Master)* on page *152*.
- Read or write via the PROFIBUS-DPV1 Slave in section *Message Monitor for Testing of DPV1 (at Slave)* on page *153*.
- Send and receive via PROFIBUS-FDL transparent SDA in section *Message Monitor for Testing of PROFIBUS-FDL transparent* SDA on page *154*.
- Send and receive via PROFIBUS-FDL transparent SDA/SDN in section *Message Monitor for Testing of PROFIBUS-FDL transparent* SDA/SDN on page *155*.

6.6.1 I/O Monitor

This is an easy way of viewing and changing the first 32 Bytes of the process data image. To open the I/O Monitor select the **menu Online > I/O Monitor**.

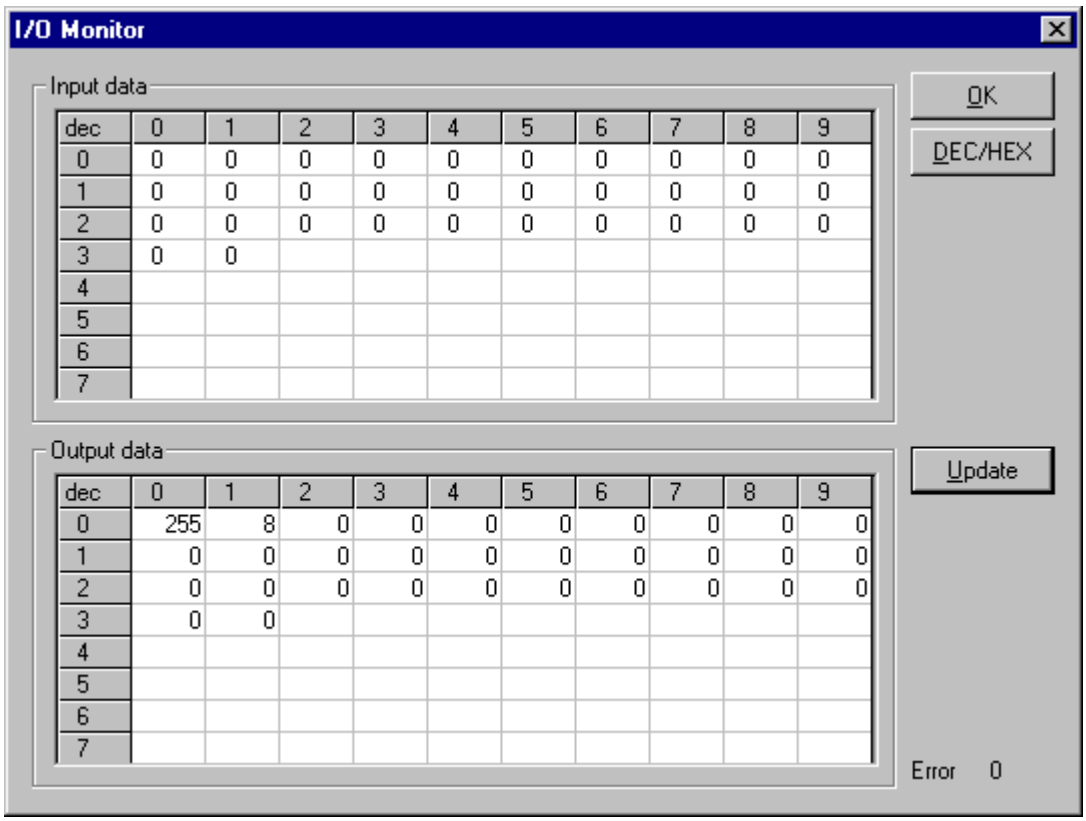


Figure 104: Online > I/O Monitor

DEC/HEX get the representation of the input data. The output data is always in the decimal form.

Enter the output value and then press **Update**.

Always the first 32 input and output Bytes of the process depiction are shown, also when these Bytes have not been occupied by the configuration.

The display is always in a Byte manner.

A more comfortable display is offered by the I/O Watch Monitor which is described in the next section.

6.6.2 I/O Watch

The I/O Watch monitor can be used in place of the I/O Monitor and offers more functionality.

- Various data formats: Hex, Unsigned Decimal, Signed Decimal, Bit
- The I/O Watch monitor works symbol oriented
- It is not necessary to know the offset addresses

The following firmware supports the I/O Watch monitor function:

Fieldbus	From Version
PROFIBUS-DP Master	1.040 (Kombimaster) resp. 1.140 (DP-Master)
InterBus Master	2.040
CANopen Master	1.040
DeviceNet Master	1.058
AS-Interface Master	1.010

Table 52: Firmware for I/O Watch function

The following table lists the typical steps to use the I/O Watch monitor.

Preconditions:

- The project/configuration already exists, containing a PROFIBUS-DP Master and the PROFIBUS-DP Slave(s) as described in section *Getting Started – Configuration Steps* on page *21*.
- The Configuration has been downloaded into the PROFIBUS-DP Master using **Online > Download**
- Running bus system

1. Open the existing project using **File > Open**.
2. Open the Windows dropdown menu and select **Window > Logical Network View** to change the window. A window with three sections opens

Left Window	Center Window	Right Window
Project Tree structure	Tag / Symbol	IO Watch

3. Open the tree structure in the left window to reach the I/O module of the device desired:

Project > Master > Slave > Module > (possible) Submodule

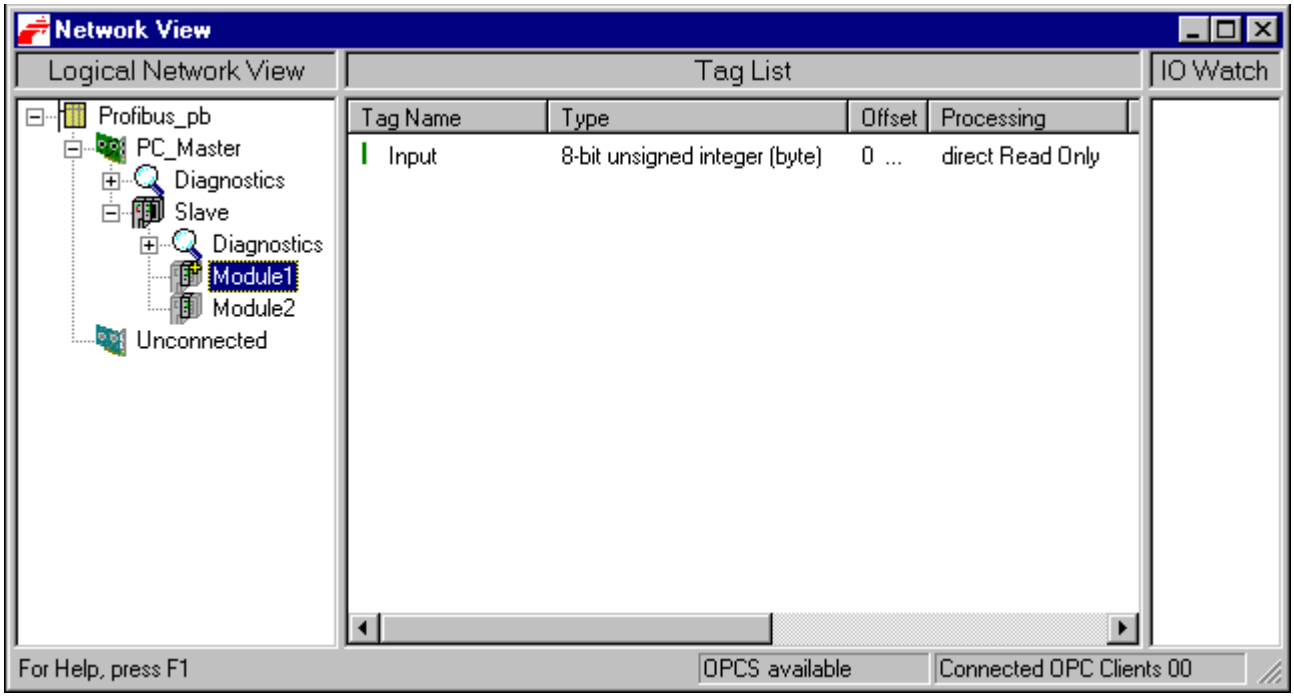


Figure 105: Logical Network View and I/O Watch

4. Left click on the module desired and the tags (I/Os) will be displayed in the center window of the Logical Network View.
5. Select with the left mouse button the tag/symbol desired and drag and drop them in the right window of the Logical Network View.
6. In the right window select the desired tag with the left mouse click to highlight it then right mouse click to open a menu. Select **Start**. A new window called IO Watch appears.
7. A table shows the Device, Symbolic Name, IEC Address (Offset), Data type Representation and Value. Select the line with the desired information. Click on **Hex** under Representation and select the way the values are to be displayed. Choices are Hex, Decimal unsigned, Decimal signed, Bit pattern.
8. Input data are displayed and can't be changed. Output data can be entered into the value column.

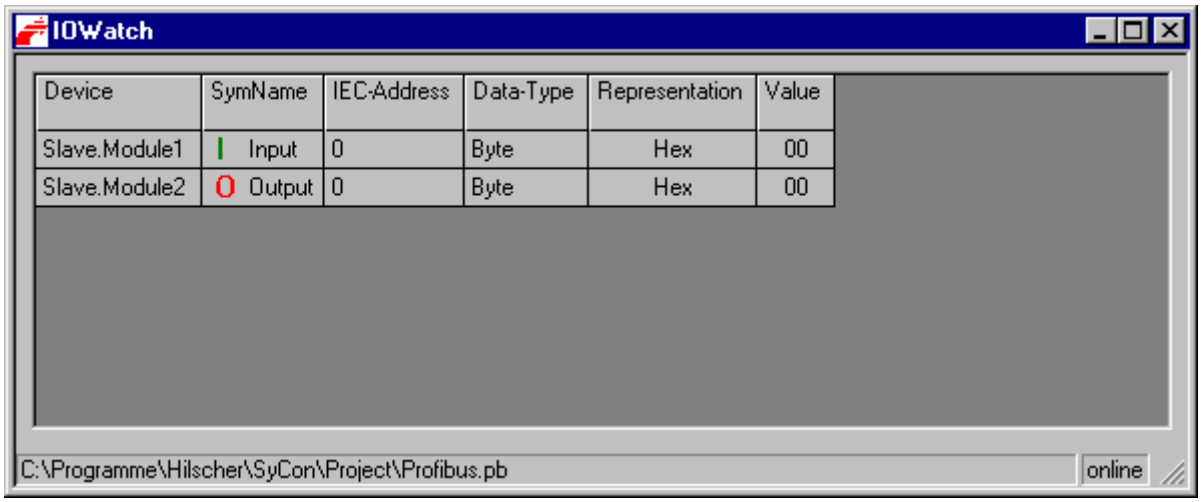


Figure 106: I/O Watch Window

In the column representation can be selected the data type: Bit Pattern, Character (Byte), Decimal Signed, Decimal Unsigned, Hex

6.6.3 FMS-Monitor

With this function, PROFIBUS-FMS services, based on the current configuration, can be carried out.

First the Master device must be chosen with a left mouse click on the symbol of the Master. Then select **Online > FMS Monitor**.

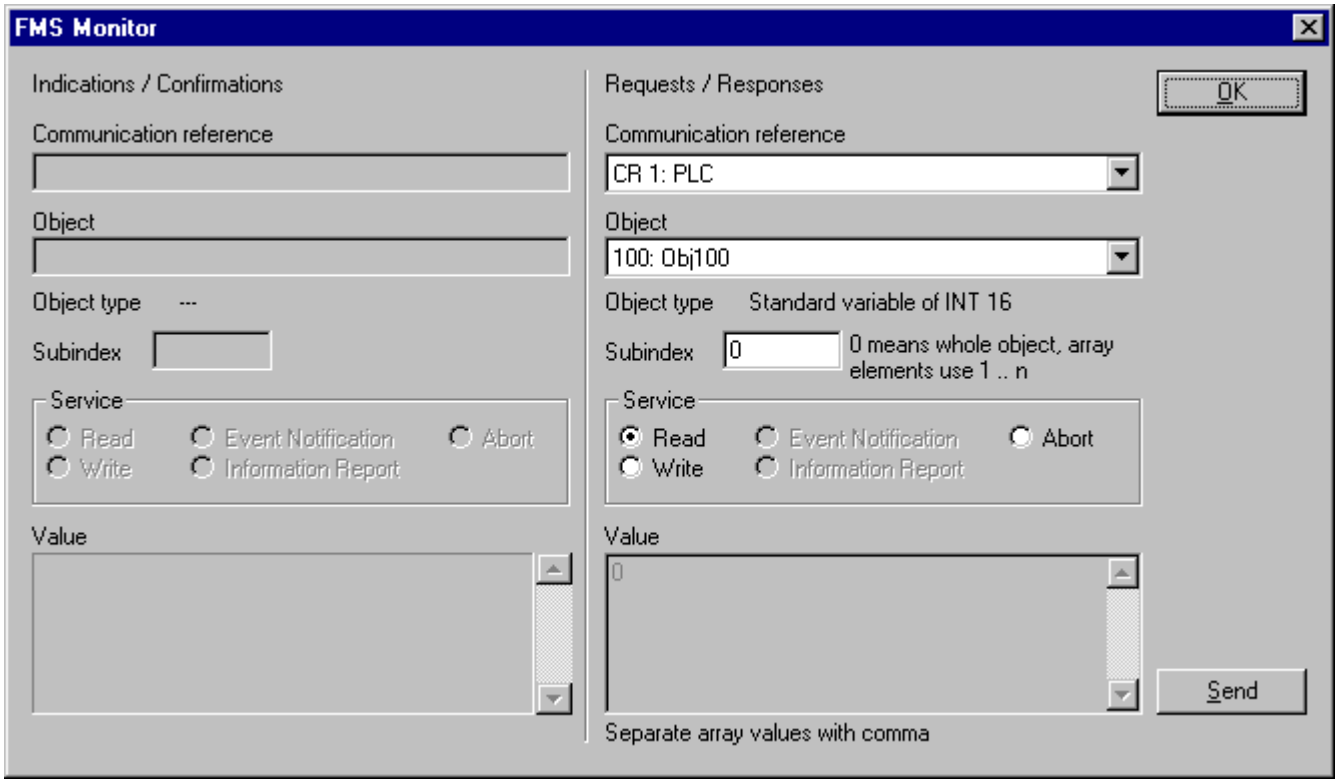


Figure 107: Online > FMS Monitor

The **Read** or **Write** service on the desired **Object** can be selected by means of the corresponding **Communication reference** and can be activated via the **Send** button. When writing, the output data must be entered in the **Value** field. On the left side, the acknowledgement, or when reading, the received data are displayed.

Only Client functions are available in this version.

Positive result:

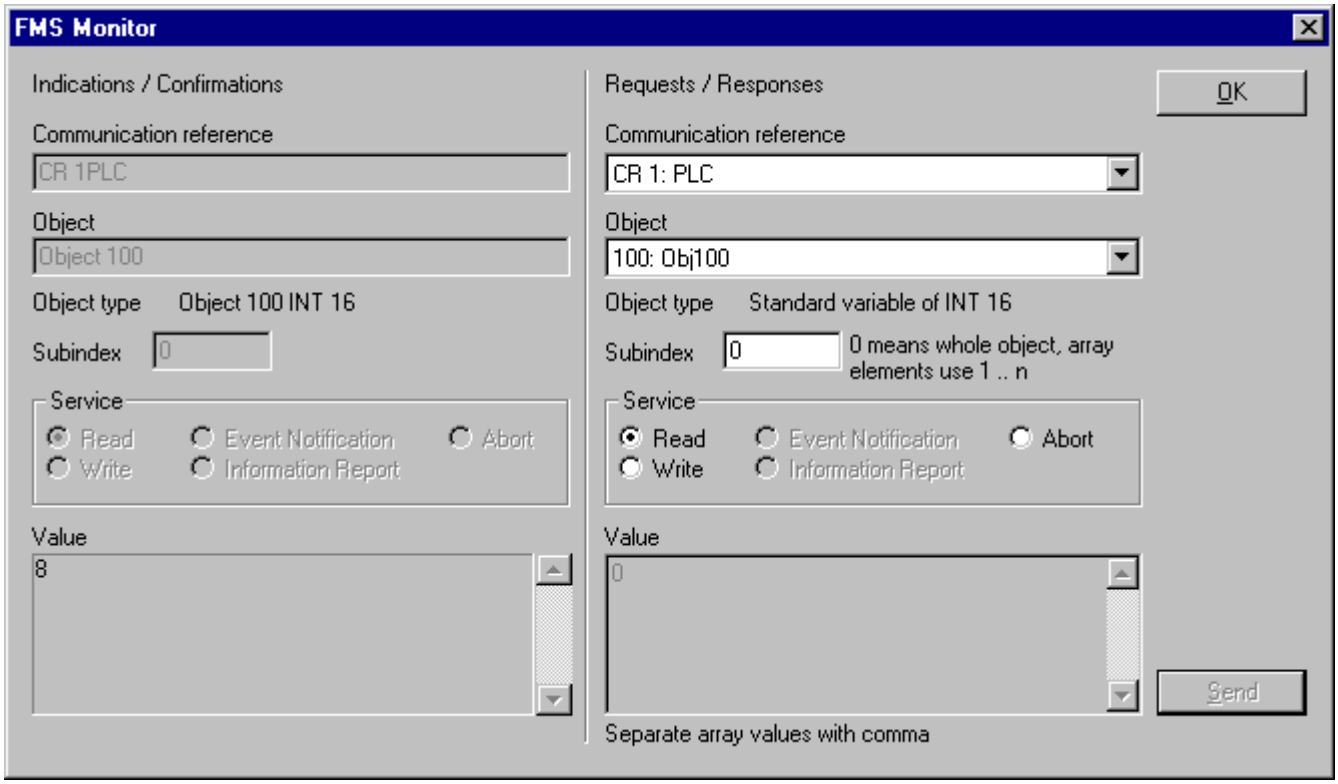


Figure 108: Online > FMS Monitor (positive test result)

Negative result:

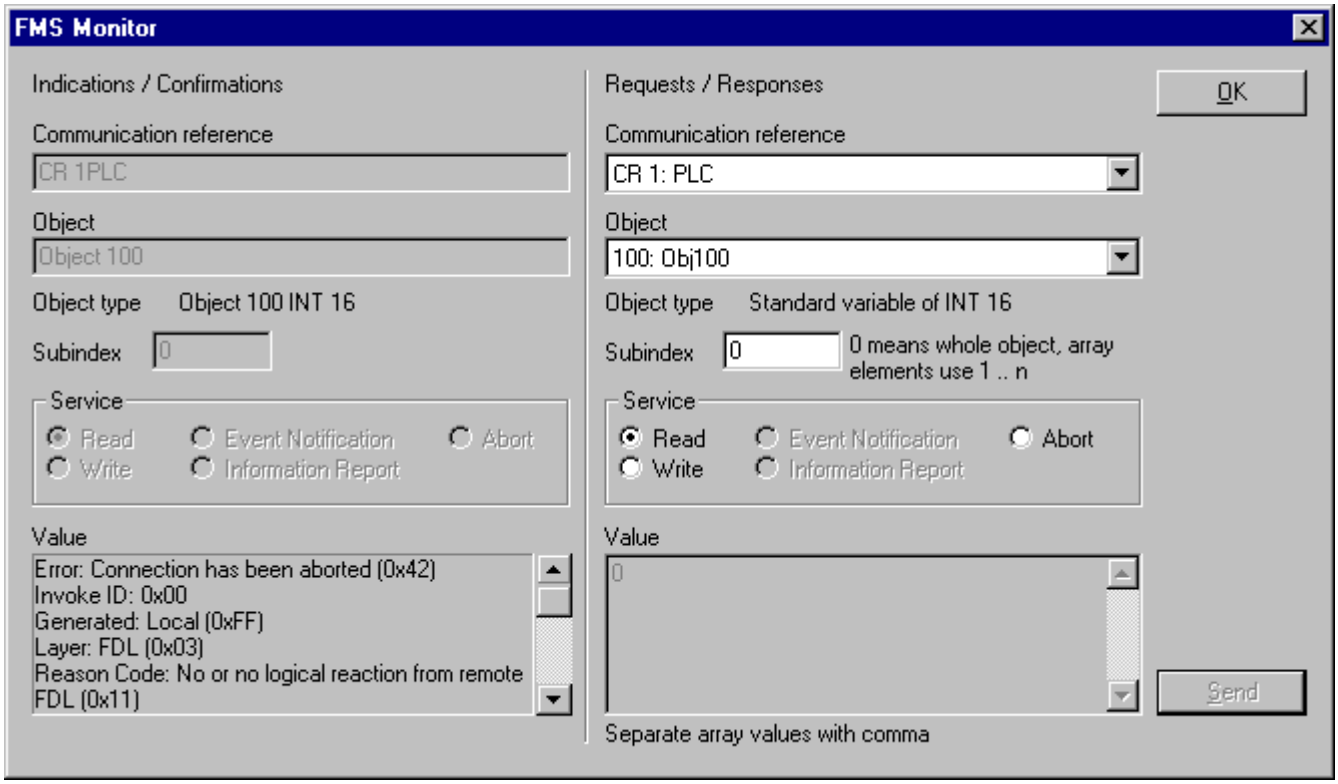


Figure 109: Online > FMS Monitor (negative test result – PROFIBUS-FDL layer)

Negative result:

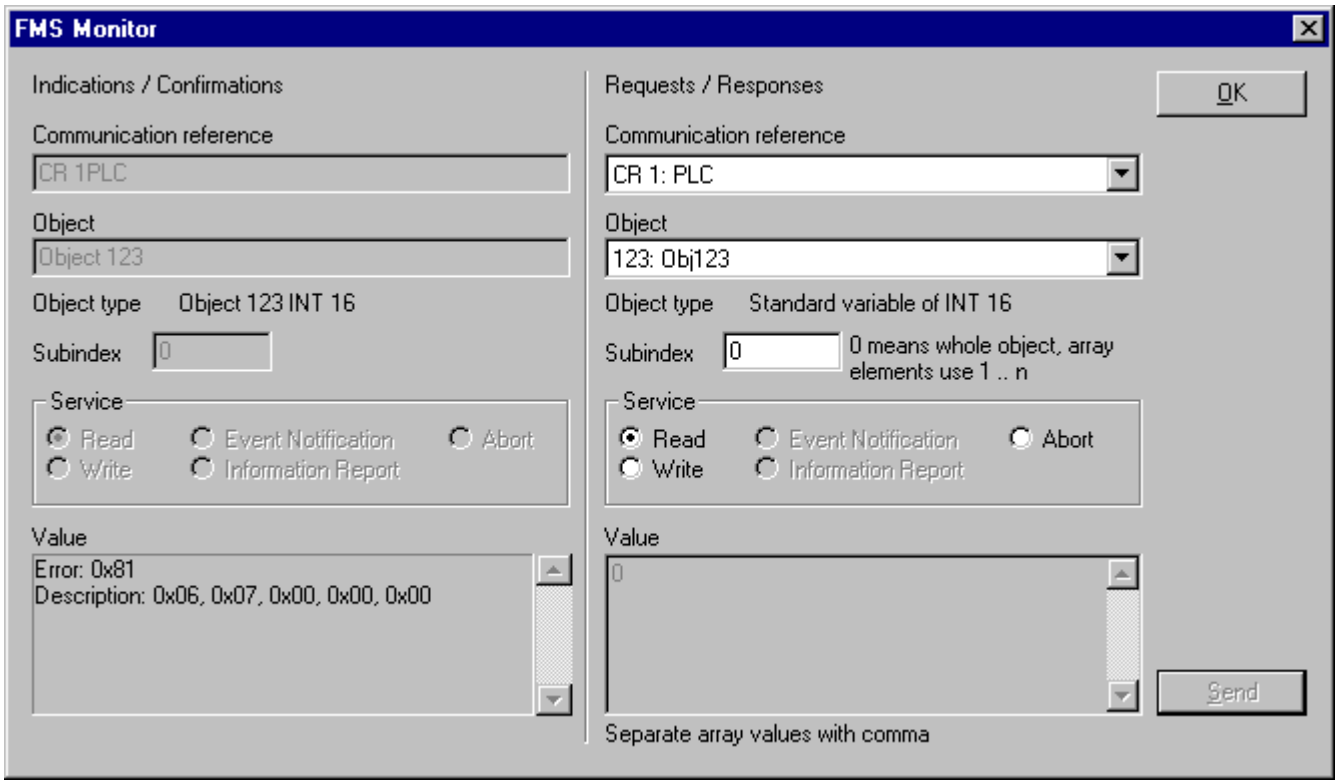


Figure 110: Online > FMS Monitor (negative test result – error message from the coupling partner)

The error 129 (0x81) is reported by the coupling partner and only shown in the FMS Monitor.

6.7 PROFIBUS Services

6.7.1 Setting the Slave Address

First the desired Slave device must be chosen with a left mouse click on the symbol of the Slave. Then set the Station address of a Slave at the PROFIBUS with the Online **> Set Slave Address** menu.

Enter the new address into the **New station address** field. If you do not want to allow further alterations to the Station address, mark the **No additional changing** field. If required, enter further parameters in hexadecimal format into **Remote Slave parameter** field. Activate the command with the **Set Address** button.

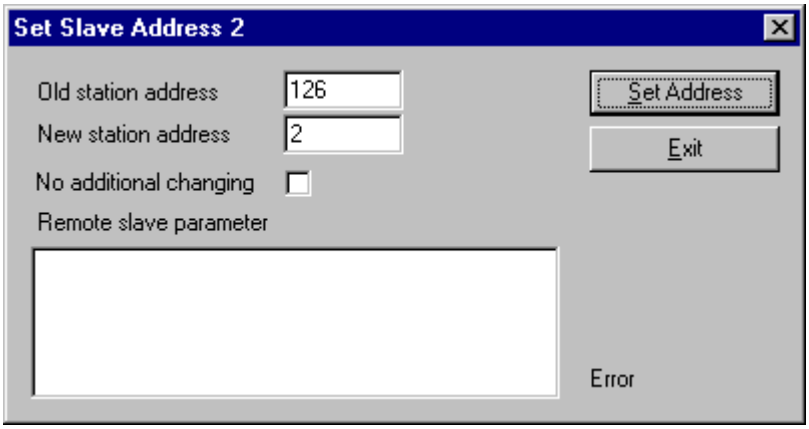


Figure 111: Online > Set Slave Address

Note: The setting of the Station address is only possible for Slaves that support this service.

6.7.2 Get Object Directory

First the Master device must be chosen with a left mouse click on the symbol of the Master. Then the Object directory of the coupling partner can be retrieved via the **Online > Get Object** menu. This is possible for devices that support the PROFIBUS-FMS service GetOD (long).

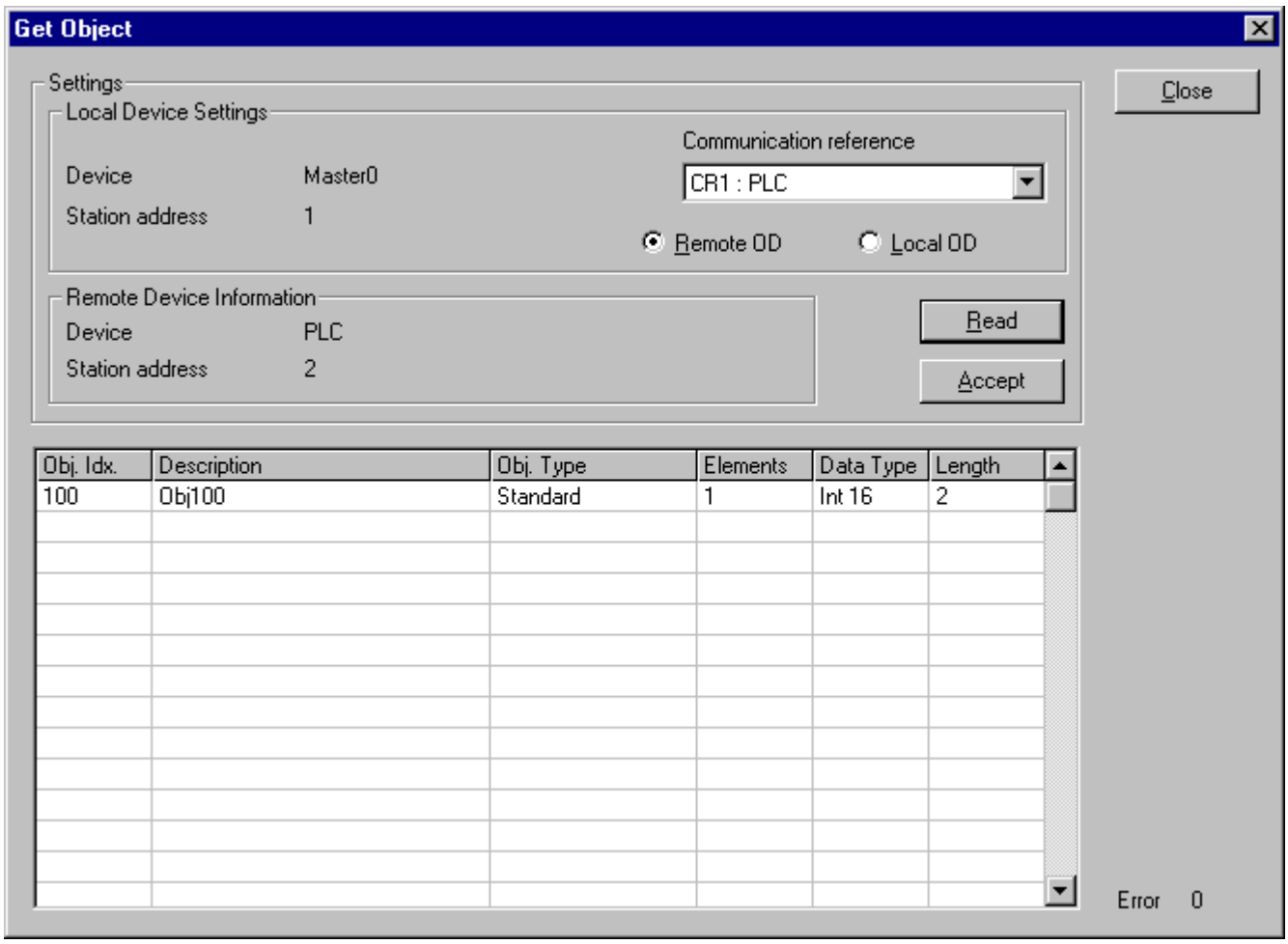


Figure 112: Online > Get Object Directory

6.8 Message Monitor

The Message Monitor permits access to the Mailbox of the CIF.

Note: The usage of the Message Monitor assumes advanced knowledge from the user.

First the Hilscher device must be chosen with a left mouse click on the symbol of the Hilscher device. Then call up the **Online > Message Monitor** menu.

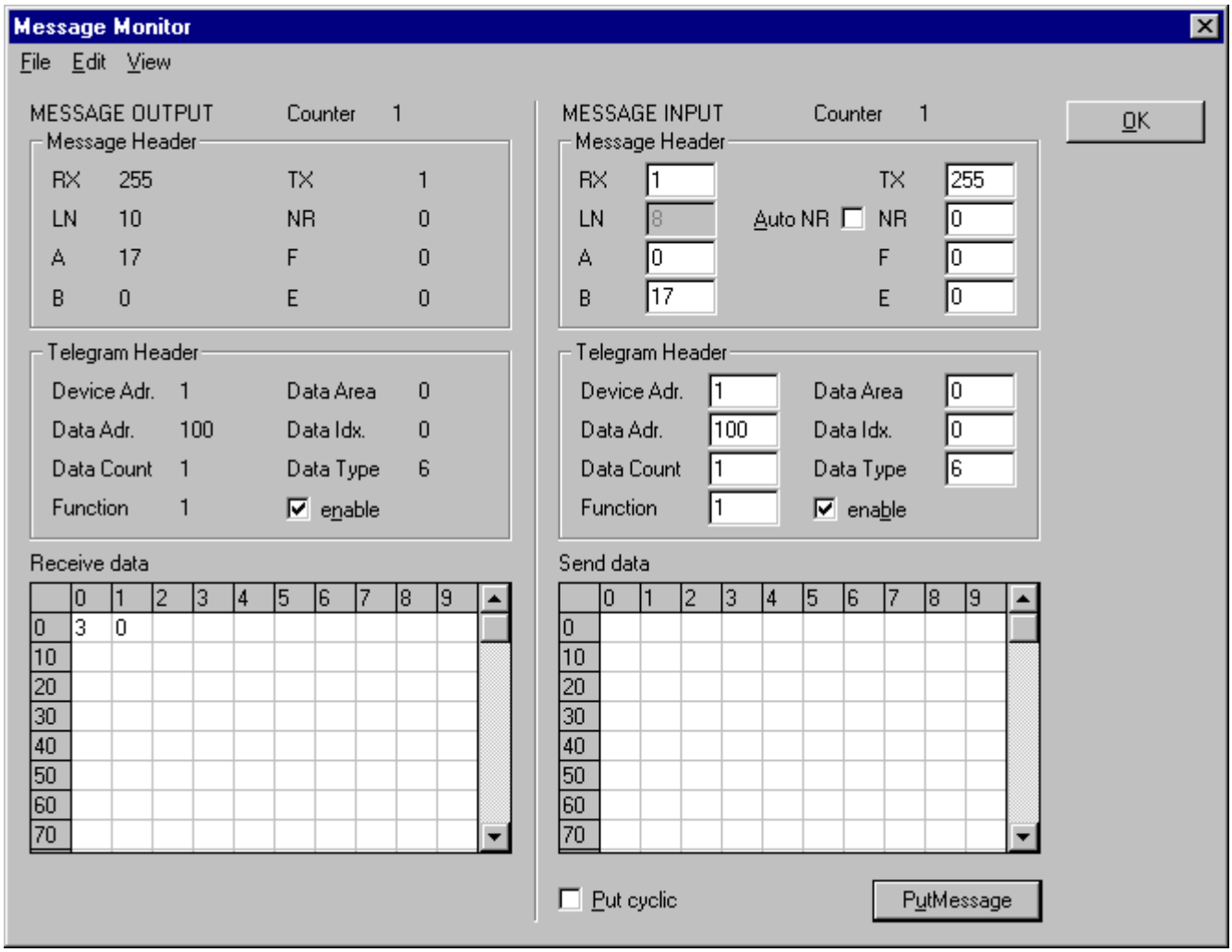


Figure 113: Online > Message Monitor

A Message can be saved and retrieved and has the file suffix *.MSG.

File > New: clears the window

File > Open: opens a Message (Message can be retrieved)

File > Save or **File > Save As**: saves a Message

File > Exit: ends the Message Monitor and returns to the SyCon.

Edit > Create answer: creates an answer Message

Edit > Reset counter: resets the Message counter

View > Review the received data: all received data is shown

View > Review the send data: all the send data is shown

View > Number of receipt errors: the number of the receipt errors is shown

View > Decimal/Hexadecimal: Switch the display format

It is recommend to create a sub-directory MSG and to store the messages there.

Figure 114: Save a Message

6.8.1 Message Monitor for Testing of DPV1 (at Master)

In the following the Message Monitor for reading and writing via DPV1 at the Master is described.

The following must be entered in the Message Monitor in order to read data via DPV1 from a Slave:

Message for Read via DPV1		
Message header		
Rx = 3 (always)	Tx = 255	
Ln = (calculated)	Nr = 0 .. 255	
A = 0	F = 0	
B = 17	E = 0	
Telegram header	**Meaning for DPV1**	**Value range**
Device Addr	Station address of the Slave	0 .. 126
Data Area	Unused	0
Data Address	Slot	0 .. 254
Data Index	Index	0 .. 255
Data Count	Data Count	1 .. 240
Data Type	Data Type	10
Function	Read	1

Table 53: Message Monitor – Example DPV 1 Read

The following must be entered in the Message Monitor in order to write data via DPV1 to a Slave:

Message for Write via DPV1		
Message header		
Rx = 3 (always)	Tx = 255	
Ln = (calculated)	Nr = 0 .. 255	
A = 0	F = 0	
B = 17	E = 0	
Telegram header	**Meaning for DPV1**	**Value range**
Device Addr	Station address of the Slave	0 .. 126
Data Area	Unused	0
Data Address	Slot	0 .. 254
Data Index	Index	0 .. 255
Data Count	Data Count	1 .. 240
Data Type	Data Type	10
Function	Write	2
Send Data		
Fill in as many data as the value in data count		

Table 54: Message Monitor – Example DPV 1 Write

6.8.2 Message Monitor for Testing of DPV1 (at Slave)

In the following the Message Monitor for reading and writing via DPV1 at the Slave is described.

The following must be entered in the Message Monitor in order to read data via DPV1 from a Slave. For this purpose, first a read Message must have been sent from the Master to the Slave. The Slave creates an answer as follows:

Message for Read via DPV1		
Message header		
Rx = 3 (always)	Tx = 255	
Ln = (calculated)	Nr = 0 .. 255	
A = 17	F = 0	
B = 0	E = 0	
Telegram header	**Meaning for DPV1**	**Value range**
Device Addr	Station address of the Slave	0 .. 126
Data Area	Unused	0
Data Address	Slot	0 .. 254
Data Index	Index	0 .. 255
Data Count	Data Count	1 .. 240
Data Type	Data Type	10
Function	Read	1
Read data		
Fill in as many data as the value in data count		

Table 55: Message Monitor – Example DPV 1 Read

The following must be entered in the Message Monitor in order to write data via DPV1 to a Slave. For this purpose first a write message must have been sent from the Master to the Slave. The Slave creates an answer as follows:

Message for Write via DPV1		
Message header		
Rx = 3 (always)	Tx = 255	
Ln = (calculated)	Nr = 0 .. 255	
A = 17	F = 0	
B = 0	E = 0	
Telegram header	**Meaning for DPV1**	**Value range**
Device Addr	Station address of the Slave	0 .. 126
Data Area	Unused	0
Data Address	Slot	0 .. 254
Data Index	Index	0 .. 255
Data Count	Data Count	1 .. 240
Data Type	Data Type	10
Function	Write	2

Table 56: Message Monitor – Example DPV 1 Write

6.8.3 Message Monitor for Testing of PROFIBUS-FDL transparent SDA

In the following the Message Monitor for sending data is described.

The following must be entered in the Message Monitor for sending data:

Message for send data via PROFIBUS-FDL transparent SDA		
Message header		
Rx = 1 (fixed)	Tx = 255	
Ln = (is calculated)	Nr = 0 .. 255	
A = 0	F = 0	
B = 17	E = 0	
Telegram header	**Meaning for FDL transparent SDA**	**Value range**
Device Addr	CR (Communication reference)	1 .. 32
Data Area	unused	0
Data Address	unused	0
Data Index	unused	0
Data Count	Data count	1 .. 240
Data Type	Data type	10
Function	Send/Write	2
Send data		
Fill in as many data as the value in data count		

Table 57: Message Monitor – Example FDL transparent SDA send

The following appears in the Message Monitor when data is received:

Message for receiving data via PROFIBUS-FDL transparent SDA		
Message header		
Rx = 16 (solid)	Tx = 1	
Ln = 9..249	Nr = 0 .. 255	
A = 0	F = 0	
B = 17	E = 0	
Telegram header	**Meaning for FDL transparent SDA**	**Value range**
Device Addr	CR (Communication reference)	1 .. 32
Data Area	unused	0
Data Address	unused	0
Data Index	unused	0
Data Count	Data count	1 .. 240
Data Type	Data type	10
Function	Send/Write	2
Receive data		
As many data as the value in data count		

Table 58: Message Monitor – Example FDL transparent SDA receive

6.8.4 Message Monitor for Testing of PROFIBUS-FDL transparent SDA/SDN

In the following the Message Monitor for sending data is described.

The following must be entered in the Message Monitor for sending data:

Message for send data via PROFIBUS-FDL transparent SDA/SDN		
Message header		
Rx = 1 (fixed)	Tx = 255	
Ln = (is calculated)	Nr = 0 .. 255	
A = 0	F = 0	
B = 17	E = 0	
Telegram header	**Meaning for FDL transparent SDA/SDN**	**Value range**
Device Addr	CR (Communication ref.)	1 .. 32
Data Area	Remote address	0 .. 126 Station address 127 Broadcast
Data Address	Local SAP	0, 2 .. 50, 52, 53, 55 .. 61
	Remote SAP	0, 2 .. 62
Data Index	unused	0
Data Count	Data count	1 .. 240
Data Type	Data type	10
Function	Send SDA Send SDN	176 177
Send data		
Fill in as many data as the value in data count		

Table 59: Message Monitor -- Example FDL Transparent SDA/SDN send

The following appears in the Message Monitor when data is received:

Message for receiving data via PROFIBUS-FDL transparent SDA		
Message header		
Rx = 16 (solid)	Tx = 1	
Ln = 9..249	Nr = 0 .. 255	
A = 0	F = 0	
B = 17	E = 0	
Telegram header	**Meaning for FDL transparent SDA/SDN**	**Value range**
Device Addr	CR (Communication ref.)	1 .. 32
Data Area	Remote address	0 .. 126 Station address 127 Broadcast
Data Address	Local SAP	0, 2 .. 50, 52, 53, 55 .. 61
	Remote SAP	0, 2 .. 62
Data Index	unused	0
Data Count	Data count	1 .. 240
Data Type	Data type	10
Function	Receive SDA Receive SDN	176 177
Receive data		
As many data as the value in data count		

Table 60: Message Monitor -- Example FDL Transparent SDA/SDN receive

6.8.5 Message Monitor for Testing of MPI (Client)

In the following the Message Monitor for reading and writing data blocks (DB) via MPI as PROFIBUS MPI-Client is described.

The following must be entered in the Message Monitor in order to read data via MPI from a Client:

Message for Read via MPI		
Message header		
Rx = 3 (always)	Tx = 255	
Ln = (calculated)	Nr = 8	
A = 0	F = 0	
B = 49	E = 0	
Telegram header	**Meaning for MPI**	**Value range**
Device Addr	Station address of the MPI server	0 .. 31
Data Area	Offset high	0 .. 255
Data Address	Data block (DB)	0 .. 65535
Data Index	Offset low	0 .. 255
Data Count	Data Count	1 .. 222
Data Type	Data Type	5
Function	Read	1

Table 61: Message Monitor – Example MPI Read

The following must be entered in the Message Monitor in order to write data via MPI to a Client:

Message for Write via MPI		
Message header		
Rx = 3 (always)	Tx = 255	
Ln = (calculated)	Nr = 9 .. 230	
A = 0	F = 0	
B = 17	E = 0	
Telegram header	**Meaning for MPI**	**Value range**
Device Addr	Station address of the MPI server	0 .. 31
Data Area	Offset high	0 .. 255
Data Address	Data block (DB)	0 .. 65535
Data Index	Offset low	0 .. 255
Data Count	Data Count	1 .. 216
Data Type	Data Type	5
Function	Write	2
Send Data		
Fill in as many data as the value in data count		

Table 62: Message Monitor – Example MPI Write

7 File, Print, Export, Edit and View

7.1 File

7.1.1 Open

An existing project can be opened with **File > open**.

7.1.2 Save and Save As

When the file name is known, the configuration can be saved under the **File > Save** menu, otherwise the **File > Save As** menu must be selected.

7.1.3 Close

The current project can be closed with **File > Close**.

7.2 Print

After the current printer has been selected in the **File > Printer Setup** menu, the configuration can be printed out under the **File > Print** menu. For a page view, select the **File > Page View** menu.

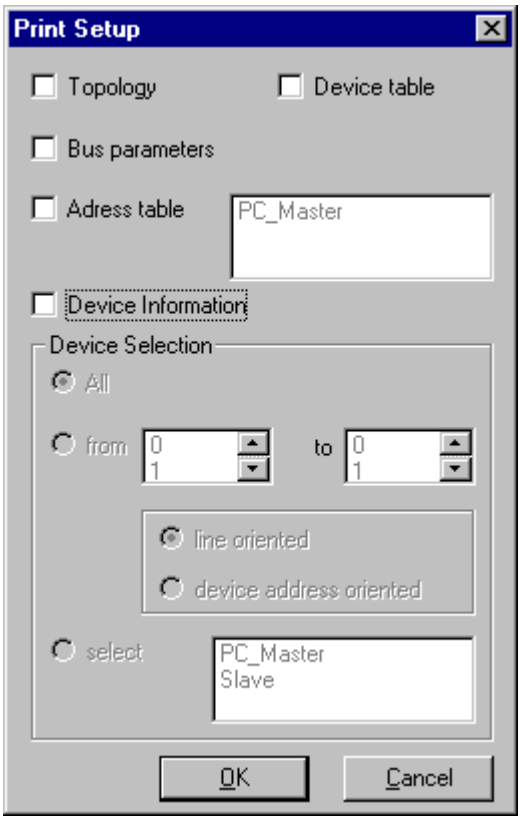


Figure 115: File > Print

The base setting prints information on one sheet only for one device.

Topology prints the topology of the bus system.

Bus parameters prints the bus parameters of the bus system.

Address table prints the address table of the Master.

Device table prints the device table.

The scope can be given with the **Device Selection** menu point. The following can be chosen:

- All
- From Station address to Station address
- Selection of a device by means of its description

If no option is selected and the **OK** button is pressed nothing will be printed out. It is like clicking the **Cancel** button.

7.3 Export Functions

7.3.1 DBM Export

Select the **File > Export > DBM menu** in order to save the previously saved project file (*.PB Microsoft Access Format) in a DBM file (Hilscher binary format). This DBM file can be retrieved in the DOS Compro program. The configuration is stored in the Project directory in the path of the SyCon Installation with the extension *.DBM.

Attention: The file name can have max. 8 characters.

7.3.2 CSV Export

With the menu **File > Export > CSV** the configuration data of the connected Slaves can be exported into a table.

Requirement is, that the configuration was saved before the export is executed. The exported file has the ending .csv (comma separated value) and is taken off in the same directory as the configuration, but with the ending *.csv.

The CSV file can be read with a table program like for example Excel.

The CSV Export saves only the text and the values of the configured Slaves. The meaning of the individual values can be shown in the table.

Here is the description of the parameters:

Parameter	Meaning
Stationaddress	The Stationaddress is the unique device address of the Slave on the bus.
RecordType	The RecordType defines the version of the following structure and is always 2.
IdentNumber	This number is the unique device number of the Slave.
VendorNumber	The VendorNumber is the clear number of the vendor (if available).
VendorName	Here the name of the vendor is shown (max. 32 characters).
Device	Name of the device (max. 32 characters).
Description	This is the description of the device, which is set by the user (max. 32 characters).
MasterAddress	This is the number of the Master Address, where the devices are related to.
Settings	Contains information about the addressing mode and the storage format of the process data (words, double words and floats) see section *Description of the Parameter Settings*.
Reserved	reserved
ModulCount	Number of the modules of the device. For each module the parameters data type, data size, data position and offset address are given. It can be follow max 60 modules. The parameters for module 1 are marked with ..._0 and of the module 60 are marked with ..._59.
DataSize_0	Number of bytes, which were used by the module.
DataType_0	The DataType, which is used in the configuration. The code for this you find below this table in section *Description of the Parameter DataType.*
DataPosition_0	The byte DataPosition, which is used in the configuration. The code for this you find below this table in section *Description of the Parameter DataPosition.*
Address_0	Offset Address in the Dual-port memory
...	...
DataSize_59	if used, see at the top
DataType_59	if used, see at the top
DataPosition_59	if used, see at the top
Address_59	if used, see at the top

Table 63: CSV Export - Meaning of the values

7.3.2.1 Description of the Parameter Settings

D7	D6	D5	D4	D3	D2	D1	D0
Reserved Area						Format	Address Mode
							0 byte Address 1 word Address
						1 little Endian (LSB/MSB) 0 big Endian (MSB/LSB)	
reserved							

Table 64: CSV-Export - Description of the Byte Settings

7.3.2.2 Description of the Parameter DataType

D7	D6	D5	D4	D3	D2	D1	D0
SubFlag	Data Direction			Data Format			
				according EN standard 0 blank space 1 Boolean 2 Integer 8 3 Integer 16 4 Integer 32 5 Unsigned Integer 8 6 Unsigned Integer 16 7 Unsigned Integer 32 8 Float 9 ASCII 10 String 14 Bit			
	0 empty space 1 input 2 output						
0 start of a module 1 sub module							

Table 65: CSV Export > DataType Code

7.3.2.3 Description of the Parameter DataPosition

D7	D6	D5	D4	D3	D2	D1	D0
Reserved Area				Bit Position			
				Bit Position of the Offset Address			
reserved							

Table 66: CSV Export > DataPosition Code

7.3.2.4 Example of a CSV file

Example of a CSV file which was exported in Excel:

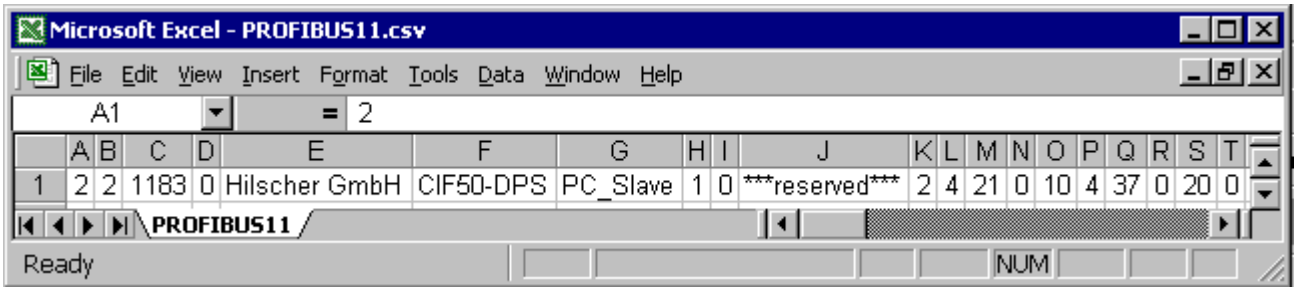


Figure 116: Example of a CSV File in Excel

Cell	Parameter	Value	Meaning
A1	StationAddress	2	Station address of the PROFIBUS Slave device.
B1	RecordType	2	The RecordType is always 2.
C1	IdentNumber	1183 (0x049F)	IdentNumber of the Slaves.
D1	VendorNumber	0	No Vendor number is available.
E1	VendorName	Hilscher GmbH	Vendor name of the device.
F1	Device	CIF50-DPS	Description of the device.
G1	Description	PC_Slave	Description of the device which is also shown in SyCon as the name of the device.
H1	MasterAddress	1	Address of the related Master.
I1	Settings	0	The addressing mode (byte- or word addressing) and the data format of the process data are shown. The description you see in section *Description of the Parameter Settings*.
J1	reserved	reserved	reserved
K1	ModulCount	2	Number of the modules of the device. For each module the information with datatype, data size, data position and the offset address follow. The information for module 1 you find in the cells L1, M1, N1, O1 and for module 2 in the cells P1, Q1, R1, S1.
L1	DataSize	4	The size of the module is 4 bytes.
M1	DataType	21	Input; Datatype unsigned Integer 8
N1	DataPosition	0	Output; Datatype unsigned Integer 8
O1	Offsetaddress	10	4 Byte-Module starting with the offset address 10.
P1	DataSize	4	The size of the module is 4 bytes.
Q1	DataType	37	Output; Datatype unsigned Integer 8
R1	DataPosition	0	Data position of the second module.
S1	Offsetaddress	20	4 Byte-Module starting with the offset address 10.
T1...IQ1	...	0	The modules 3 till 59 are not used for this device and so a 0 is shown.

If two or more Slave devices are connected to the Master, these are displayed in the next lines of the table.

7.3.3 PDD Export

The abbreviation PDD stands for Predefined Device. The purpose of the PDD Export is to export the configured devices to a file in order to insert, or copy them again.

It is recommended to create a sub-directory with the name PDD in the SyCon directory in order to store the PDD files.

With the left mouse button, first set the focus on the Slave (left mouse click) to be exported. Alternatively the Master can be selected (again a left mouse click) in order to export several Slaves at the same time.

Select the **File > Export > PDD**.

Figure 117: PDD Export (1)

Enter the file name. As an example the figure shows the name Slave (.PDD).

Now select **Open**. The following figure appears:

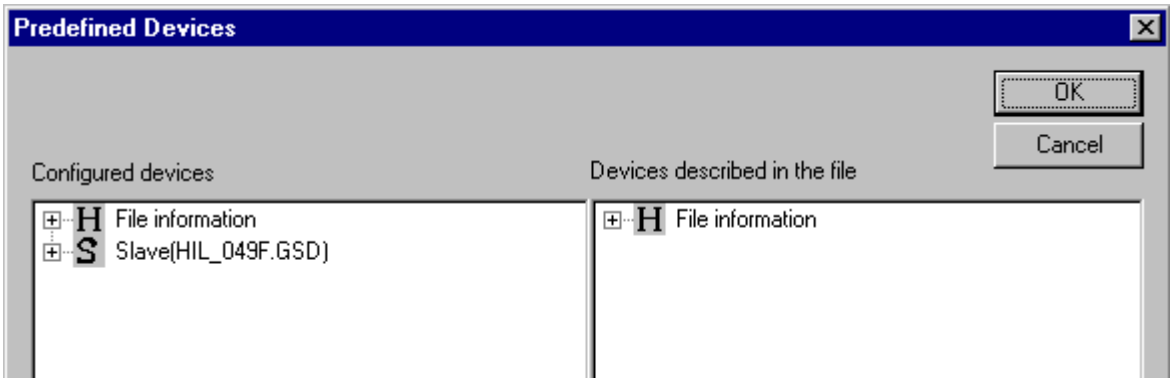


Figure 118: PDD Export (2)

For instance, select the device/s from **Configured devices** (left-hand side) and pull them to the **Devices described in file** side (right-hand side) and release the left mouse button (drag and drop). The following figure appears:

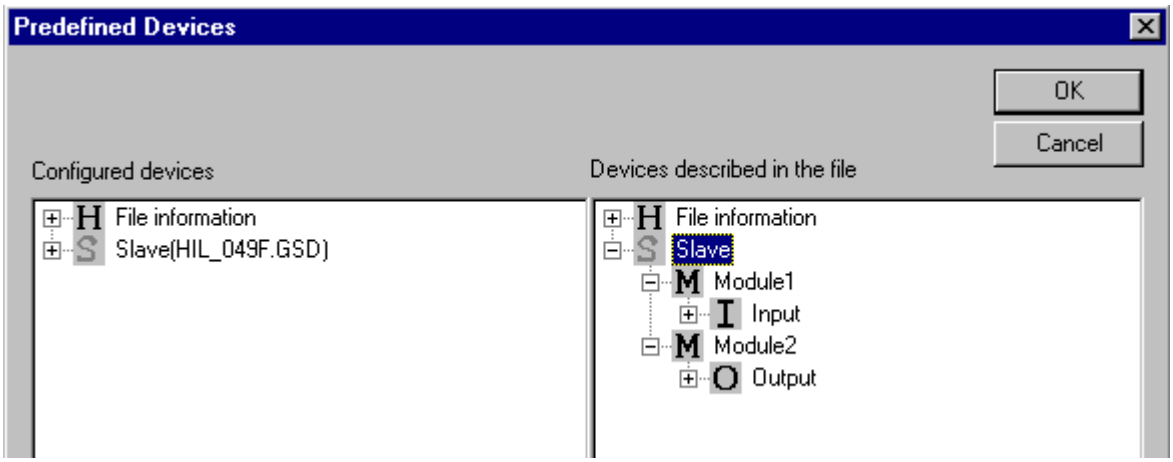


Figure 119: PDD Export (3)

The figure shows a device with the description Slave2 consisting of two modules with the description Module1 and Module2.

Select **OK** in order to write the PDD Export into the file.

The symbols have the following meaning:

Symbol	Meaning
H	Header (File Information)
S	Slave
M	Module
I	Input
O	Output

Table 67: PDD Symbols

Finally, the path and the file name are given.

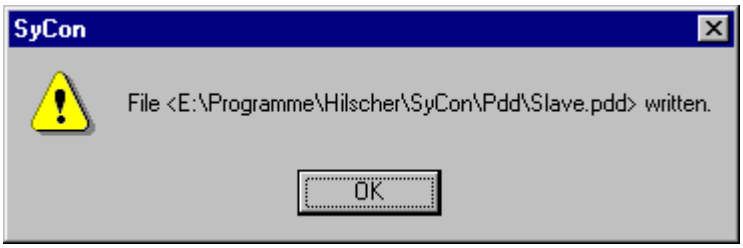


Figure 120: PDD Export (4)

7.4 Edit

7.4.1 Cut, Copy and Paste (Master)

With the menus **Edit > Cut** and **Edit > Copy** you put the cut/copied Master with its settings and configuration (only not the description of the Master) in the Clipboard and with **Edit > Paste** it can be insert.

The difference between **Cut** and **Copy** is:

With the menu option **Edit > Cut** you move a Master from one point in the configuration to another. With the menu option **Edit > Copy** you duplicate an existing Master.

If you select **Edit > Cut** a security question appears.

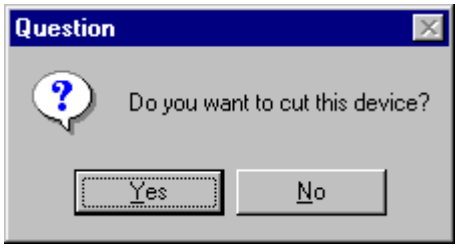


Figure 121: Security question cut device (Master)

If you answer this question with **Yes** the Master is cut and stays in the clipboard.

With the menu **Edit > Insert** and clicking at the position where the Master should be insert, a window opens where the cut/copied Master can be selected.

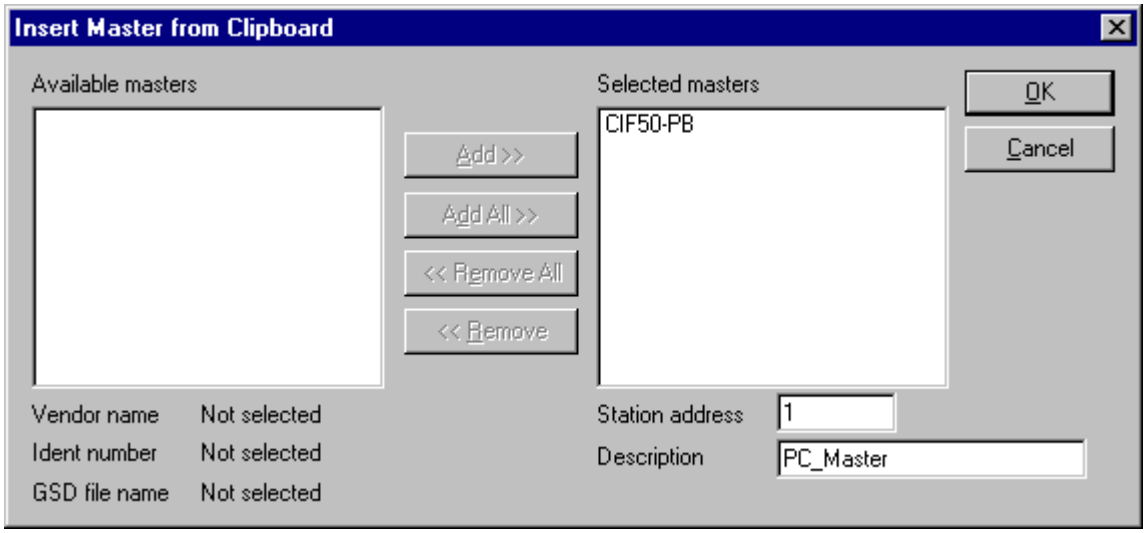


Figure 122: Insert a cut/copied Master

When you click on the **OK** button the Master will be insert in the configuration.

7.4.2 Cut, Copy and Paste (Slave)

With the menus **Edit > Cut** and **Edit > Copy** you put the cut/copied device with its settings and configuration (only not the description of the device) in the Clipboard and with **Edit > Paste** it can be insert.

The difference between **Cut** and **Copy** is:

With the menu option **Edit > Cut** you move a device from one point in the configuration to another. With the menu option **Edit > Copy** you duplicate an existing device.

If you select **Edit > Cut** a security question appears.

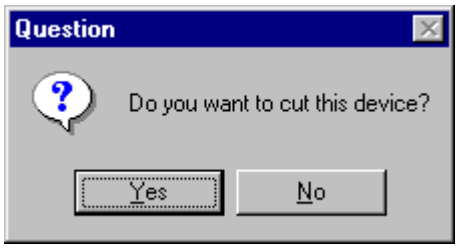


Figure 123: Security question cut device (Slave)

If you answer this question with **Yes** the device is cut and stays in the clipboard.

With the menu **Edit > Insert** and clicking at the position where the device should be insert, a window opens where the cut/copied device can be selected.

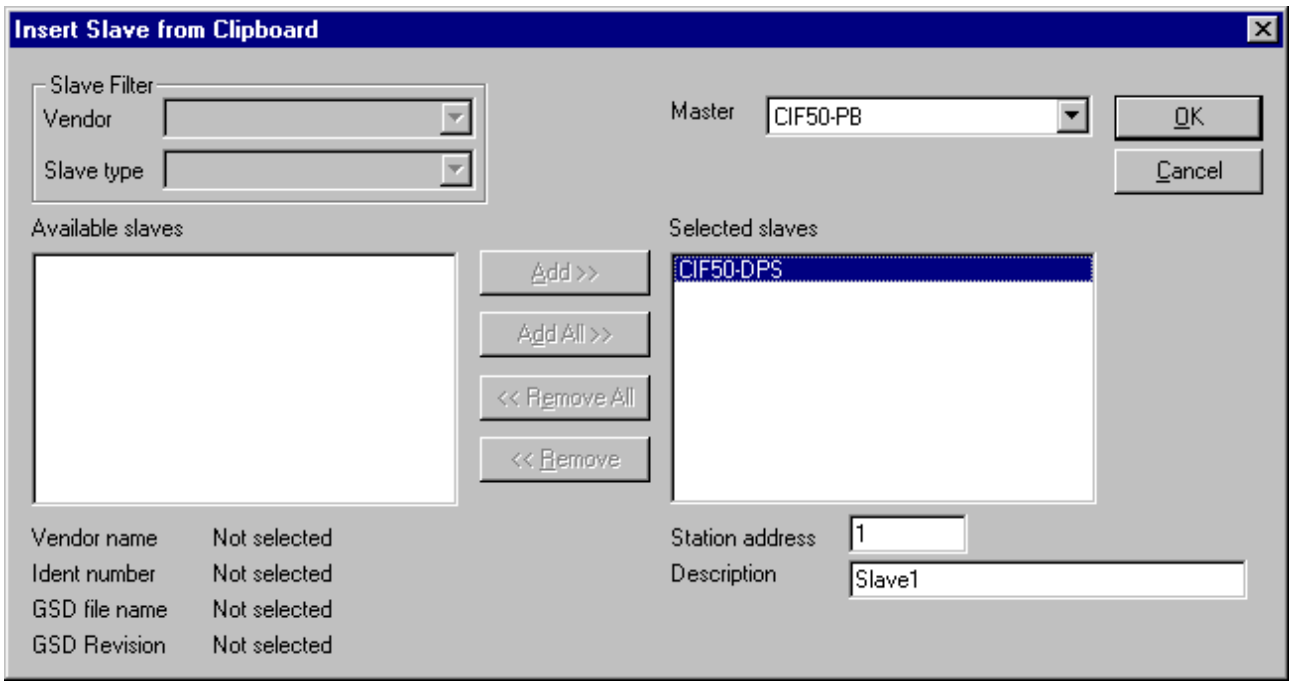


Figure 124: Insert a cut/copied device

When you click on the **OK** button the device will be insert in the configuration.

7.4.3 Delete

To delete a Master or Slave device you first have to mark this device and then select the menu **Edit > Delete**. Before SyCon deletes the Master or Slave a security question appears.

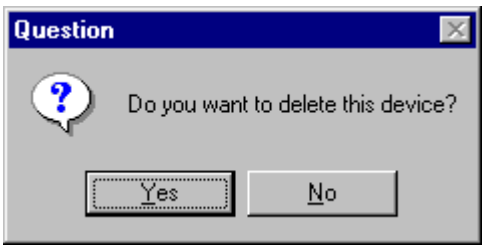


Figure 125: Security question delete device

Note: When you delete a device the settings and the configuration of this device get lost.

7.4.4 Replace

With the menu **Edit > Replace** a Master or Slave device can be replaced. How to replace the Master look in section *Replace Master* at page *47*. If you want to replace a Slave device look in section *Replace Slave* at page *56*.

7.5 View of the Configuration

The configuration can be displayed in a table. The following tables are available:

- Device Table
- Address Table (Occupation of the process image memory in the Hilscher PROFIBUS-DP Master)
- CRL Table (PROFIBUS-FMS)
- OD Table (PROFIBUS-FMS)

Selecting the menu **View > Address Table**, **View > CRL Table** or **View > OD Table** the following windows may appear to select the Hilscher Master device.

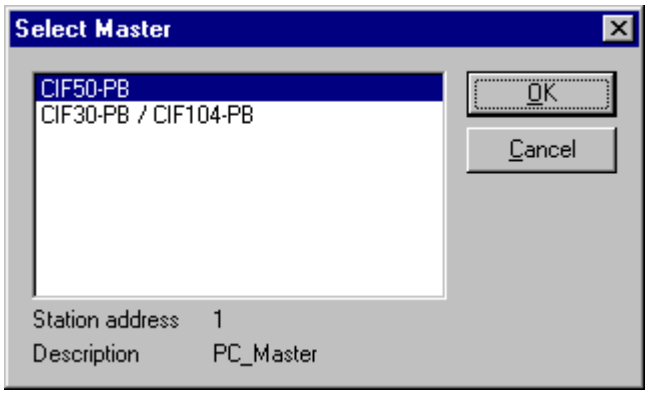


Figure 126: View and Select Master

7.5.1 Device Table

The **View > Device Table** menu shows the list of all devices that have been inserted.

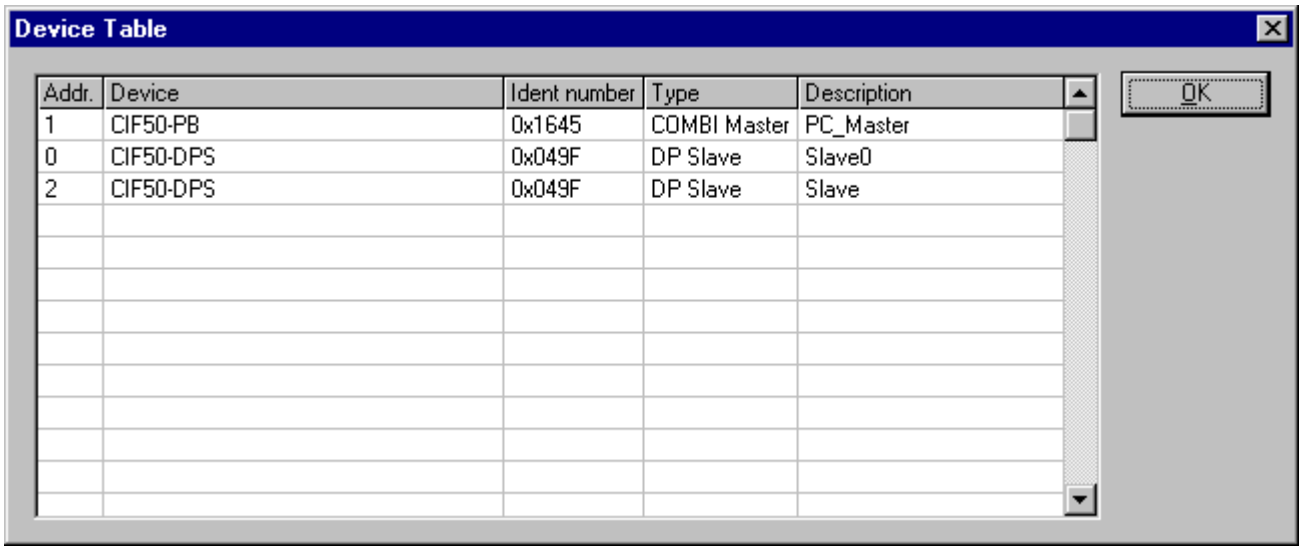


Figure 127: View > Device Table

7.5.2 Address Table

A list of all addresses used in the process depiction is displayed in the **View > Address Table** menu. For this purpose the current Master must be chosen for which the table is displayed.

Addresses refer to the Master.

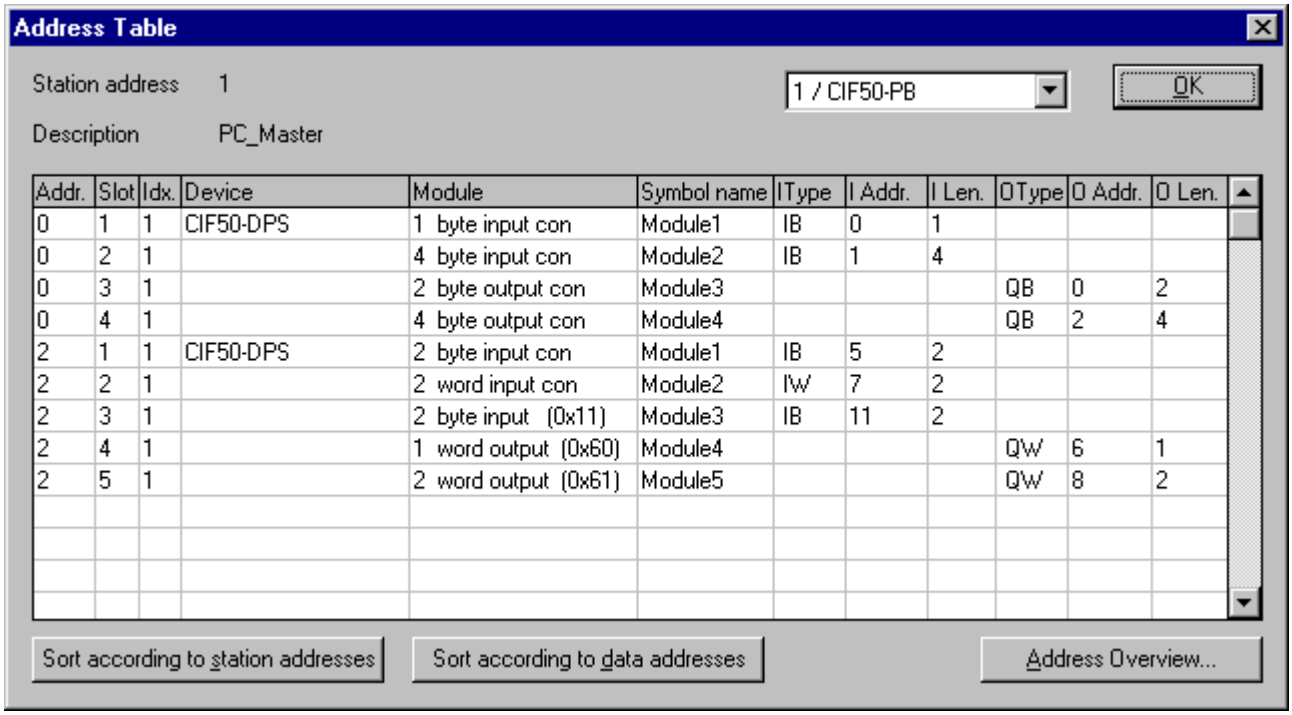


Figure 128: View > Address Table

It is possible to sort the addresses according to Station addresses or data addresses.

7.5.2.1 Address Overview

Starting from **View > Address Table** and then **Address Overview** opens the window with the overview over the used addresses in the input process image and the output process image.

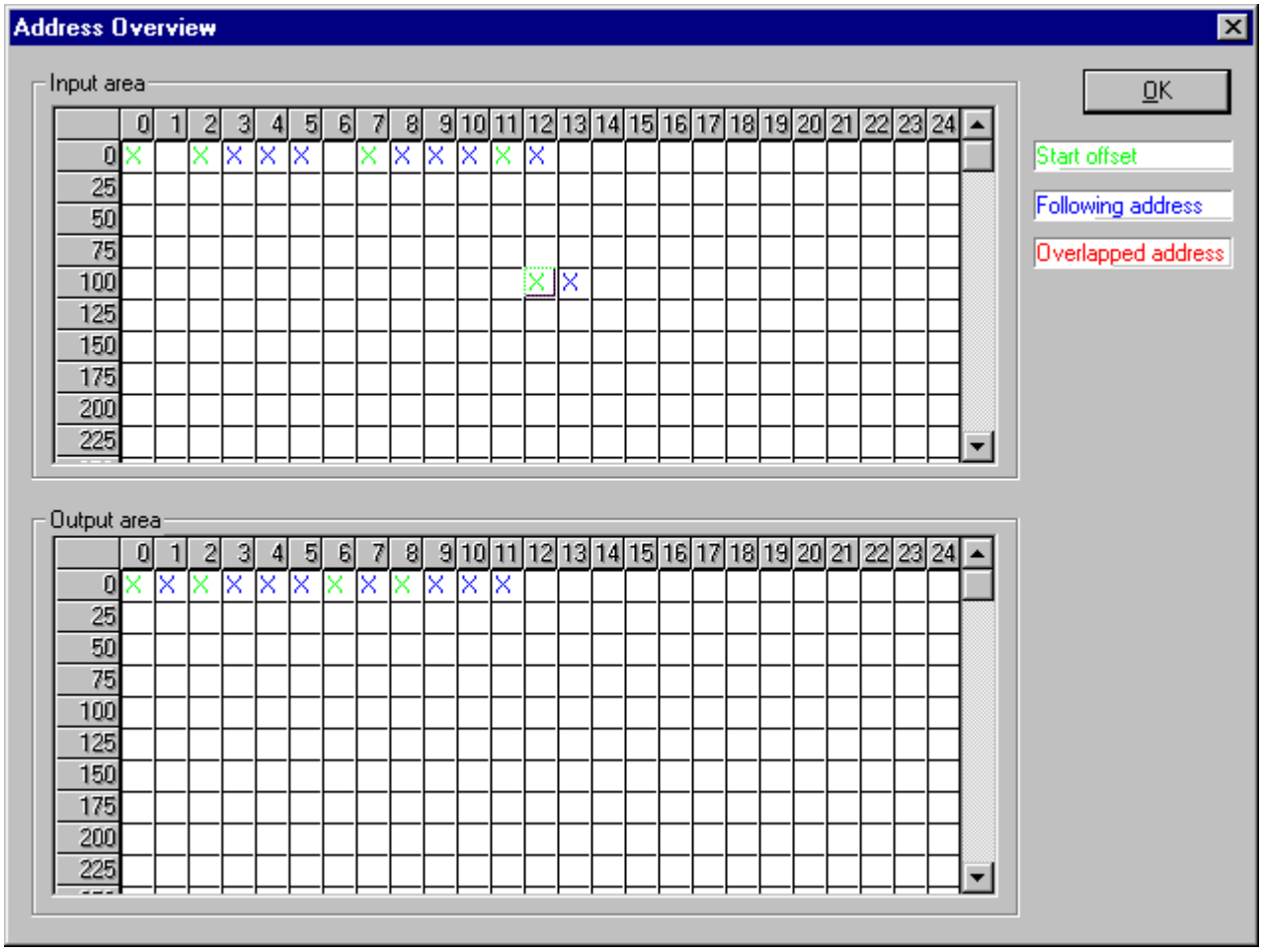


Figure 129: View > Address Table > Address Overview

Note: To change the offset addresses here the auto addressing mode has to be disabled.

The assignments can be changed here by making the auto addressing disabled. In order to change the assignment, click with the left mouse button on a cross and keep the mouse button pressed. The mouse button changes to an arrow. Pull the arrow (with depressed mouse button) to the desired (unoccupied) position and release the mouse button. A confirmation query will appear, whether the change is carried out or not.

The assignment of the Offset address can also be carried out via the Slave configuration menu.

The above example shows the moving of a two- Byte module.

Overlapping addresses are shown with a red cross. This means that this address is used by more than one module.

7.5.2.2 Byteinformation Window

The information which Slave occupies a particular address can be seen by a double click on the corresponding cross. The **Byte information window** opens.

7.5.3 CRL Table

The communication reference list is shown in the **View > CRL Table** menu. The information refers to the PROFIBUS-FMS.

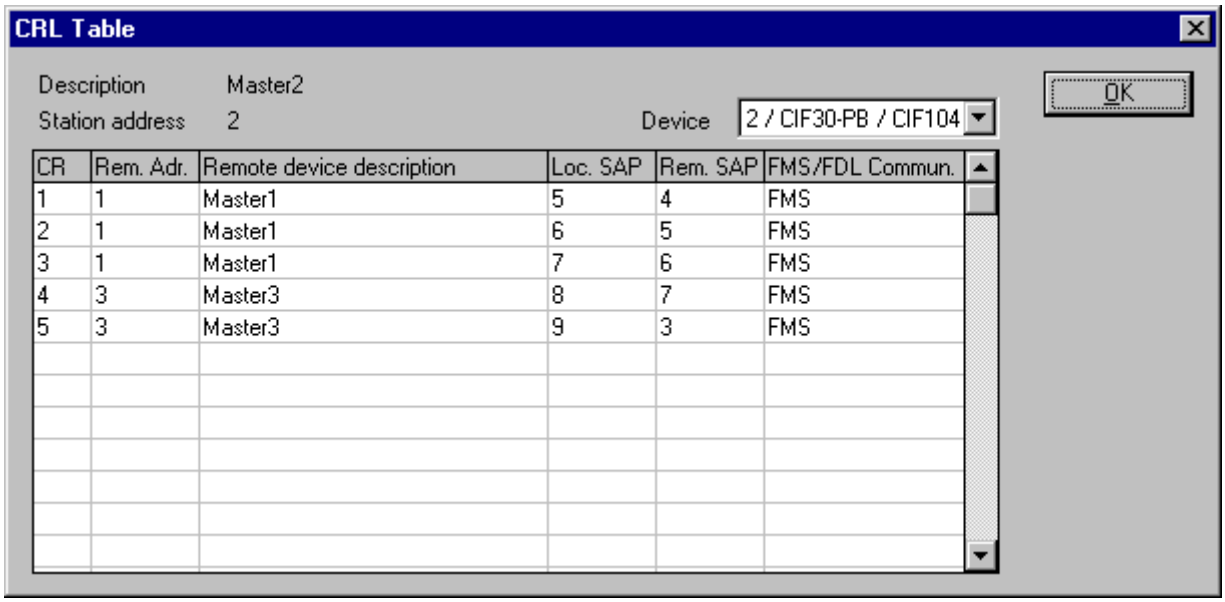


Figure 130: View > CRL Table

7.5.4 OD Table

The Object directory is shown in the **View > OD Table** menu. The information refers to the PROFIBUS-FMS.

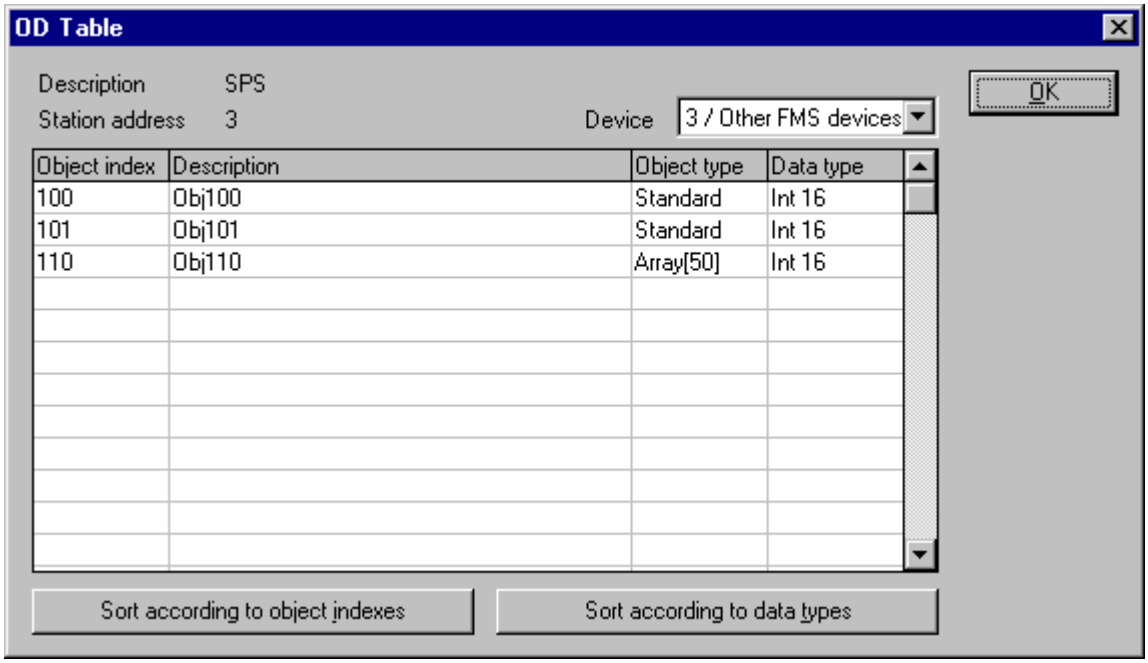


Figure 131: View > OD Table

8 Tools

8.1 GSD Viewer

The menu **Tools > GSD Viewer** opens a GSD file to view it.

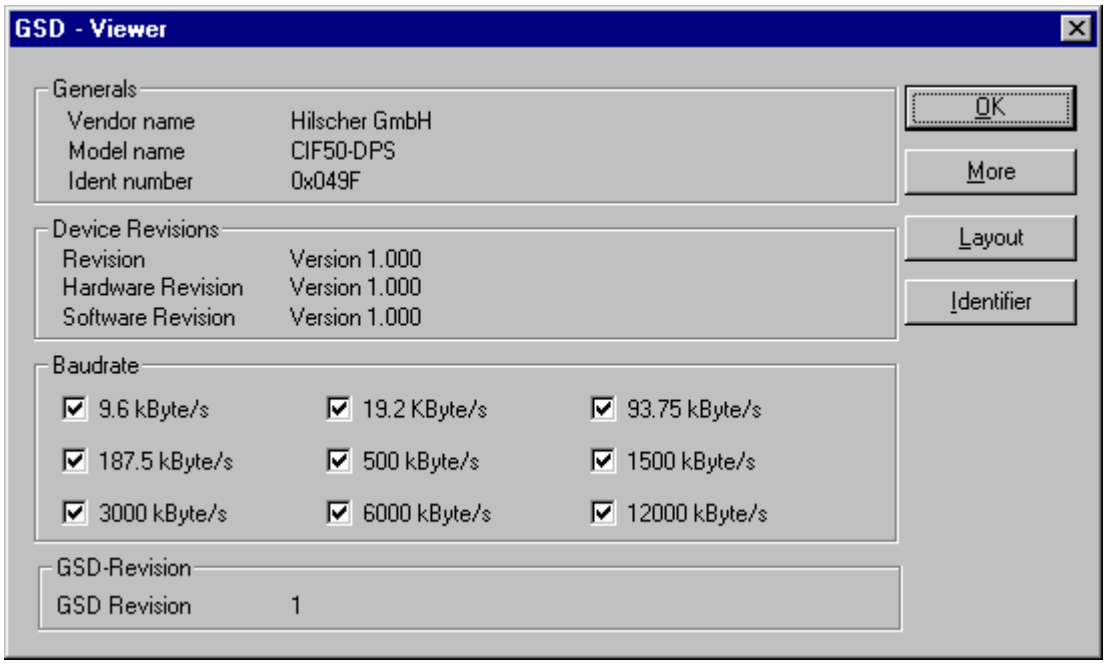


Figure 132: Tools > GSD Viewer

With **More** the information e.g. max. Number of modules, max. Number of I/O data, max. length of input data and max. length of output data is displayed.

With **Layout** the icons for the Slave are displayed for

- Configuration phase
- Run phase
- Diagnostic phase.

With **Identifier** the modules of the device and its identifier bytes are displayed.

8.2 PKV40 / PKV50 Gateway

The Tools menu for the PKV40 and respectively PKV50 is described in an own operating manual.

9 Error Numbers

9.1 CIF Device Driver (Dual-port memory) Error Numbers (-1 .. -49)

This is the list of error numbers of Dual-port memory access using the CIF Device Driver.

Error Number	Description
-1	Driver: Board not initialized The communication board is not initialized by the driver. No or wrong configuration found for the given board, check the driver configuration. Driver function used without calling DevOpenDriver() first.
-2	Driver: Error in internal ‘Init state‘
-3	Driver: Error in internal ‘Read state‘
-4	Driver: Command on this channel is active
-5	Driver: Unknown parameter in function occurred
-6	Driver: Version is incompatible The device driver version does not correspond to the driver DLL version. From version V1.200 the internal command structure between DLL and driver has changed. Make sure to use the same version of the device driver and the driver DLL.
-10	Device: Dual port memory RAM not accessible (board not found) Dual-ported RAM (DPM) not accessible / no hardware found. This error occurs, when the driver is not able to read or write to the Dual-port memory. Check the BIOS setting of the PC Memory address conflict with other PC components. Try another memory address, check the driver configuration for this board, and check the jumper setting of the board.
-11	Device: Not ready (RDY flag=Ready flag failed) Board is not ready. This could be a hardware malfunction or another program writes inadmissible to the dual-port memory.
-12	Device: Not running (RUN flag=Running flag failed) The board is ready but not all tasks are running, because of an initialization error. No data base is loaded into the device or a wrong parameter can be the reason that a task can't initialize.
-13	Device: Watch dog test failed
-14	Device: Signals wrong Operating System version No license code found on the communication board. Device has no license for the used operating system or customer software. No firmware or no data base to the device is loaded.

Table 68: CIF Device Driver Error Numbers (-1..-14)

Error Number	Description
-15	Device: Error in dual port memory flags
-16	Device: Send mailbox is full
-17	Device: Function PutMessage timeout No message could be send during the timeout period given in the DevPutMessage() function. If you use an interrupt, check the interrupt on the device and in driver setup. These settings have to be the same! Is an interrupt on the board set? Is the right interrupt set? The interrupt could already be used by another PC component, also if the operating system reports it as unused. If you use polling mode, then make sure that no interrupt is set on the board and that polling is set in the driver setup. These settings have to be the same! Device internal segment buffer full and therefore PutMessage() function is not possible, because all segments on the device are in use. This error occurs, when only PutMessage() is used but not GetMessage(). HOST flag is not set for the device. No messages are taken by the device. Use DevSetHostState() to signal a board an application is available.
-18	Device: Function GetMessage timeout No message received during the timeout period given in the DevGetMessage() function. If you use an interrupt, then check the interrupt on the device and in driver setup. These settings have to be the same! Is an interrupt on the board set? Is the right interrupt set? The interrupt could already be used by another PC component, also if the operating system reports it as unused. If you use polling mode, then make sure that no interrupt is set on the board and that polling is set in the driver setup. These settings have to be the same! The used protocol on the device needs longer than the timeout period given in the DevGetMessage() function.
-19	Device: No message available

Table 69: CIF Device Driver Error Numbers (-15..-19)

Error Number	Description
-20	Device: Reset command timeout The board is ready but not all tasks are running, because of an initialization error. No data base is loaded into the device or a wrong parameter can be the reason that a task can't initialize. The device needs longer than the timeout period given in the DevReset() function. Using device interrupts. The timeout period can differ between fieldbus protocols. If you use an interrupt, then check the interrupt on the device and in driver setup. These settings have to be the same! Is an interrupt on the board set? Is the right interrupt set? The interrupt could already be used by another PC component, also if the operating system reports it as unused. If you use polling mode, then make sure that no interrupt is set on the board and that polling is set in the driver setup. These settings have to be the same!
-21	Device: COM flag not set The device can not reach communication state. Device not connected to the fieldbus. No station found on the fieldbus. Wrong configuration on the device.
-22	Device: IO data exchange failed
-23	Device: IO data exchange timeout The device needs longer than the timeout period given in the DevExchangeIO() function. If you use an interrupt, then check the interrupt on the device and in driver setup. These settings have to be the same! Is an interrupt on the board set? Is the right interrupt set? The interrupt could already be used by another PC component, also if the operating system reports it as unused. If you use polling mode, then make sure that no interrupt is set on the board and that polling is set in the driver setup. These settings have to be the same!
-24	Device: IO data mode unknown
-25	Device: Function call failed
-26	Device: Dual-port memory size differs from configuration
-27	Device: State mode unknown

Table 70: CIF Device Driver Error Numbers (-20..-27)

Error Number	Description
-30	User: Driver not opened (device driver not loaded) The device driver could not be opened. Device driver not installed. Wrong parameters in the driver configuration. If the driver finds invalid parameters for a communication board and no other boards with valid parameters are available, the driver will not be loaded.
-31	User: Can't connect with device board
-32	User: Board not initialized (DevInitBoard not called)
-33	User: IOCTRL function failed A driver function could not be called. This is an internal error between the device driver and the DLL. Make sure to use a device driver and a DLL with the same version. An incompatible old driver DLL is used.
-34	User: Parameter DeviceNumber invalid
-35	User: Parameter InfoArea unknown
-36	User: Parameter Number invalid
-37	User: Parameter Mode invalid
-38	User: NULL pointer assignment
-39	User: Message buffer too short
-40	User: Size parameter invalid
-42	User: Size parameter with zero length
-43	User: Size parameter too long
-44	User: Device address null pointer
-45	User: Pointer to buffer is a null pointer
-46	User: SendSize parameter too long
-47	User: ReceiveSize parameter too long
-48	User: Pointer to send buffer is a null pointer
-49	User: Pointer to receive buffer is a null pointer

Table 71:CIF Device Driver Error Numbers (-30..-49)

Error Number	Description
1000	If the operating system of the device reports an initialization error, then a value of 1000 will be add to the error number and shown to the user

Table 72: CIF Device Driver Error Numbers (1000)

9.2 CIF Serial Driver Error Numbers (-20 .. -71)

This is the list of error numbers using the serial driver.

Error Number	Description
-20	Driver: No COM port found or COM port already in use.
-21	Driver: COM port already opened
-22	Driver: Function call into driver has failed
-23	Driver: Internal driver error
-24	Driver: Could not create read thread
-25	Driver: Could not create read event
-26	Driver: Could not create write event
-27	Driver: Could not create timer event
-28	Driver: Error by writing data
-29	Driver: Wrong COM state
-30	Driver: COM state error is set
-31	Driver: COM buffer setup failed
-32	Driver: COM set timeout failed
-33	Driver: Receive buffer overrun
-34	Driver: Receive buffer full
-35	Driver: Send busy
-36	Driver: Error during close driver
-40	User: COM port not opened
-41	User: Invalid handle value
-42	User: Invalid COM number
-43	User: Size parameter invalid
-44	User: Size parameter zero
-45	User: Buffer pointer is NULL
-46	User: Buffer too short
-47	User: Setup error

Table 73: CIF Serial Driver Error Numbers (-20..-47)

Error Number	Description
-50	User: Send message, timeout error
-51	User: Could not send a message Cable not connected. Wrong cable. Device does not respond.
-52	User: Send message, no device connected
-53	User: Error by send message, message receiving
-54	User: Telegram collision
-55	User: Telegram, no acknowledgement received
-56	User: Telegram, noise
-57	User: Telegram, data overrun
-58	User: Telegram, parity error
-59	User: Telegram, framing error
-60	User: Telegram, unknown error
-70	User: Timeout by receive a message
-71	User: No message received

Table 74: CIF Serial Driver Error Numbers (-20..-47)

9.3 CIF TCP/IP Driver Error Numbers

This is the list of error numbers using the CIF TCP/IP Driver.

9.3.1 Standard Win32 Socket API Errors

Error Number	Description
10013	Permission denied
10024	Too many open sockets.
10048	Address already in use
10049	Cannot assign requested address.
10050	Network is down
10051	Network is unreachable
10052	Network dropped connection on reset
10053	Software caused connection abort. An established connection was aborted by the software in your host machine, possibly due to a data transmission time-out or protocol error.
10054	Connection reset by peer
10055	No buffer space available
10056	Socket is already connected
10057	Socket is not connected.
10058	Cannot send after socket shutdown
10060	Connection timed out
10061	Connection refused
10065	No route to host
10092	Winsock.dll version out of range

Table 75: CIF TCP/IP Driver Error Numbers - Standard Win32 Socket API errors

9.3.2 Specific NetIdent Errors

Error Number	Description
0x8004c701	Unknown Device Error
0x8004c702	Request Pending
0x8004c703	Set IP time exceeded
0x8004c704	IP address invalid
0x8004c705	Returned IP address invalid
0x8004c706	Answer from wrong device
0x8004c707	Wrong OP code received
0x8004c708	NetIdent Timeout

Table 76: CIF TCP/IP Driver Error Numbers - Specific NetIdent Errors

9.4 RCS Error Numbers (4 .. 93)

This is the list of error numbers returned by the RCS (Realtime Communication System), that is the operating system of Hilscher devices. The error number is returned in an answer message. Command messages and answer messages are used to communicate between the application (e.g. the System Configurator) and the Hilscher device. An example of this communication is the download of a configuration.

Error Number	Description
4	Task does not exist
5	Task is not initialized
6	The MCL is locked
7	The MCL rejects a send command because of an error
20	The user will download a database into the device that is not valid for this device type.
21	Data base segment not configured or not existed
22	Number for message wrong during download
23	Received number of data during download does not match to that in the command message
24	Sequence identifier wrong during download
25	Checksum after download and checksum in command message do not match
26	Write/Read access of data base segment
27	Download/Upload or erase of configured data base type is not allowed
28	The state of the data base segment indicated an error. Upload not possible
29	The access to the data base segment needs the bootstraploader. The bootstraploader is not present
30	Trace buffer overflow
31	Entry into trace buffer too long
37	No or wrong license. The OEM license of the System Configurator allows only communication to devices that have the same license inside
38	The data base created by the System Configurator and the data base expected by the firmware is not compatible
39	DBM module missing

Table 77: RCS error numbers (answer message) (4..39)

Error Number	Description
40	No command free
41	Command unknown
42	Command mode unknown
43	Wrong parameter in the command
44	Message length does not match to the parameters of the command
45	Only a MCL does use this command to the RCS
50	FLASH occupied at the moment
51	Error deleting the FLASH
52	Error writing the FLASH
53	FLASH not configured
54	FLASH timeout error
55	Access protection error while deleting the FLASH
56	FLASH size does not match or not enough FLASH memory
60	Wrong structure type
61	Wrong length of structure
62	Structure does not exist
70	No clock on the device
80	Wrong handle for the table (table does not exist)
81	Data length does not match the structure of this table
82	The data set of this number does not exist
83	This table name does not exist
84	Table full. No more entries allowed
85	Other error from DBM
90	The device info (serial number, device number and date) does already exist
91	License code invalid
92	License code does already exist
93	All memory locations for license codes already in use

Table 78: RCS error numbers (answer message) (40..93)

9.5 Database Access Error Numbers (100 .. 130)

The following table lists the error numbers of the database access errors

Error Number	Description
100	Database already opened
101	Dataset could not be opened
103	Error while opening database occurred
104	No valid path name
105	No connection to data base. Call function DbOpen().
106	Error in parameter
107	Error during opening a table
108	Null pointer occurred
109	Table not opened. Call function OpenTable() first.
110	The first record is reached
111	The last record is reached
112	Unknown type in the record found
113	Data has to be truncated
114	No access driver installed on the system
115	Exception received
116	This table is set to read only
117	There is no data set in the table
118	The requested table could not be edit
119	An operation could not be completed
120	User gives an unexpected length in WriteDs().
121	An assertion failed
122	DLL not found
123	DLL couldn't be freed
124	Specified function not found in the DLL
125	ODBC Function returns an error
126	Count of data bytes in the record exceeds 1938
127	DBM32 DLL is not loaded
128	Field with the given index was not found
129	This table contains no records
130	Invalid character (' ') found in a Table or Column

Table 79: Database Access Error Numbers (100..130)

9.6 Online Data Manager Error Numbers

9.6.1 Online Data Manager Error Numbers (1000 .. 1018)

The following table lists the error numbers of the Online Data Manager.

Error Number	Description
1000	Driver OnlineDataManager not opened
1001	Initialization of the OnlineDataManager has failed
1002	No DriverObject found. OnlineDataManager Sub DLL not found.
1003	No DeviceObject found. Device not found.
1004	Application not found
1010	Application has requested an unknown event
1011	Application has requested an unknown function mode, operating mode. Known function modes, operating modes are Reset, Download, Register Server, Unregister Server.
1012	Application has requested an unknown command
1013	Message Server already exists
1014	Message Server not registered
1015	Device already in use
1016	Device not assigned
1017	Device has changed
1018	Command active

Table 80: Online Data Manager Error numbers (1000..1018)

9.6.2 Message Handler Error Numbers (2010 .. 2027)

The following table lists the error numbers of the Message handler of the Online Data Manager.

Error Number	Description
2010	Message handler: Message buffer empty
2011	Message handler: Message buffer full
2021	Message handler: Invalid Message ID (msg.nr)
2022	Message handler: No entry
2023	Message handler: Message already active
2024	Message handler: Wrong Application
2025	Message handler: Message Timeout No message received. **Possible Error Cause:** Different reasons. **(1)** The selected interrupt is not free or used also from another PC component (shared interrupt). **(2)** CIF is not initialized. This is shown by an acyclic flashing RUN LED. **(3)** CIF is in bootstraploader mode. This is indicated by a flashing RDY LED. **(4)** Another application program is accessing to the CIF the same time as SyCon. **Remedy:** **(1A)** Use polling mode instead of interrupt mode. Shared interrupts are not supported from the CIF device driver under Windows 95/98/ME/NT. **(1B)** Use a free interrupt. **(2)** Download the configuration. If necessary create a new configuration. **(3)** First download the firmware and then download the configuration. **(4)** Close all other application programs that communicates to the CIF.
2026	Message handler: Wait for Delete
2027	Message handler: No cyclic Message

Table 81: Error Numbers of the Message Handler of the Online Data Manager (2010..2027)

9.6.3 Driver Functions Error Numbers (2501 .. 2512)

The following table lists the error numbers of the Driver Functions of the Online Data Manager.

Error Number	Description
2501	OnlineDataManager Sub DLL not found
2502	Function missing
2503	'Read Thread' not created
2504	'Write Thread' not created
2505	'IO Thread' not created
2510	Function failed
2512	Assign reports error. Return neither OK or cancel

Table 82: Error Numbers of the Driver Functions of the Online Data Manager (2501..2512)

9.6.4 Online Data Manager Sub Functions Error Numbers (8001 .. 8035)

The following table lists the error numbers of the Sub functions of the Online Data Manager.

Error Number	Description
8001	Driver not opened. E.g. CIF Device Driver
8002	Application has requested an unknown event
8003	Application has requested an unknown command
8004	Command has failed
8005	Command active
8006	Device invalid
8010	No device was assigned
8011	Device was already assigned
8020	Driver not connected
8021	Driver already connected
8030	Faulty 'GetState'
8031	Send error (PutMessage returns error)
8032	Send active (PutMessage active)
8033	Receive error (GetMessage returns error)
8034	Receive active (GetMessage active)
8035	IO Error (ExchangeIO returns error)

Table 83: Sub function Error Numbers of the Driver Functions of the Online Data Manager (8001..8035)

9.7 Data Base Functions Error Numbers (4000 .. 4098)

The following table lists the error numbers of the converting functions.

Error Number	Description
4000	File does not exist
4001	Success in compromising
4002	Dataset does not exist
4003	Last respectively first entry reached
4004	Not enough memory
4005	File directory full
4006	Max number of entries reached
4007	No writing to this table possible, because the table is located in the FLASH
4008	Table name does already exist
4009	File name does not exist
4010	Free RAM length from RCS_CNF.P86 is smaller than E_F_INDEX * 2
4011	Parameter ‘next’ wrong
4012	Not enough free space to copy data set
4013	Set is deleted
4014	Value for Index is wrong
4015	Access not allowed
4016	open_file used before init_file
4017	Drive is not ready
4018	Not enough drive memory
4019	File name or path does not exist
4020	Cannot create path
4021	Wrong path
4022	Wrong flag
4023	The delete path is the root path
4024	Path file exists
4025	Write error during write a file
4026	Error during create a file
4027	Error during close a file
4028	No DBM file
4029	Length of the read data is unequal of the file length

Table 84: Error numbers of converting functions (4000..4029)

Error Number	Description
4030	Path too long
4031	Directory changed
4032	Directory created
4034	Length of converting stream is 0
4035	Non equal data set found
4036	Non equal data set found
4037	Non equal data set found
4038	Data set has length 0
4039	The function DbmInit has assigned a Zero pointer during RCS initialization
4040	Printer not ready
4041	The data base is used from another function
4042	New length of data base is smaller than used
4043	Unknown access mode
4044	Old data base has to be converted
4045	Error while converting. Function not known
4046	Unknown type in set 0 found
4047	No float function available
4048	Function not in RCS module
4049	Check failed
4050	Checksum check failed
4051	More segments are existing in file, than in the structure FILE_INFO_T in wMaxEntries
4052	SegLen in structure FILE_INFO_T is smaller then the length in the file. Return of function dbm_restore_data
4053	The header file holds an other information for a length than in the segment itself
4054	Not enough memory for allocation on the PC
4055	No index for file handle in structure FLASH_DIR of RCS found
4057	File type 2 can not be printed because of too many definitions
4058	The definitions need too many lines to display them, than in the program available
4059	An unknown format for the parameter. Valid is U, H, or S
4060	Unknown parameter type

Table 85: Error numbers of converting functions (4030..4060)

Error Number	Description
4061	The data base was transmitted into the FLASH
4062	Set 0 contains no structure definition
4063	Set 0 can not be deleted
4064	Error during execution of a ODBC data base access
4065	Initialization of DBM through RCS had no success
4066	Passed data length incorrect
4067	Sorting function not linked
4068	Error in function parameter
4069	Error from ODBC table
4070	No free handle available. Too many data base links are already opened
4071	Unknown data type found in the table
4072	Structure of table GLOBAL not correct or no such table existing
4073	No name of an ACCESS data base
4074	Download window can’t be created
4075	Download not fully performable

Table 86: Error numbers of converting functions (4061..4075)

Error Number	Description
4082	More than 32 tables should be created
4083	No entry in element szSourceFile
4084	ODBC connection initialization not possible. This could happen when in file ODBCINST.INI in section [Microsoft Access Driver (*.mdb)] is no valid path to ODBCJT16/32.DLL.
4085	Error in structure in the ACCESS data base that is in DBM format
4086	Error in structure in the ACCESS data base that is in DBM format
4087	No data in a ODBC table
4088	No entry
4089	ODBC set length not valid
4090	Not enough data sets in ODBC table
4091	Table CreateTab not found
4092	Error in structure of table CreateTab
4093	No entry in element szSourceTable
4094	No entry in element szDestTable
4095	Entry in iSourceType of table CreateTab is wrong
4096	Entry in iTranslate of table CreateTab is wrong
4097	Function SQLAllocStmt reports an error
4098	ODBC source table not found
4099	ODBC data truncated
4100	Download timeout
4101	Library load error
4102	Library function error
4103	Error in description 'toggle'
4104	Error in description 'KB'
4105	Column does not exist
4106	ODBC structure different
4107	ODBC address error
4108	No CRC sum exists (table GLOBAL exists or old)
4109	Table GLOBAL is old
4110	Calculated CRC different to CRC in table GLOBAL
4199	Programming error

Table 87: Error numbers of converting functions (4082..4199)

9.8 Converting Functions Error Numbers (5001 .. 5008)

The following table lists the error numbers of converting functions.

Error Number	Description
5000	Function PackLongToByteShort: Not enough space in pvD (Number of elements greater than reserved memory)
5001	Function PackLongToByteShort: Not enough space in pvD. Detected during converting of pvS
5002	Function PackLongToByteShort: Not enough space in pvD
5003	Function StringToByte: Not enough space in pvD
5004	Function IntToByte: Not enough space in pvD
5005	Function LongToShort: Not enough space in pvD
5006	Function PackStringDumpToByteArray: Not enough space in pvD
5007	Function PackStringBumpToByteArray: A character was found, which is not convertible into a HEX value
5008	Function PackStringDumpToByteArray: Number of character odd
5009	Function PackStringDumpToByteArray: Not enough space in pvD
5010	Function PackStringDumpToByteArray: The current data set needs to be appended the previous one
5011	Function PackStringDumpToByteArray: No corresponding function to the given number exist
5012	Converting error

Table 88: Error Numbers of data base functions (5000 .. 5012)

10 Appendix

10.1 Extended Device Diagnostic Master

On the following pages the task state structure of Hilscher PROFIBUS-DP and/or PROFIBUS-FMS Master is described.

10.1.1 PLC_TASK Common Variables

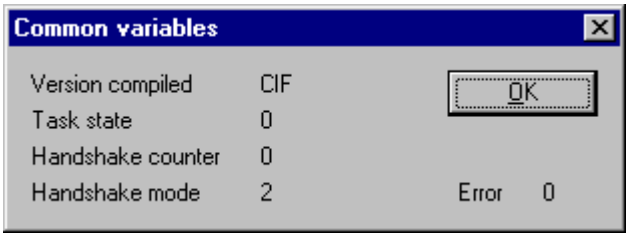


Figure 133: PLC_TASK Common Variables

Variable	Meaning
Version Compiled	Hardware
Task State	Task State
Handshake Counter	Counter for the performed process data handshakes
Handshake Mode	This value represents the actual handshake mode between application and CIF. 0 = Bus synchronous, Device Controlled 1 = Buffered, Device Controlled 2 = Uncontrolled 3 = Buffered, Host Controlled 4 = Bus synchronous, Host Controlled

Table 89: PLC_TASK Common Variables

10.1.2 USR_INTF Task State

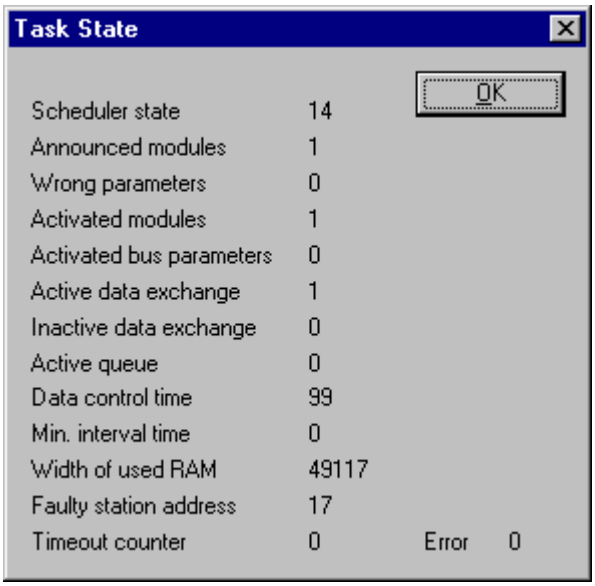


Figure 134: USR_INTF Task State

Variable	Meaning
Scheduler State	Status value of the Scheduler
Announced Modules	Number of configured Slaves
Wrong Parameters	Number of Slaves with faulty data sets
Activated Modules	Number of activated Slaves
Activated Bus Parameters	0 = Bus Parameter active, 255 = Bus Parameter inactive
Active Data Exchange	Current active Data_Exchange-Service
Inactive Data Exchange	Number of Stations with that no process data possible is
Active Queue	Number of stored Commands
Data Control Time	Counter of Data_Contol_Time
Min. Interval Time	Counter of min.Slave_Intervals
Width of used RAM	Number of used bytes in the upper RAM
Faulty Station Address	Station address of the faulty Station
Timeout Counter	Supervision counter that is activated when a short circuit was detected on the bus

Table 90: USR_INTF Task State

10.1.3 USR_INTF Running States

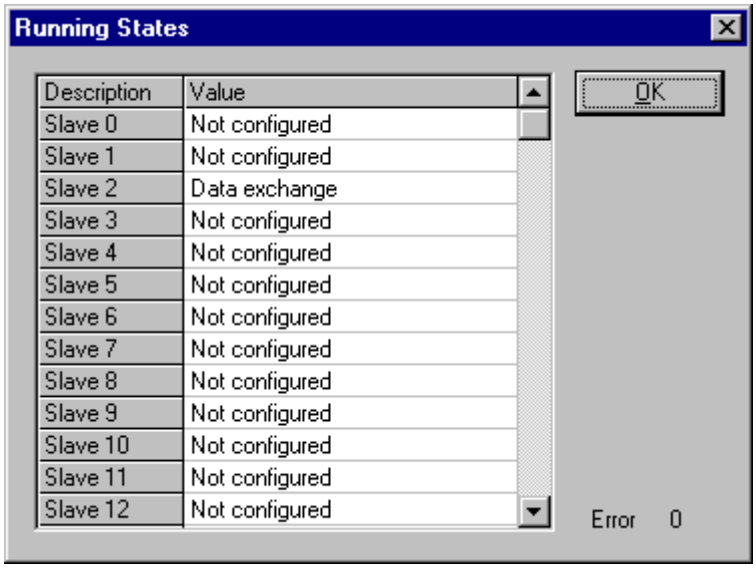


Figure 135: USR_INTF Running States

Variable	Meaning
Slave x (x=0 .. 125)	Slave handler-State for Station address x

Table 91: USR_INTF Running States

10.1.4 USR_INTF Global State Field

See section

Global State Field on page *134*.

10.1.5 USR_INTF Communication Error

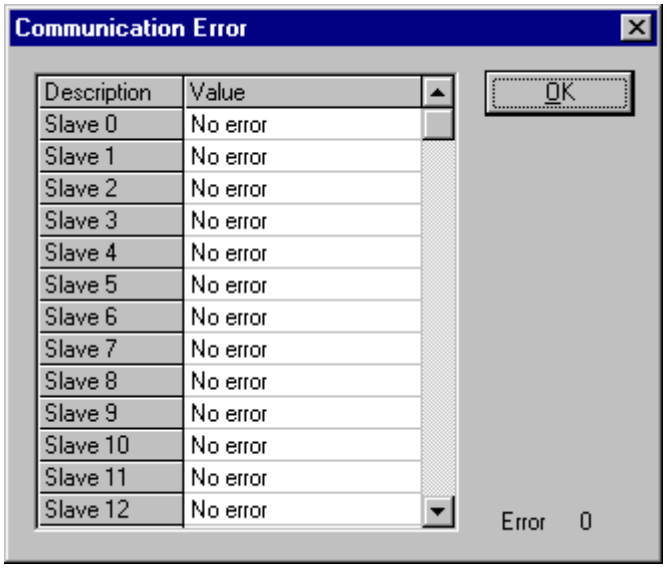


Figure 136: USR_INTF Communication Error

Variable	Meaning
Slave x (x=0 .. 125)	Error number of the Slave

Table 92: USR_INTF Communication Error

10.1.6 USR_INTF Parameter Set List

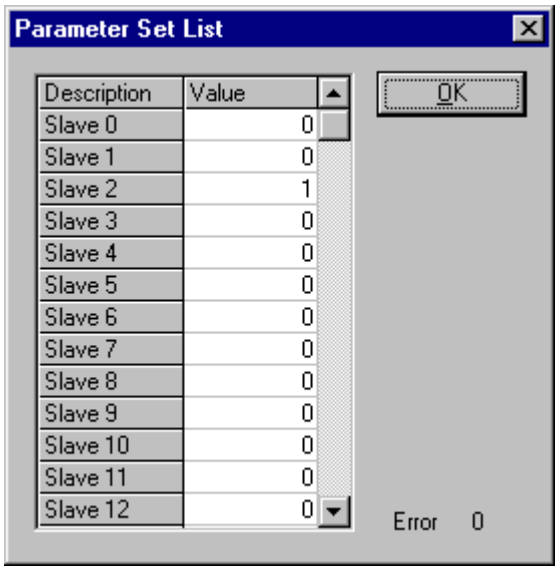


Figure 137: USR_INTF Parameter Set List

Variable	Meaning
Slave x (x=0 .. 125)	0 = no or no valid parameter data set 1 = valid parameter data set

Table 93: USR_INTF Parameter Set List

10.1.7 USR_INTF Last Download Parameter

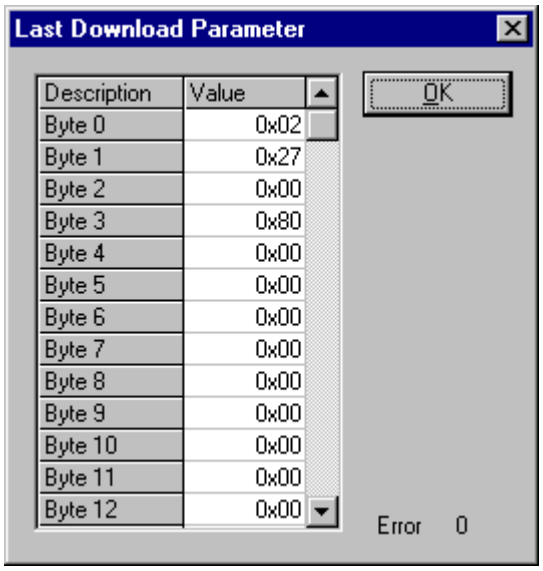


Figure 138: USR_INTF Last Download Parameter

Variable	Meaning
Byte 0 to 119	Last parameter data set

Table 94: USR_INTF Last Download Parameter

10.1.8 USR_INTF Disconnect Report

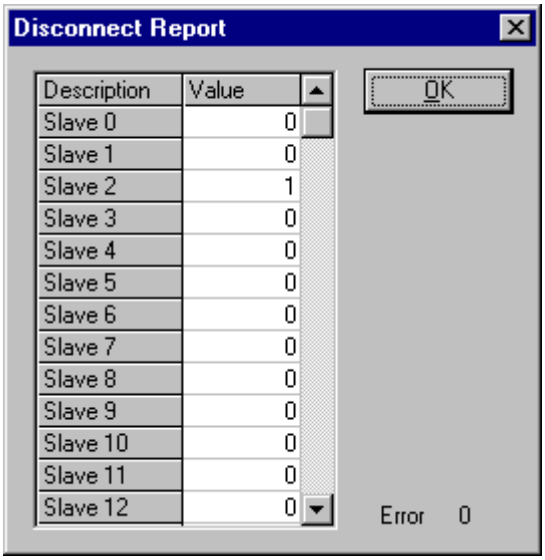


Figure 139: USR_INTF Disconnect Report

Variable	Meaning
Slave (x=0 .. 125)	Counter for disconnection for Slave x (x = 0 to 125)

Table 95: USR_INTF Disconnect Report

The status table shows the number of communication break downs (disconnections) resulted by a bus communication errors for each Slave station. The counter is incremented only when the Master was communicating in the 'Data Exchange All' mode with all Slaves before. A hard error is when the max retries were reached (given by the Max_Retry_Limit). See bus parameter Max_Retry_Limit.

10.1.9 USR_INTF Diagnostic Report

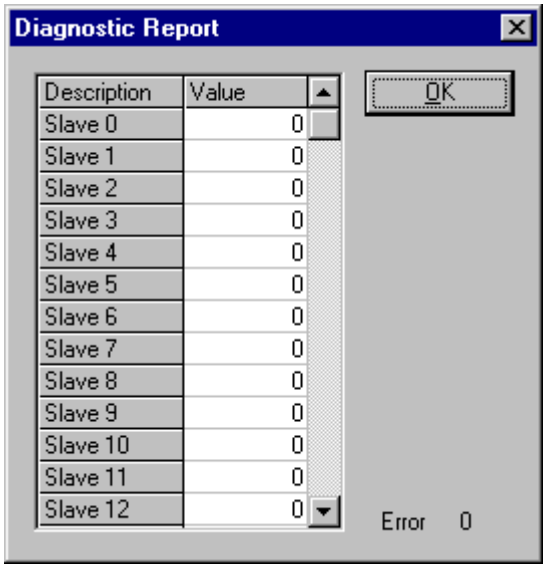


Figure 140: USR_INTF Diagnostic Report

Variable	Meaning
Slave (x=0 .. 125)	Counter for diagnostic reports for Slave x (x = 0 .. 125)

Table 96: USR_INTF Diagnostic Report

The status table shows the number of diagnostic reports for each Slave station that has reported to the Master. For each received report the data_exchange state to this Slave was left for one DP cycle to read out the diagnostic information.

10.1.10 USR_INTF DPV1 Data

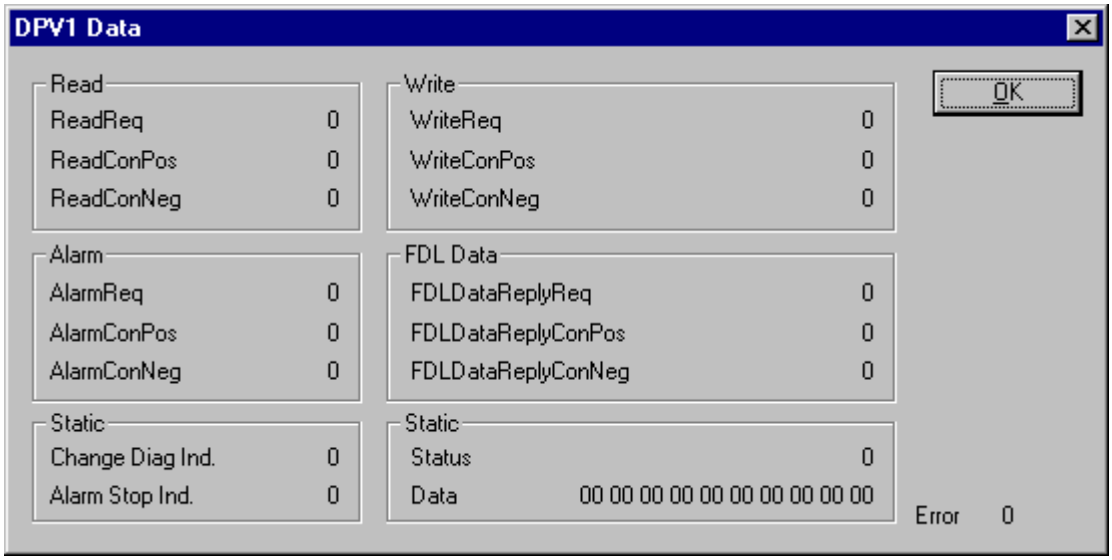


Figure 141: USR_INTF DPV1 Data

Variable	Meaning
Read Req	Counter for Read Requests
Read Con Pos	Counter for Read Confirmations Positive
Read Con Neg	Counter for Read Confirmations Negative
Write Req	Counter for Write Requests
Write Con Pos	Counter for Write Confirmations Positive
Write Con Neg	Counter for Write Confirmations Negative
Alarm Req	Counter for Alarm Requests
Alarm Con Pos	Counter for Alarm Confirmations Positive
Alarm Con Neg	Counter for Alarm Confirmations Negative
FDL Data Reply Req	Counter for FDL Data Reply Requests
FDL Data Reply Con POs	Counter for FDL Data Reply Confirmations Positive
FDL Data Reply Con Neg	Counter for FDL Data Reply Confirmations Negative
Change Diag Ind.	Counter for Change Diag Indication
Alarm Stop Ind	Counter for Alarm Stop Indication
Alarm Not Enable	Counter for Alarm Stop Enable
Status	Counter for Status

Table 97: USR_INTF DPV1 Data

10.1.11 FDL_TASK Task State

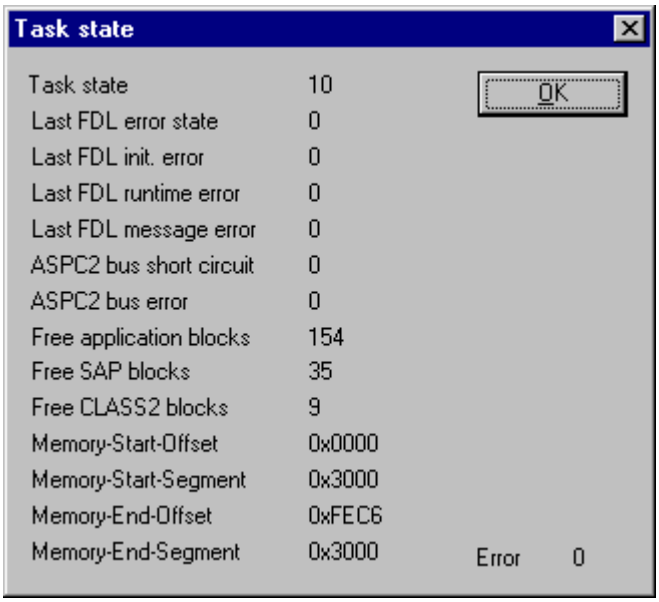


Figure 142: FDL_TASK Task State

Variable	Meaning
Task State	Task state number
Last FDL error state	Error state
Last FDL init. Error	Initialization error
Last FDL runtime error	Runtime error
ASPC2 bus short circuit	Counter for occurred bus synchrony error reports or bus short circuits of the ASPC2
ASPC2 bus error	Counter for occurred bus error reports of the ASPC2
Free application blocks	free applications blocks of the software
Free SAP blocks	free SAP blocks of the software
Free CLASS2 blocks	free class 2 blocks of the software

Table 98: FDL_TASK Task State

10.1.12 FDL_TASK Act. Bus parameter

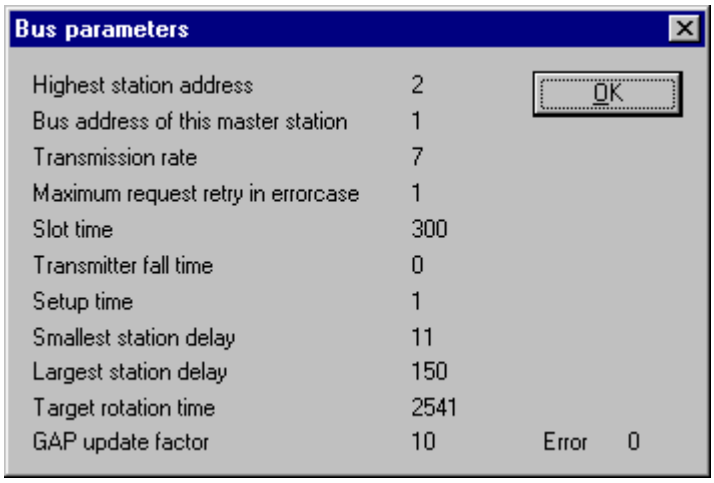


Figure 143: FDL_TASK Act. Bus parameter

Display of the bus parameters

Variable	Meaning
Highest station address	HSA Highest Station address
Bus address of this Master station	TS (This station) own bus address
Transmission rate	Transmission rate 0 = 9600; 1 = 19200; 2 = 93,75; 3 = 187,5; 4 = 500k; 7 = 1.5M; 8 = 3M; 9 = 6M; 10 = 12M
Maximum request retry in error case	Number of retries for bus errors
Slot time	TSL Slot Time
Transmitter fall time	TQUI Transmitter Fall Time
Setup time	TSET Setup Time
Smallest station delay	MIN TSDR minimum station delay
Largest station delay	MAX TSDR maximum station delay
Target rotation time	TTR Target Rotation Time
GAP update factor	G GAP Update Factor

Table 99: FDL_TASK Act. Bus parameter

10.1.13 FDL_TASK DDLM Requests Class 1

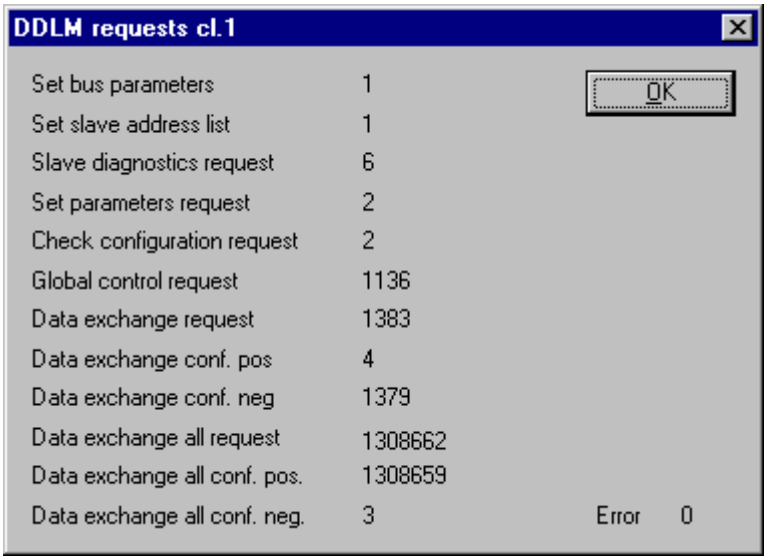


Figure 144: FDL_TASK DDLM Requests Class 1

Variable	Meaning
Set bus parameters	Counter for 'Set-Bus-Par' Request
Set Slave address list	Counter for 'Set-Slave-List' Request
Slave diagnostic requests	Counter for 'Slave-Diag' Request
Set parameter request	Counter for 'Set-Prm' Request
Check configuration request	Counter for 'Check-Cfg' Request
Global control request	Counter for 'Global-Control' Request
Data exchange requests	Counter for 'Data-Exchange' Request
Data exchange conf pos	Counter for 'Data-Exchange' Confirmation positive
Data exchange conf neg	Counter for 'Data-Exchange' Confirmation negative
Data exchange all requests	Counter for 'Data-Exchange-All' Request
Data exchange all conf pos	Counter for positive Confirmation of 'Data-Exchange-All'
Data exchange all conf neg	Counter for negative Confirmation of 'Data-Exchange-All'

Table 100: FDL_TASK DDLM Requests Class 1

Services which were send continued to the according to the PROFIBUS-DP standard are counted in this table. Fundamental only the 'data-exchange-all' should be count in a faultless network. The services 'set-slave-list', 'set-prm', 'chk-cfg', 'data-exchange' permits in case of faultless course for each configured Slave module to be activated only one time. If the count changes continuously in case of these services, a bus error has occurred. If for example the service 'slave-diag' changes sporadically the bus cable can have a defect or the terminating resistor is missing in the cable. It is also possible that a conscious error report of a Slave module that activates the service in the Master.

10.1.14 FDL_TASK DDLM Requests Class 2

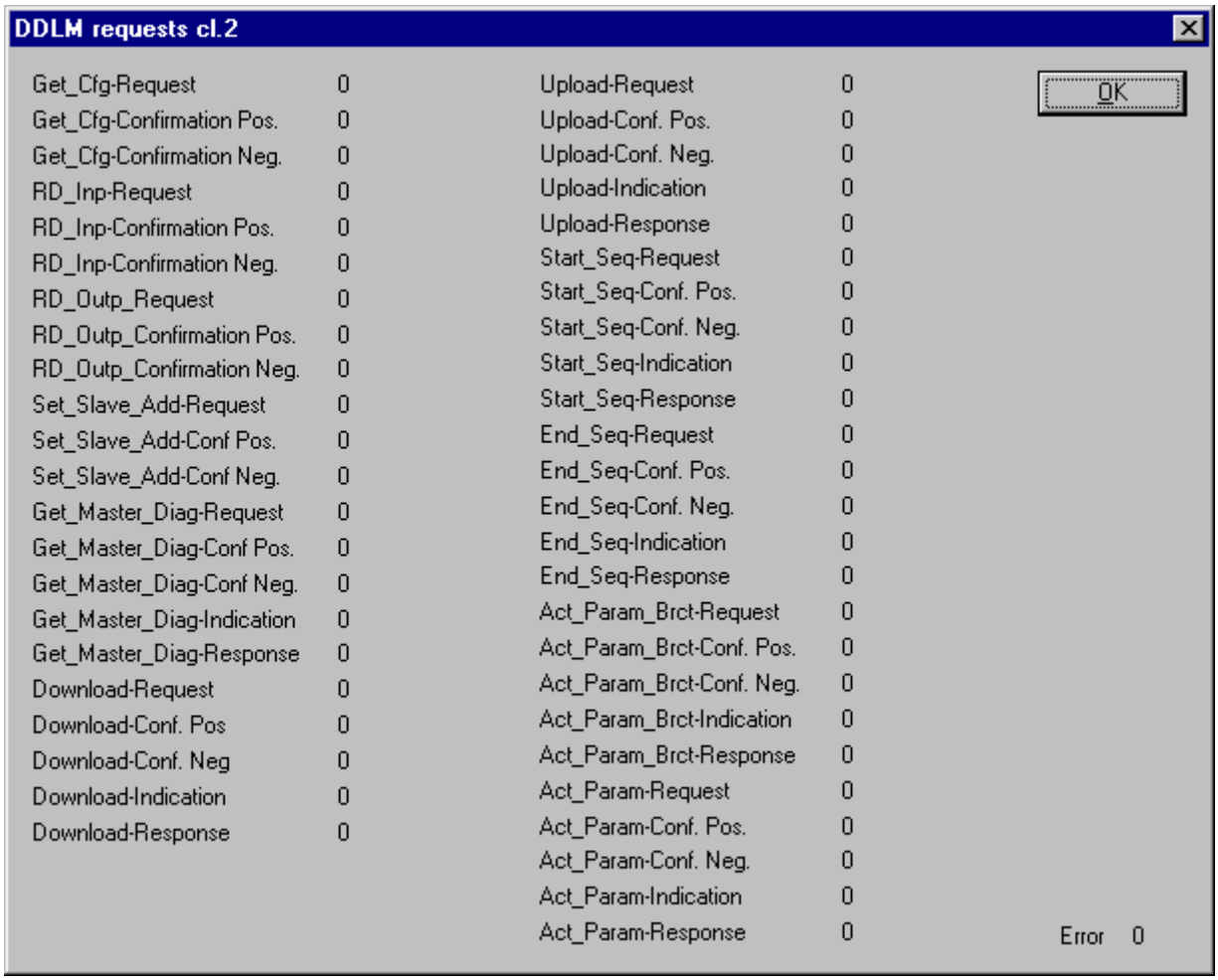


Figure 145: FDL_TASK DDLM Requests Class 2

Variable	Meaning
Service/Function	Counter for this Service/Function

Table 101: FDL_TASK DDLM Requests Class 2

10.1.15 FDL_TASK FDL Requests

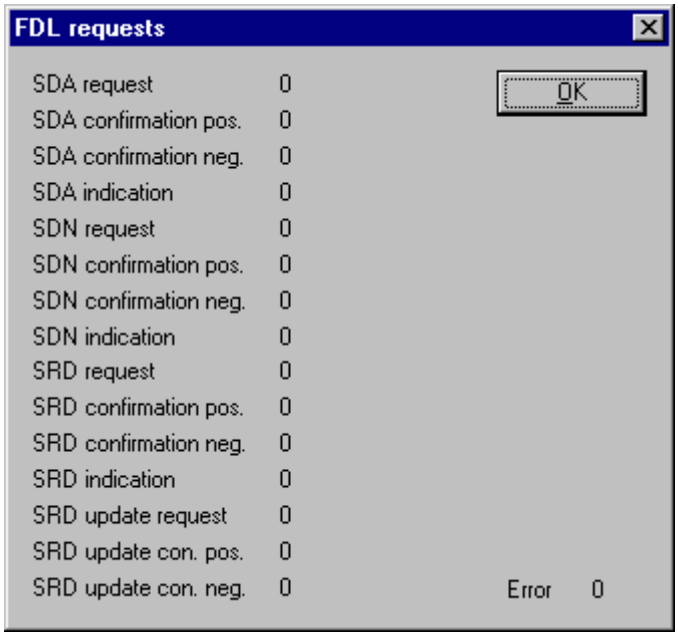


Figure 146: FDL_TASK FDL Requests

Variable	Meaning
SDA request	Counter for 'SDA' Request
SDA confirmation pos	Counter for 'SDA' Confirmation, positive
SDA confirmation neg	Counter for 'SDA' Confirmation, negative
SDA indication	Counter for 'SDA' Indication
SDN request	Counter for 'SDN' Request
SDN confirmation pos	Counter for 'SDN' Confirmation, positive
SDN confirmation neg	Counter for 'SDN' Confirmation, negative
SDN indication	Counter for 'SDN' Indication
SRD request	Counter for 'SRD' Request
SRD confirmation pos	Counter for 'SRD' Confirmation, positive
SRD confirmation neg	Counter for 'SRD' Confirmation, negative
SRD indication	Counter for 'SRD' Indication
SRD update request	Counter for 'SRD' Update Request
SRD update con pos	Counter for 'SRD' Update Confirmation, positive
SRD update con neg	Counter for 'SRD' Update Confirmation, negative

Table 102: FDL_TASK FDL Requests

FDL Services that are activated on the bus according to the PROFIBUS specification are counted in this window. The request (send), its confirmation (positive or negative) and the indication (received) are counted.

Not all services/functions are supported by the firmware.

10.1.16 FDL_TASK FMA Requests

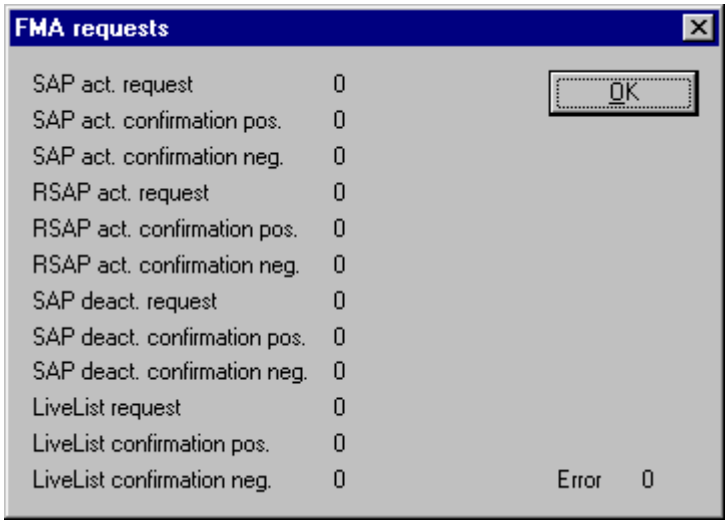


Figure 147: FDL_TASK FMA Requests

Variable	Meaning
SAP act. Request	Counter for 'SAP Activate' Request
SAP act. Confirmation pos	Counter for 'SAP Activate' Confirmation, positive
SAP act. Confirmation neg	Counter for 'SAP Activate' Confirmation, negative
RSAP act. Request	Counter for 'RSAP Activate' Request
RSAP act. Confirmation pos	Counter for 'RSAP Activate' Confirmation, positive
RSAP act. Confirmation neg	Counter for 'RSAP Activate' Confirmation, negative
SAP deact. Request	Counter for 'SAP Deactivate' Request
SAP deact. Confirmation pos	Counter for 'SAP Deactivate' Confirmation, positive
SAP deact. Confirmation neg	Counter for 'SAP Deactivate' Confirmation, negative
LiveList request	Counter for 'LiveList' Request
LiveList confirmation pos	Counter for 'LiveList' Confirmation, positive
LiveList confirmation neg	Counter for 'LiveList' Confirmation, negative

Table 103: FDL_TASK FMA Requests

FMA Services that are activated on the bus according to the PROFIBUS specification are counted in this window. The request (send) and its confirmation (positive or negative) are counted.

Not all services/functions are supported by the firmware.

10.1.17 FDL_TASK DP Retry for Slave

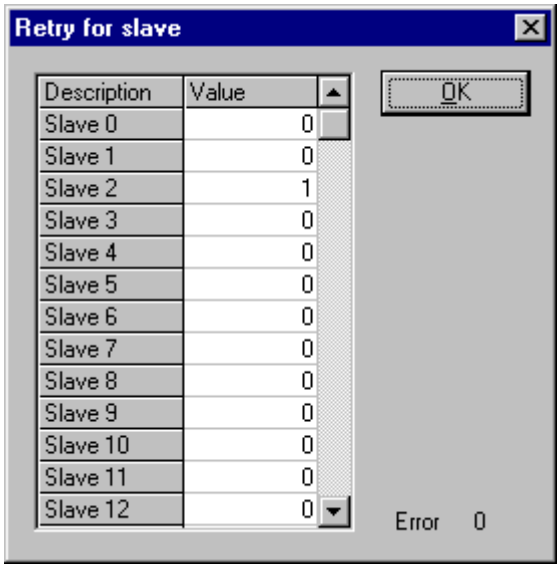


Figure 148: FDL_TASK DP Retry for Slave

Variable	Meaning
Slave x (x=0 .. 125)	Retries for Slave x (x=0 .. 125)

Table 104: FDL_TASK DP Retry for Slave

The number of retries for the PROFIBUS communication chip is set with the bus parameters. If this number of retries is reached, that means no or a negative answer of the Slave was received, this counter is counted up, if the Master has leave the state DataExchange with this Slave.

10.1.18 FDL_TASK DP Activated Slave

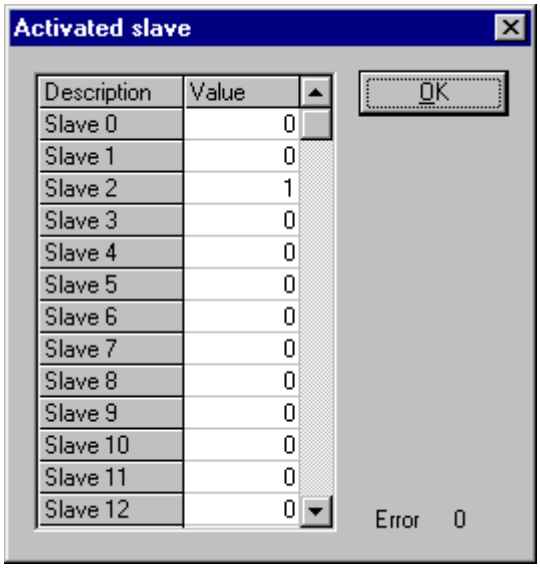


Figure 149: FDL_TASK DP Activated Slave

Variable	Meaning
Slave x (x=0 .. 125)	Inactive (=0) or active (=1) Slave x (x=0 .. 125)

Table 105: FDL_TASK DP Activated Slave

10.1.19 ALI_TASK VFD Status

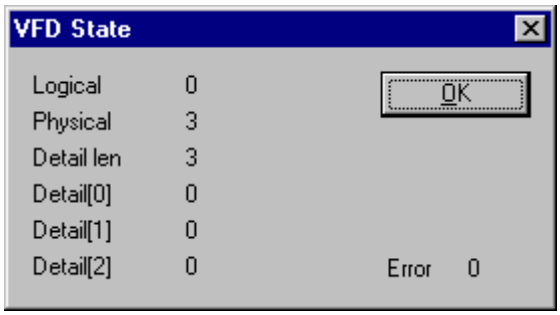


Figure 150: ALI_TASK VFD Status

Variable	Meaning
Logical	undocumented
Physical	undocumented
Detail Len	undocumented
Detail[0]	undocumented
Detail[1]	undocumented
Detail[2]	undocumented

Table 106: ALI_TASK VFD Status

10.1.20 ALI_TASK Confirmed FMS Services

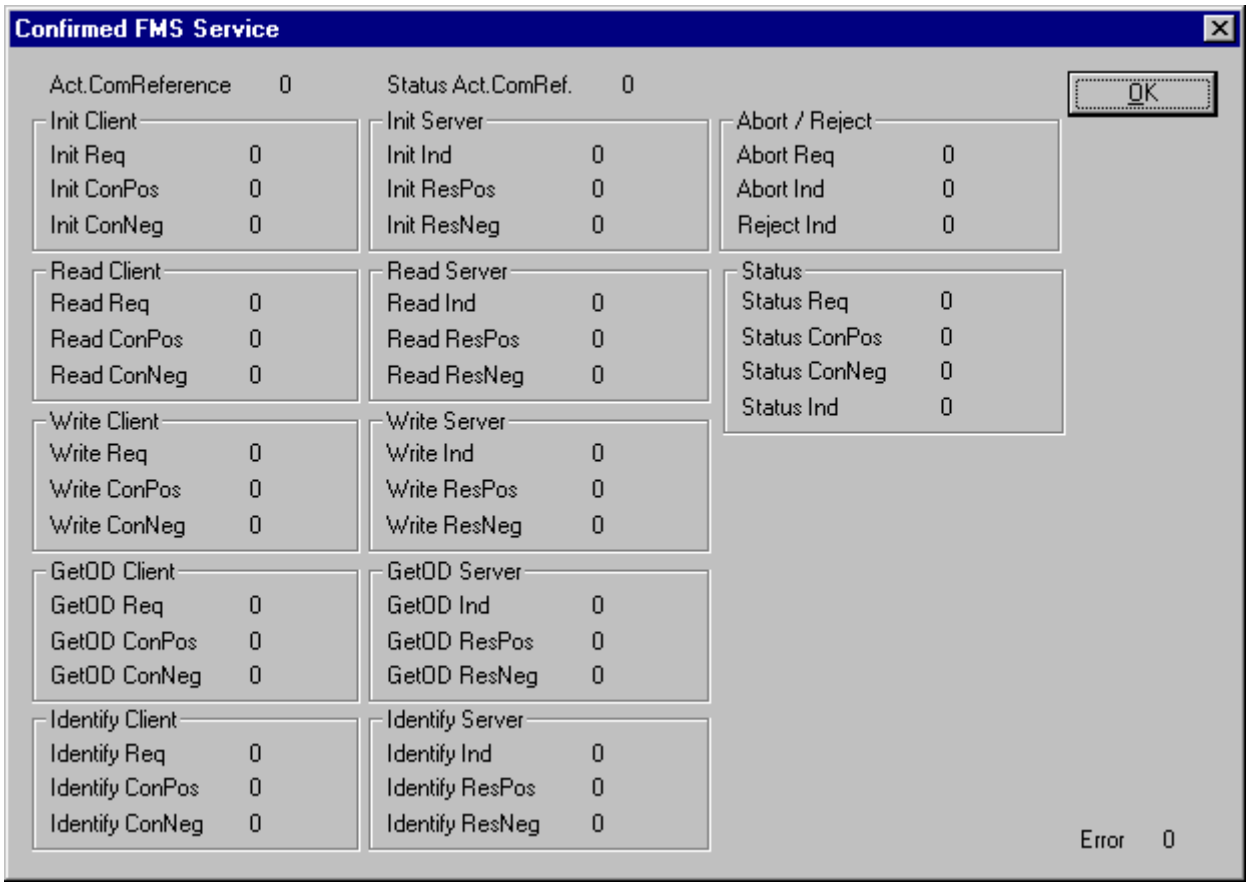


Figure 151: ALI_TASK Confirmed FMS Services

Counter for confirmed PROFIBUS-FMS services. In the left column are the counters for Client services and in the middle column are the counters for server services. For the Client Req means request and Con means confirmation. For the Server Ind means indication and Res means response.

Variable	Meaning
Act ComReference	Actual or last used CR
Status Act ComReference	0 connection closed 1 connection is established at the moment 2 connection established
Init, Read, Write, GetOD, Identify	Counter for the service
Abort, Status	Counter for the service

Table 107: ALI_TASK Confirmed FMS Services

The counters

- Req (Request) and Con (Confirmation) respectively
- Ind (Indication) and Res (Response)

belong together. If the device is used as a client then a request and a confirmation means a performed a command. If the device is used as a server then an indication and a response means a performed command.

10.1.21 ALI_TASK Unconfirmed FMS Services

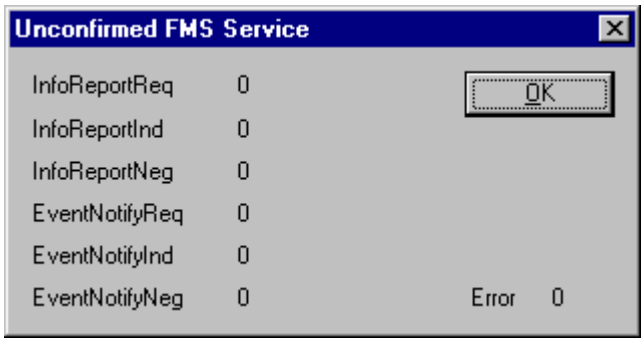


Figure 152: ALI_TASK Unconfirmed FMS Services

Counter for unconfirmed PROFIBUS-FMS services. Req means request, Ind means indication and Neg means negative.

Variable	Meaning
InfoReport, EventNotify	Counter for the service

Table 108: ALI_TASK Unconfirmed FMS Services

10.1.22 ALI_TASK FDL Services

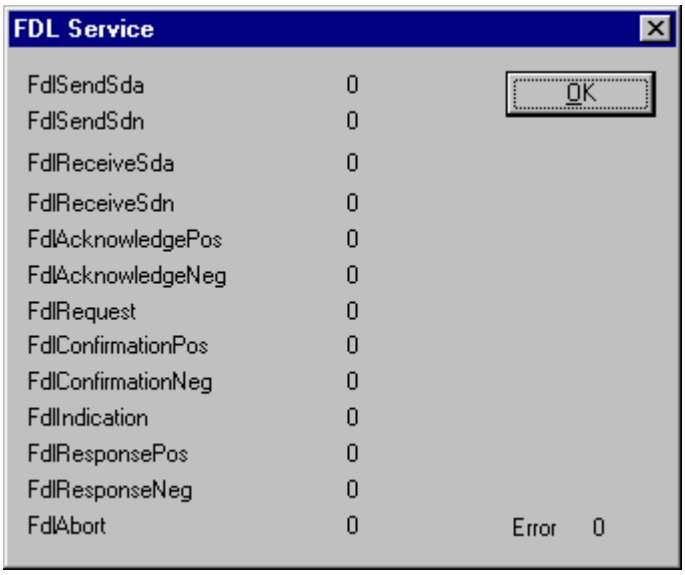


Figure 153: ALI_TASK FDL Services

Variable	Meaning
FdlSendSda	Counter for FDL Send SDA
FdlSendSdn	Counter for FDL Send SDN
FdlReceiveSda	Counter for FDL Receive SDA
FdlReceiveSdn	Counter for FDL Receive SDN
FdlAcknowledgePos	Counter for FDL Acknowledge positive
FdlAcknowledgeNeg	Counter for FDL Acknowledge negative
FdlRequest	Counter for FDL Request
FdlConfirmationPos	Counter for FDL Confirmation positive
FdlConfirmationNeg	Counter for FDL Confirmation negative
FdlIndication	Counter for FDL Indication
FdlResponsePos	Counter for FDL Response positive
FdlResponseNeg	Counter for FDL Response negative
FdlAbort	Counter for FDL Abort

Table 109: ALI_TASK FDL Services

10.1.23 ALI_TASK Error Counter

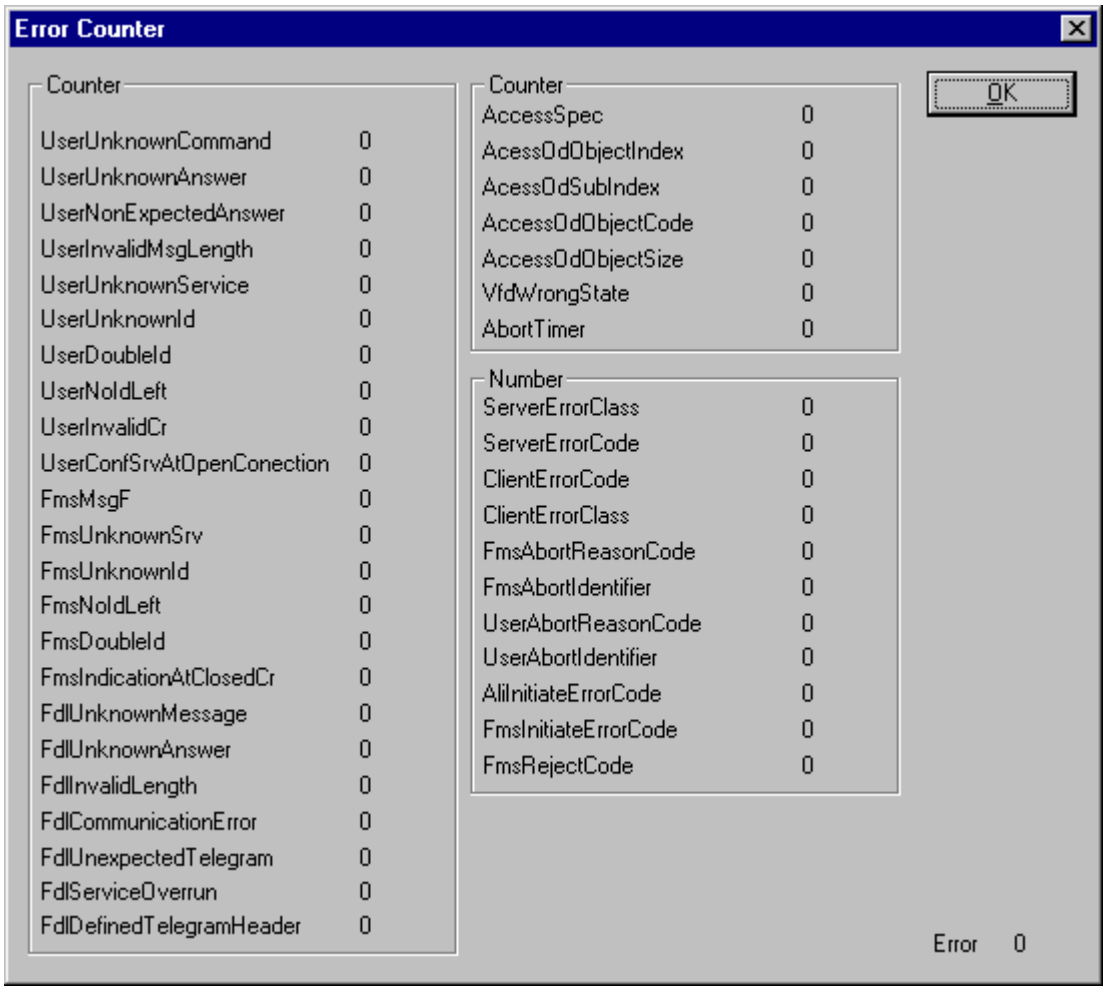


Figure 154: ALI_TASK Error Counter

Variable	Meaning
User, FMS, FDL	Counter for errors

Table 110: ALI_TASK Error Counter

10.1.24 ALI_TASK Client Parallel Services

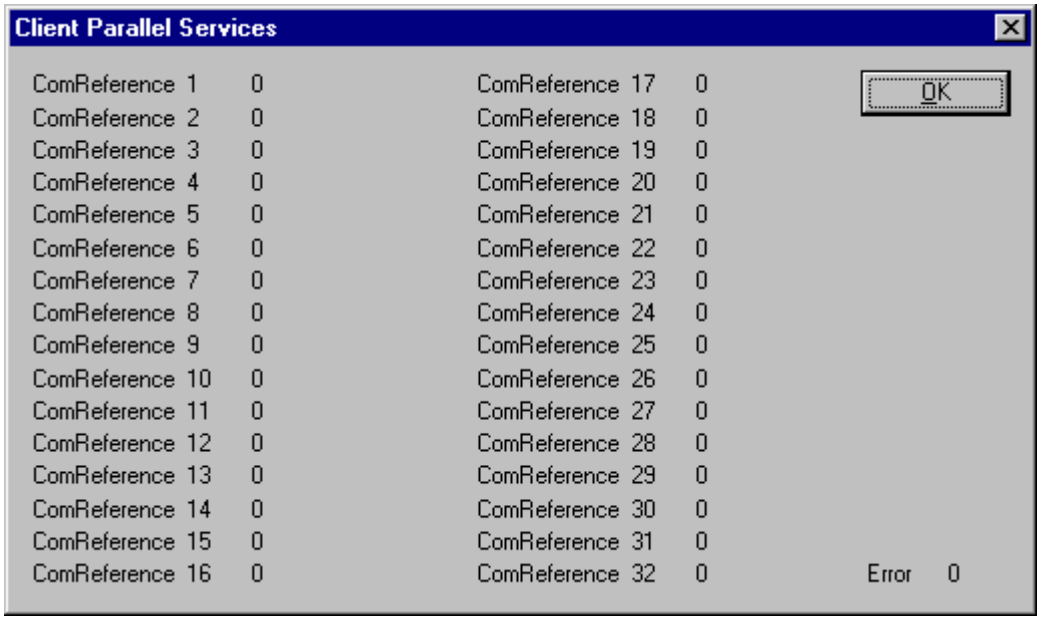


Figure 155: ALI_TASK Client Parallel Services

Variable	Meaning
ComReference x (x = 1 ..32)	Counter for active Client services

Table 111: ALI_TASK Client Parallel Services

10.1.25 ALI_TASK Server Parallel Services

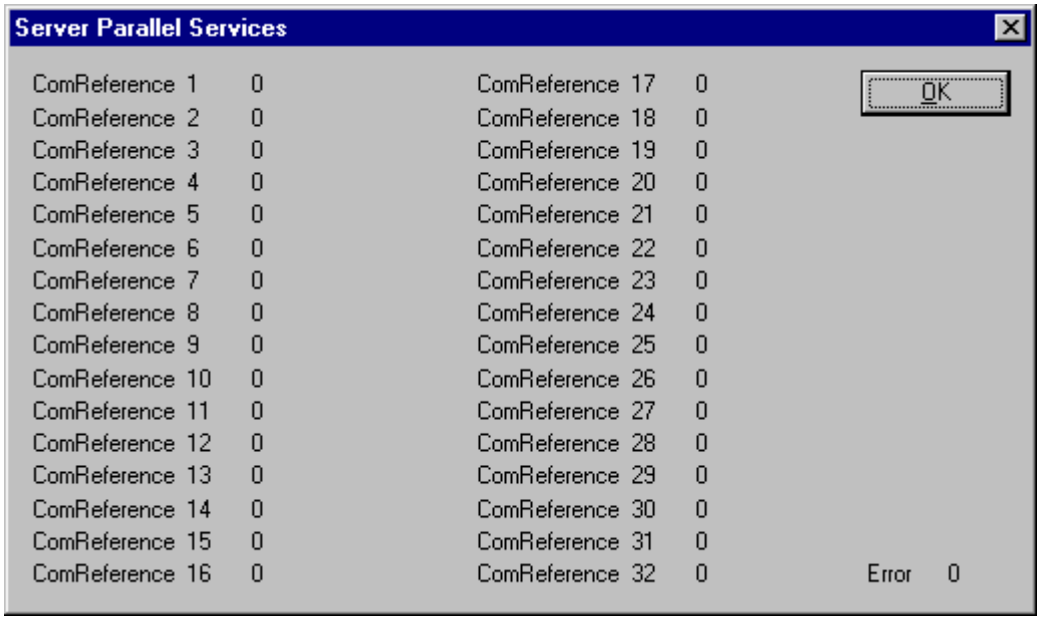


Figure 156: ALI_TASK Server Parallel Services

Variable	Meaning
ComReference x (x = 1 ..32)	Counter for active Server services

Table 112: ALI_TASK Server Parallel Services

10.1.26 ALI_TASK Status ComReference

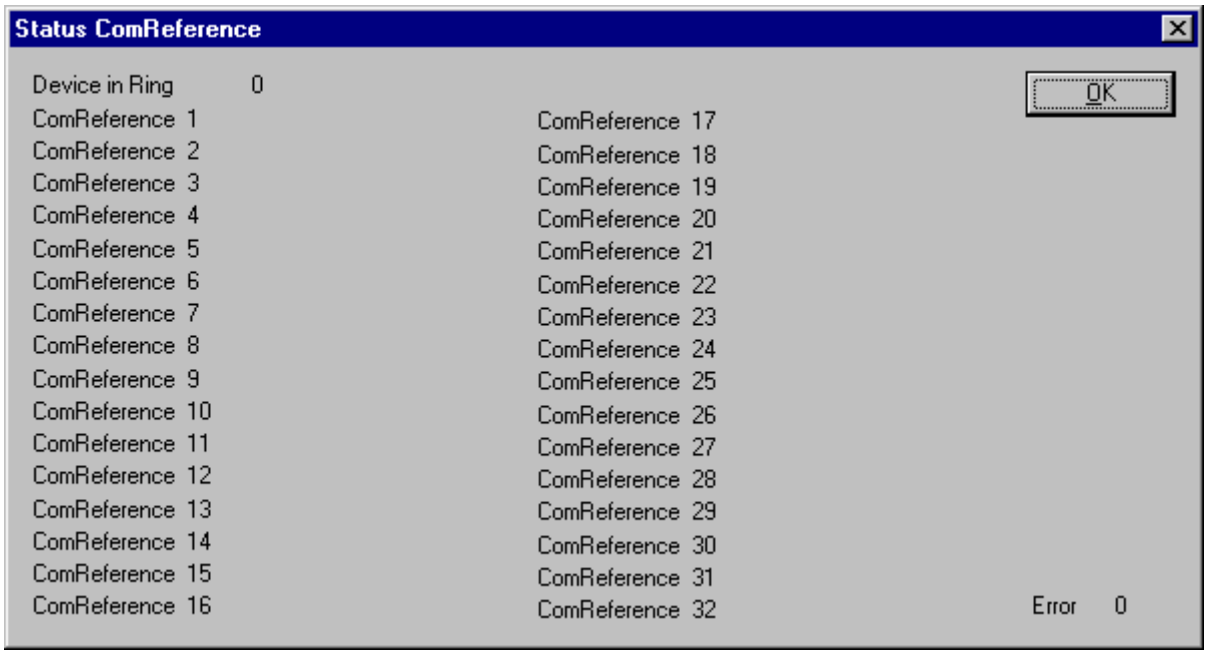


Figure 157: ALI_TASK Status ComReference

Variable	Meaning
Device in Ring	Device in the Token ring
ComReference x (x = 1 ..32)	State of the communication reference 0 = connection closed 1 = connection is established at the moment 2 = connection established

Table 113: ALI_TASK Status ComReference

10.1.27 ALI_TASK Timer ComReference

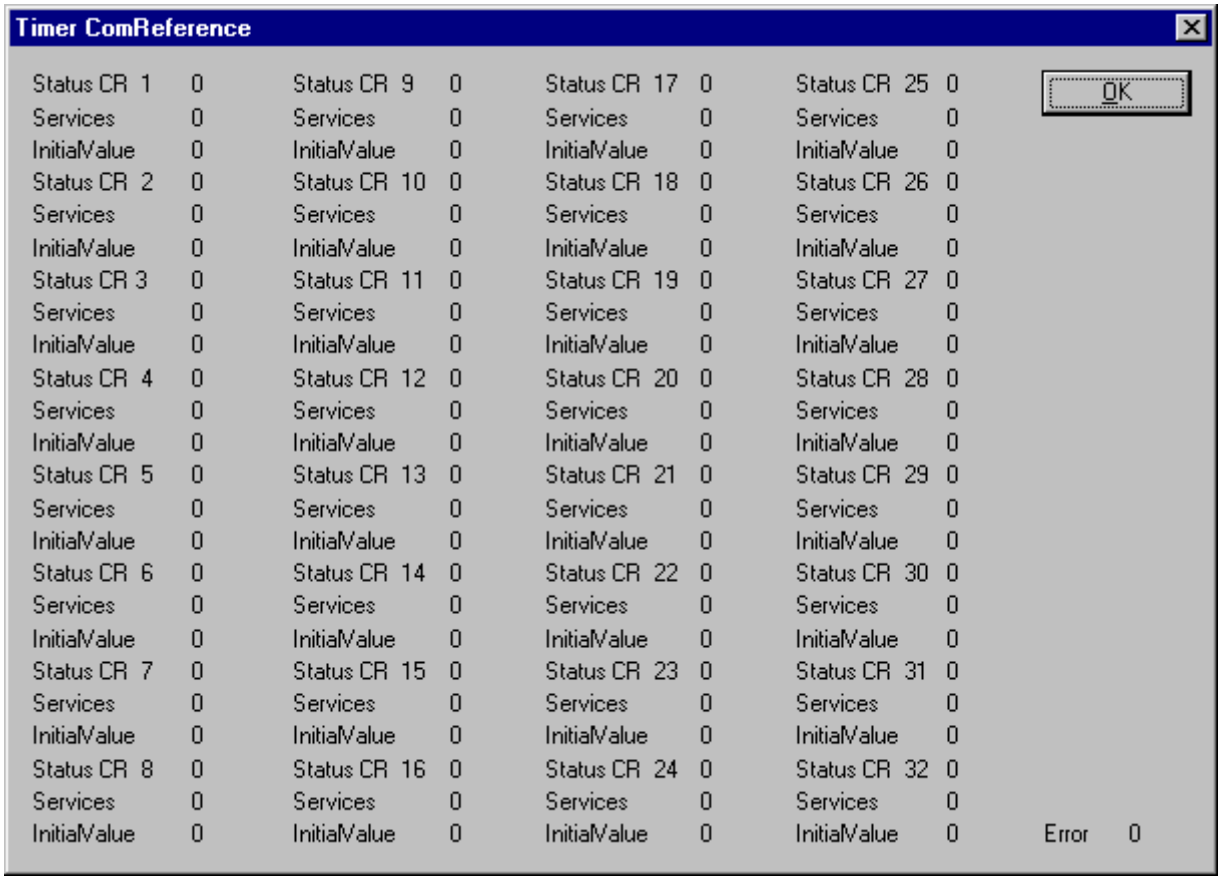


Figure 158: ALI_TASK Timer ComReference

Variable	Meaning
Status CR x (x = 1 ..32)	State of the communication reference 0 = connection closed 1 = connection is established at the moment 2 = connection established
Services	Number of outstanding services (0..4)
Initial value	Initial value

Table 114: ALI_TASK Timer ComReference

10.2 Extended Device Diagnostic DP Slave

On the following pages the task state structures for Hilscher PROFIBUS-DP Slave are described.

10.2.1 PLC_TASK Variables

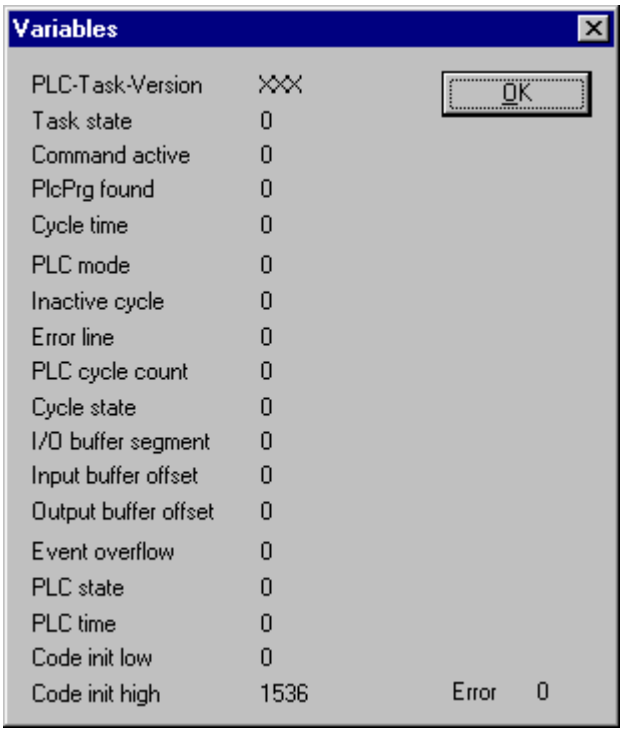


Figure 159: PLC_TASK Variables (Slave)

The variables of the PLC task are not longer supported in newer firmware because of performance reasons.

10.2.2 SPC3CTRL SPC3

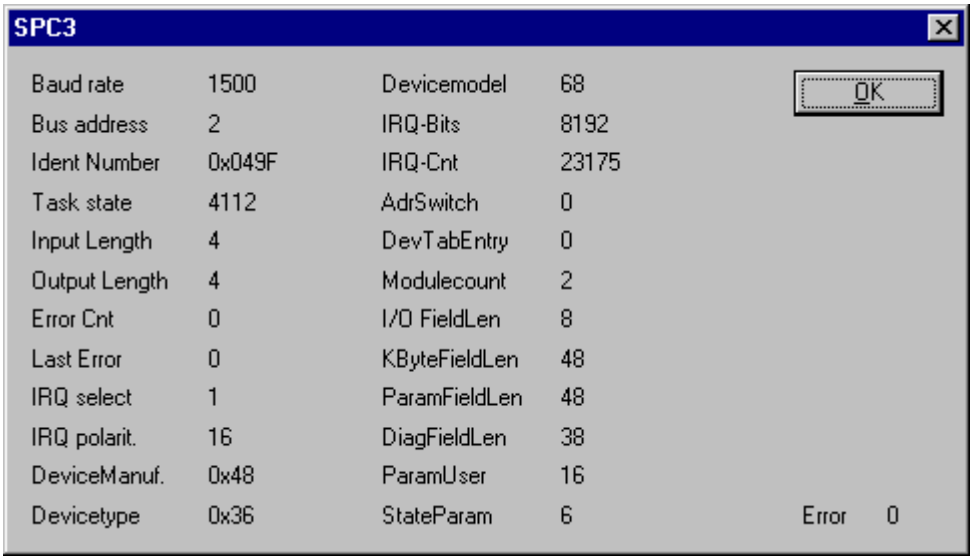


Figure 160: PLC_TASK Variables

Variable	Meaning
Baud Rate	Baudrate
Bus Address	Bus address
Ident Number	Ident Number
Task State	Task state
Input Length	Length of input bytes for cyclic transfer
Output Length	Length of output bytes for cyclic transfer
Error Cnt	Error counter
Last Error	Error code of the last error
IRQ Select	Number of the SPC3 interrupt line
IRQ Polarit.	Polarity of the SPC3 interrupt line
Device Manuf.	Device manufacturer
Device Type	Device Type
Device Model	Device Model
IRQ Bits	Type of the last SPC3 interrupts
IRQ Cnt	Counter for SPC3 interrupt requests
Addr Switch	Type of the address switch
DevTabEntry	Internal usage
Module Count	Number of the configured input/output modules on the PROFIBUS
I/O Field Len	Length of the input/output data buffer in the SPC3
KByte Field Len	Length of the configuration data buffer in the SPC3
Param Field Len	Length of the parameter data buffer in the SPC3
Diag Field Len	Length of the diagnostic data buffer in the SPC3
Param User	Internal usage
State Param	Internal usage

Table 115: PLC_TASK Variables

10.2.3 SPC3CTRL Slave Config

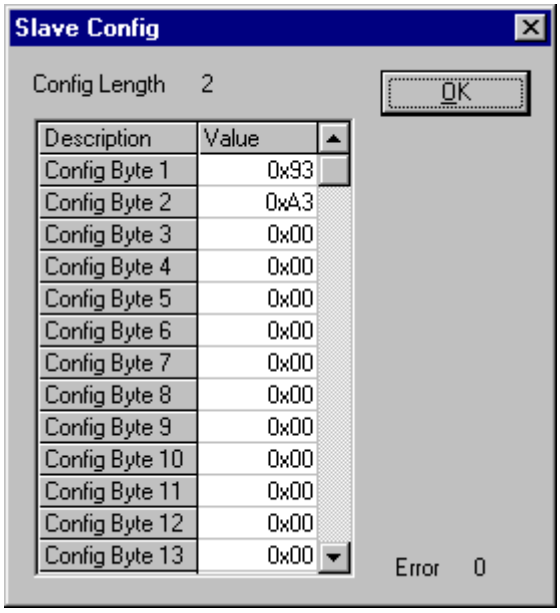


Figure 161: SPC3CTRL Slave Config

Variable	Meaning
Config Length	Length of the actual Configuration data in the Slave
Config Byte 1	Configuration data Byte 1
...	...

Table 116: SPC3CTRL Slave Config

10.2.4 SPC3CTRL Master Config

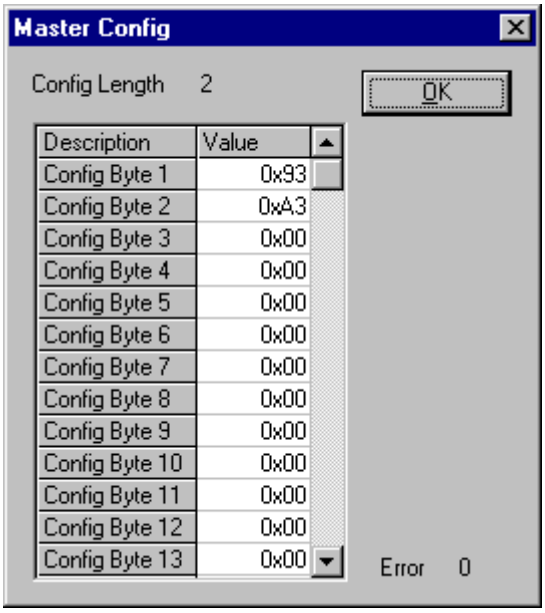


Figure 162: SPC3CTRL Master Config

Variable	Meaning
Config Length	Length of the configuration data send by the Master
Config Byte 1	Configuration data Byte 1
...	...

Table 117: SPC3CTRL Master Config

10.2.5 SPC3CTRL Param Data

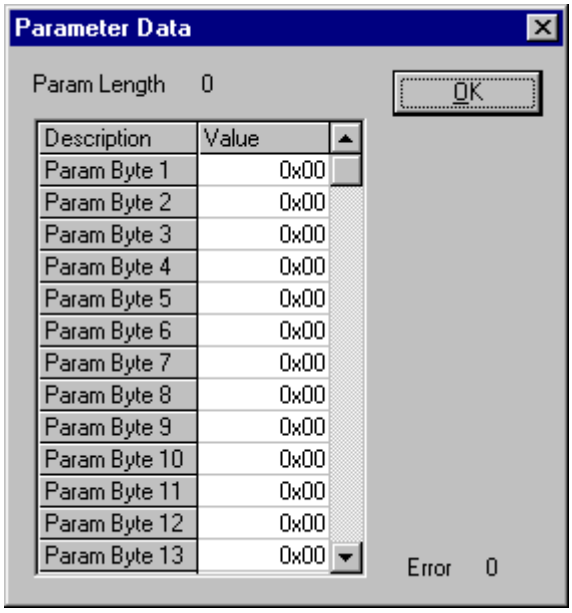


Figure 163: SPC3CTRL Param Data

Variable	Meaning
Param Length	Length of the User-Param-Data send by the Master
Param Byte	User-Param-Data-Byte 1
...	...

Table 118: SPC3CTRL Param Data

The standard Parameter data bytes are not displayed.

10.2.6 SPC3CTRL DPM

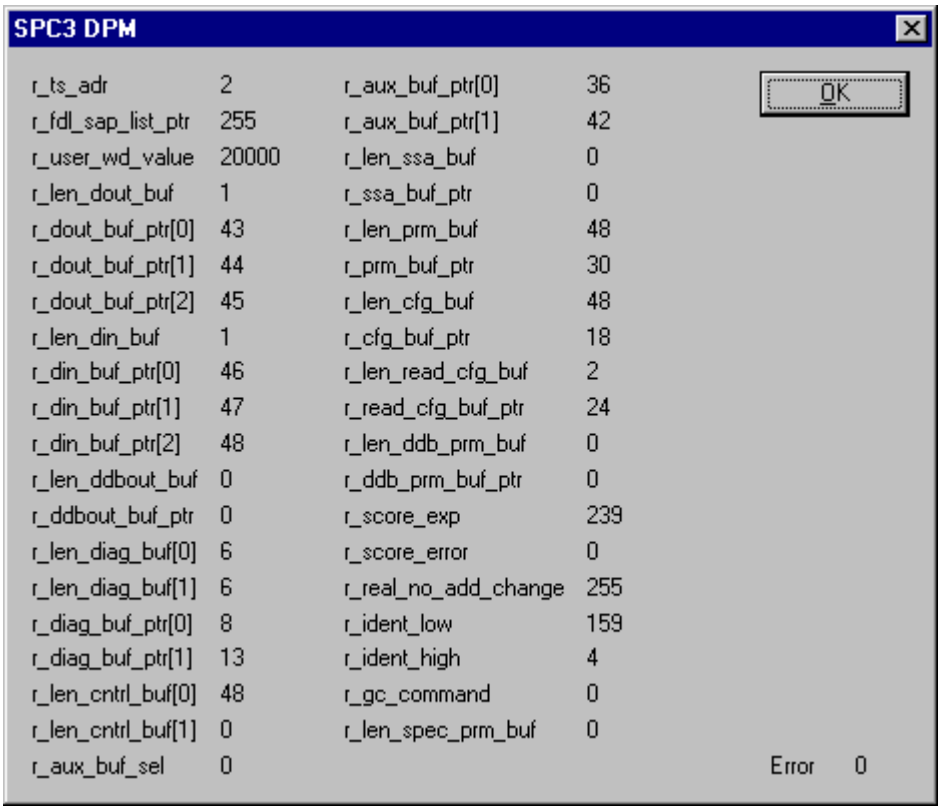


Figure 164: SPC3CTRL DPM

Display of the internal variables of the SPC3 PROFIBUS ASIC.

10.2.7 SPC3CTRL DPV1 Class 1

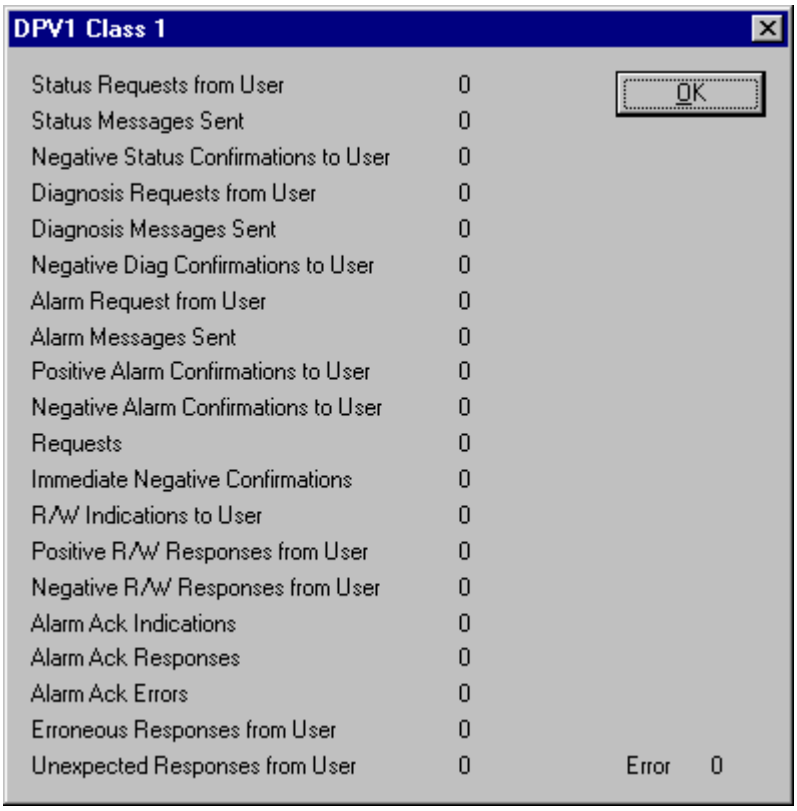


Figure 165: SPC3CTRL DPV1 Class 1

Variable	Meaning
Status Requests from User	Status reports by the user
Status Messages Sent	Status reports sent to the PROFIBUS
Negative Status Confirmations to User	Status reports rejected with error by the user
Diagnosis Requests from User	Single diagnostic reports by the user
Diagnosis Messages Sent	Single diagnostic reports sent to the PROFIBUS
Negative Diag Confirmations to User	Single diagnostic reports rejected with error by the user
Alarm Request from User	Alarm reports by the user
Alarm Messages Sent	Alarm reports sent to the PROFIBUS
Positive Alarm Confirmations to User	Alarm reports confirmed by the user
Negative Alarm Confirmations to User	Alarm reports rejected by the user
Requests	DPV1 class 1 requests from PROFIBUS received
Immediate Negative Confirmations	DPV1 class 1 requests rejected with error
R/W Indications to User	Read/Write requests forwarded to the user
Positive R/W Responses from User	Read/Write requests from the user (positive)
Negative R/W Responses from User	Read/Write requests from the user (negative)
Alarm Ack Indications	Alarm acknowledgement from PROFIBUS received
Alarm Ack Responses	Alarm acknowledgement answered
Alarm Ack Errors	Alarm acknowledgement with errors
Erroneous Responses from User	DPV1 class 1 answers from the user with error
Unexpected Responses from User	Unexpected DPV1 class 1 answers from the user

Table 119: SPC3CTRL DPV1 Class 1

10.2.8 SPC3CTRL DPV1 Class 2

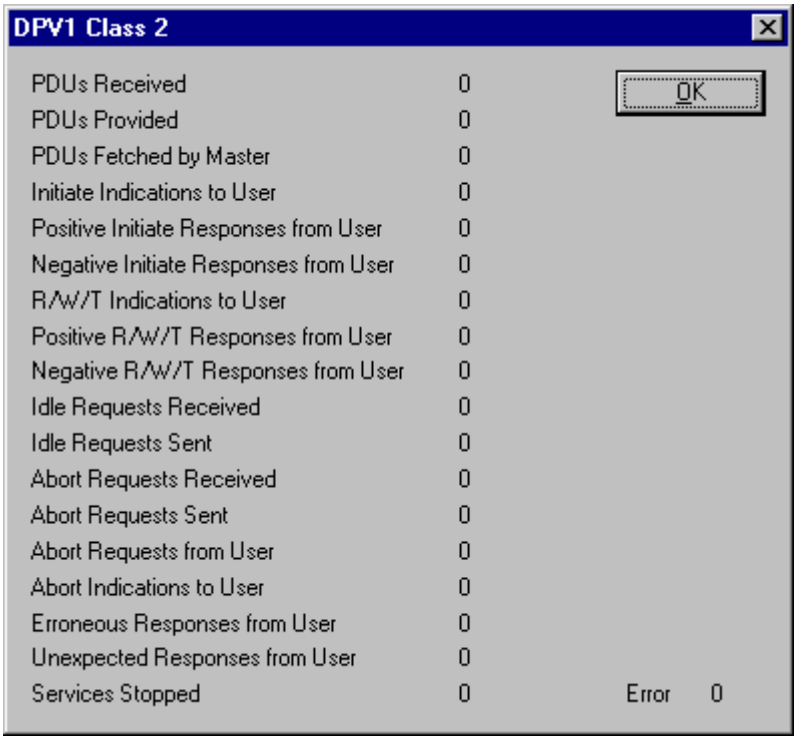


Figure 166: SPC3CTRL DPV1 Class 2

Variable	Meaning
PDUs Received	DPV1 class 2 PDUs from PROFIBUS received
PDUs Provided	DPV1 class 2 PDUs given to the PROFIBUS
PDUs Fetched by Master	DPV1 class 2 PDUs taken by the Master on the PROFIBUS
Initiate Indications to User	Initiate indication forwarded to the user
Positive Initiate Responses from User	Initiate response of the user (positive)
Negative Initiate Responses from User	Initiate response of the user (negative)
R/W/T Indications to User	Read/Write/Data transport indication forwarded to the user
Positive R/W/T Responses from User	Read/Write/Data transport responses of the user (positive)
Negative R/W/T Responses from User	Read/Write/Data transport responses of the user (negative)
Idle Requests Received	Idle telegrams received from PROFIBUS
Idle Requests Sent	Idle telegrams sent to PROFIBUS
Abort Requests Received	Abort request received from PROFIBUS
Abort Requests Sent	Abort request sent to PROFIBUS
Abort Requests from User	Abort request from user
Abort Indications to User	Abort indication forward to user
Erroneous Responses from User	DPV1 class 2 answers of the user with error
Unexpected Responses from User	Unexpected DPV1 class 2 answers of the user
Services Stopped	DPV1 class 2 services stopped

Table 120: SPC3CTRL DPV1 Class 2

10.2.9 SPC3CTRL Code Diagnostic

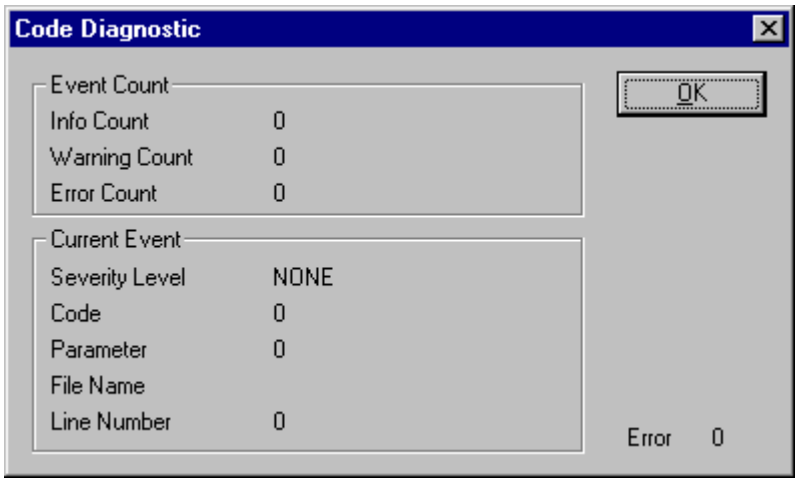


Figure 167: SPC3CTRL Code Diagnostic

Display for state and error reports from the firmware.

10.3 DP Slave Diagnostic

A PROFIBUS-DP Master can read out diagnostic information of a DP Slave. The diagnostic telegram contains standard diagnostic and as the case maybe extended diagnostic.

Standard Diagnostic 6 Byte	Extended Diagnostic (if available)

Table 121: DP Slave Diagnostic

The **Standard Diagnostic** of the first 6 Byte for DP Slave devices is described in section *PROFIBUS DP Device Diagnostic* on page *127*.

If an **Extended Diagnostic** is available for this device, you find a description in section *Extended Slave Device Diagnostic* on page *230*.

10.3.1 Extended Slave Device Diagnostic

10.3.1.1 Device Related Diagnostic

This extended diagnostic is referred to the device. The length of the device related diagnostic comprises min 2 to max 63 bytes.

2 .. 63 Bytes			
Headerbyte	2. Byte	...	63. Byte
	Manufacturer specific		

Table 122: Device Related Diagnostic

The meaning of the Headerbyte is shown in the following table. The meaning of the following 1 to max. 62 diagnostic bytes is fixed by the device manufacturer. For further analysis the ident number and the device description of the manufacturer are necessary.

MSB							LSB	Meaning
7	6	5	4	3	2	1	0	
		Block length in bytes including header byte 2 to header byte 63						
		Bit 7, Bit 6 fixed to 00						

Table 123: Device Related Diagnostic (Headerbyte)

10.3.1.2 Identifier Related (Module) Diagnostic

This extended diagnostic is referred to the module (identifier byte). The length of the identifier related diagnostic comprises min 2 to max 63 bytes.

2 .. 63 Bytes					
Headerbyte	**7 .. 0**	**15 .. 8**	**23 .. 16**	**31 .. 24**	**...**

Table 124: Identifier Related (Module) Diagnostic

For each used identifier byte at the configuration one bit is reserved. It is padded to byte limits. The bits which are not configured are set to zero. A set bit means there is diagnostic for this module (identifier byte).

Header Byte

MSB							LSB	Meaning
7	6	5	4	3	2	1	0	
								Block length in bytes including header byte 2 to header byte 63
								Bit 7, Bit 6 fixed to 00

Table 125: Identifier Related (Module) Diagnostic (Headerbyte)

Bit structure for identifier related diagnostic

MSB							LSB	Meaning
7	6	5	4	3	2	1	0	
								Identifier byte 0 has diagnostic
								Identifier byte 1 has diagnostic
								...
								Identifier byte 7 has diagnostic

Table 126: Identifier Related (Module) Diagnostic (Bit structure)

10.3.1.3 Channel Related Diagnostic

This extended diagnostic is referred to a channel.

Byte 1 Identifier Number	Byte 2 Channel Number	Byte 3 Type of Diagnostic

Table 127: Channel Related Diagnostic

The length per entry is 3 bytes. In this block the diagnosed channels and the diagnostic reason are entered in turn. Several blocks with channel related diagnostic can appear.

Byte 1: Identifier Number

MSB							LSB	Meaning
7	6	5	4	3	2	1	0	
		Identifier Number 0 to 63						
		Bit 7, Bit 6 fixed to 00						

Table 128: Byte 1: Identifier Number

Byte 2: Channel Number

MSB							LSB	Meaning
7	6	5	4	3	2	1	0	
		Channel Number 0 to 63						
		Input / Output 00 reserved 01 Input 10 Output 11 Input / Output						

Table 129: Byte 2: Channel Number

For identifier bytes which contain both input and output, the direction of the diagnosed channel is indicated in bit 7 and bit 6 of the cannel number.

Byte 3: Type of Diagnostic

MSB							LSB	Meaning
7	6	5	4	3	2	1	0	
								Error Type (described in the following table)
								Channel Type 000 reserved 001 Bit 010 2 Bit 011 4 Bit 100 Byte 101 Word 110 2 Words 111 reserved

Table 130: Byte 3: Type of Diagnostic

Error Type	Description
0	reserved
1	short circuit
2	under voltage
3	over voltage
4	overload
5	over temperature
6	line break
7	upper limit value exceeded
8	lower limit value exceeded
9	error
10	reserved
...	...
15	reserved
16	manufacturer specific
...	...
31	manufacturer specific

Table 131: Error Type

10.4 Identifier Bytes

In the configuration telegram identifier bytes are used. The meaning of them is specified in the PROFIBUS specification.

The following table is an overview.

	Value		Meaning			
GIF/SIF	0x00	00	free place			
	0x01-0x0F	01-15	see SIF			
GIF	0x10-0x1F	16-31	1-16	Byte	Input	Consistency over Byte
GIF	0x20-0x2F	32-47	1-16	Byte	Output	Consistency over Byte
GIF	0x30-0x3F	48-63	1-16	Byte	Input/Output	Consistency over Byte
	0x40-0x4F	64-79	see SIF			
GIF	0x50-0x5F	80-95	1-16	Word	Input	Consistency over Word
GIF	0x60-0x6F	96-111	1-16	Word	Output	Consistency over Word
GIF	0x70-0x7F	112-127	1-16	Word		Consistency over Word
	0x80-0x8F	128-143	see SIF			
GIF	0x90-0x9F	144-159	1-16	Byte	Input	Consistency over whole length
GIF	0xA0-0xAF	160-175	1-16	Byte	Output	Consistency over whole length
GIF	0xB0-0xBF	176-191	1-16	Byte		Consistency over whole length
	0xC0-0xCF	192-207	see SIF			
GIF	0xD0-0xDF	208-223	1-16	Word	Input	Consistency over whole length
GIF	0xE0-0xEF	224-239	1-16	Word	Output	Consistency over whole length
GIF	0xF0-0xFF	240-255	1-16	Word		Consistency over whole length

Table 132: Identifier bytes (overview)

10.4.1 Identifier Bytes (General Identifier Format GIF)

For the identifier bytes in general identifier format the following table shows the meaning.

MSB							LSB	
7	6	5	4	3	2	1	0	**Meaning**
								Bit 3 to 0: Length 0000 = 1 Byte or 1 Word 0001 = 2 Byte or 2 Word ... 1111 = 16 Byte or 16 Word
								Bit 5 and 4: Input/Output 00 = special identifier format (SIF) 01 = Input 10 = Output 11 = Input and Output
								Bit 6: Format 0 = Byte 1 = Word
								Bit 7: Consistency over 0 = Byte or Word 1 = whole length

Figure 168: Identifier Bytes (General Identifier Byte Format GIF)

	Value		Meaning			
GIF/SIF	0x00	00	Free place			
SIF	0x01 – 0x0F		see SIF			
GIF	0x10	16	1	Byte	Input	Consistency over Byte
GIF	0x11	17	2	Byte	Input	Consistency over Byte
GIF	...	...	...	Byte	Input	Consistency over Byte
GIF	0x1F	31	16	Byte	Input	Consistency over Byte
GIF	0x20	32	1	Byte	Output	Consistency over Byte
GIF	0x21	33	2	Byte	Output	Consistency over Byte
GIF	...	...	...	Byte	Output	Consistency over Byte
GIF	0x2F	47	16	Byte	Output	Consistency over Byte
GIF	0x30	48	1	Byte	Input/Output	Consistency over Byte
GIF	0x31	49	2	Byte	Input/Output	Consistency over Byte
GIF	...	...	...	Byte	Input/Output	Consistency over Byte
GIF	0x3F	63	16	Byte	Input/Output	Consistency over Byte
SIF	0x40 – 0x4F		see SIF			
GIF	0x50	80	1	Word	Input	Consistency over Word
GIF	0x51	81	2	Word	Input	Consistency over Word
GIF	...	...	...	Word	Input	Consistency over Word
GIF	0x5F	95	16	Word	Input	Consistency over Word
GIF	0x60	96	1	Word	Output	Consistency over Word
GIF	0x61	97	2	Word	Output	Consistency over Word
GIF	...	...	...	Word	Output	Consistency over Word
GIF	0x6F	111	16	Word	Output	Consistency over Word
GIF	0x70	112	1	Word	Input/Output	Consistency over Word
GIF	0x71	113	2	Word	Input/Output	Consistency over Word
GIF	...	...	...	Word	Input/Output	Consistency over Word
GIF	0x7F	127	16	Word	Input/Output	Consistency over Word
SIF	0x80 – 0x8F		see SIF			
GIF	0x90	144	1	Byte	Input	Consistency over whole length
GIF	0x91	145	2	Byte	Input	Consistency over whole length
GIF	...	...	...	Byte	Input	Consistency over whole length
GIF	0x9F	159	16	Byte	Input	Consistency over whole length

Table 133: Identifier Bytes 0x10 .. 0x3F, 0x50 .. 0x7F, 0x90 .. 0x9F (GIF)

	Value		Meaning			
GIF	0xA0	160	1	Byte	Output	Consistency over whole length
GIF	0xA1	161	2	Byte	Output	Consistency over whole length
GIF	...	...	...	Byte	Output	Consistency over whole length
GIF	0xAF	175	16	Byte	Output	Consistency over whole length
GIF	0xB0	176	1	Byte	Input/Output	Consistency over whole length
GIF	0xB1	177	2	Byte	Input/Output	Consistency over whole length
GIF	...	...	...	Byte	Input/Output	Consistency over whole length
GIF	0xBF	191	16	Byte	Input/Output	Consistency over whole length
SIF	0xC0 – 0xCF		see SIF			
GIF	0xD0	208	1	Word	Input	Consistency over whole length
GIF	0xD1	209	2	Word	Input	Consistency over whole length
GIF	...	...	...	Word	Input	Consistency over whole length
GIF	0xDF	223	16	Word	Input	Consistency over whole length
GIF	0xE0	224	1	Word	Output	Consistency over whole length
GIF	0xE1	225	2	Word	Output	Consistency over whole length
GIF	...	...	...	Word	Output	Consistency over whole length
GIF	0xEF	239	16	Word	Output	Consistency over whole length
GIF	0xF0	240	1	Word	Input/Output	Consistency over whole length
GIF	0xF1	241	2	Word	Input/Output	Consistency over whole length
GIF	...	...	...	Word	Input/Output	Consistency over whole length
GIF	0xFF	255	16	Word	Input/Output	Consistency over whole length

Table 134: Identifier Bytes 0xA0 .. 0xBF, 0xD0 .. 0xFF (GIF)

10.4.2 Special Identifier Byte Format (SIF)

The special identifier byte format (SIF) is an extension of the general identifier byte format and offers more flexibility. Also manufacturer specific information can be used with it.

MSB							LSB	Meaning
7	6	5	4	3	2	1	0	
								Bit 0 to 3: Length of manufacturer specific data according to the length byte for In- and/or Output In case of DDLM_Chk_Cfg: 0000 = no manufacturer specific data follow 0001 = 1 manufacturer specific data follow ... 1110 = 14 manufacturer specific data follow 1111 = no manufacturer specific data follow In case of DDLM_Get_Cfg: 0000 = no manufacturer specific data follow 0001 = 1 manufacturer specific data follow ... 1110 = 14 manufacturer specific data follow 1111= not allowed
								Bit 5 and 4: solid 00 = solid
								Bit 7 and 6: Input/Output 00 = free place 01 = a length byte for Input follows 10 = a length byte for Output follows 11 = a length byte for Input and Output follows

Figure 169: Special Identifier Format (SIF)

Length Byte

MSB							LSB	Meaning
7	6	5	4	3	2	1	0	
								Bit 0 to 5: Length 000000 = 1 Byte or 1 Word 000001 = 2 Byte or 2 Word ... 111111 = 64 Byte or 64 Word
								Bit 6: Format 0 = Byte 1 = Word
								Bit 7: Consistency over 0 = Byte or Word (element) 1 = whole length

Table 135:Length Byte of the SIF

	Value		Meaning
GIF/SIF	0x00	00	free place
GIF	0x01 – 0x0E	01 – 14	free place and 1-14 manufacturer specific data
GIF	0x0F	15	free place and no manufacturer specific data
GIF	0x40	64	1 length byte Input
GIF	0x41 – 0x4E	65 – 78	1 length byte Input and 1-14 manufacturer specific data
GIF	0x4F	79	1 length byte Input and no manufacturer specific data
GIF	0x80	128	1 length byte Output
GIF	0x81 – 0x8E	129 – 142	1 length byte Output 1 and 1-14 manufacturer specific data
GIF	0x8F	143	1 length byte Output 1 and no manufacturer specific data
GIF	0xC0	192	1 length byte Output and 1 length byte Input
GIF	0xC1 – 0xCE	193 – 206	1 length byte Output, 1 length Input byte and 1-14 manufacturer specific data
GIF	0xCF	207	1 length byte Output, 1 length Input byte and no manufacturer specific data

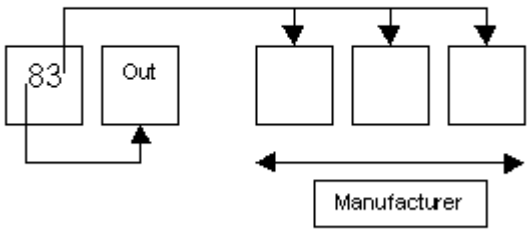
Table 136: Special Identifier bytes 0x01 .. 0x0F, 0x40 .. 0x4F, 0x80 .. 0x8F, 0xC0 .. 0xCF (SIF)

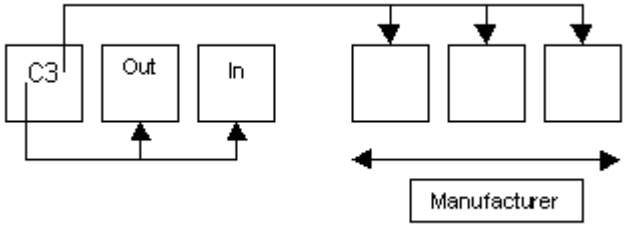
Length Byte

Value		Meaning		
0x00 – 0x3F	00-63	1-64	Byte	Consistency over Byte
0x40 – 0x7F	64-127	1-64	Word	Consistency over Word
0x80 – 0xBF	129-191	1-64	Byte	Consistency over whole length
0xC0 – 0xFF	193-255	1-64	Word	Consistency over whole length

Table 137: Length byte of the special identifiers (SIF)

Example for SIF:





11 Lists

11.1 List of Figures

11.2 List of Tables

11.3 List of Equations

12 Glossary

SyCon

System Configurator.

Configuration and Diagnostic Tool.