Operating Instruction Manual

SyConIB

System Configurator InterBus

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Language: English (EN)

Hilscher Gesellschaft für Systemautomation mbH
Rheinstraße 15
D-65795 Hattersheim
Germany

Tel. +49 (6190) 99070
Fax. +49 (6190) 990750

Sales: +49 (6190) 99070
Hotline and Support: +49 (6190) 990799

Sales email: sales@hilscher.com
Hotline and Support email: hotline@hilscher.com

Web: www.hilscher.com

List of Revisions

Index	Date	Version	Chapter	Revision
3	13.07.01	2.690 INTERBUS.DLL 2.638 SYCON.EXE	all	revised, updated, extended new chapter structure
4	04.09.01	2.700 INTERBUS.DLL 2.638 SYCON.EXE	all	InterBus device counting starts with 0
5	24.01.02	2.701 INTERBUS.DLL 2.6383 SYCON.EXE	all 7.3.2 7.7 10.3	revised Chapter: CSV Export added Chapter: View Menu SyCon added Chapter: Length- and ID Codes added
6				

Although this program has been developed with great care and intensively tested, Hilscher Gesellschaft für Systemautomation mbH cannot guarantee the suitability of this program for any purpose not confirmed by us in writing.

Guarantee claims shall be limited to the right to require rectification. Liability for any damages which may have arisen from the use of this program or its documentation shall be limited to cases of intent.

We reserve the right to modify our products and their specifications at any time in as far as this contribute to technical progress. The version of the manual supplied with the program applies.

Table of Contents

1 Overview SyCon

1.1 Main Functions

The main functions of the InterBus 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, Debugger, Global State Field etc.
	User Data Transfer	I/O Monitor, I/O Watch, PCP Monitor, Message Monitor
Documentation	*Project Information*	Set the project information
	Print	Print out the configuration

Table 1: SyCon Main Functions

1.2 Properties

SyCon is a 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 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. In this case a Slave is 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 NT 4.0/2000/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
- COM/DCOM only for OPC Server
- Keyboard and Mouse

2.2 Software Installation

Close all application programs on the system!

Insert the CD Hilscher System software 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 asks for the components you want to install. Answer these questions with **Yes** or **No**.

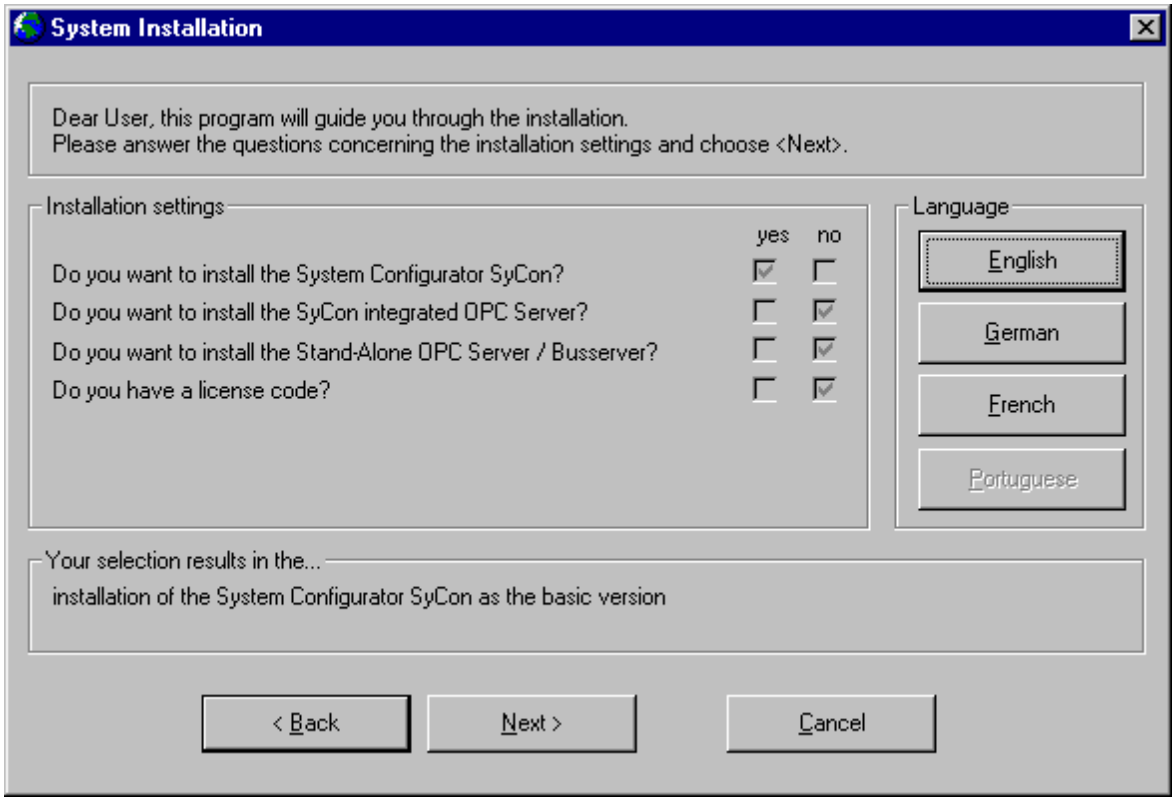

Figure 1: Selection for the Installation of the System Configurator in basic version

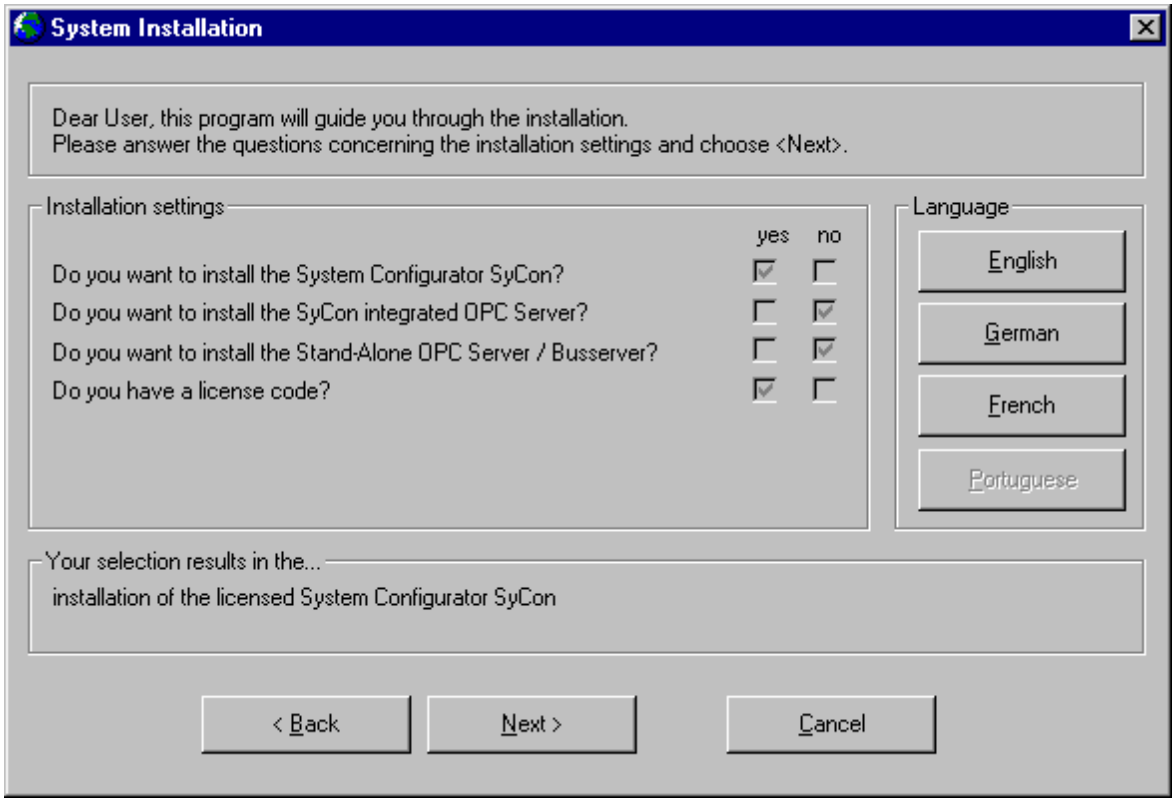

Figure 2: Selection for the Installation of the licensed System Configurator

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 printed of 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 name 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**.

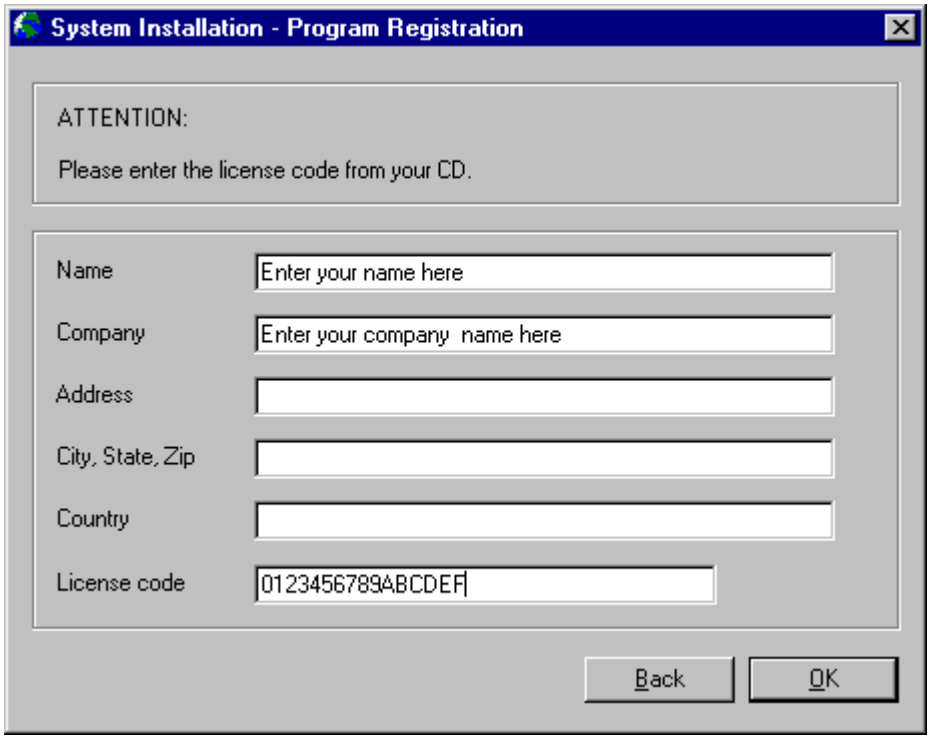

Figure 3: Enter the Name, the Company Name and the license code

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 SyCon 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 formulary 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 License Code* as described below on page *15*.

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 planed fields.

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

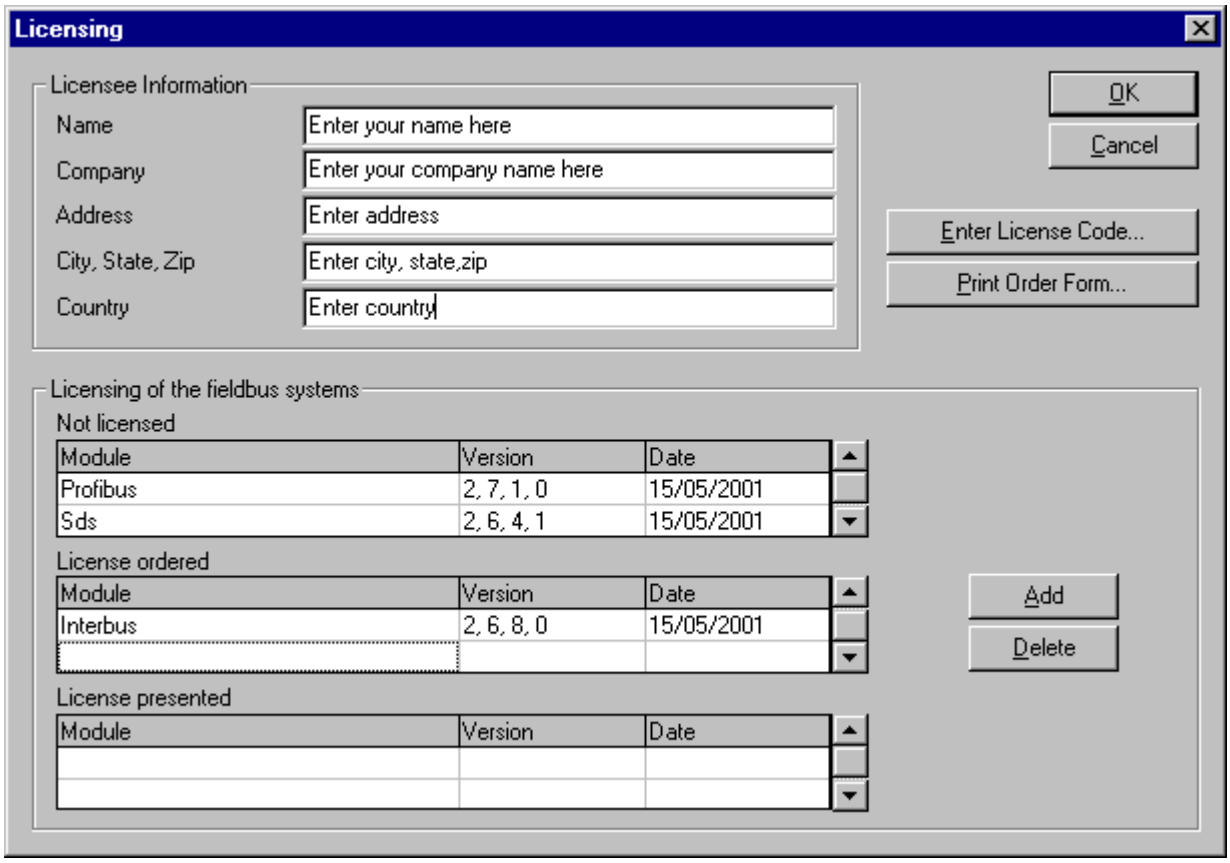

Figure 4: Example for select the Fieldbus Module InterBus

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 SyCon. 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 were 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 window 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 this System Configurator (license codes with less than 16 digits) expects a license in the device.

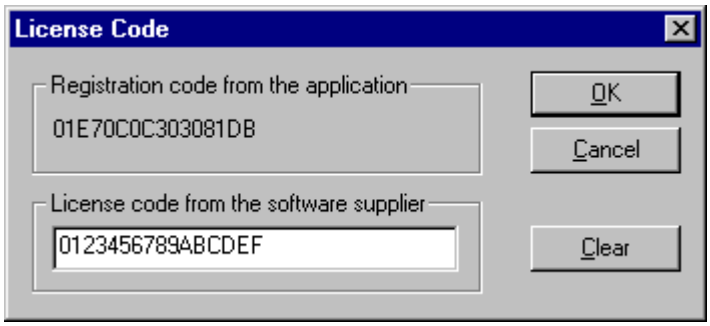

Figure 5: Enter the License Code

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 the System Configurator will ask you to exit and restart the system to activate the license. If the license code is invalid the following window appears.

Figure 6: Note license code 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 mode and unlicensed fieldbus modules have the following functionality:

- Full functionality for configuring up to two devices. For the configuration of one 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 that you want to use. The configuration steps are described in the given section.

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 already done.

Communication	Device	Device	Described in section	Page
InterBus (I/O)	Hilscher InterBus Master	Any InterBus Slave	*Configuration Hilscher InterBus Master to any InterBus Slave*	*20*
	Any InterBus Master	Hilscher InterBus Slave	*Configuration Hilscher InterBus Slave to any InterBus Master*	*21*
	Hilscher InterBus Master	Hilscher InterBus Slave	*Configuration Hilscher InterBus Master to Hilscher InterBus Slave*	*22*
InterBus PCP	Hilscher InterBus PCP Master	Any InterBus PCP Slave	*Configuration Hilscher InterBus PCP Master to any InterBus PCP Slave*	*24*
	Any InterBus PCP Master	Hilscher InterBus PCP Slave	*Configuration Hilscher InterBus PCP Slave to any InterBus PCP Master*	*25*
	Hilscher InterBus PCP Master	Hilscher InterBus PCP Slave	*Configuration Hilscher InterBus PCP Master to Hilscher InterBus PCP Slave*	*26*

Table 3: Overview Communication Types

3.2 Configuration Hilscher InterBus Master to any InterBus Slave

The following table describes the steps to configure a Hilscher InterBus Master to any InterBus 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 > InterBus**	*Setting up the InterBus Configuration*	*27*
2	Choose Hilscher InterBus Master	**Insert > Master**	*Insert Master*	*28*
3	Choose InterBus Slave **(*1)**	**Insert > Remote Bus Branch Interface** or **Insert > Local Bus Branch Interface** or **Insert > Remote Bus Device** or **Insert > Local Bus Device**	*Insert InterBus Slave*	*31*
4	Assign the input and output modules	Mark the Slave (left Mouse click), then **Settings > Slave Configuration**	*Slave Configuration*	*34*
5	Assign the offset addresses			
6	Set device assignment if no automatic assignment has occurred	Mark the Master (left Mouse click), then **Settings > Device Assignment**	*Device Assignment*	*45*
7	Save project	**File > Save**	*Save and Save As*	*99*
8	Download	Mark the Master (left Mouse click), then **Online > Download**	*Downloading the Configuration*	*69*
9	Start Debugger	Mark the Master (left Mouse click), then **Online > Start Debug Mode**	*Debug Mode (InterBus* Master)	*77*
10	Device diagnostic	Mark the Slave (left Mouse click), then **Online > Device Diagnostic**	*InterBus Slave Device Diagnostic*	*78*
11	Stop Debugger	**Online > Stop Debug Mode**	*Debug Mode (InterBus* Master)	*77*
12	Global Diagnostic	Mark the Master (left Mouse click), then **Online > Global State Field**	*Global State Field*	*80*
13	Transfer user data: Write output, read input	Mark the Master (left Mouse click), then **Online > I/O Monitor**	*I/O Monitor* **(*2)** *or* *I/O Watch*	*88* *89*

Table 4: Steps for Configuration Hilscher InterBus Master to any InterBus Slave

Note (*1): If the Slave device is missing in the selection list, an EDS file can be produced with the System Configurator under the menu **Tools > EDS Generator** (described on page *116*).

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

3.3 Configuration Hilscher InterBus Slave to any InterBus Master

The following table describes the steps to configure a Hilscher InterBus Slave to any InterBus 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 > InterBus**	*Setting up the InterBus Configuration*	*27*
2	Choose Hilscher InterBus Master **(*1)**	**Insert > Master**	*Insert Master*	*28*
3	Choose Hilscher InterBus Slave	**Insert > Remote Bus Device**	*Insert InterBus Slave*	*31*
4	Set Length Code for Hilscher InterBus Slave Set ID code to 03H	Mark the Slave (left Mouse click), then **Settings > Slave Settings**	*Slave Settings*	*62*
5	Assign the input and output modules **(*2)**	Mark the Slave (left Mouse click), then **Settings > Slave Configuration**	*Slave Configuration*	*34*
6	Set device assignment if no automatic assignment has occurred	Mark the Slave (left Mouse click), then **Settings > Device Assignment**	*Device Assignment*	*45*
7	Save project	**File > Save**	*Save and Save As*	*99*
8	Download	Mark the Slave (left Mouse click), then **Online > Download**	*Downloading the Configuration*	*69*
9	Switch the Hilscher InterBus Slave off and then on (make it voltage less) **(*3)**	-	-	-
10	Transfer user data: Write output, read input	Mark the Slave (left Mouse click), then **Online > I/O Monitor**	*I/O Monitor* **(*4)**	*88*

Table 5: Steps for Configuration Hilscher InterBus Slave to any InterBus Master

Note (*1): Insert a Hilscher InterBus 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 InterBus Master and have no meaning here.

Note (*3): Modifications of the Ident and of the Length Code that are taken over by the Hilscher InterBus Slave device only, if it is switched off (without voltage) and switched on again .

Note (*4): Alternatively the CIF Device Driver Test program can be used for the test. After Board Select: Data Transfer > I/O Data > DevExchangeIO.

3.4 Configuration Hilscher InterBus Master to Hilscher InterBus Slave

The following table describes the steps to configure a Hilscher InterBus Master to a Hilscher InterBus 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 > InterBus**	*Setting up the InterBus Configuration*	*27*
2	Choose Hilscher InterBus Master	**Insert > Master**	*Insert Master*	*28*
3	Choose Hilscher InterBus Slave	**Insert > Remote Bus Device**	*Insert InterBus Slave*	*31*
4	Set Length Code for Hilscher InterBus Slave Set ID code to 03H	Mark the Slave (left Mouse click), then **Settings > Slave Settings**	*Slave Settings*	*62*
5	Assign the input and output modules **(*1)**	Mark the Slave (left Mouse click), then **Settings > Slave Configuration**	*Slave Configuration*	*34*
6	Assign the offset addresses			
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*	*45*
8	Set device assignment for the Slave if no automatic assignment has occurred	Mark the Slave (left Mouse click), then **Settings > Device Assignment**	*Device Assignment*	*45*
9	Save project	**File > Save**	*Save and Save As*	*99*
10	Download to the Master	Mark the Master (left Mouse click), then **Online > Download**	*Downloading the Configuration*	*69*
11	Download to the Slave	Mark the Slave (left Mouse click), then **Online > Download**		
12	Switch the Hilscher InterBus Slave off and then on (make it tensionless) **(*2)**	-	-	-
13	Start Debugger	Mark the Master (left Mouse click), then **Online > Start Debug Mode**	*Debug Mode (InterBus* Master)	*77*
14	Device diagnostic	Mark the Slave (left Mouse click), then **Online > Device Diagnostic**	*InterBus Slave Device* Diagnostic	*78*
15	Stop Debugger	**Online > Stop Debug Mode**	*Debug Mode (InterBus* Master)	*77*
16	Global Diagnostic	Mark the Master (left Mouse click), then **Online > Global State Field**	*Global State Field*	*80*
17	Transfer user data: Write output, read input	Mark the Master (left Mouse click), then **Online > I/O Monitor**	*I/O Monitor* **(*3)** or Alternative(for the Master): *I/O Watch*	*88* *89*

Table 6: Steps for Configuration Hilscher InterBus Master to Hilscher InterBus Slave

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

Note (*2): Modifications of the Ident and of the Length Code are taken over by the Hilscher InterBus Slave device only, if it is switched off (without voltage) and becomes switched on again.

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

3.5 Configuration Hilscher InterBus PCP Master to any InterBus PCP Slave

The following table describes the steps to configure a Hilscher InterBus PCP Master to any InterBus PCP 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 > InterBus**	*Setting up the InterBus Configuration*	*27*
2	Choose Hilscher InterBus PCP Master	**Insert > Master**	*Insert Master*	*28*
3	Choose InterBus PCP Slave **(*1)**	**Insert > Remote Local Bus Device**	*Insert InterBus Slave*	*31*
4	Set InterBus PCP Parameter **(*2)**	Mark the Slave (left Mouse click), then **Settings > Communication Reference List (CRL)**	*Communication Reference List (CRL)*	*38*
5	Set objects **(*2)**	Mark the Master (left Mouse click), then **Settings > Object Directory**	*Object Directory*	*42*
6	Set device assignment if no automatic assignment has occurred	Mark the Master (left Mouse click), then **Settings > Device Assignment**	*Device Assignment*	*45*
7	Save project	**File > Save**	*Save and Save As*	*99*
8	Download	Mark the Master (left Mouse click), then **Online > Download**	*Downloading the Configuration*	*69*
9	Transfer user data: Read and write data	Mark the Master (left Mouse click), then **Online > PCP Monitor**	*PCP-Monitor*	*92*

Table 7: Steps for Configuration Hilscher InterBus PCP Master to any InterBus PCP Slave

Note (*1): If the Slave device is missing in the selection list, an EDS file can be produced with the System Configurator under the menu **Tools > EDS Generator** (described on page *116*).

Note (*2): Consider to it also the configuration notes in the manual of the InterBus Slave.

3.6 Configuration Hilscher InterBus PCP Slave to any InterBus PCP Master

The following table describes the steps to configure a Hilscher InterBus PCP Slave to any InterBus PCP 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 > InterBus**	*Setting up the InterBus Configuration*	*27*
2	Choose Hilscher InterBus PCP Master **(*1)**	**Insert > Master**	*Insert Master*	*28*
3	Choose Hilscher InterBus PCP Slave	**Insert > Remote Bus Device**	*Insert InterBus Slave*	*31*
4	Set Length Code for Hilscher InterBus PCP Slave Set ID code to F0H	Mark the Slave (left Mouse click), then **Settings > Slave Settings**	*Slave Settings*	*62*
5	Set InterBus PCP Parameter **(*2)**	Mark the Slave (left Mouse click), then **Settings > Communication Reference List (CRL)**	*Communication Reference List (CRL)*	*38*
6	Set Objects	Mark the Master (left mouse click), then **Settings > Object Directory**	*Object Directory*	*42*
7	Set device assignment if no automatic assignment has occurred	Mark the Slave (left Mouse click), then **Settings > Device Assignment**	*Device Assignment*	*45*
8	Save project	**File > Save**	*Save and Save As*	*99*
9	Download	Mark the Slave (left Mouse click), then **Online > Download**	*Downloading the Configuration*	*69*
10	Switch the Hilscher InterBus Slave off and then on (make it voltage less) **(*2)**	-	-	-
11	Transfer user data: Read and write data	Mark the Slave (left Mouse click), then **Online > Message Monitor**	*Message Monitor*	*94*

Table 8: Steps for Configuration Hilscher InterBus PCP Slave to any InterBus PCP Master

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

Note (*2): Modifications of the Ident and of the Length Code that are taken over by the Hilscher InterBus Slave device only, if it is switched off (without voltage) and switched on again .

3.7 Configuration Hilscher InterBus PCP Master to Hilscher InterBus PCP Slave

The following table describes the steps to configure a Hilscher InterBus PCP Master to a Hilscher InterBus PCP 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 > InterBus**	*Setting up the InterBus Configuration*	*27*
2	Choose Hilscher InterBus PCP Master	**Insert > Master**	*Insert Master*	*28*
3	Choose Hilscher InterBus PCP Slave	**Insert > Remote Bus Device**	*Insert InterBus Slave*	*31*
4	Set Length Code for Hilscher InterBus Slave Set ID code to F0h	Mark the Slave (left Mouse click), then **Settings > Slave Settings**	*Slave Settings*	*62*
5	Set InterBus PCP Parameter	Mark the Slave (left Mouse click), then **Settings > Communication Reference List (CRL)**	*Communication Reference List (CRL)*	*38*
6	State objects	Mark the Slave (left Mouse click), then **Settings > Object Directory**	*Object Directory*	*42*
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*	*45*
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*	*99*
10	Download to the Master	Mark the Master (left Mouse click), then **Online > Download**	*Downloading the Configuration*	*69*
11	Download to the Slave	Mark the Slave (left Mouse click), then **Online > Download**		
12	Switch the Hilscher InterBus Slave on and off (make it voltage less) **(*1)**	-	-	-
13	Transfer user data: Read and write data	Mark the Master (left Mouse click), then **Online > PCP Monitor** Mark the Slave (left Mouse click), then **Online > Message Monitor**	 *PCP-Monitor* *Message Monitor for Testing of PCP (Server)*	 *92* *96*

Table 9: Steps for Configuration Hilscher InterBus PCP Master to Hilscher InterBus PCP Slave

Note (*1): Modifications of the Ident and of the Length Code that are taken over by the Hilscher InterBus Slave device only, if it is switched off (without voltage) and switched on again .

4 Configuration of InterBus with SyCon

4.1 Setting up the InterBus Configuration

To create a new configuration, choose the **File > New** menu. This will offer a selection list of fieldbus systems. Choose the **InterBus**. If only the InterBus 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 EDS Files

EDS (Electronic Data Sheet of a device) files contain and describe the functions and characteristics of InterBus devices. All the available EDS files together form the device database.

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

If an EDS file for a device is needed which does not appear in the selection list, you can generate with the System Configurator in the menu **Tools > EDS Generator** an EDS file (see section *EDS Generator* on page *116*). If an EDS file was already generated then the EDS file can be copied into the EDS directory with **File > Copy EDS**. Another possibility is to copy the EDS file into the SyCon EDS directory with the Windows Explore and then retrieve the EDS files into the EDS directory with **Settings > Path** and **OK**.

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

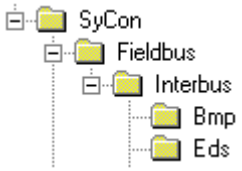

Figure 7: EDS files and bitmaps directory

The EDS files for Hilscher devices as well as devices from other manufacturers are already included in the scope of delivery and installed. The files are based on no standard and can not be obtained from other manufacturers because of this reason.

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

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:

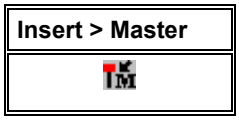

Figure 8: Insert > Master Symbol

The window opens from which exactly one Master can be chosen. After this selection the chosen master is at the first position in the configuration window.

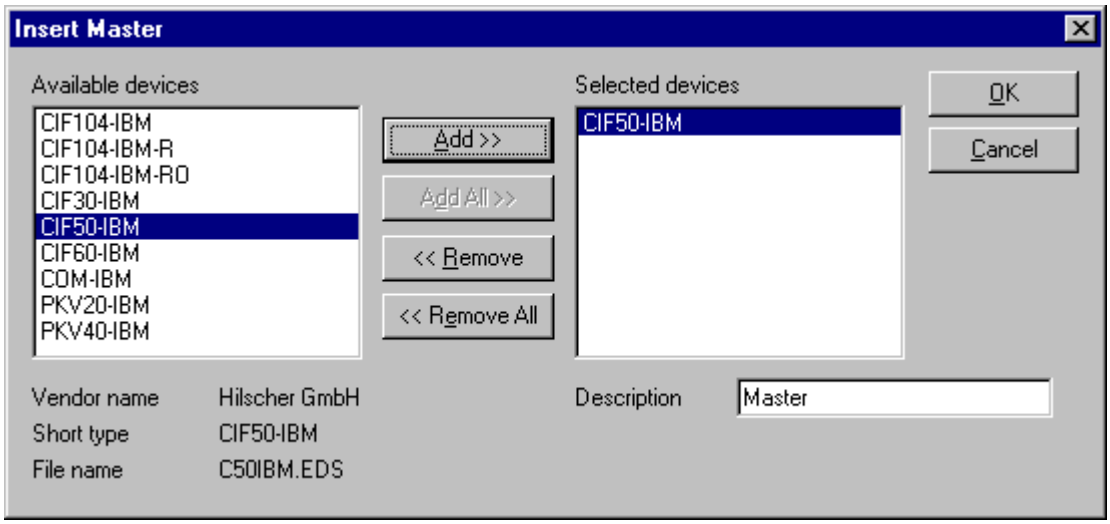

Figure 9: Insert > Master

This example shows a CIF 50-IBM. It gets no Station address but the standard description **Master**. This description is changeable in this window.

4.3.1.1 Hardware Assignment

If you have configured the CIF Device Driver Setup for your hardware and you insert the right 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.

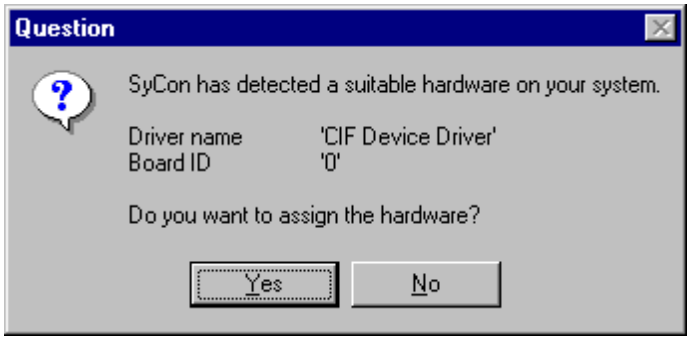

Figure 10: Assign hardware Master

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 *45*).

4.3.2 Master Configuration

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

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

or

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

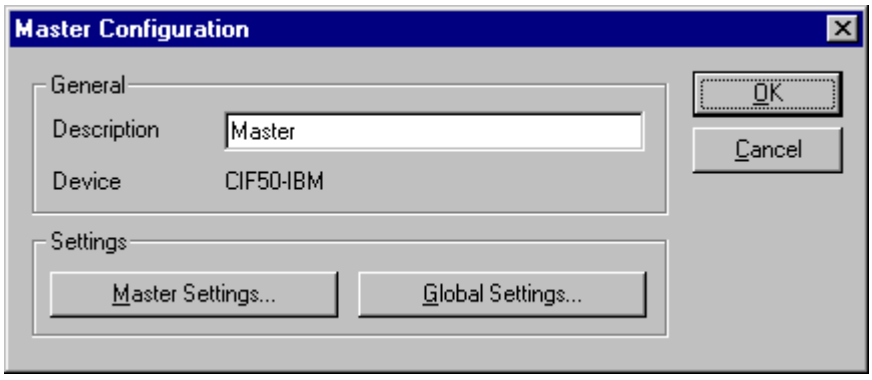

Figure 11: Settings > Master Configuration

In this Master Configuration window can be set:

- a (symbolic) **Description** of the Master
- the window *Master Settings* (described on page *58*) can be opened
- the window *Global Settings* (described on page *61*) can be opened

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

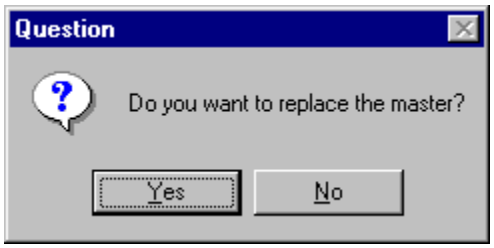

Figure 12: Security question replace Master

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

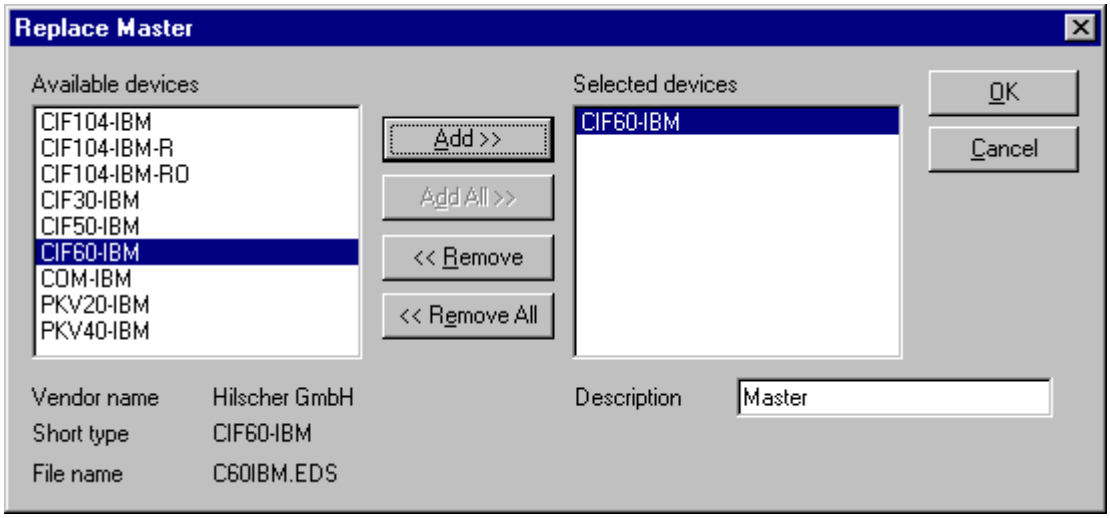

Figure 13: Edit > Replace Master

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

4.4 InterBus Slave

4.4.1 Insert InterBus Slave

In order to insert an InterBus Slave into the configuration, choose the **Insert > Remote Bus Branch Interface, Insert > Local Bus Branch Interface, Insert > Remote Bus Device, Insert > Local Bus Device** menu to open the selection window

or

click on the symbol:

Insert > Remote Bus Branch Interface	Insert > Local Bus Branch Interface	Insert > Remote Bus Device	Insert > Local Bus Device
			

Table 10: Insert an InterBus Slave

The mouse pointer automatically changes to the Insert Slave pointer. First the mouse pointer for “no insert position” appears.

Mouse pointer “no insert position”


Table 11: Mouse pointer “no insert position“

Possible insert positions are displayed with a colored circle  . If you move the mouse pointer on the colored circle, it changes into these symbols:

Mouse pointer for Insert > Remote Bus Branch Interface	Mouse pointer for Insert > Local Bus Branch Interface	Mouse pointer for Insert > Remote Bus Device	Mouse pointer for Insert > Local Bus Device
			

Table 12: Mouse pointer for insert an InterBus Slave

Click on the position where the Slave is to be inserted.

Figure 14: Possible insert positions of devices with identification by a colored circle

The window opens where one or more Slaves could be selected.

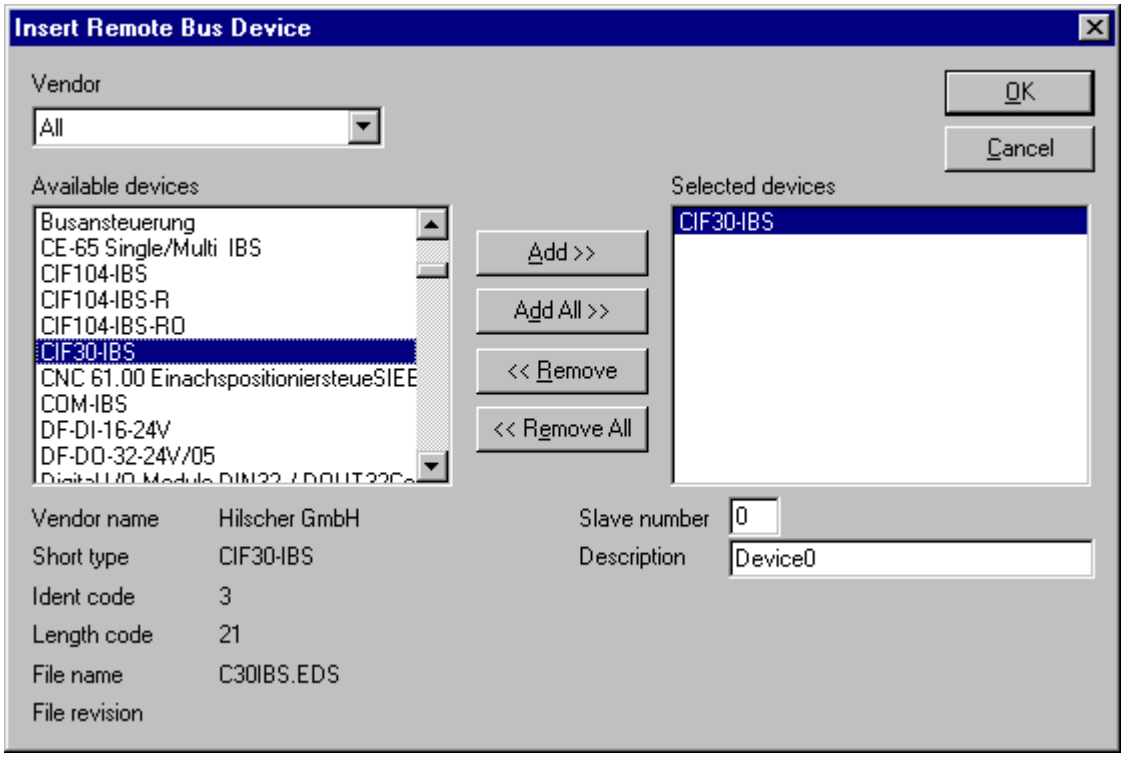

Figure 15: Insert > Remote Bus Device

The list on the left displays for selection all the Slave devices whose EDS files have been put in the EDS directory. A filter can be used to limit the selection list of the manufacturer. Further information on a Slave is shown below the selection list (**Available Slaves**) when it is selected (one mouse click). Apart from the manufacturer name and the description especially the ID-Code, the Length-Code, the file name and the file revision are given. The Slave appears on the right-hand list with a mouse click or with the **Add** button. All devices in the right-hand list are assigned to the current insert point that is also shown in this window. If the Slaves in the right-hand list are chosen one after the other (with a mouse click), a name can be assigned for every Slave in the **Description** field.

4.4.1.1 Hardware Assignment

If you have configured the CIF Device Driver Setup for your hardware and you insert the right Slave device 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.

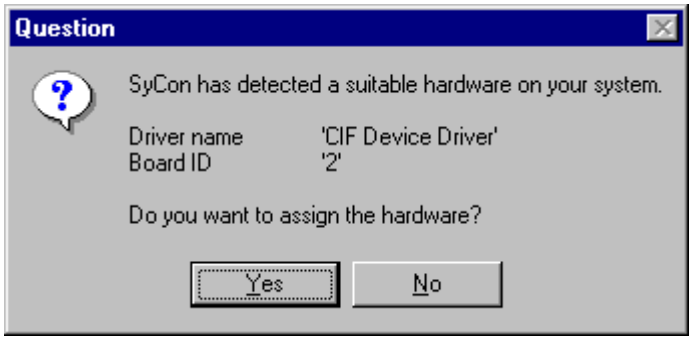

Figure 16: Assign hardware Slave

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 *45*).

4.4.2 Slave Configuration

First click 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 InterBus Slave device.

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

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

Note: With the Hilscher Slave, the input or output data at the Bus are taken over directly into the Dual-port Memory.

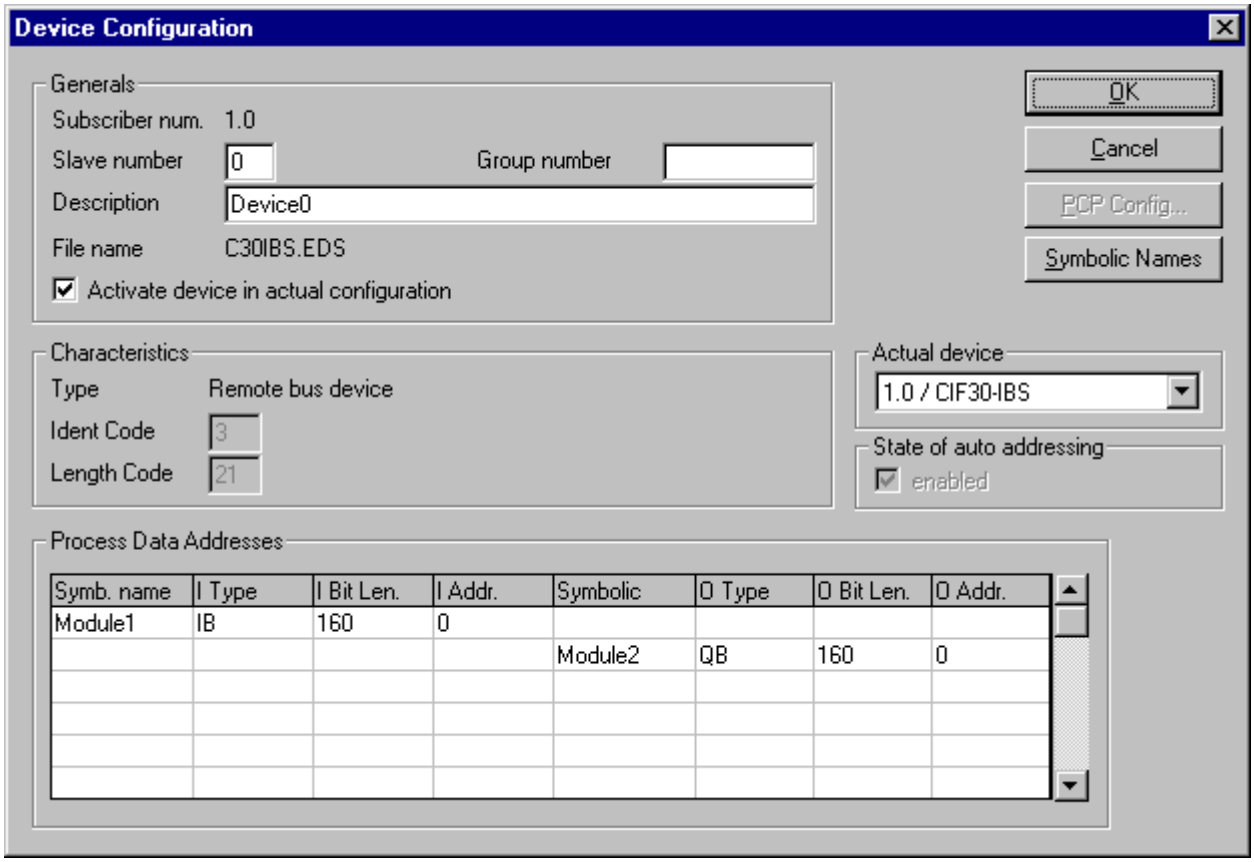

Figure 17: Settings > Slave Configuration

The device-specific configuration is carried out here. These are in detail:

- a **description** of the device,
- **activate** or **deactivate** the Slave in the actual configuration,
- configure the **Process Data Addressing** (see following description)
- selecting an other device without leaving the window
- changing the settings for the Parameter Data Channel with the **PCP Config...** button, if the device is PCP capable. You first have to set the focus on the Slave (left mouse click) and select the menu **Edit > Replace.** The *Parameter Data Channel - PCP* is described in an own section *on page 38*.

If **Activate device in actual configuration** is selected, the Master carries out a data exchange to this device. Is this setting deactivated, then the master doesn't carry out a data exchange to this device. In both cases however the memory in the process image is used respectively reserved in the Master.

The I/O addresses can be automatically assigned by SyCon or can be allocated by the user. For this purpose you have to activate (Auto addressing) and deactivate (manual addressing) respectively it in the menu **Settings > Global Settings** the **Process Data Auto Addressing**. When the Auto Addressing is active, then the addresses of the Slaves will be allocated in their physical order by SyCon. The addresses can be viewed and checked in the **View > Address Table**. When the Auto addressing is deactivated, then only the address 0 is shown in the **I Addr** or **O Addr** and must be overwritten by the user.

In the state of auto configuration is shown if the Process Data Addressing are placed automatically by SyCon (selected) or manual by the user (not selected).

Depending on the **Addressing mode**, which can be set in the **InterBus Master Settings**, the addresses are either Byte or Word addresses. For further details of this, see the description in the section *Addressing Mode* on page *60*.

At **actual device** you can change to another Slave device without leaving the window.

Individual InterBus Slave devices can be combined to groups with **the group number**. This is optional. In the field group number you can

- indicate only one number (from 1 to 255)
- also indicate an alternative number (from 1 to 255) apart from the group number in the course of which group number and alternative have to be separated with a hyphen. For example: **2-4** (group 2, alternative 4).

The group number is used to switch devices of one group on and off together.

The alternative number is used to switch on one or another alternative, however not more than one alternatives.

4.4.3 Replace Slave

To replace a Slave device in the configuration against another you first have to set the focus on the Slave (left mouse click at the Slave) and select the menu **Edit > Replace**. In the opened window the question appears if the Slave device should be replaced.

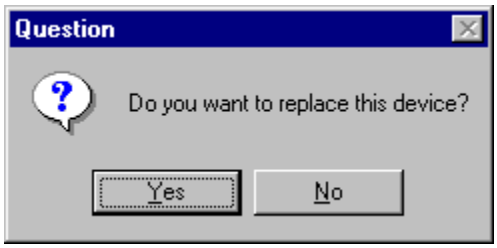

Figure 18: Security question replace device

If you answer this question with **Yes**, the following window appears where you can select another Slave device.

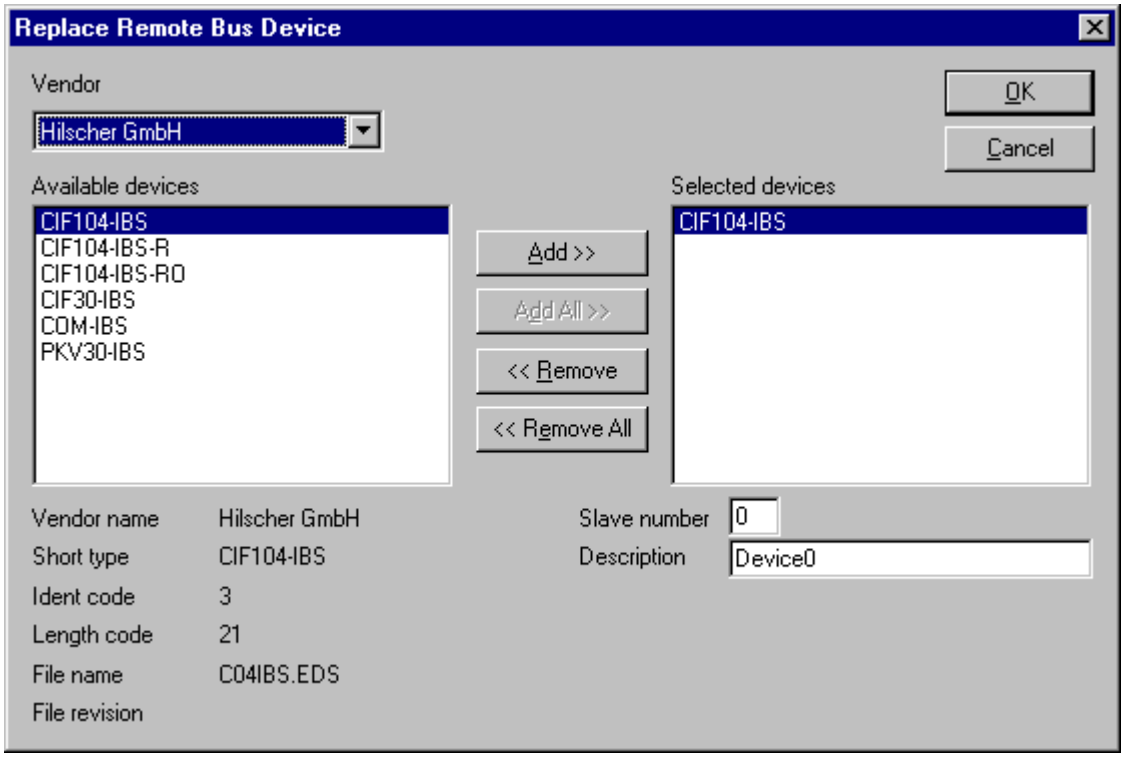

Figure 19: Edit > Replace Device

In this window you can choose the device you want by clicking on it. By clicking the **Add** button **the** Slave is shown under **Selected devices**. With **OK** you confirm the selection and the Slave will be replaced.

4.4.4 Parameter Data Channel - PCP

The PCP Channel offers the user data exchange with the functions read and write.

The direction of user data is shown in the following table:

Function	Direction of user data
Read	From server to client
Write	From client to server

Table 13: PCP Channel: direction of user data for reading and writing

Before you are able to use the functions read and write you first have to

- Set logic connection (Communication Reference List, CRL) in both devices (see section *Communication Reference List (CRL)* at page *38*) as well as
- Set objects in the sever (see section *Object Directory* at page *42*)

With the Download of the configuration into the Hilscher InterBus Master the Communication Reference List is loaded into the Master.

With the Download of the configuration into the Hilscher InterBus Slave the Communication Reference List and the Object Directory of the Slaves are loaded into the Slave.

4.4.4.1 Communication Reference List (CRL)

Communication between two PCP devices is only possible, when a communication relation is configured between both devices (each device has to be PCP capable). This means both devices get information how to communicate with the other device. This information is saved in a data base, called Communication Reference List (CRL).

The logic connection (Communication Reference CR) can be set from the view of the Master or from the view of the Slave.

From the view point of the Master:

At first you have to mark the Master (left mouse click) and then select the menu **Settings > Communication Reference List...**

or

right mouse click on Master and click on **Communication Reference List...**

A new Communication Reference will be added in the CRL Table with **Add** or **Insert**.

If a new entry is added or insert into an empty CRL table, this entry gets the description CR 2 because CR 1 is used internally.

In **Remote address / device** you can select the remote station for the current **Communication Reference**.

Note: The number of the Communication Reference is the key for the communication.

The difference between CR **Add** and **Insert** is:

With the button **Add** you insert the new entry at the end of the list. With **Insert** the new entry is fitted in at the current position and the other CR in the list move one position forwards.

The following figure shows the typical settings for **Max. SCC**, **Max. RCC, Max SAC**, **Max RAC**, the Client Services, the Server Services, the **Acyclic Control Interval (ACI)** as well as for the **Max. PDU Size Send** and **Max. Size Receive**.

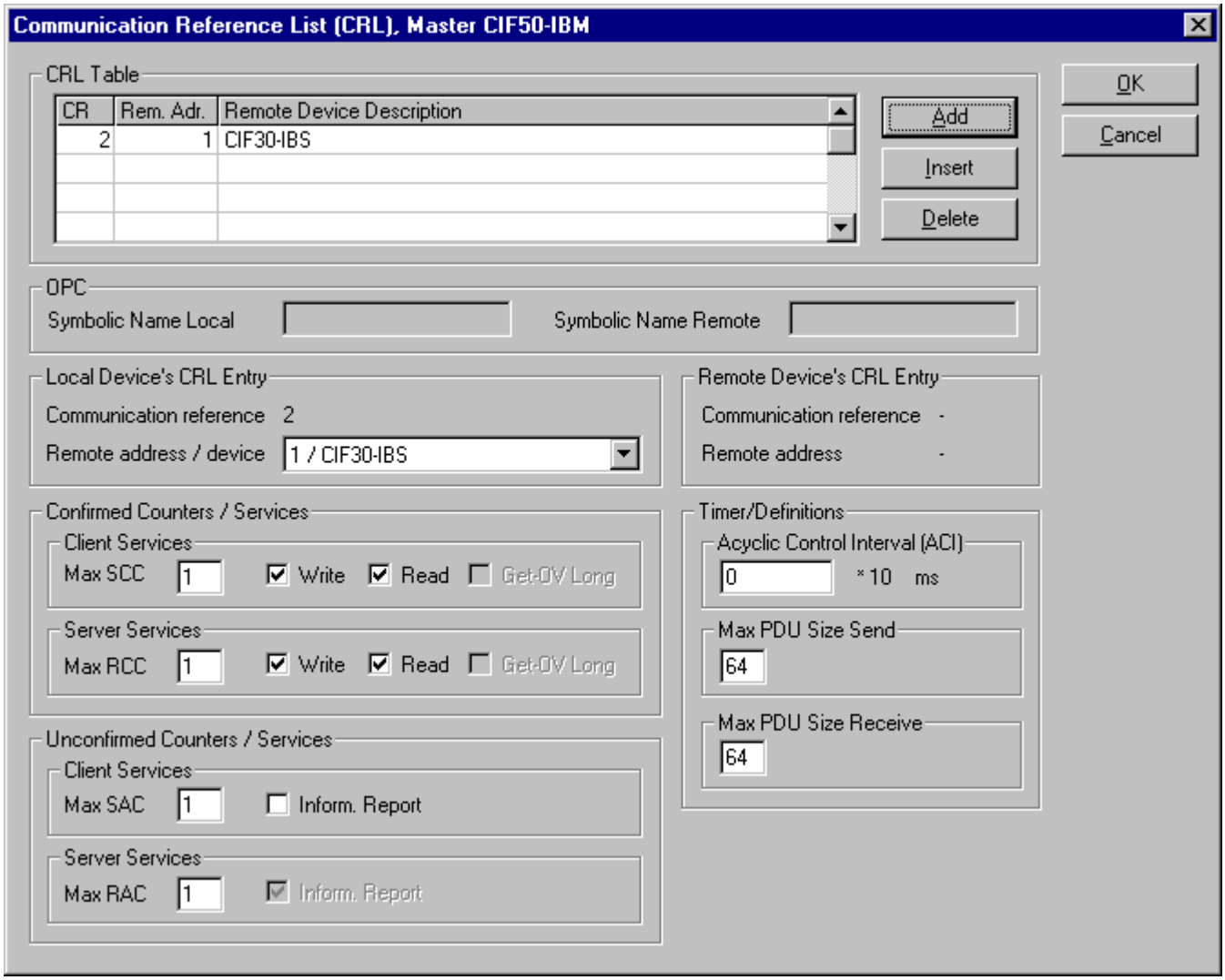

Figure 20: Communication Reference List from the view of the Master

Note: Please note that the permissible settings in the instruction of InterBus Slave device (configuration instructions).

Note: Please note that these settings also exist in the communication partner device!

From the view point of the Slave:

At first you have to mark the Slave (left mouse click) and select the menu **Settings > Communication Reference List...**

or

right mouse click on the Slave and click on **Communication Reference List...**

or

double click on the Slave and press in the window **Device Configuration** the button **PCP Config...** In the following window **PCP Configuration** you have to choose **Device CRL**. Finally confirm with the **OK** button.

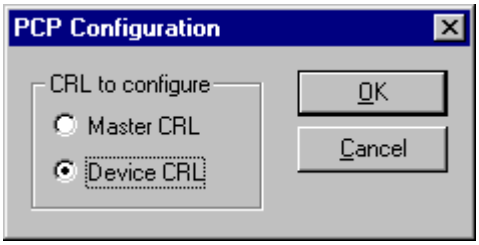

Figure 21: Selection of Master or Device CRL

A window with the CRL of the selected Device appears.

You have to carry out the settings as already described in this section. These settings are from the view point of the Slaves.

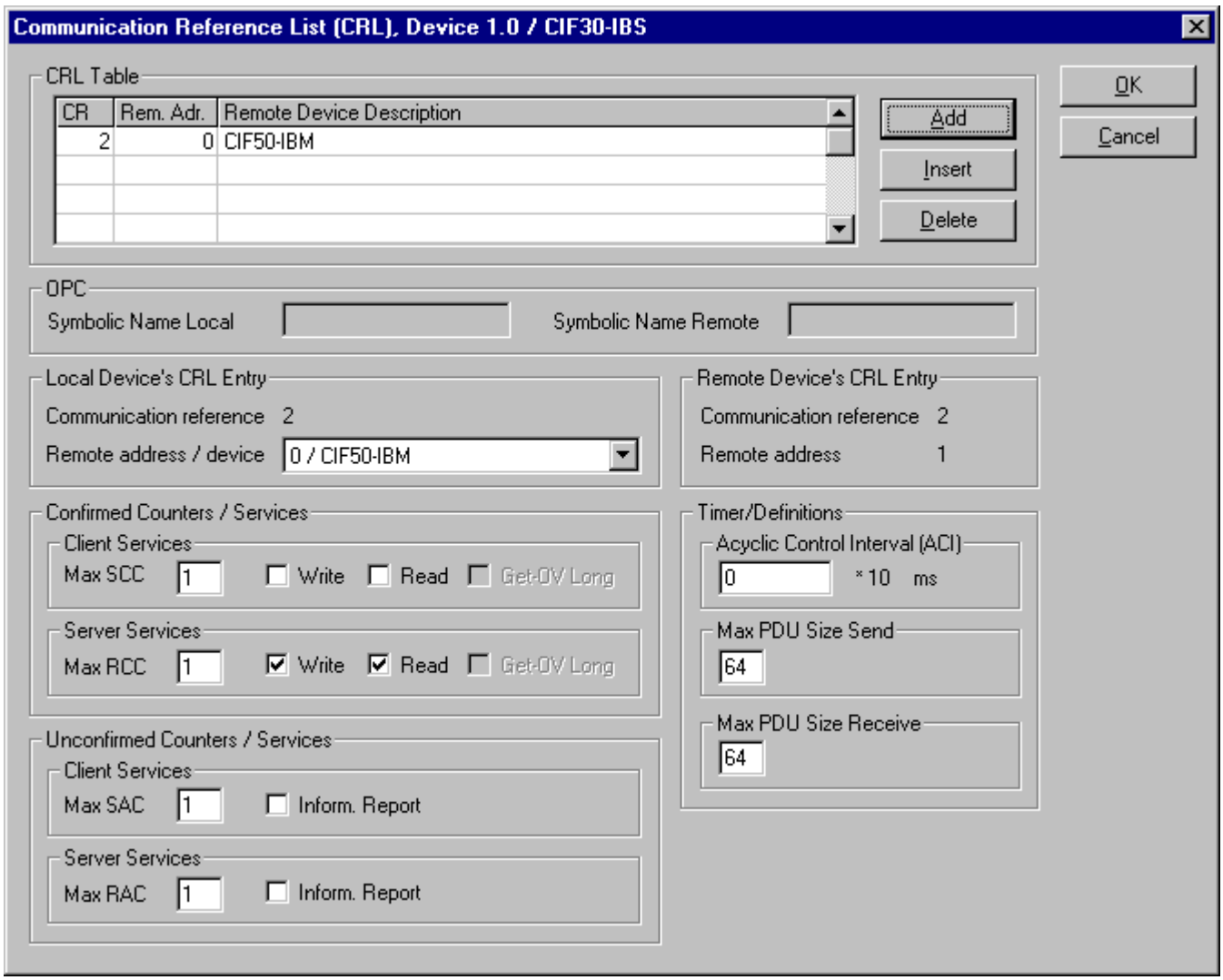

Figure 22: Communication Reference List from the Slaves point of view

4.4.4.2 Object Directory

The Slave expects a description about the objects, which are available in the user application. For this you have to create an **Object Directory**. All configured objects are shown in the window Object Directory. Objects can be added or removed and their specific property can be set.

First mark the Slave (left mouse click) and select the menu **Settings > Object Directory**

or

right mouse click on the Slave and select **Object Directory.**

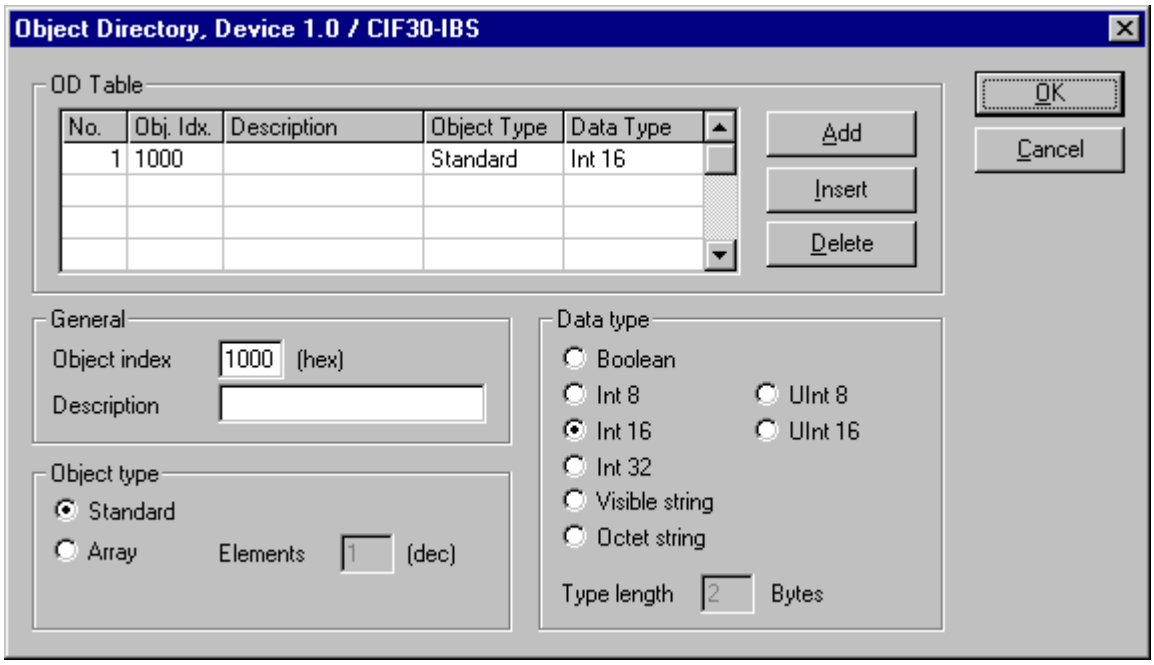

Figure 23: Object Directory single element

Insert a new object into the Object Directory with **Add** or **Insert**.

- **General**

  The **Object index** describes a unique number which is assigned to a definite data object inside the Object Directory of the Slave. You can save a short text as a **description** to each object. Here appears a standard object with the index 1000h.

- **Data Type**

  The **Data Type** of an object is decisive for its length. Here you can select different Data Types: Boolean, Int8, Int16, Int32, Uint8, Uint16 and two string Data Types (ASCII in OCTET), which require information for it's **length**.

- **Object Type**

  Objects can be distinguished according to single element or field. Single element Types (**Standard** Object Types or Single Element) are for example Integer-Variable. On the other hand field Object Types are **Arrays**. Arrays need the information about the number of the available **Elements**.

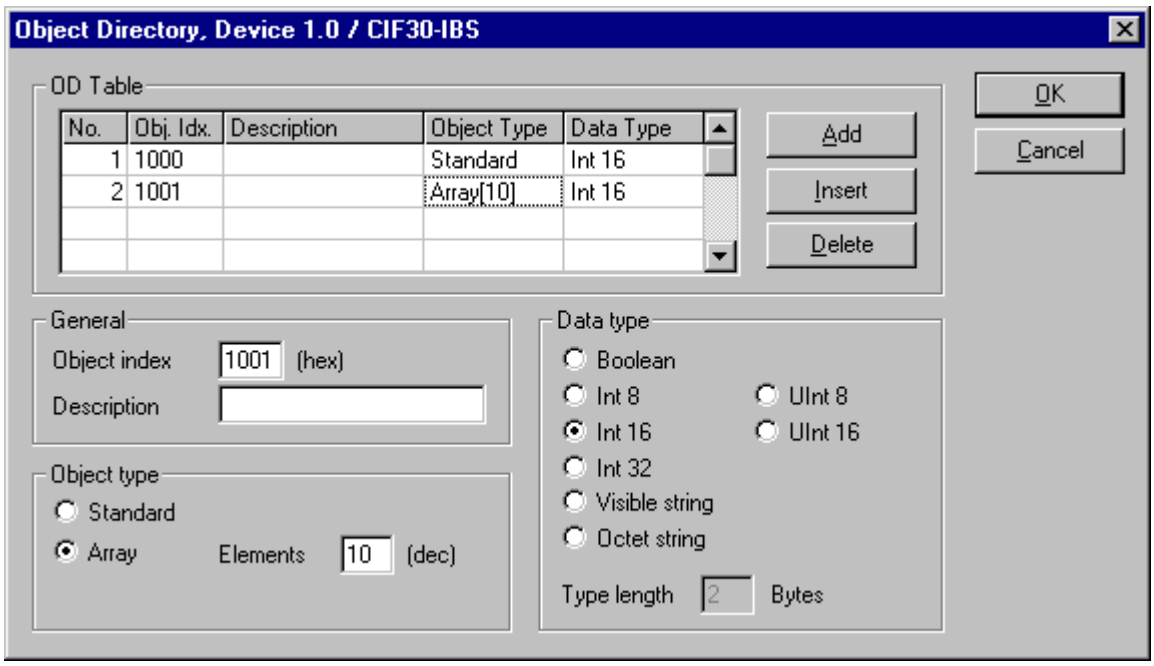

Figure 24: Object Directory Array (field)

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.

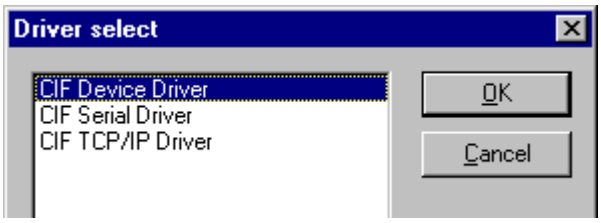

Figure 25: Driver Selection

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*	*47*
CIF Serial Driver	*CIF Serial Driver*	*49*
CIF TCP/IP Driver	*CIF TCP/IP Driver*	*51*

Table 14: 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 26: 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

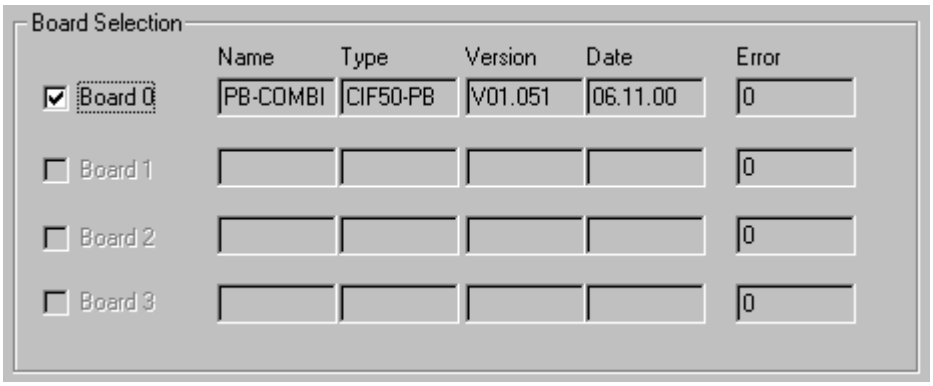

Figure 27: CIF Device Driver - Board Selection

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 15: 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.

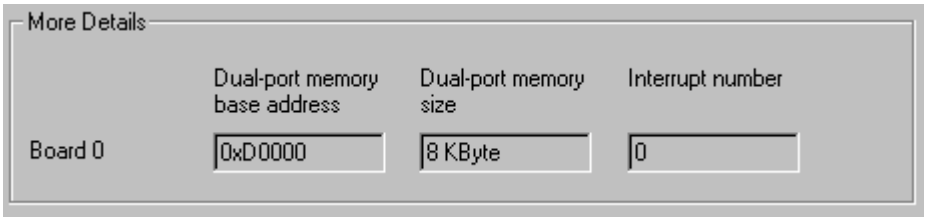

Figure 28: CIF Device Driver - More Details

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 29: 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

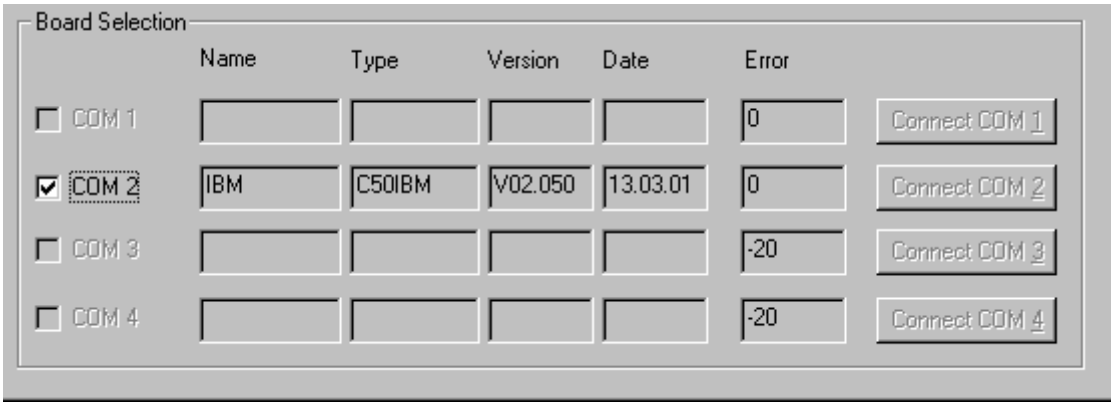

Figure 30: CIF Serial Driver - Board Selection

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 16: 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 31: 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 32: 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.

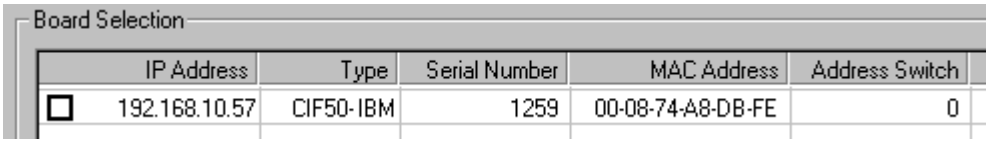

Figure 33: CIF TCP/IP Driver - Board Selection - Found Device

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 *54*.

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 17: 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:

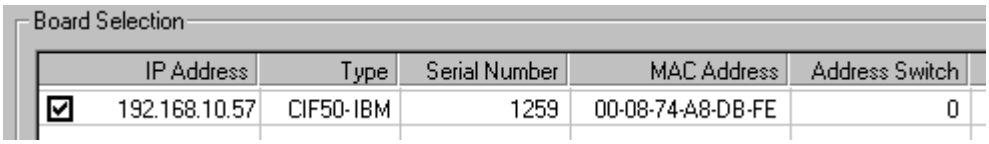

Figure 34: CIF TCP/IP Driver - Board Selection - Assigned Device

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

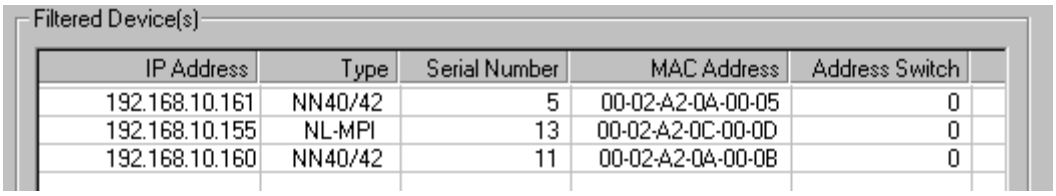

Figure 35: CIF TCP/IP Driver - Filtered Devices

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:

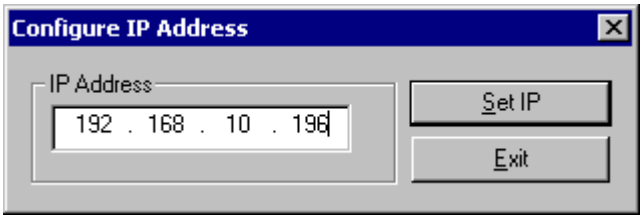

Figure 36: Set IP Address

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 can be displayed with the menu **Settings > Bus Parameters**.

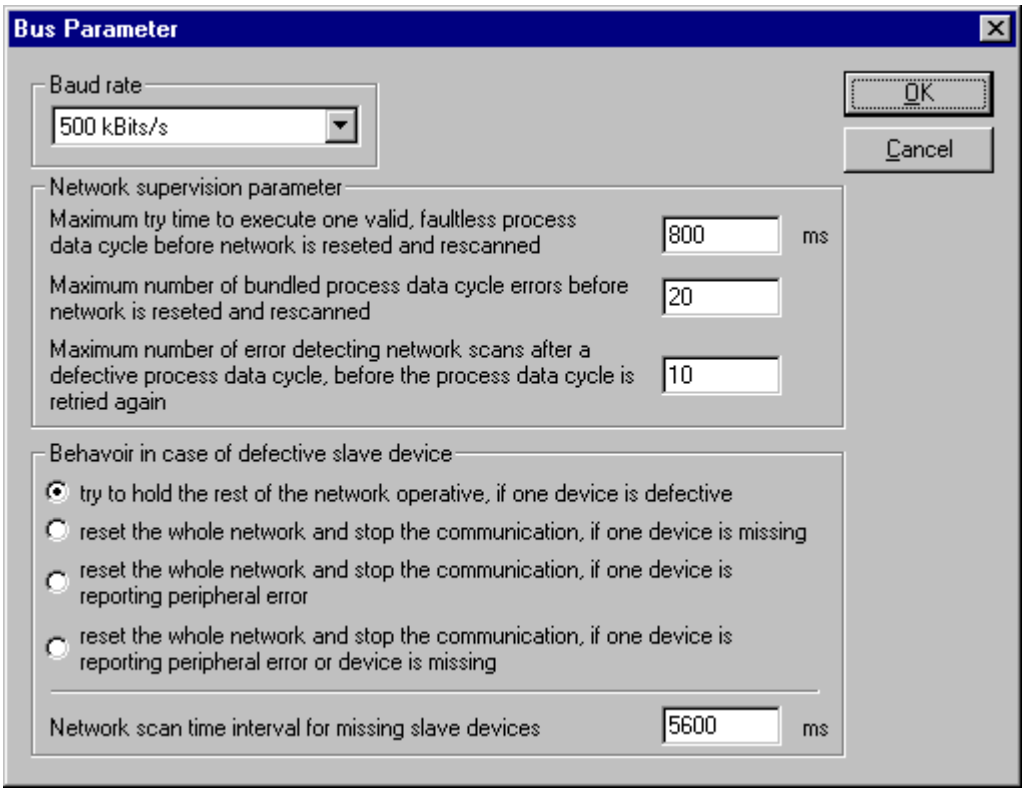

Figure 37: Settings > Bus Parameters

Attention: The alteration of Bus Parameters can cause communication faults.

Note: The displayed Bus Parameters are offline values. The Bus Parameters are used after the download of the configuration to the Hilscher device.

The **Baud rate** is only adjustable up to 500kBaud. We reserve the right for extensions.

The **Network Supervision Parameters** serve for adjustment of error tolerance in the case of data cycle errors. The Master supervises every data cycle. If an error appears, this data cycle is repeated after an identification cycle was executed.

- **Maximum try time to execute one valid, faultless process data cycle before network is reset and rescanned.** This parameter is a time in the multiples of 8 milliseconds, in which the master tries to transmit a disturbed data cycle error free N times. After a data cycle error the master always starts an identification cycle, in order to recognize all available Slave devices, before the same data cycle is restarted. This procedure is repeated until the data cycle is transferred without an error and is however terminated when the maximum configured time interval exceeds its limit. At least then the network is reset. As a function of the **Behaviour in case of defective Slave device** and **Network Scan Time Interval if devices missing** the master stops the entire communication or tries to initialize the network again.
- **Maximum number of bundled process data cycle errors before network is reset and rescanned.** Sometimes it is possible, e.g. by an EMC disturbance within the InterBus network that a whole sequence of successive data cycles are destroyed. The maximum permissible number of direct successively disturbed cycles is defined here. A value of 20 is the presented value. If this value is exceeded, the master as a function of **Behaviour in case of defective Slave device** and **Network Scan Time Interval if devices missing** stops entire communication or tries to reinitialize the network again.
- **Maximum number of error detecting network scans after a defective process data cycle, before the process data cycle is retried again.** If a data cycle error occurs, the master starts automatically an identification cycle, in order to determine the source of error in the network. If this following identification cycle is executed also incorrect too, the master tries to repeat it according the number indicated here, before it reacts in accordance to the **Behaviour in case of defective Slave device** and **Network Scan Time Interval if devices missing**.

The **Behaviour in case of defective Slave device** determines the procedure of the Masters, if a Slave is detected as missed during run time and during the first network start up phase

- **Try to hold the rest of the network operative, if one device is defective.** The master does not consider the status of the attached Slaves and the resetting of the network in the case of an error is disabled. Depending on the **Network Scan Time Interval in case of missing devices**, the master tries to get all missing devices preoperative by rescanning the network cyclically.
- **Reset the whole network and stop the communication, if one device is missing.** The master stops entire network communication and resets the entire network, if it detects a missing Slave device during the first network scan or during the data exchange.
- **Reset the whole network and stop the communication, if one device is reporting peripheral error.** The master stops the entire communication and resets the whole network, if at least one Slave device is reporting an InterBus specific module error. Modules reporting such an error is indicating thereby e.g. short-circuit at an output or under voltage.
- **Reset the whole network and stop the communication, if one device is reporting peripheral error or device is missing.** The master stops entire communication and resets the network, if it detects a missing Slave during the first network scan or during the data exchange or if at least one Slave device indicates an InterBus specific module error.

Network scan time interval in case of missing devices

This parameter enables or disables the scan cycles in those cases a missing Slave device was detected. If the value is configured to 0, this function is deactivated.

The first cycle of the network scan, which is executed by the master directly after the initialization, is independent of this parameter and is always executed. Values unequal of 0 configure a cycle time in the multiples of 800 msec. Please note that the cyclic data exchange during this rescan is interrupted, but the initially left and original process data during this cycle are remaining at their old values.

5.3 InterBus Master

5.3.1 Master Settings

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

The 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.

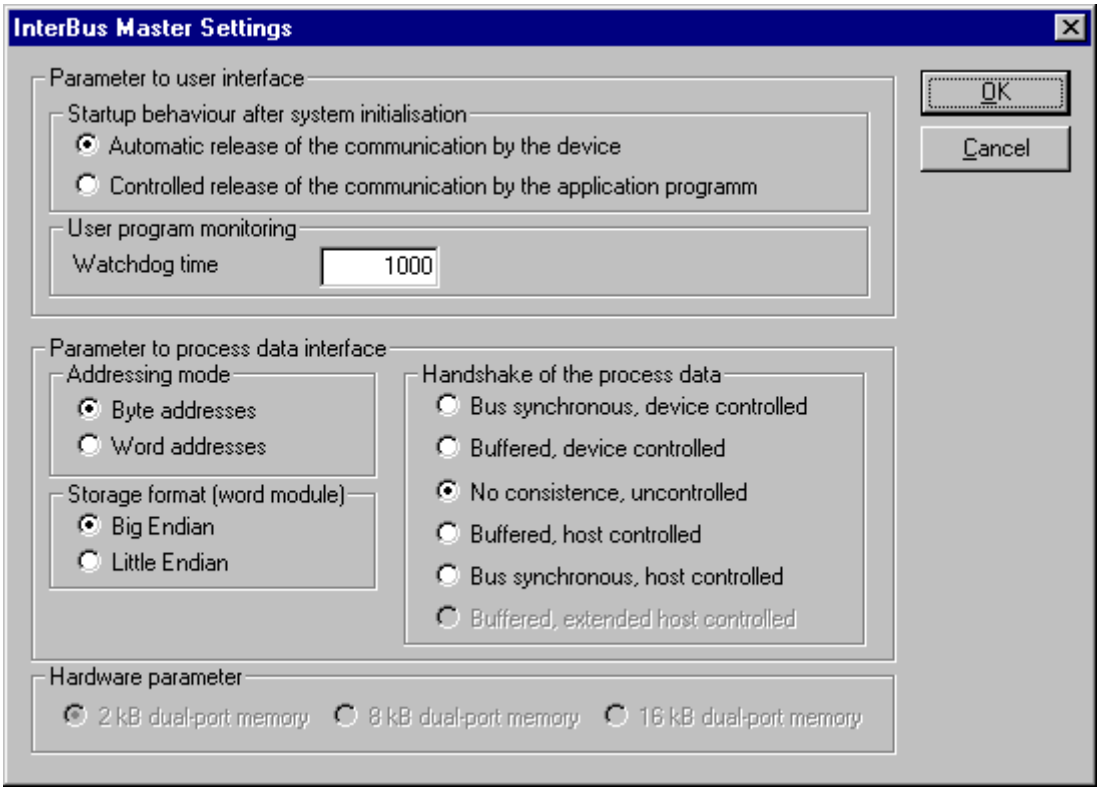

Figure 38: Settings > Master Settings

- **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 finished. When **Controlled release of communication by the application program** has been set, the application program has to 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 InterBus function.

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

- **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 stored in the process image. For the Word data type it is possible to choose higher/lower value Byte or lower/higher value Byte.

Storage format (word module)
MSB/LSB = higher/lower = Motorola format = Big Endian
LSB/MSB = lower/higher = Intel format = Little Endian

Table 18: Storage format

- **Handshake of the process data**

  These various types are used for setting the handshake of the process data for the Master. 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.

- **Hardware parameter**

  This parameter displays the full size of the dual-port memory. This is read only information. If the size is for example 2KB then 1KB is usable for the process image.

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 19: 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 address 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
QW 6	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 20: 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
	-	

Table 21: 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
	-	

Table 22: Image of the method of addressing for output

5.3.3 Global Settings

In this window it is set whether the process data addressing is executed automatically by SyCon (active selected) or manually by the user (active not selected).

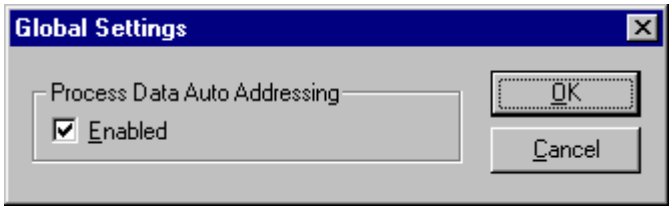

Figure 39: Settings > Global Settings

5.4 InterBus Slave

5.4.1 Slave Settings

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

In order to open the InterBus Slave settings menu, first choose the Slave and then open the window in the **Settings > Slave Settings** menu.

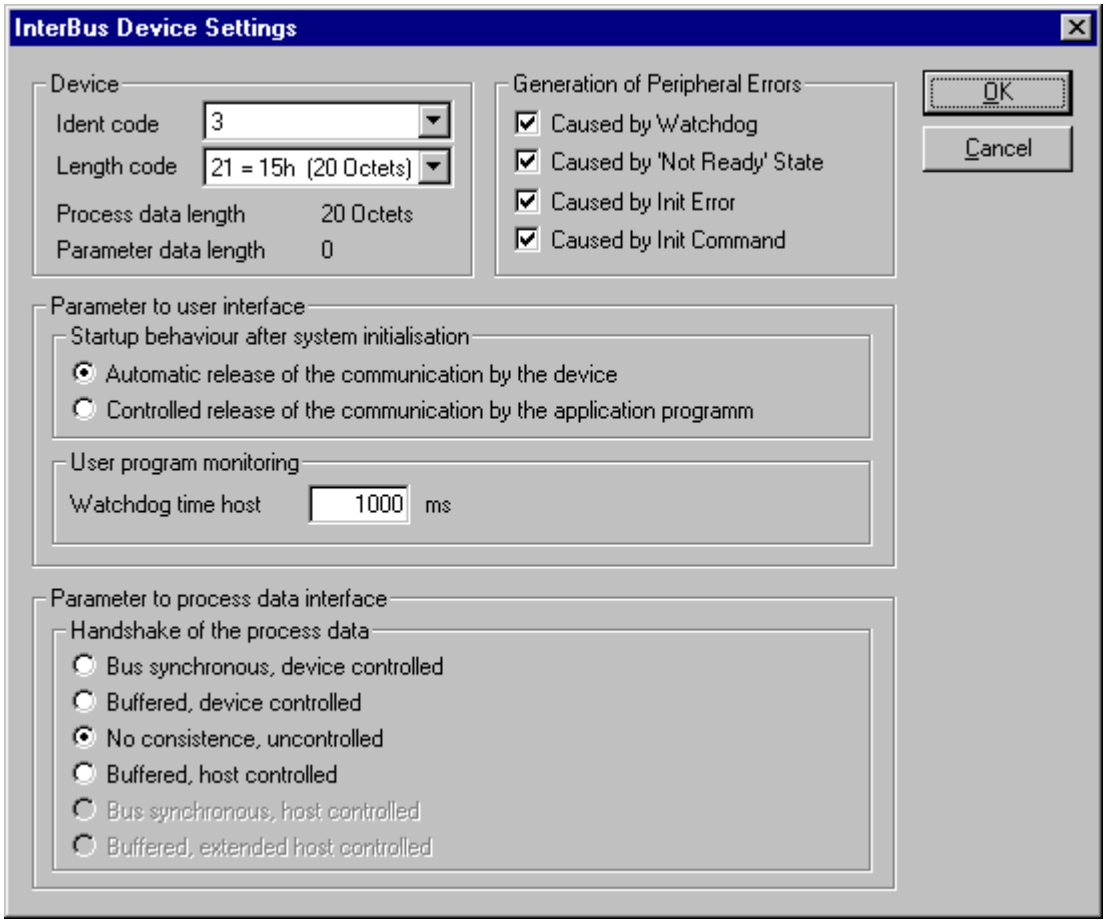

Figure 40: Settings > Slave Settings

- **Ident- and Length Code**

  The Ident code determines the behaviour of the device at the bus. With the length code the entire data length of the Slaves is determined within an InterBus cycle. This length reduced with the parameter data length (if necessarily) results in the remaining (cyclic) process data length.

ID-Code	Meaning
3,03h	Digital I/O
240,F0h	PCP (two words)

Table 23: Ident-Code (for Hilscher InterBus Slaves)

Length Code	Length for ID Code 3, 03h	Length for ID Code 240, F0h
1, 01h	1 Word (2 Octets) I/O	-
2, 02h	2 Words (4 Octets) I/O	2 Words PCP (2 Octet)
3, 03h	3 Words (6 Octets) I/O	1 Words (2 Octets) I/O and 2 Words PCP
4, 04h	4 Words (8 Octets) I/O	2 Words (4 Octets) I/O and 2 Words PCP
5, 05h	5 Words (10 Octets) I/O	3 Words (6 Octets) I/O and 2 Words PCP
6, 06h	6 Words (12 Octets) I/O	4 Words (8 Octets) I/O and 2 Words PCP
7, 07h	7 Words (14 Octets) I/O	5 Words (10 Octets) I/O and 2 Words PCP
9, 09h	8 Words (16 Octets) I/O	6 Words (12 Octets) I/O and 2 Words PCP
14, 0Eh	9 Words (18 Octets) I/O	7 Words (14 Octets) I/O and 2 Words PCP
15, 0Fh	10 Words (20 Octets) I/O	8 Words (16 Octets) I/O and 2 Words PCP
21 ,0F	1 Octet	-

Table 24: Length Code (for Hilscher InterBus Slaves)

- **Generation of peripheral errors**

  In this field events can be determined, which results in a **station error** for the Slave for in the InterBus Master. These events are as follows:

  - if the configured time of the user program monitoring ran out (Softwarewatchdog)
  - if the NotReady Bit was set
  - after an initialization error
  - after a renewed initialization command.

- **Startup behaviour after system initialization**

  If **automatic release of communication** is selected **by the system**, the Slave is ready to communicate with the master. If **controlled release of communication** is selected **by the application program**, the user program must release the communication.

- **User program monitoring**

  The monitoring time indicates, how long the device for a user triggering will wait, until it resets all outputs to zero. This must be activated by the application program (triggering of the software watchdog).

- **Parameter to process data interface**

  With these different functions that is selected the, handshake of the process data of the Slaves. The selection of the function is important for correct data exchange between application and the device (look at page *58*).

5.4.2 Slave Configuration

The Slave configuration is described further above in the section *Slave Configuration* on page *34*.

5.5 Project Information

If the user creates an 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 opened.

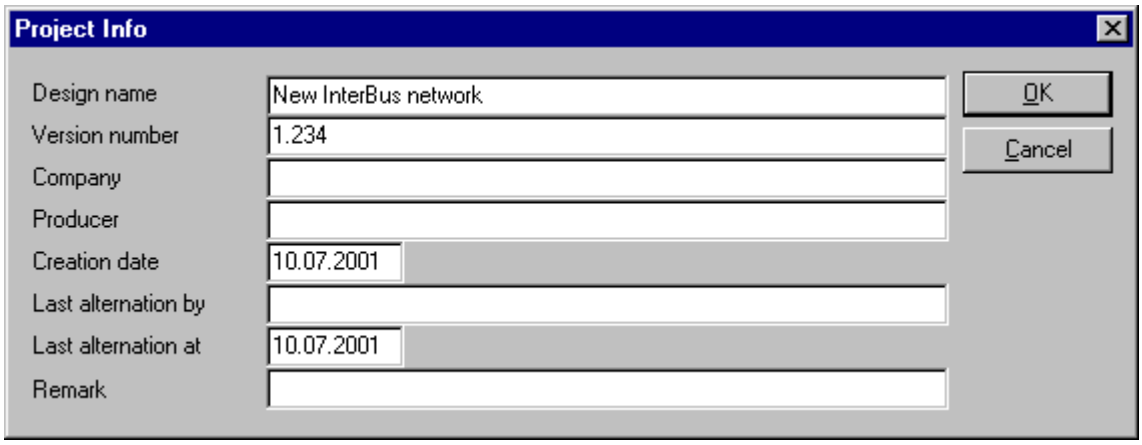

Figure 41: Settings > Project Information

By clicking the **OK** button the Project Information is saved.

5.6 Path

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

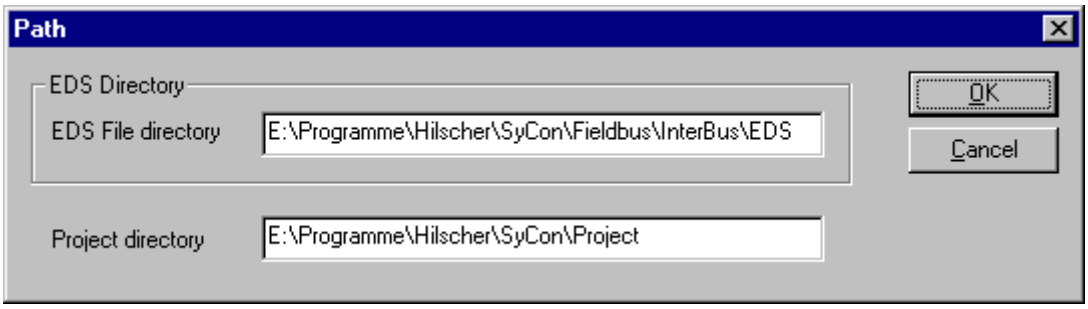

Figure 42: Settings > Path

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

5.7 Language

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

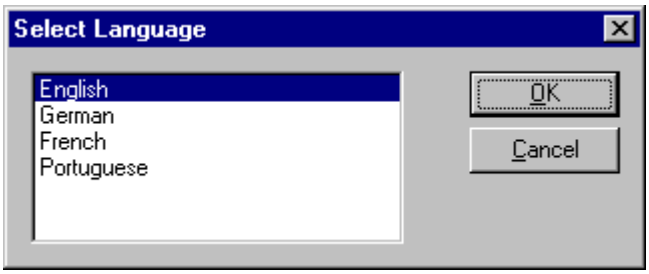

Figure 43: Settings > Language

Here can be set the language of the System Configurator. Select the desired language and confirm the entry 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!

5.8 Start Options

Starting from the window Network View (menu **Window > Network View**) the menu **Settings > 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.

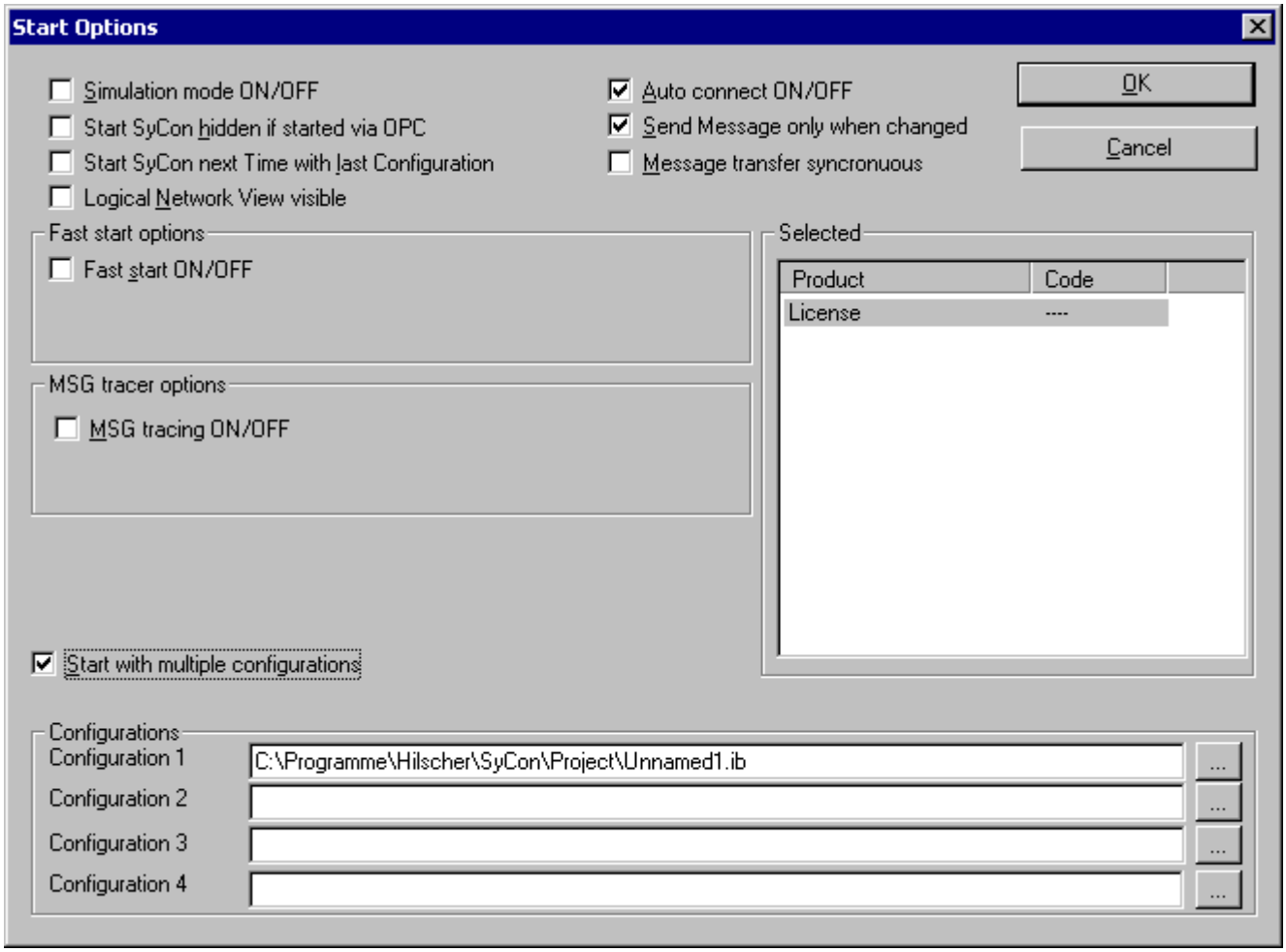

Figure 44: Settings > Start Options

- **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 selected the last saved configuration in the SyCon is automatically loaded when the SyCon is started again.

- **Logic Network View visible**

  When this is selected 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 paths are 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 InterBus devices, e.g. CIF 50-IBM, CIF 30-IBS, 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 transfer the configuration, 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 InterBus will be interrupted. This warning must be confirmed.

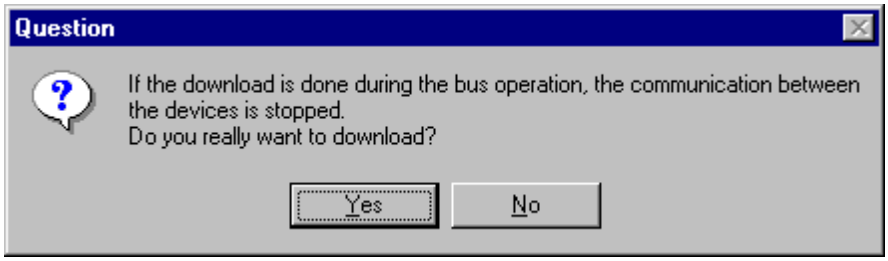

Figure 45: Security question before download

Attention: The download overwrites the configuration in the device.

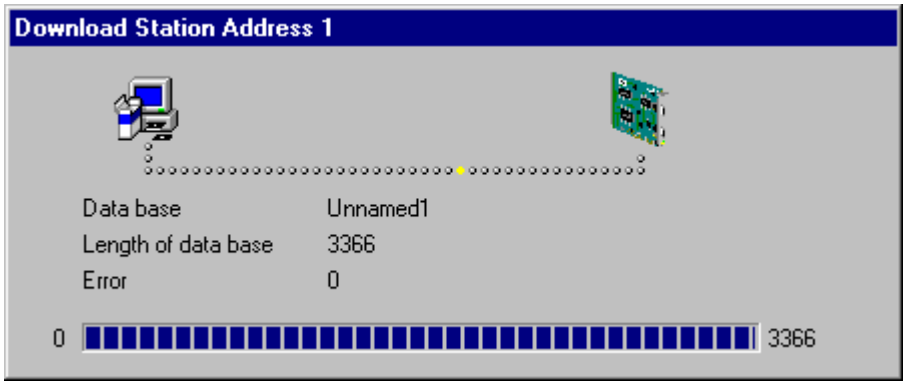

Figure 46: Online > Download

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.

If the assignment 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 is stored there in FLASH memory in a zero voltage manner so that the configuration is available when the power supply is switched off and on again.

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

Note: (only for the Slave) Modifications of the Ident and of the Length Code that are taken over by the Hilscher InterBus Slave device only, if it is switched (without voltage) and becomes switched on again .

6.2.2 Firmware Download

If you want to carry out a Firmware download, act as follow: First the desired device for Firmware downloading must be chosen in that the symbol of the device is selected with a left mouse click. Then, call up the **Online > Firmware Download** menu. Select the new Firmware and retrieve it with **Download** into the device. The Firmware is now downloaded.

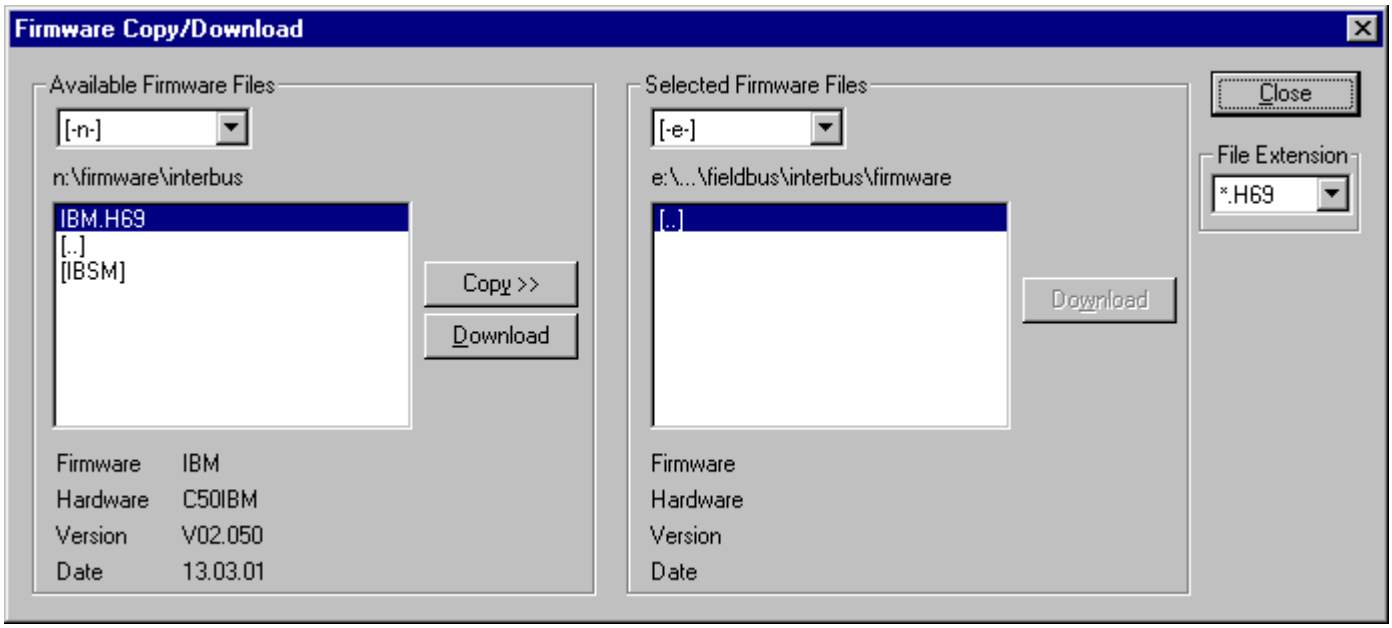

Figure 47: Online > Firmware Download

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.

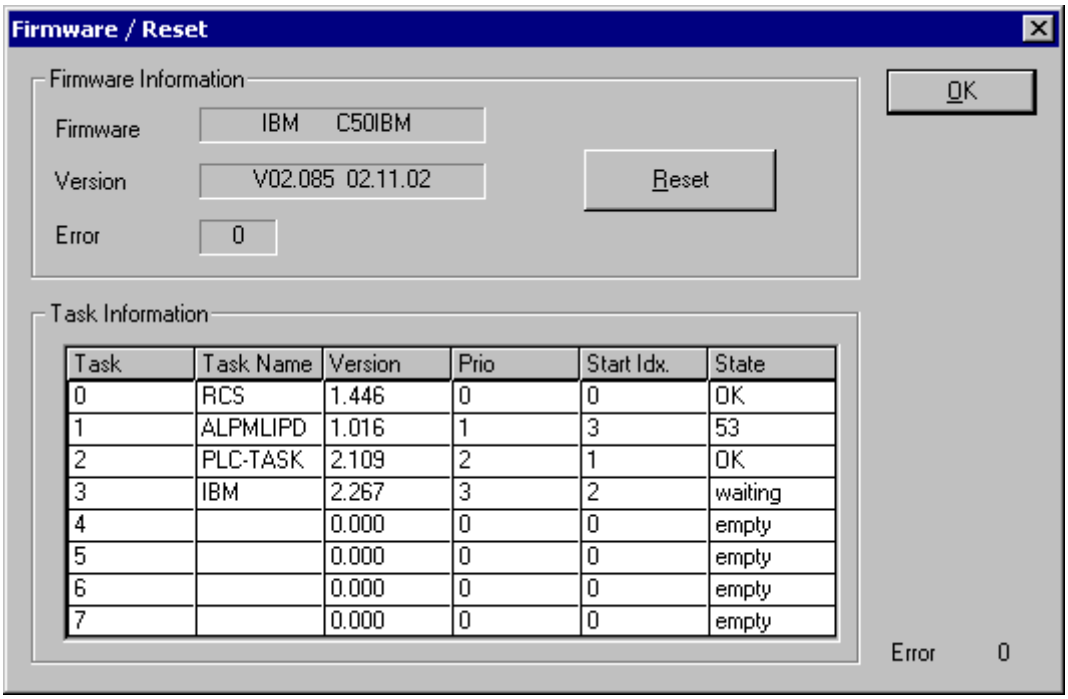

Figure 48: Online > Firmware / Reset

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 read out and shown.

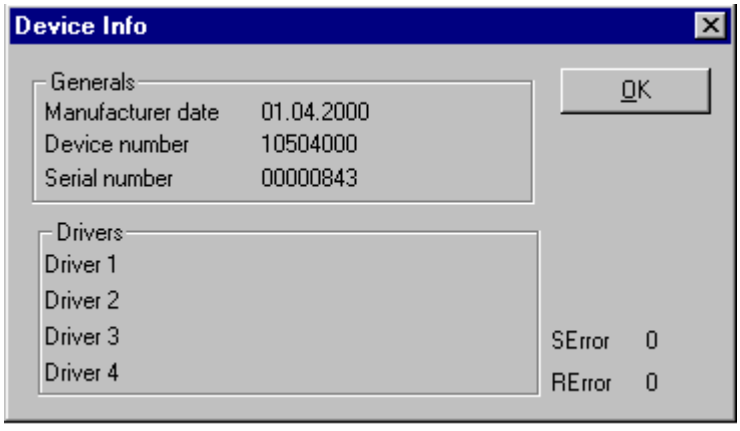

Figure 49: Online > Device Info

6.2.5 Read Project Information

With **Online > Read Project Information** can be read out the project information from the device.

6.2.6 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.

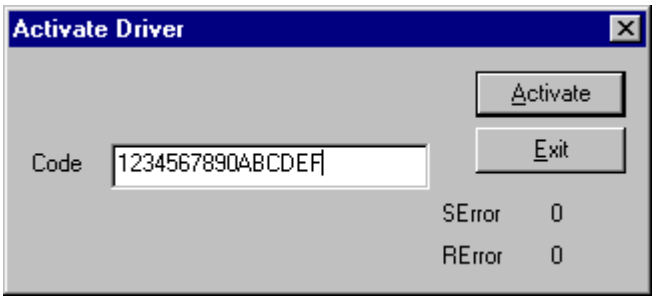

Figure 50: Online > Activate Driver

Note: The code 01234567890ABCDEF is not a valid code and is only 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 InterBus. Therefore the following steps are necessary:

- Create a new project: Select the menu **File > New** and InterBus.
- Select the Master: Select the Master from the menu **Insert > Master**.
- If the Master isn't initialized you need to make a download first. To make this download select the menu **Online > Download**.
- Scan the network: Select the menu **Online > Automatic Network Scan**. Hereby the Length and ID code as well as the installation depth of all users attached at the network are determined.

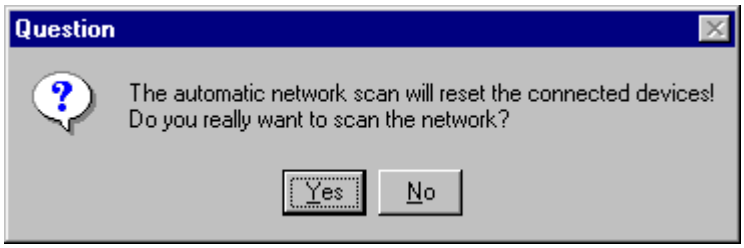

Figure 51: Online > Automatic Network Scan (security question)

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

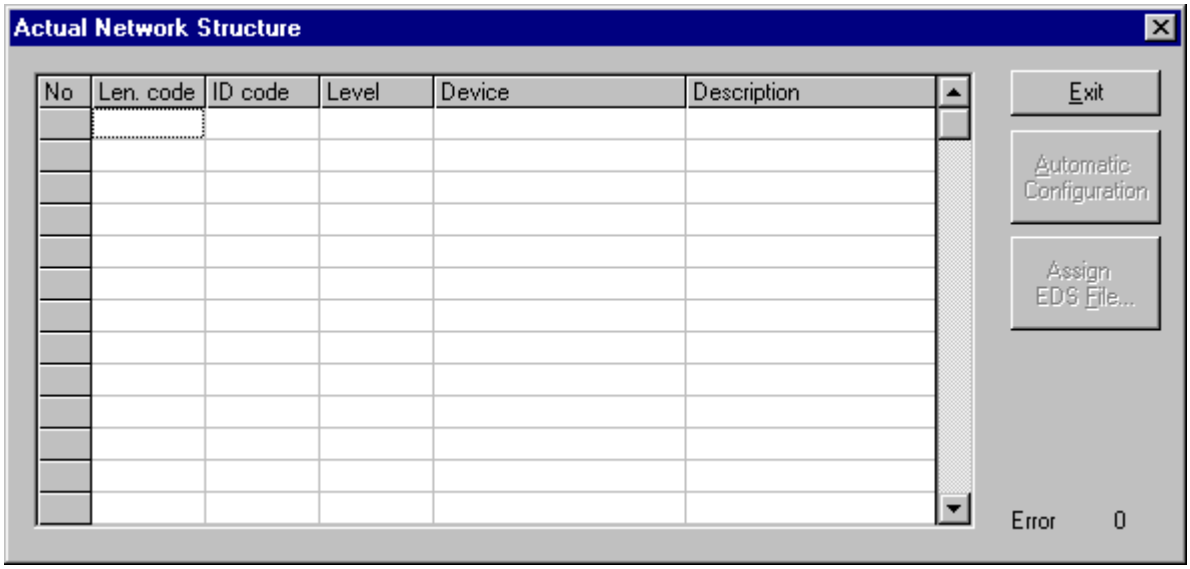

Figure 52: Online > Automatic Network Scan (During the Scan)

All buttons are grey during the network scan.

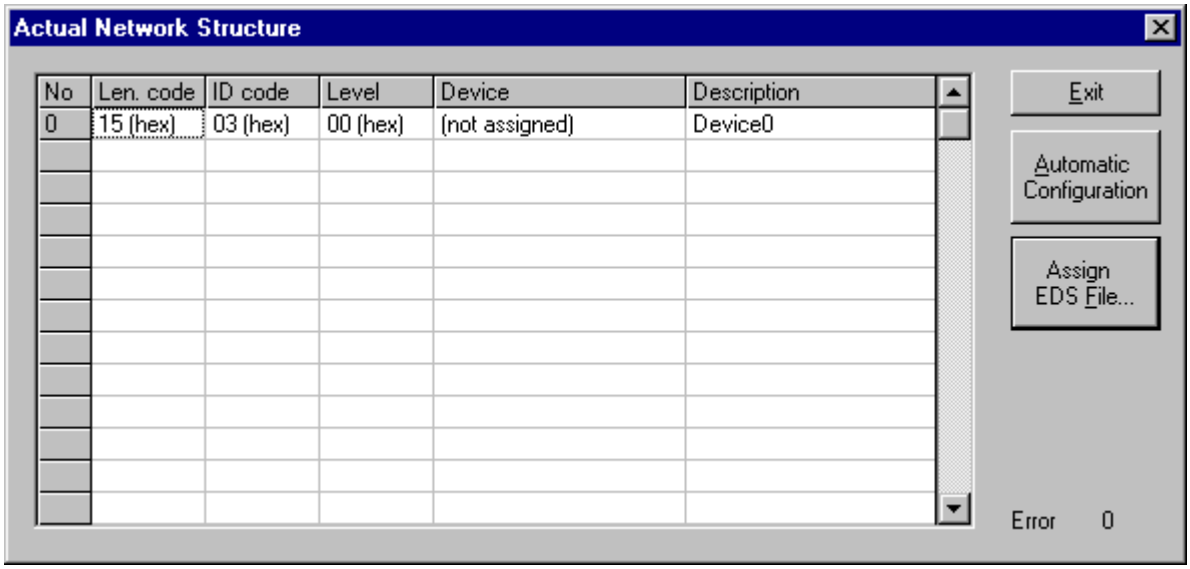

Figure 53: Online > Automatic Network Scan (After the Scan)

6.3.1 Automatic Configuration

If you activate the button **Automatic Configuration**, the following safety question appears.

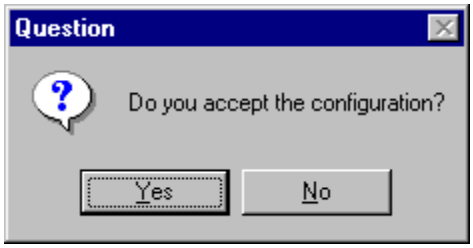

Figure 54: Online > Automatic Network Scan > accept configuration

Answer the question with **Yes**, if the read in structure is to be taken over as configuration. Answer the question with **No**, if the old configuration is to be maintained.

6.3.2 Assign EDS File

After reading the network structure the Length and ID Codes of the connected devices are known, an assign of EDS files is possible. With the menu **Edit > EDS file assign** opens a dialog that contains a list with the suitable EDS files, from which the correct device can be selected.

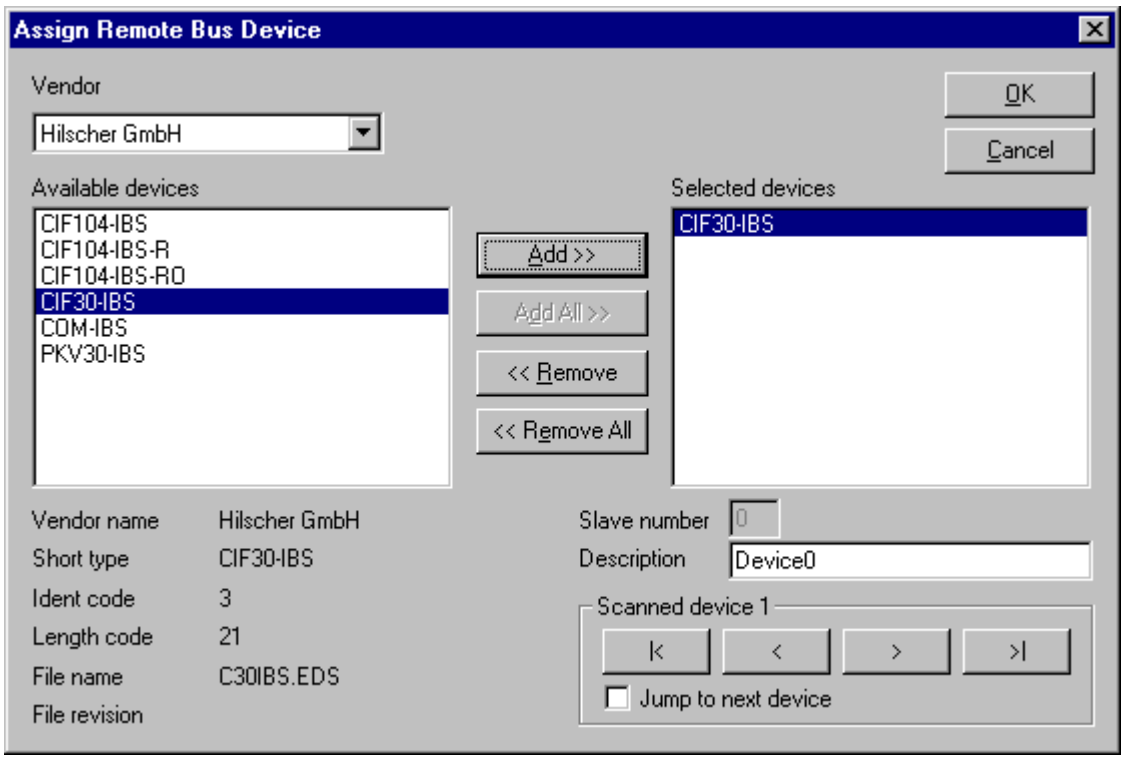

Figure 55: Online > Automatic Network Scan > Assign EDS file

Description of the navigation buttons:

With the navigation buttons it is possible to assign each device an EDS-file directly by clicking on these buttons. Without this buttons you need to close the dialog **Assign Device** with the **OK** button and select another device in the window **Actual Network Structure** to assign the other devices.

Button	Meaning
|<	With this button the first detected device is loaded into the dialog
<	With this button the previous device is loaded into the dialog
>	With this button the next device is loaded into the dialog
>|	With this button the last detected device is loaded into the dialog

Table 25: Assign EDS files - buttons and their meaning

The option "**Jump to next device**" make it easier to assign the EDS-files, too.

If this option is activated the next device is loaded into the dialog automatically after the user had assigned an EDS-file for a previous device.

6.4 Start/Stop Communication

First the desired device must be chosen with a left mouse click on the symbol of the device. The communication between InterBus Master and InterBus Slave can be manually started or stopped. In order to do this select the **Online > Communication start** or **Online > Communication stop** menu.

6.5 Diagnostic Functions

6.5.1 Debug Mode (InterBus Master)

Starting from the Master select the menu **Online > Start Debug Mode**. The System Configurator cyclically reads out the status of the network communication on the Hilscher device and the individual condition of the devices.

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

6.5.1.1 Debug Window

When started the debug session 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 56: The Debug Window

If diagnostic information is available for a specific device, next to the device icon the text **Diag** appears in red. 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 Master is in stop mode.

In run mode the master icon has the sign  .

6.5.1.2 InterBus Slave Device Diagnostic

After the debugger was started from this time SyCon requests the status of all devices from the Master. If there is an error on a device the bus line to this Slave is drawn in red colour otherwise it is green. This information is displayed closer if you click with the mouse onto the corresponding device in debug mode.

To activate the debug mode you have to mark the Master and select the menu **Online > Start Debug Mode**. Then set the focus at the Slave and with the menu **Online > Device Diagnostic** you activate the InterBus device diagnostic. To end the Debug Mode you have to mark the Master again and select the menu **Online > Stop Debug Mode**.

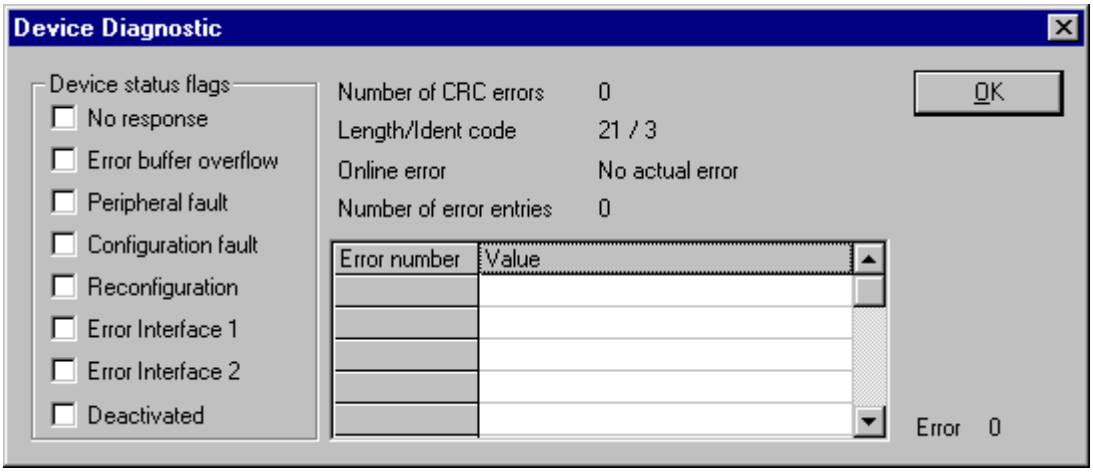

Figure 57: Online > Device Diagnostic (InterBus standard diagnostic)

The individual bits in the **Device Diagnostic** have the following meaning:

Bits in the Device Diagnostic	Meaning
No answer	The station is configured but missing at the network. Please you check the cable connection between the master and the Slave device.
Error buffer overflow	An error can occur at each Slave device during operation. These errors are stored in an internal buffer, which can take up 50 error registrations per Slave device. This bit is set, if the buffer overflows.
Peripheral device error	The Slave device announces a peripheral device error. That can be e.g. a short-circuit at the device outputs or an under voltage.
Configuration error	The ID code or the Length Code of the Slave device does not correspond with the configured ID code or length code.
Reconfiguration	The device announces a reconfiguration request.
Error interface 1	An error on the outgoing interface 1 was detected.
Error interface 2	An error on the outgoing interface 2 was detected.
Deactivated	The Slave device is deactivated in the current configuration and does not participate in the data exchange.
Number of CRC errors	This counter accumulates all detected check sum errors.
Length-/Ident-Code	The real length code and ID code of the Slave device are displayed here.
Online error	The currently detected errors are displayed here.
Number of error registrations	This value indicates the number of entries in the internal error buffer.
Error table	This table shows the detected errors in the occurred order.

Table 26: Meaning of the bits in the Device Diagnostic

6.5.2 Global State Field

With the menu option **Online > Global State Field** opens a window in that cyclically Statistic about the bus status and attached devices to be output.

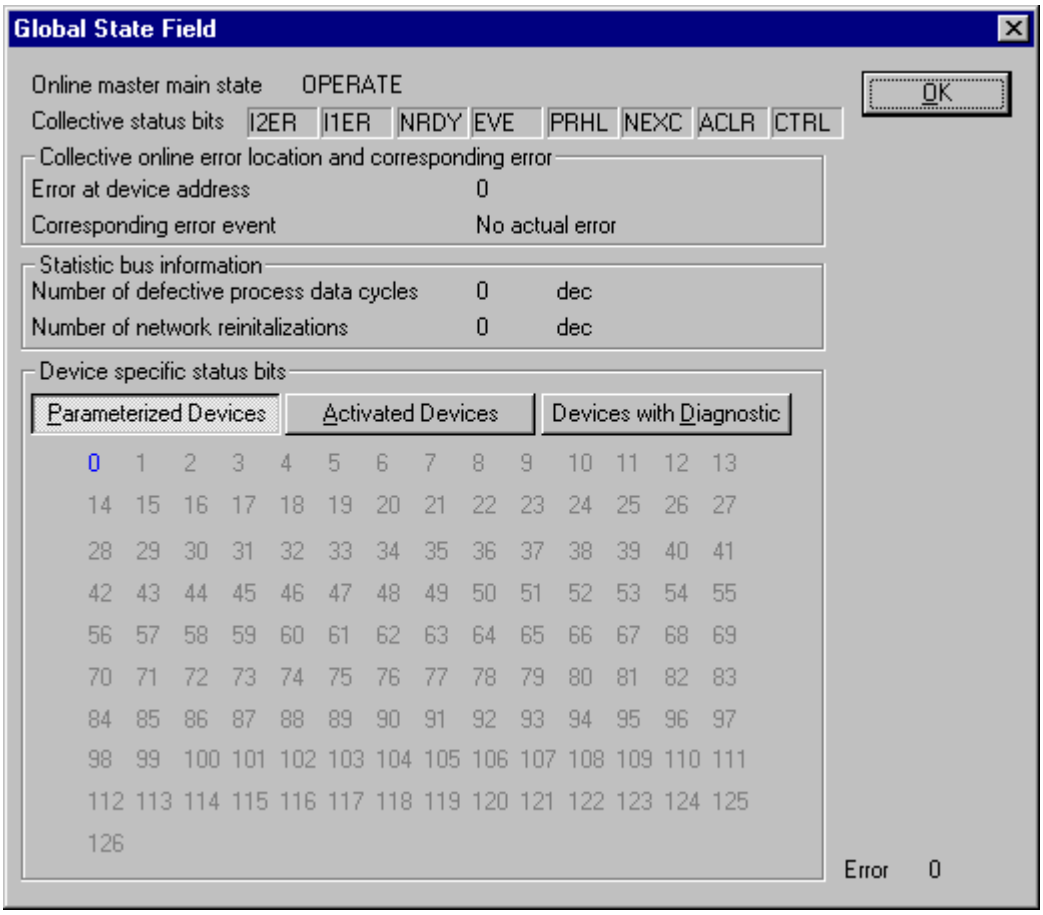

Figure 58: Online > Global State Field

The first row displays the main state of the Master. It can have the state **OPERATE** or **STOP**.
The next row displays individual bus errors. A pending error is displayed with a red field. The meaning of the individual abbreviations is described in the following.

Status Bits	Meaning
I2ER	INTERFACE-2-ERROR: If this bit is set at least one remote bus interface (called outgoing interface 2) of a Slave device was detected during the ID scan, which has produced a timeout after it was opened in this session. This error can only occur either at InterBus branch interface or at remote bus devices, because both are having the outgoing interface 2 to connect it to the next remote bus device. If more defective interfaces were detected at the same time, the value shows the physically nearest Slave device to the master in the InterBus ring.
I1ER	INTERFACE-1-ERROR: If this bit is set at least one local bus interface or remote bus branch interface (called outgoing interface 1) of a Slave device was detected during the ID scan, which has produced a timeout after it was opened in this session. This error can only occur at InterBus branch interfaces, because these are the only components which have an interface 1 to manage InterBus branching. If more defective interfaces were detected at the same time, the value shows the physically nearest Slave device to the master in the InterBus ring.
NRDY	HOST-NOT-READY-NOTIFICATION: indicates if the host program has set its state to operative or stop. If this bit is set the host program is not ready to communicate.
EVE	EVENT-ERROR: The used InterBus master chip has detected at least one transmission error. The number of detected events are counted in Number of defective process data cycles and the error Number of network reinintializations. The bit will be set when the first event was detected and will not be cleared any more and remains set then.
PRHL	PERIPHERAL-ERROR: Some InterBus modules have the capability to indicate if they have detected low power or a short circuit in the in the external periphery. If at least one module reports this error it is shown in this bit. If all errors have disappeared, the bit will be released.
NEXC	NON-EXCHANGE-ERROR: An activated bit indicates that at least one of the configured Slave device is not operational because of a configuration fault or simply because it's not present in the network.
ACLR	AUTO-CLEAR-ERROR: This bit is set, when the master stops the communication to all handled Slave devices because of missing Slave devices. Before doing this the Master sets all output values of the left Slave devices to the save zero condition. The behaviour, if the master shall shut down or not, when it loses the contact to at least one device, is configurable in SyCon configuration tool or in the bus parameter download procedure. After the master has shut down only a warm- or cold start (reset) can reactivate the communication again.
CTRL	CONTROL-ERROR: Configuration error or heavy runtime error. Some of them can occur during startup procedure of the master. For example if the InterBus controller Ix1 of the master card do not respond or the configuration of SyCon has inconsistencies.

Table 27: Meaning of collecting status bits in the Global State Field

Further displays are:

Error at device address and **Corresponding error event** indicate the address of the faulty station and the actual error in plain text. Statistical bus information indicates the number of the detected bus short-circuits and rejected telegrams.

Devices specific status bits:

These display the **parameterized devices**, the **active devices** or **the devices with diagnostic** according to the activated button. Pending diagnostic information can be received by a double click on the respective number of the station.

This display is cyclically updated.

6.5.3 Extended Device Diagnostic

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

First select the Hilscher device 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, status information and parameter information:

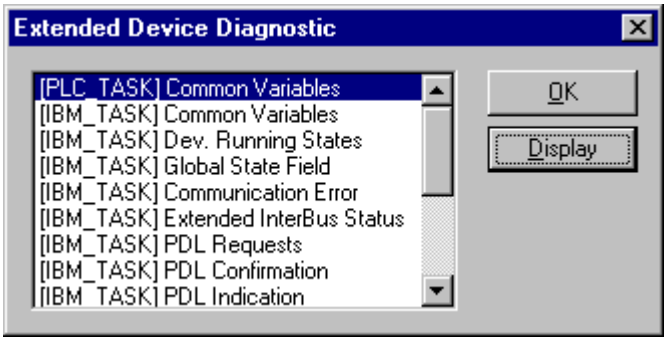

Figure 59: Online > Extended Device Diagnostic

First the list for the InterBus Master and far down the list for the InterBus Slave follows.

6.5.3.1 Extended Device Diagnostic for the InterBus Master

IBM_TASK: InterBus Administration

ALPMLIPD: Application interface (PCP Channel)

Task / Task State	Page
PLC_TASK Common Variables	*137*
IBM_TASK Common Variables	*138*
IBM_TASK Device Running States	*140*
IBM_TASK Global State Field	*140*
IBM_TASK Communication Error	*141*
IBM_TASK Extended InterBus Status	*142*
IBM_TASK PDL Requests	*143*
IBM_TASK PDL Confirmation	*144*
IBM_TASK PDL Indication	*145*
IBM_TASK Data Cycle Status	*145*
IBM_TASK Scanned ID Codes	*147*
ALPMLIP Common Variables	*148*
ALPMLIPD ALI Information	*150*
ALPMLIPD PMS Information	*151*
ALPMLIPD LLI Information	*152*

Table 28: Extended Device Diagnostic for the InterBus Master

6.5.3.2 Extended Device Diagnostic for the InterBus Slave

PLC_TASK

SUPI_TASK

ALI_TASK

Table 29: Extended Device Diagnostic for the InterBus Slave

6.5.4 Statistic Information

In the window **Statistic Information** a long-term recording of the InterBus communication can be activated and deactivated. Occurred error messages can be stored into a log file.

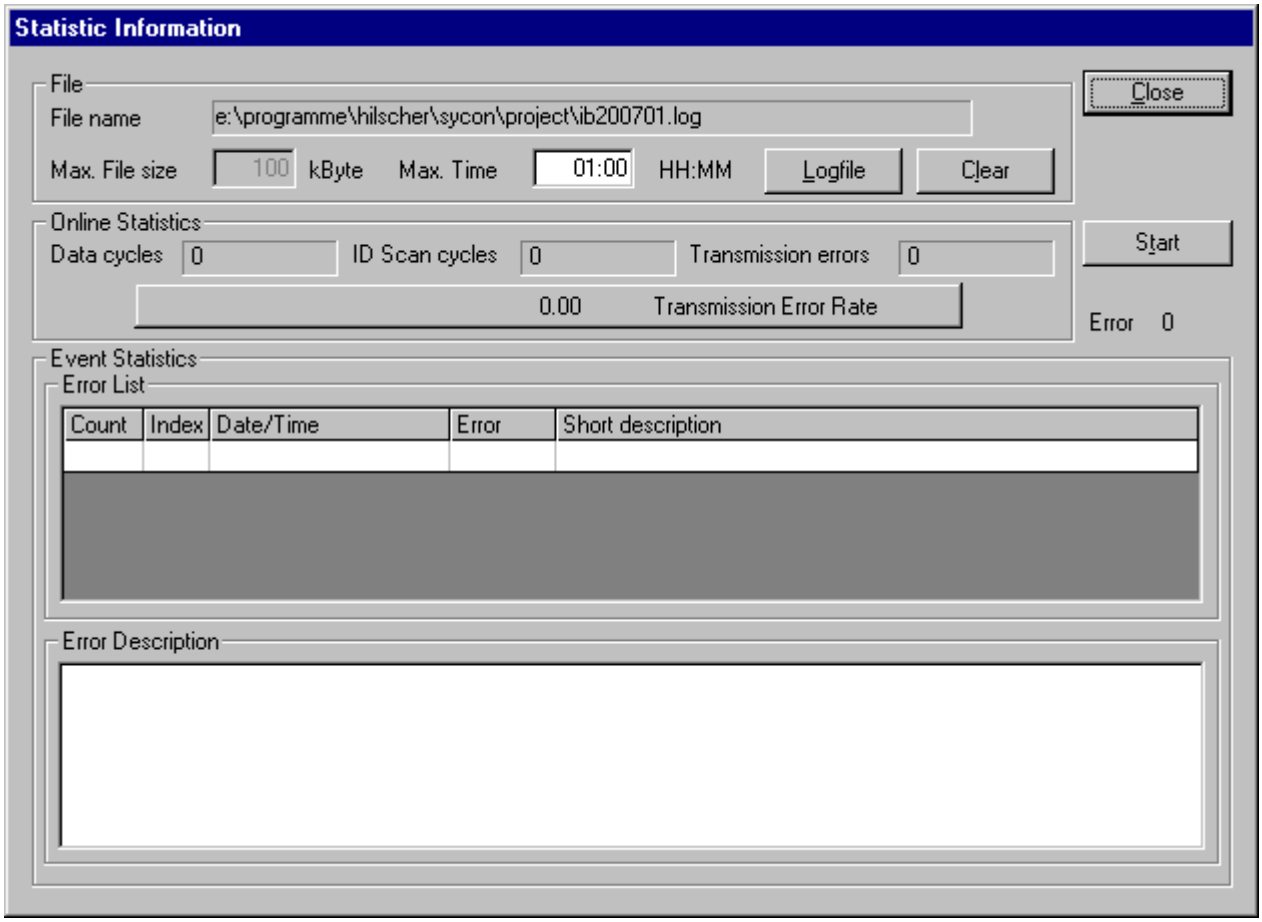

Figure 60: Online > Statistic Information

Under log file the path and the name of the file can be changed. The recording is started by clicking the **Start** button.

If the Master is connected, the information about **data cycles, ID scan cycles**, **transfer errors** and the **transfer rate** are displayed online.

The following figure shows a faultless communication.

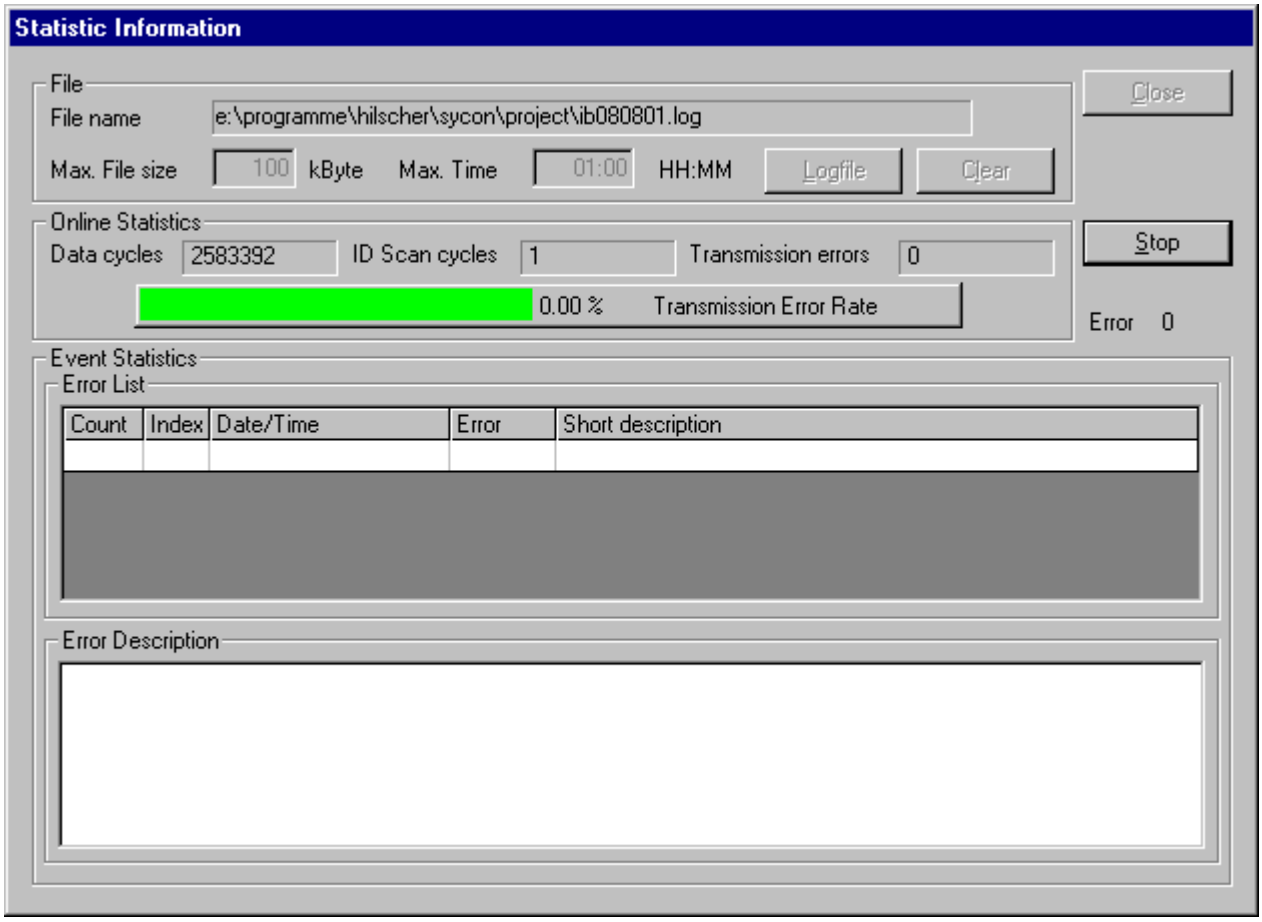

Figure 61: Online > Statistic Information (faultless)

The following figure shows an error message to a data transfer with an occurred communication error. The displayed figure shows an error message of a cable interruption (cable disconnected and connected again).

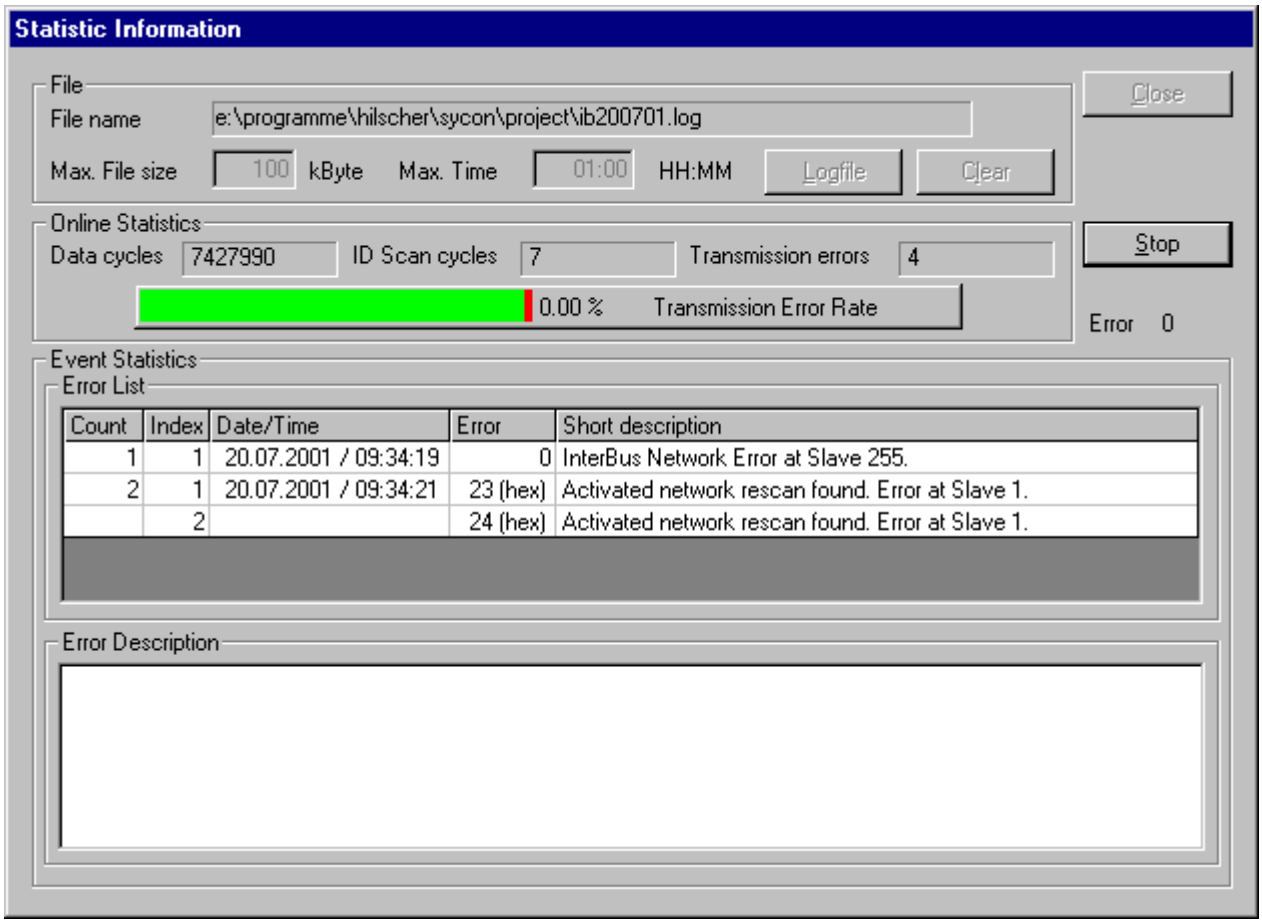

Figure 62: Online > Statistic Information (error displayed)

6.6 User Data Transfer

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

- Hilscher InterBus Master devices
- Hilscher InterBus Slave devices

User data transfer function	Usage	Usable with Hilscher InterBus Master devices	Usable with Hilscher InterBus Slave devices
I/O Monitor	Read input data and set output data. (cyclic I/O data exchange)	Yes	Yes
I/O Watch	Read input data and set output data. (cyclic I/O data exchange)	Yes	No
PCP-Monitor	Read or write data (objects)	Yes	No

Table 30: Overview User Data Transfer

6.6.1 I/O Monitor

This is an easy way of displaying and changing the first 32 Bytes of the process data image.

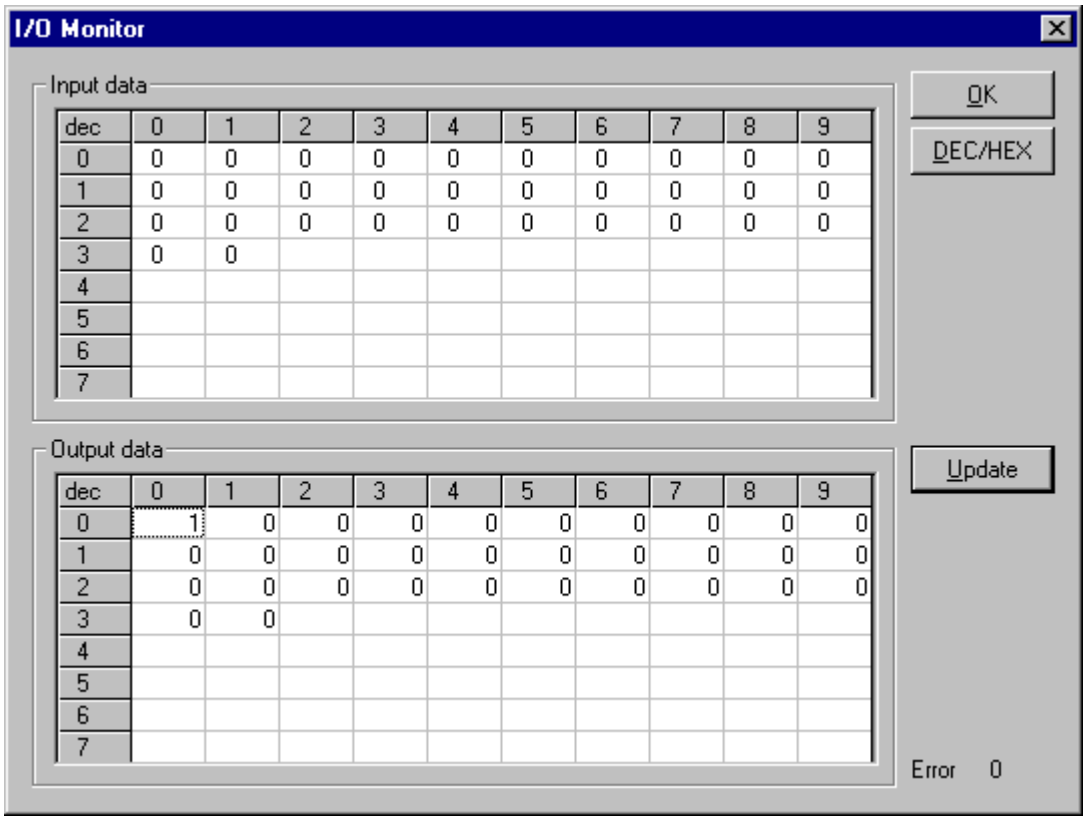

Figure 63: Online > I/O Monitor

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

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

Always the first 32 input and output Bytes of the process data image 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 that 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 (Combimaster) resp. 1.140 (DP-Master)
InterBus Master	2.040
CANopen Master	1.040
DeviceNet Master	1.058

Table 31: 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 an InterBus Master and the InterBus Slave(s) as described in section *Getting Started – Configuration Steps* on page *19*.
- The Configuration has been downloaded into the InterBus 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
Logical network view	Tag list	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

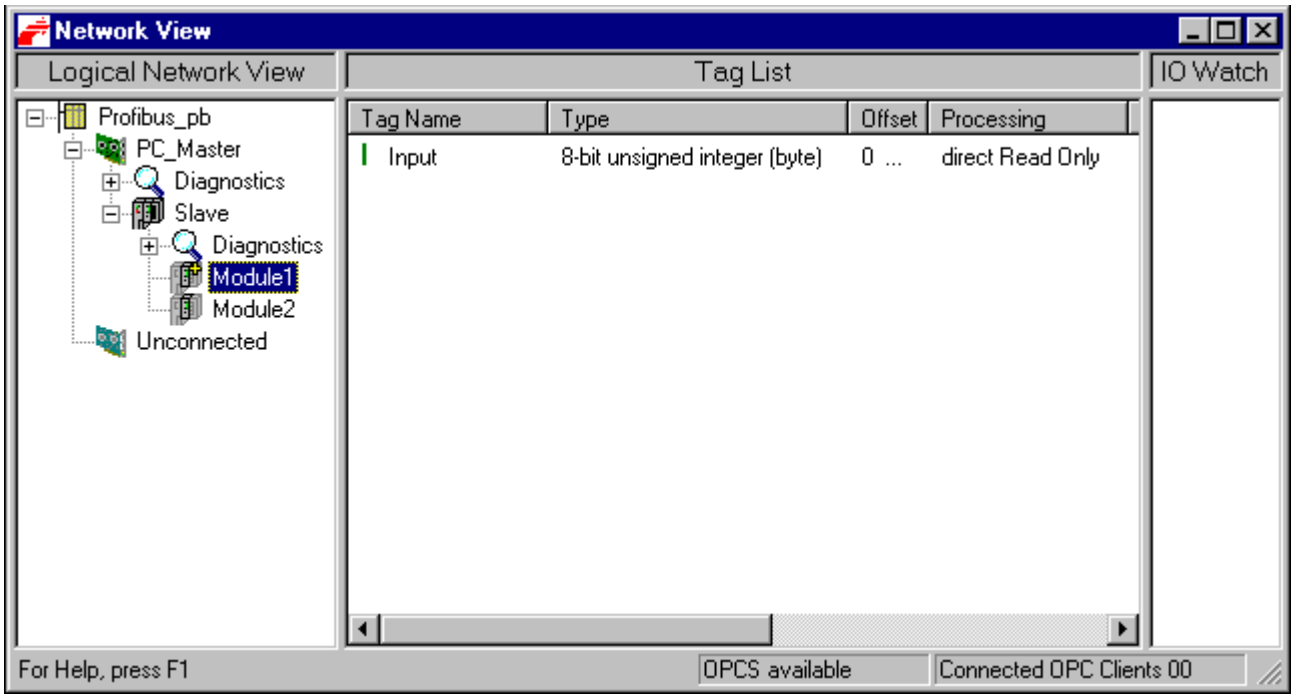

Figure 64: Logical Network View and I/O Watch

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 (I/O Watch) of the Logical Network View.

6. In the right hand side 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 I/O Watch appears.

7. A table shows the Device, Symbolic Name, IEC Address (Offset), Data type Representation and Value.

8. Input data are displayed and can't be changed. Output data can be entered into the value column.

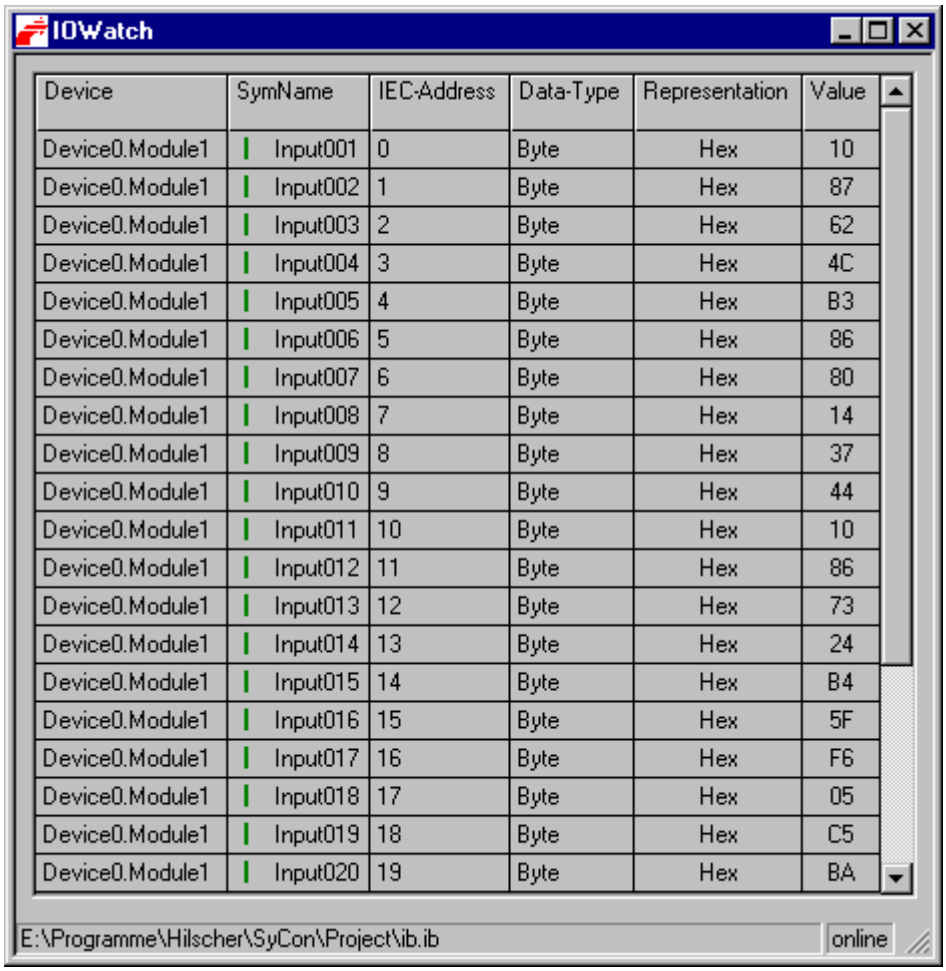

Figure 65: I/O Watch Window

In the column representation can be selected the data type: Bit Pattern, Char, Decimal Signed, Decimal Unsigned, Hex

6.6.3 PCP-Monitor

With this function InterBus services based on the current configuration, can be carried out.

First select the Master with a left mouse click on the Master device. Then select **Online > PCP Monitor**.

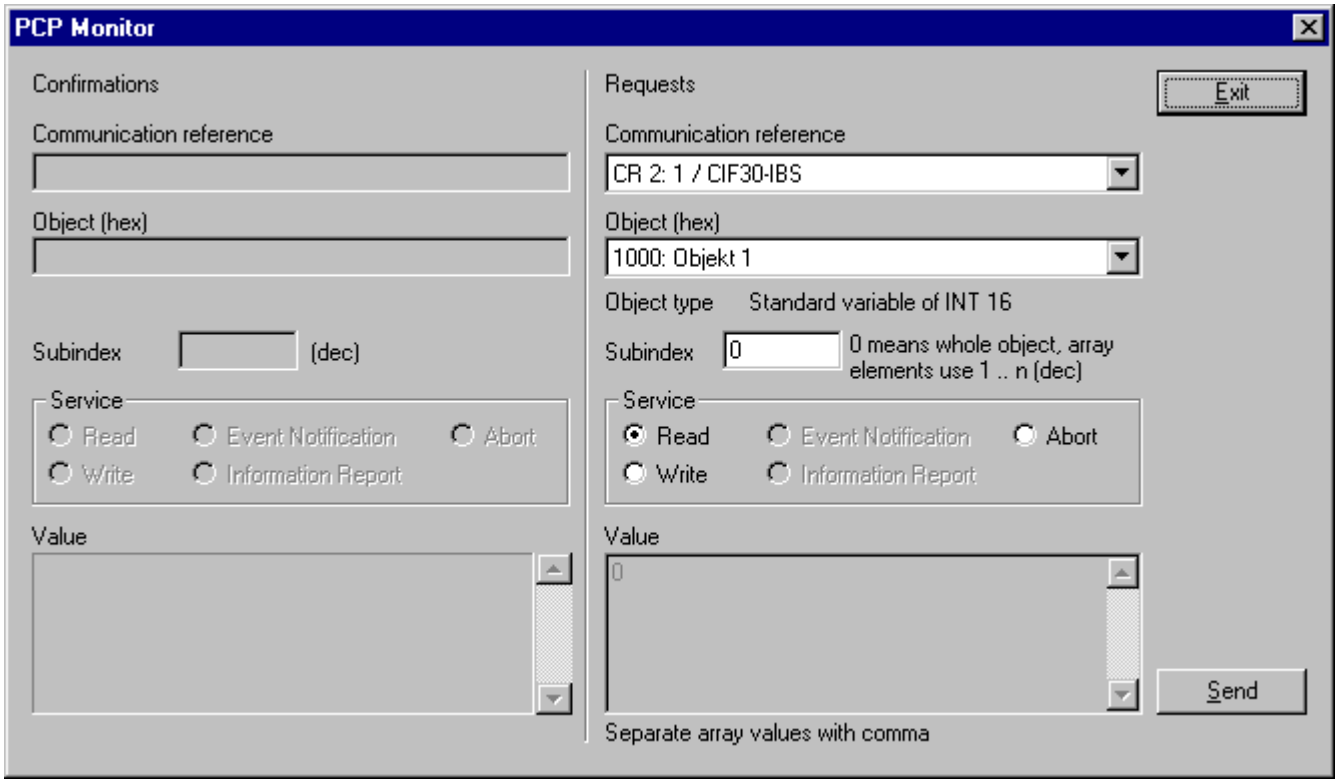

Figure 66: Online > PCP Monitor

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 data must be entered in the **Value** field. On the left side, the acknowledgement, or when reading, the received data are displayed.

Note: Only Client functions are available in this version. Server functions are not supported.

Positive result:

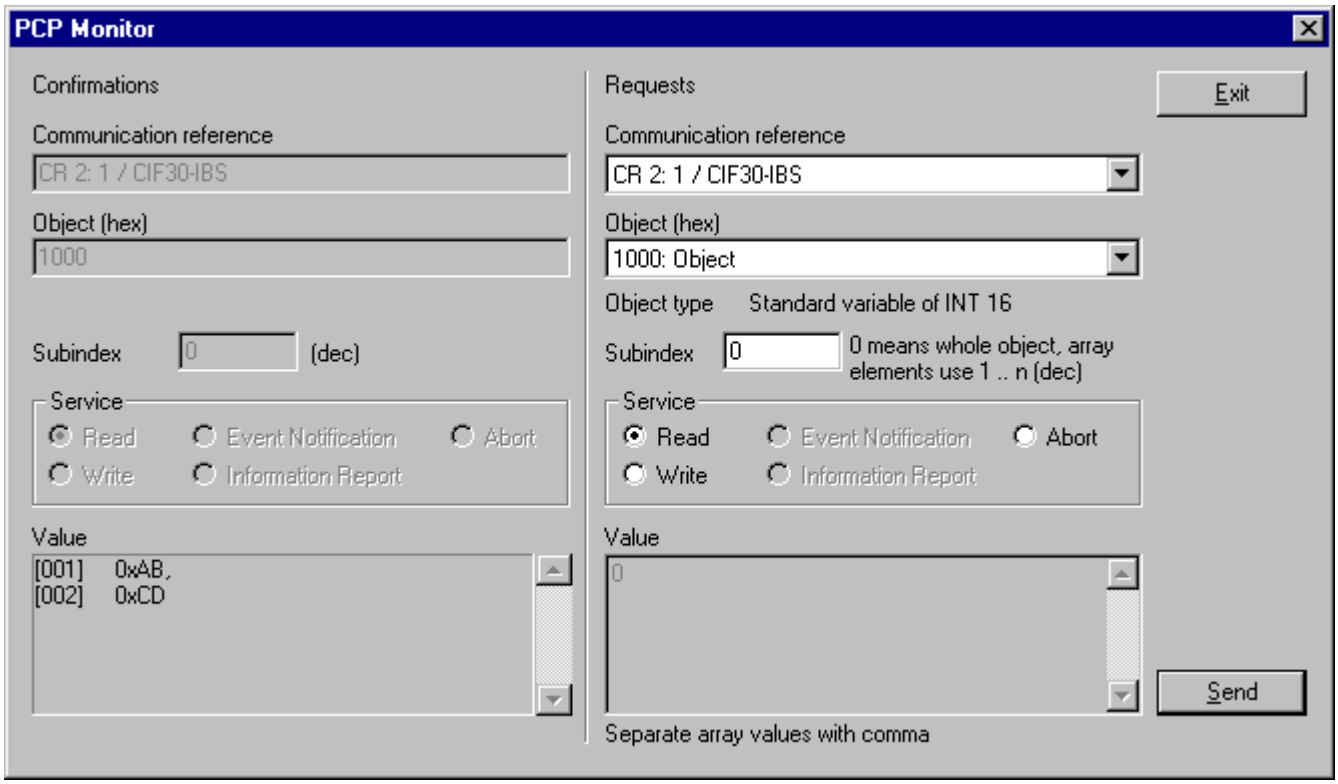

Figure 67: Online > PCP Monitor (positive result)

Negative result:

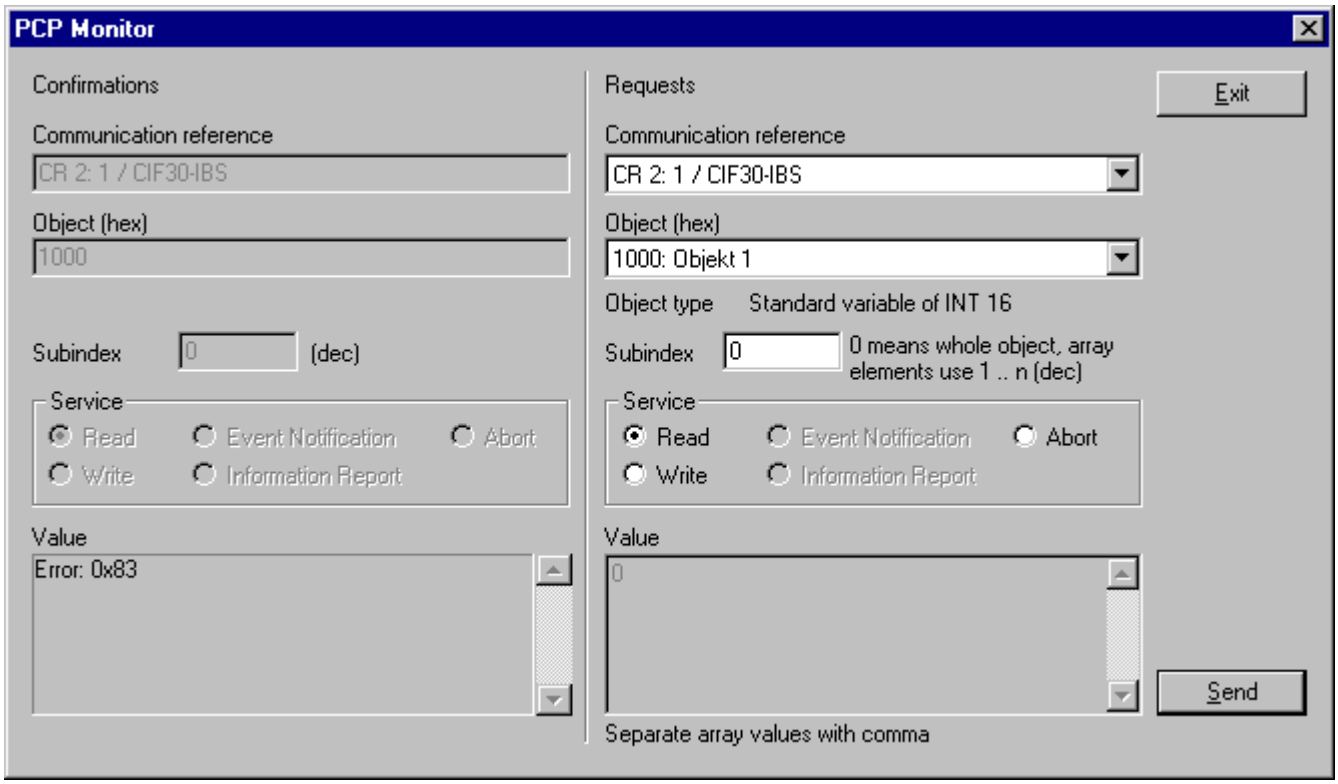

Figure 68: Online > PCP Monitor (negative result)

6.7 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 select the **Online > Message Monitor** menu.

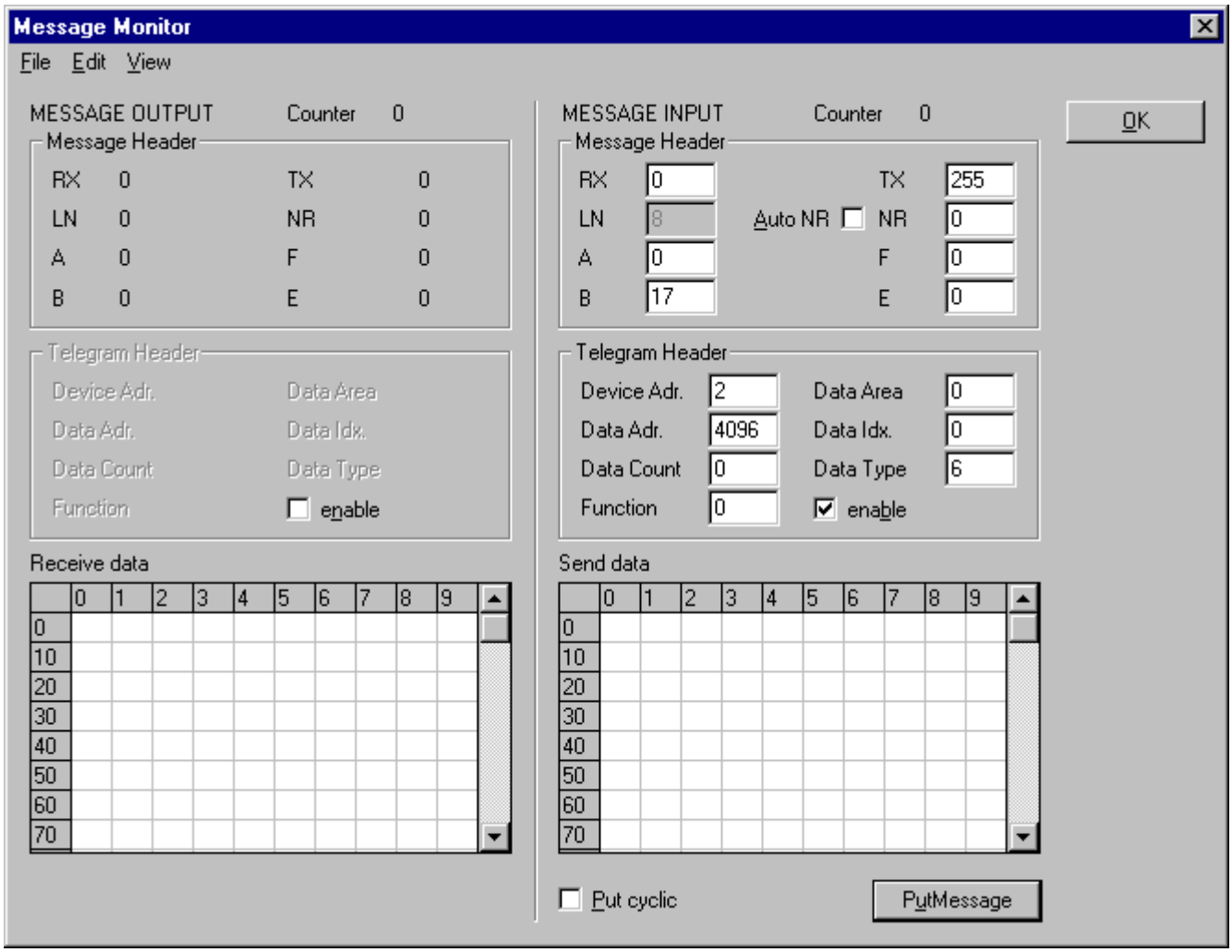

Figure 69: Online > Message Monitor

A Message can be saved and loaded and has the file extension *.MSG.

File > New: clears the window

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

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 are shown

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

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

View > Decimal/Hexadecimal: Switch the display format

It is recommend to create a sub-directory MSG and to save the messages in it.

Figure 70: Save a Message

6.7.1 Message Monitor for Testing of PCP (Server)

In the following, the Message Monitor for reading and writing via PCP as a server is described.

To read data over PCP from the Slave the following has to be set in the Message Monitor. A reading message must have been transmitted before from the Master to the Slave. The Slave creates its response as follows:

Message for Read via PCP		
Message header		
Rx = 1 (always)	Tx = 255	
Ln = (calculated)	Nr = 0 .. 255	
A = 17	F = 0	
B = 0	E = 0	
Telegram header	**Meaning for PCP**	**Value range**
Device Adr	CR	2, 3 (2..63 for the Master)
Data Area	unused	0
Data Address	Object	15..65535
Data Index	Index	0..240
Data Count	Data Count	1 .. 240
Data Type	Data Type	1..6, 9, 10
Function	Read	1
Reading data		
Fill in as many data as the value in data count		

Table 32: Message Monitor - Example PCP Read

The following must be entered in the Message Monitor in order to write data via PCP to a Slave. A writing message must have been transmitted before from the Master to the Slave. The Slave creates its response as follows:

Message for Write via PCP		
Message header		
Rx = 1 (always)	Tx = 255	
Ln = (calculated)	Nr = 0 .. 255	
A = 17	F = 0	
B = 0	E = 0	
Telegram header	**Meaning for PCP**	**Value range**
Device Adr	CR	2, 3 (2..63 by the Master)
Data Area	unused	0
Data Address	Object	15..65535
Data Index	Index	0..240
Data Count	Data Count	1 .. 240
Data Type	Data Type	1..6, 9, 10
Function	Write	2

Table 33: Message Monitor - Example PCP Write

6.8 Control Active Configuration

In the menu **Online > Control Active Configuration** the communication between Master and Slave can be switched on and off.

If the Master is selected (focus on Master) and the menu **Online > Control Active Configuration** is called out, a selection list is displayed.

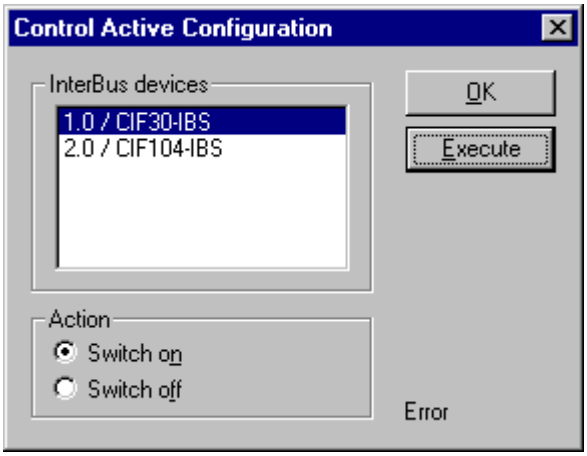

Figure 71: Online > Control Active Configuration

When the Slave is selected (focus on Slave) and the menu **Online > Control Active Configuration**, no selection list is shown.

Note: If a bus branch interface is switched off, all attached InterBus Slave devices are always switched off.

If groups were defined, these groups can be switched off or on.

Note: If the InterBus Slave device is assigned to a group, this group is completely switched off.

Note: If a group contains alternatives, then only exactly one alternative of this group can be turned on.

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, then 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.

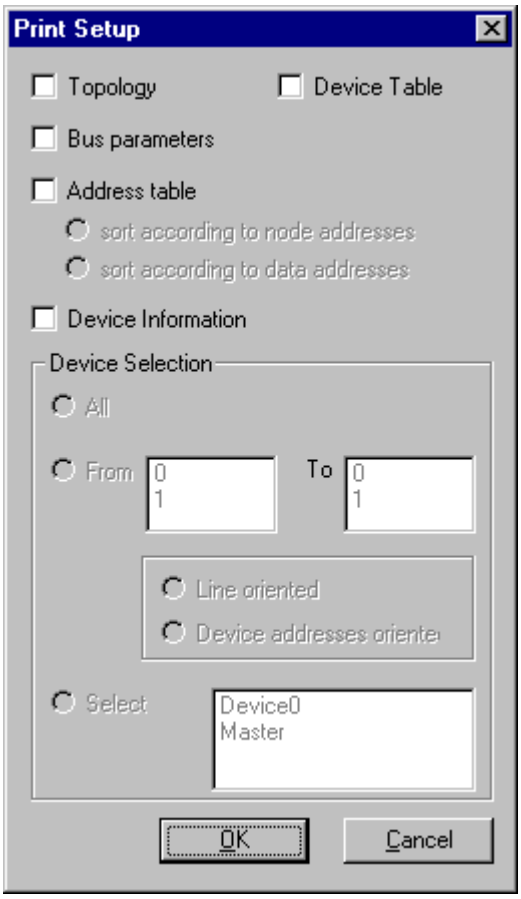

Figure 72: File > Print

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 number to station number
- 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 (*.IB Microsoft Access Format) in a DBM file (Hilscher binary format). This DBM file can be loaded 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 Vendor Number 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 Data Position, 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 34: 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 35: 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 36: 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 37: CSV Export > DataPosition Code

7.3.2.4 Example of a CSV file

Example of a CSV file which was exported in Excel:

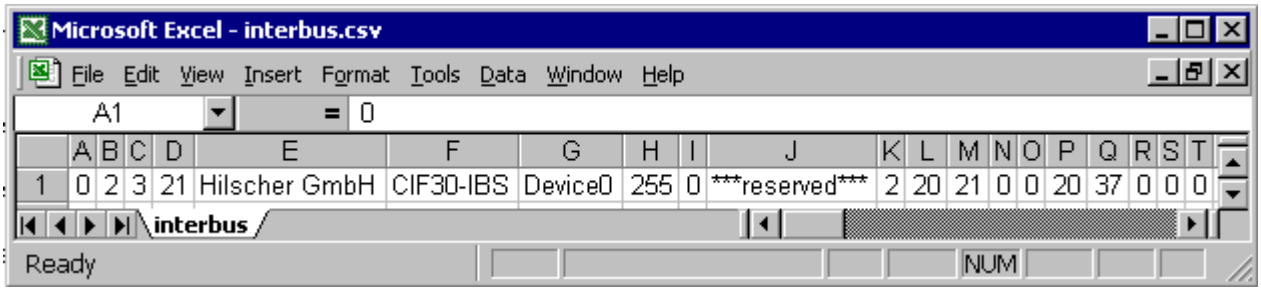

Figure 73: Example of a CSV File in Excel

Cell	Parameter	Value	Meaning
A1	StationAddress	2	Station address of the InterBus Slave device.
B1	RecordType	2	The Record Type is always 2.
C1	IdentNumber	3	Ident Number of the Slaves.
D1	VendorNumber	21	The Vendor Number is 21.
E1	VendorName	Hilscher GmbH	Vendor name of the device.
F1	Device	CIF30-IBS	Description of the device.
G1	Description	Device0	Description of the device which is also shown in SyCon as the name of the device.
H1	MasterAddress	255	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 data type, 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, and S1.
L1	DataSize	20	The size of the module is 20 bytes.
M1	DataType	21	Input; Data type unsigned Integer 8
N1	DataPosition	0	Output; Data type unsigned Integer 8
O1	Offsetaddress	0	4 Byte-Module starting with the offset address 0.
P1	DataSize	20	The size of the module is 20 bytes.
Q1	DataType	37	Output; Data type unsigned Integer 8
R1	DataPosition	0	Data position of the second module.
S1	Offsetaddress	0	4 Byte-Module starting with the offset address 0.
T1...IQ1	...	0	The modules 3 till 59 are not used for this device and so a 0 is shown.

Table 38: Example of a CSV file in Excel

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

7.4 Import Functions

7.4.1 CMD Import

SyCon offers the possibility of importing a project from project engineering and diagnostic program IBS CMD G4 of the company Phoenix Contact GmbH. This project must be present in an ASCII file (*.CSV).

The ASCII file can be produced in IBS CMD G4 with the following steps:

- Parameter memory select: With one mouse click on the appropriate symbol you select the parameter memory.
- ASCII file produce: With the **menu Configuration > ASCII file write > project files (*.CSV)** the production of the ASCII file are initiated. All control fields of the dialog must remain activated.
- Format of the ASCII file determine: With CSV-options the desired format of the ASCII file is determined.

For the import of the ASCII file in the SyCon the following steps are necessary:

- Create new project: With the menu **File > New** and the selection of the **InterBus** a new project is produced.
- Masters select: With the menu **Insert > Master** the Master is selected.
- ASCII file import: With the menu **File > Import > CMD** the import is started.

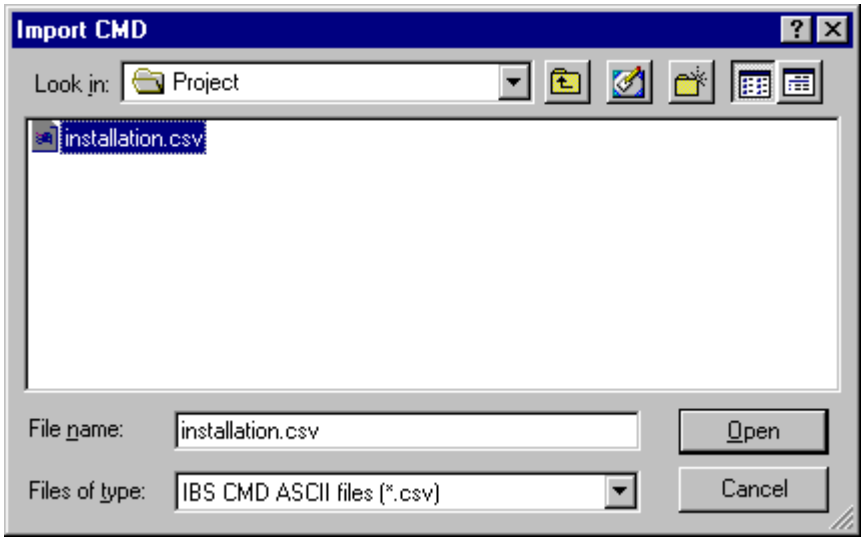

Figure 74: File > Import > CMD

After selection of the ASCII file which can be imported you must indicate the adjustments for the format of the file, made in IBS CMD G4.

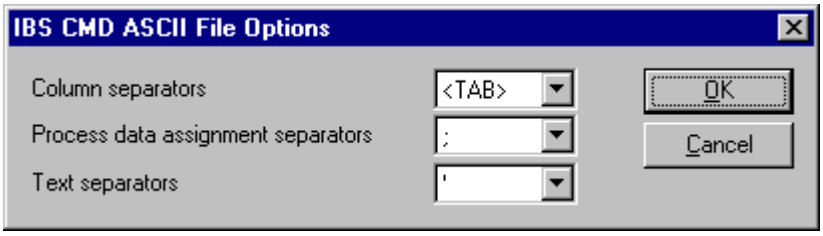

Figure 75: File > Import > CMD (Settings IBS CMD G4)

Close the window with the button **OK**, if the import is to be started. Close the window with **Cancel**, if no import is to be made.

With the import the System Configurator assigns a suitable EDS file to each Slave device.

7.5 Edit

7.5.1 Cut, Copy and Paste

With **Edit > Cut** and **Edit > Copy** you put the cut/copied Slave 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 Slave device from one point in the configuration to another. With the menu option **Edit > Copy** you duplicate an existing Slave device.

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

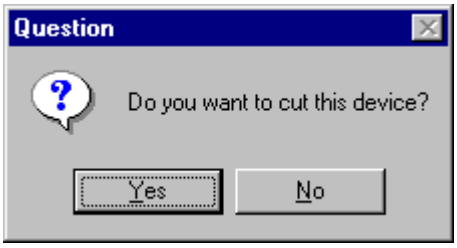

Figure 76: Security question cut device

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

When you select **Edit > Paste** the device can be insert again at the position you want.

Possible insert positions are displayed with a colored circle  . If you move the mouse pointer over this circles it changes into one of these symbols dependent on which Slave device was cut or copied.

Mouse pointer - possible insert positions			
			
Remote Bus Branch Interface	Local Bus Branch Interface	Remote Bus Device	Local Bus Device

Table 39: Mouse pointer - possible insert positions

Figure 77: Paste a Slave device in the configuration

Click on the position where the Slave is to be inserted. A window opens where the cut/copied Slave device can be selected.

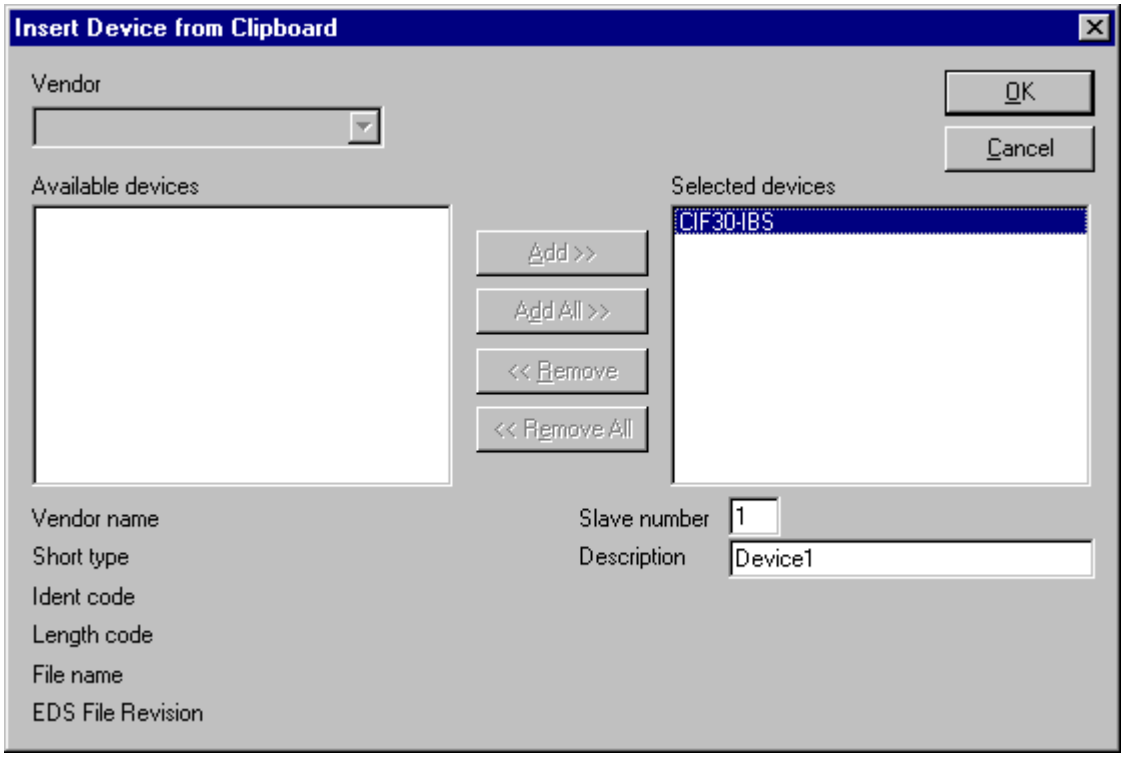

Figure 78: Edit > Paste Insert Device from Clipboard

With the **OK** button the Slave will be insert.

7.5.2 Delete

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

Figure 79: Security question delete device

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

7.5.3 Replace

With the menu **Edit > Replace** the Master or a Slave device can be replaced. How to replace the Master look in section *Replace Master* at page *30*. If you want to replace a Slave device look in section *Replace Slave* at page *37*.

7.5.4 Assign EDS File

With the menu **Edit > Assign EDS File** the following window appears:

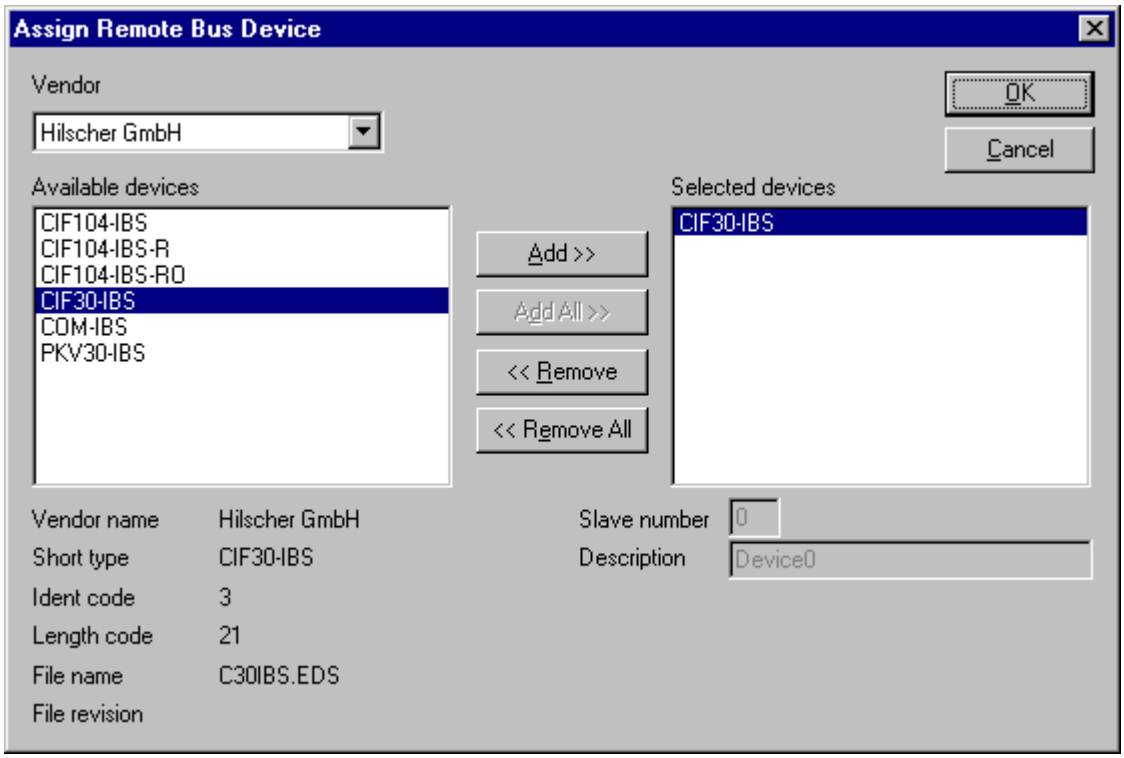

Figure 80: Edit > Assign EDS File

In this window you are able to assign an existing EDS file to a Slave device which was scanned before (Scan with *Automatic Network Scan* see at page *73*).

7.6 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 InterBus Master)

7.6.1 Device Table

The **View > Device Table** menu shows the list of all devices which are used in the configuration.

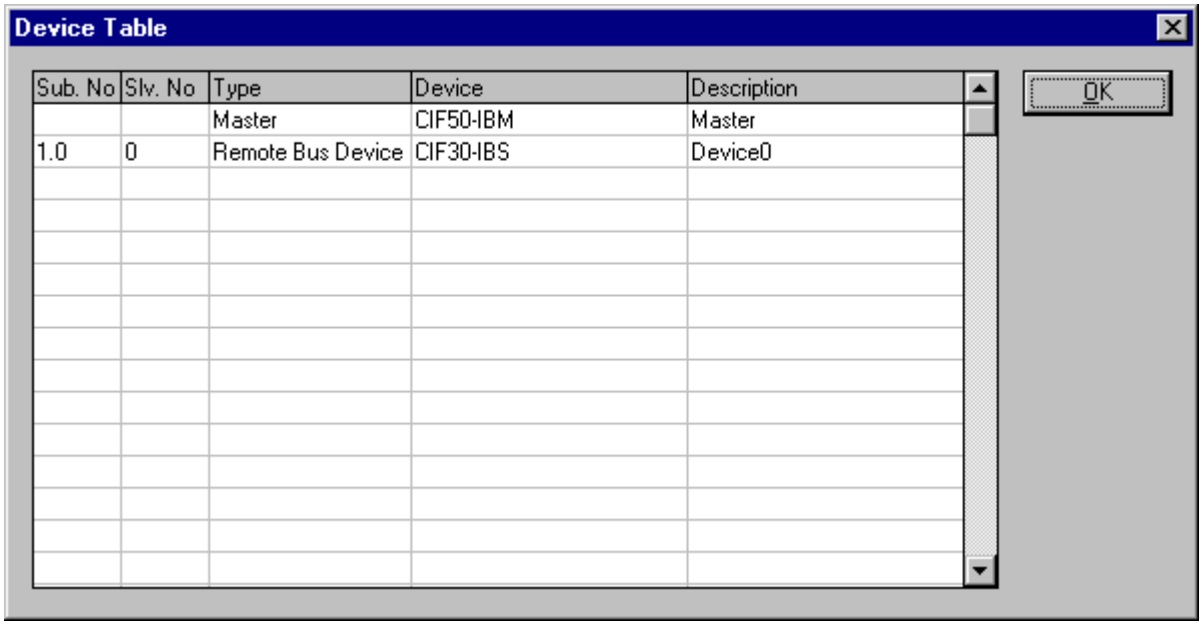

Figure 81: View > Device Table

7.6.2 Address Table

A list of all addresses used in the process data image is displayed in the **View > Address table** menu.

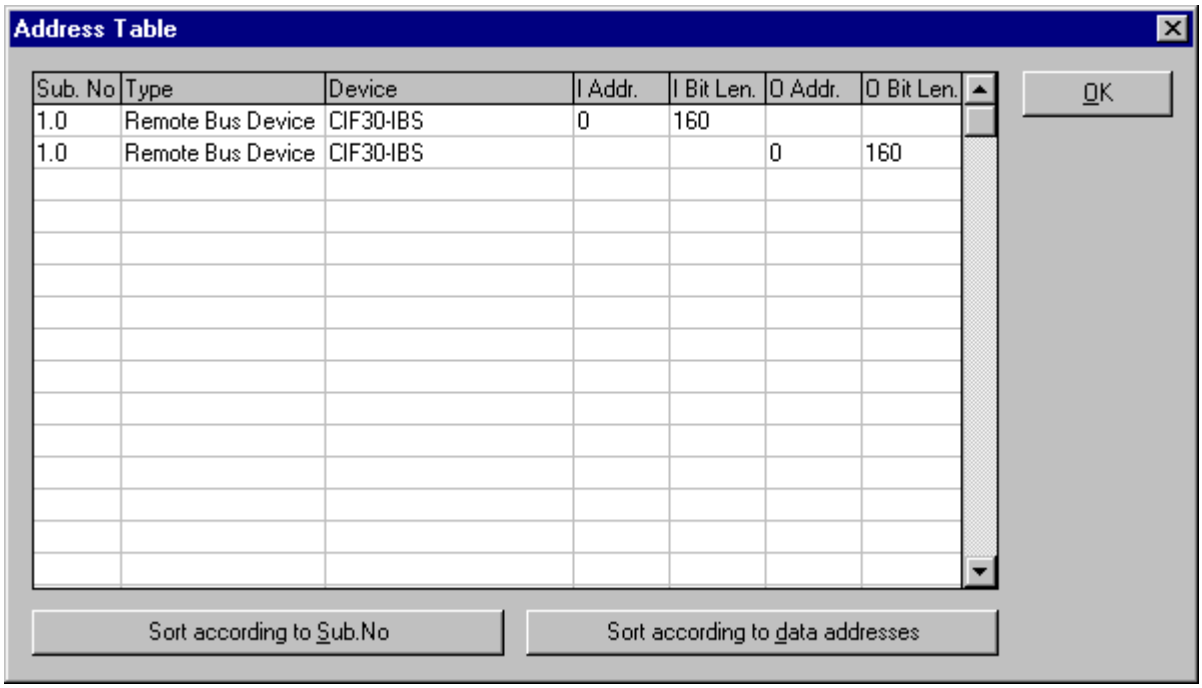

Figure 82: View > Address Table

It is possible to sort the addresses according to Slave numbers or data addresses.

7.7 View Menu SyCon

7.7.1 Logical Network View

In the menu **View > Logical Network View** the user can activate or deactivate the network view by selecting it (with hook) or by not selecting it (without hook).

The network view is used for example for the Start Options.

7.7.2 Toolbars

In the menu **View > Toolbars** the user has the possibility to activate or deactivate the Toolbars **Standard** and **Fieldbus**. If this function is deactivated the toolbars are not shown.

7.7.3 Status Bar

In the menu **View > Status Bar** this bar can be activated (with hook) or deactivated (without hook).

8 Tools

8.1 EDS Viewer

The menu **Tools > EDS Viewer** opens an EDS file to view it.

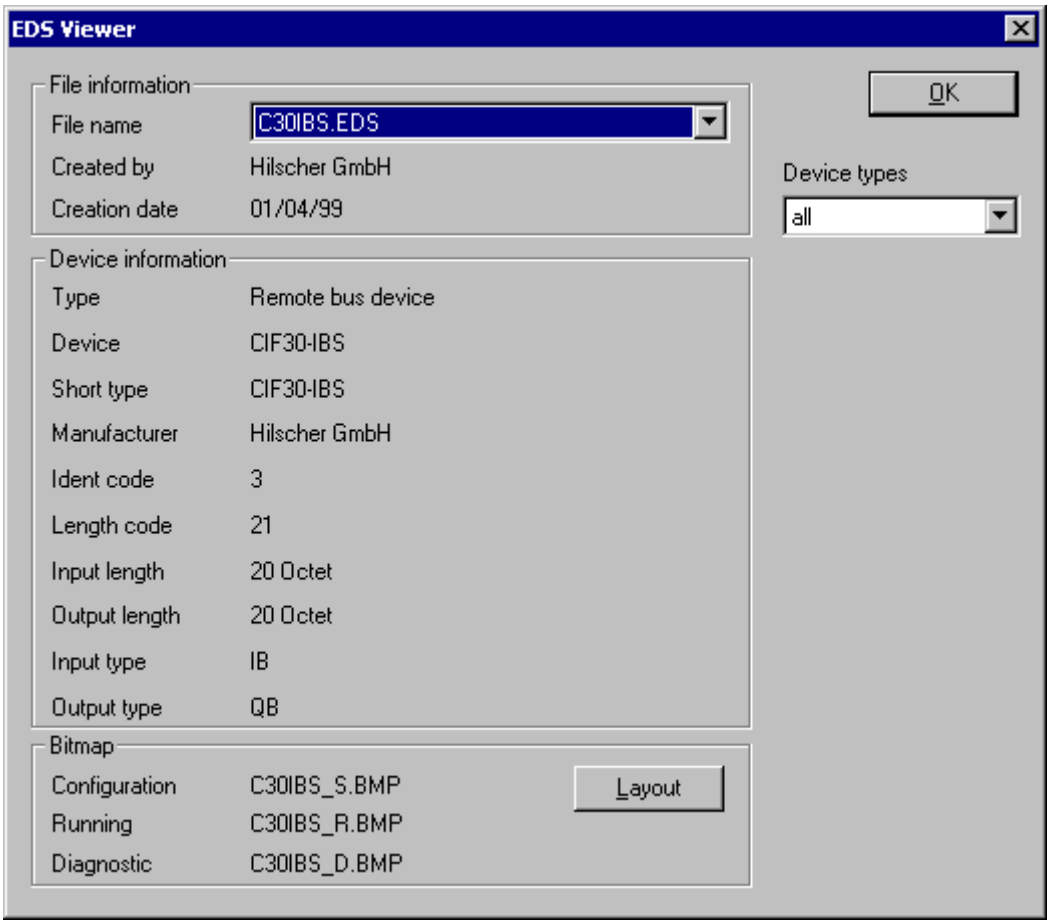

Figure 83: Tools > EDS Viewer

ID-Code, Length Code, input length and output length are not displayed, if the device supports several ID- and Length Codes.

The following device types are available:

- Remote Bus Branch Interface
- Local Bus Branch Interface
- Remote Bus Device
- Local Bus Device

The button **Layout** displays the assigned figures of the device (see section *Layout* on page *117*).

8.2 EDS Generator

If an InterBus device is not contained into the provided EDS files, the appropriate EDS file can be produced with **Tools > EDS Generator**.

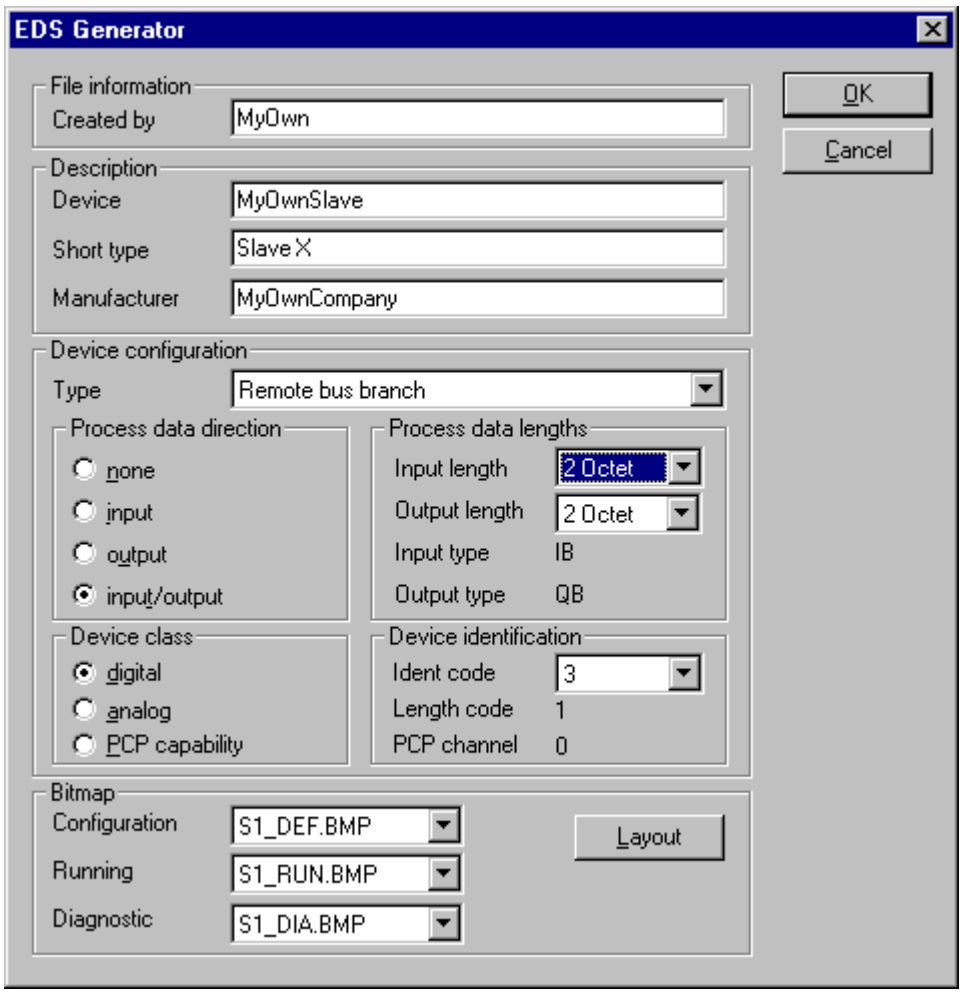

Figure 84: Tools > EDS Generator

In this window the device-specific data must be filled in. See manual of this device. The two most important parameters are the Length Code and the ID-Code, which are also imprinted on the devices normally. Both guarantee that the Slave device is detected in the network.

8.3 Layout

On the basis of **Tools > EDS Viewer** or **Tools > EDS Generator** the current course arranging of bitmaps of the device can be seen.

The bitmaps of the device for

- Configuration Phase (typical colour grey),
- Operating Phase (typical colour: green),
- Diagnostic Phase (typical colour: red)

are displayed.

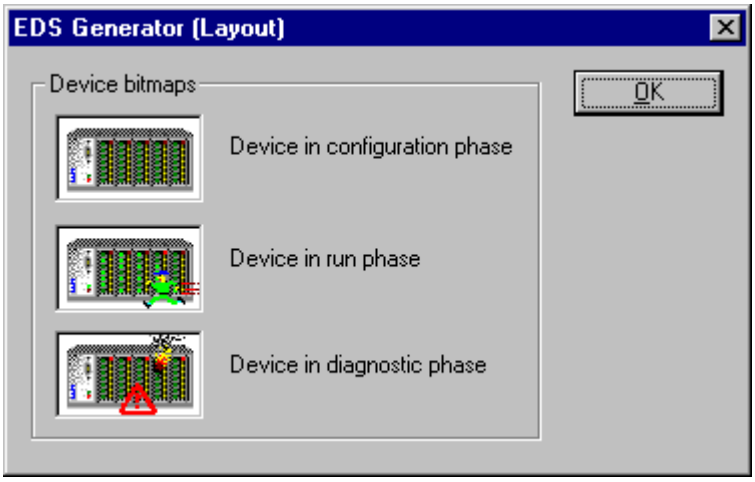

Figure 85: Layout for Tools > EDS Viewer or Tools > EDS Generator

8.4 PKV 40 Gateway

The Tools menu for the PKV40 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 causes 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 40: 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 41: 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 causes 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 42: 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: Messagebuffer 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 43: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 44: 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 45: 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 46: 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 47: 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 48: 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 existent
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 49: 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 50: 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	Nullpointer 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 WritsDs().
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 51: 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 52: 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: Messagebuffer empty
2011	Message handler: Messagebuffer 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
2026	Message handler: Wait for Delete
2027	Message handler: No cyclic Message

Table 53: 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 54: 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 55: Sub function Error Numbers of the Driver Functions of the Online Data Manager (8001..8035)

9.7 Data Base Functions Error Numbers (4000 .. 4199)

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 56: 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 wMaxEintraege
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 57: 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	Initializing 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 58: 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 exists
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 59: 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 PackStringDumpToByteArray: 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 60: Error Numbers of data base functions (5000 .. 5012)

10 Appendix

10.1 Extended Device Diagnostic Master

On the following pages the task state structures of the InterBus Master are described.

10.1.1 PLC_TASK Common Variables

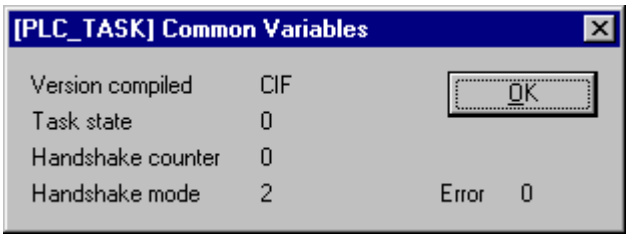

Figure 86: PLC_TASK Common Variables

Variable	Meaning
Version Compiled	Hardware
Task State	Task State
Handshake Counter	Counter for the performed process data hand shakes
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 61: Meaning of Variables

10.1.2 IBM_TASK Common Variables

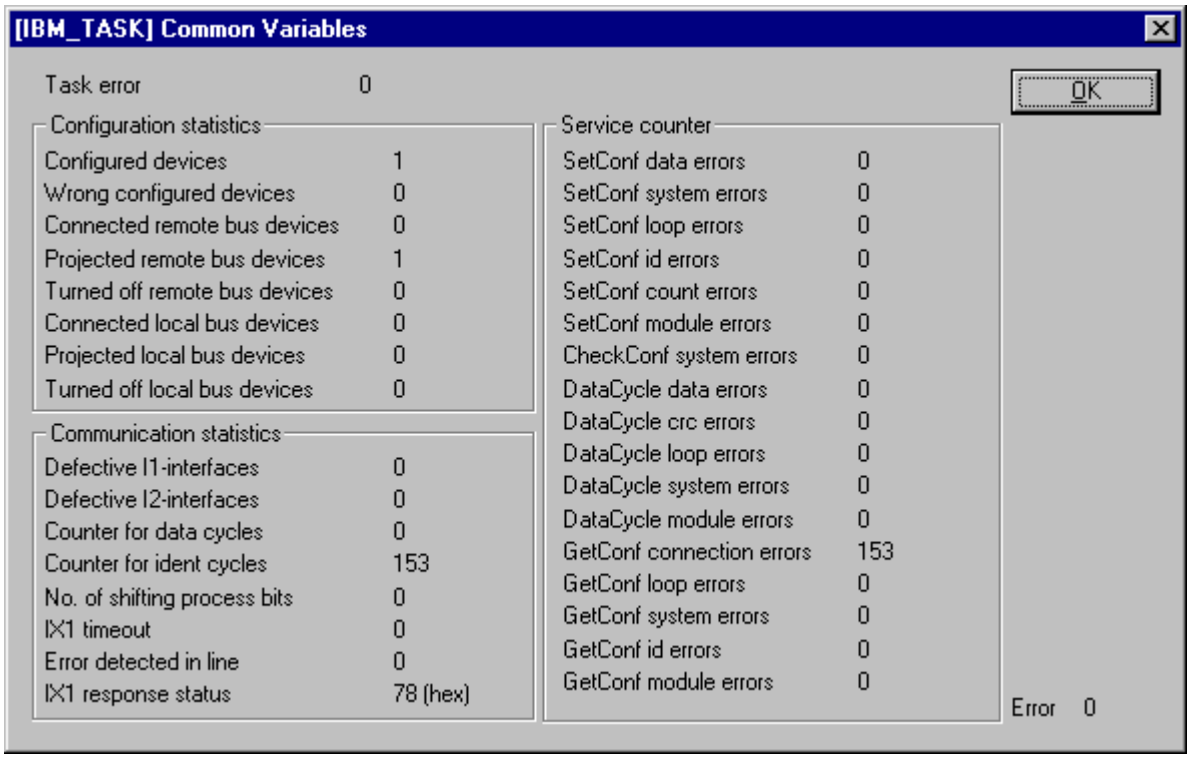

Figure 87: IBM_TASK Common Variables

Configuration State	Meaning
Configured devices	number of device that are actual configured
Wrong configured devices	the master executes a consistency check of each Slave parameter set and increments this counter by each found faulty data set
Connected remote bus devices	this value shows the actual number of scanned remote bus device in the connected network.
Projected remote bus devices	this value indicates the number of configured remote bus devices the master wants to run with.
Turned off remote bus devices	in case of configuration faults, like wrong ID code for example, the master deactivates these network components. The number of disabled device is indicated here. The value should normally be 0.
Connected local bus devices	this value shows the actual number of scanned local bus device in the connected network.
Projected local bus devices	this value indicates the number of configured local bus devices the master wants to run with.
Turned off local bus devices	in case of configuration faults, like wrong ID code for example, the master deactivates these network components. The number of disabled device is indicated here. The value should normally be 0.
Defective I1-Interfaces	for each timeout causing branch interface of the network this counter is incremented. The value should normally be zero, else check the network visual and search for red LB-LEDs on the modules. This indicates the defective interface module.
Defective I2-Interfaces	for each timeout causing remote interface of the network this counter is incremented. The value should normally be zero, else check the network visual and search for red RB-LEDs on the modules. This indicates the defective interface module.

Counter of data cycles	this value shows the actual number of driven process data cycles since the last master reset.
Counter of ident cycles	this value is normally incremented during the startup phase of the InterBus network when the master does its management ID-sequence. If the counter increments during runtime, then the master has to proceed some extra ID-sequences because of defective data cycles. So normally the value shouldn't increment.
No. of shifting process bits	the master adds up here the number of actual shifted process data bits of all active devices.
Error detected in line	the master code has special debug information included, which shows in case of a hard communication to the fieldbus controller at which source code line the error happened.
IX1 response status	this value represents the actual confirmation command of the fieldbus controller. During runtime the value is 48hex which indicates 'Start data cycle confirmation'.
SetConf service counter	during the management ID-sequence startup phase of the network. The values should normally be zero.
DataCycle service counter	here the master counts all InterBus process data cycle errors which forced him to leave the process data exchange and need to drive an extra management ID cycle to search for the error location. The data errors as well as CRC errors and module errors are errors which can occur normally during runtime because of electrical disturbance. These kinds of errors can be corrected by the master and influences the process data exchange in case of moderate occurrence only a little. But the system errors which mean timeout in the incoming process data stream, or loop errors which means the InterBus ring was shortened, forces the master to go into stop and resets the network.
SetConf, CheckConf, DataCycle and Get Conf counter	These counter are incremented only if the Master detects heavy communication errors. These values should normally be zero.

Table 62: Configuration State

10.1.3 IBM_TASK Device Running States

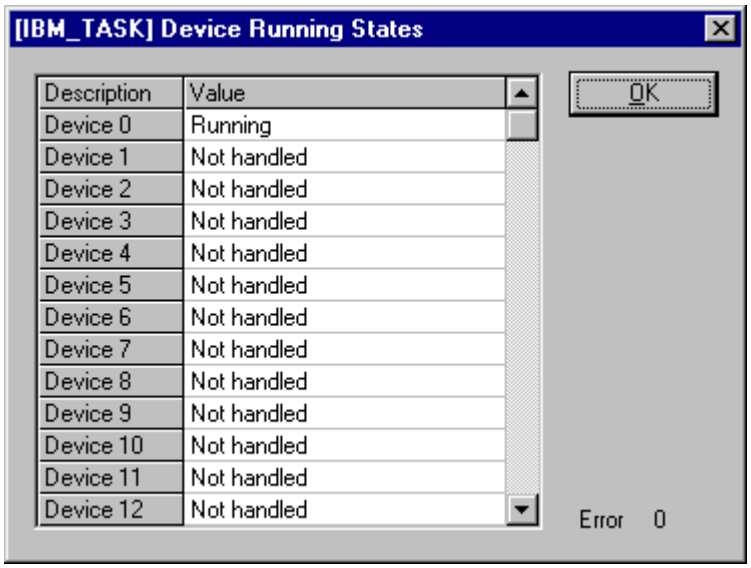

Figure 88:IBM_TASK Device Running States

Variable	Meaning
Device x (x=0..128)	Textural state for station address

Table 63: IBM_TASK Device Running States

10.1.4 IBM_TASK Global State Field

See section *Global State Field* on page *80*.

10.1.5 IBM_TASK Communication Error

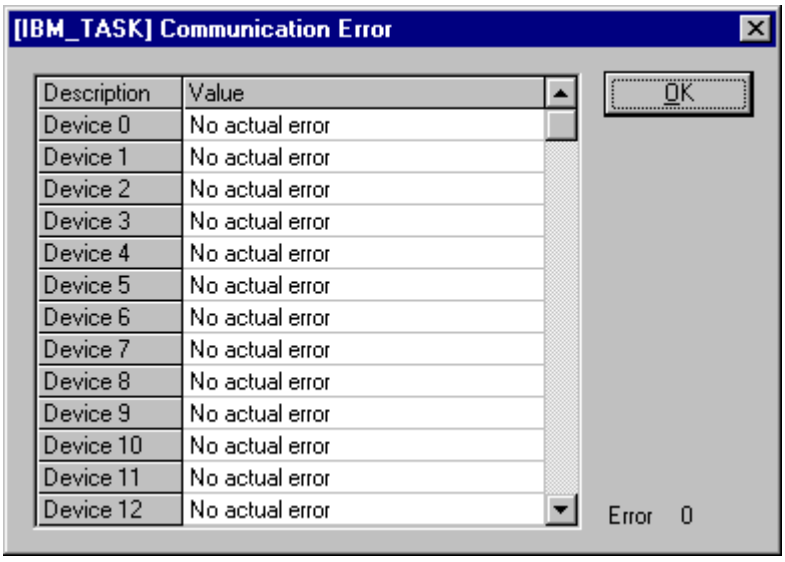

Figure 89: IBM_TASK Communication Error

Variable	Meaning
Slave x (x=0..128)	Actual error number of the Slave

Table 64: IBM_TASK Communication Error

10.1.6 IBM_TASK Extended InterBus Status

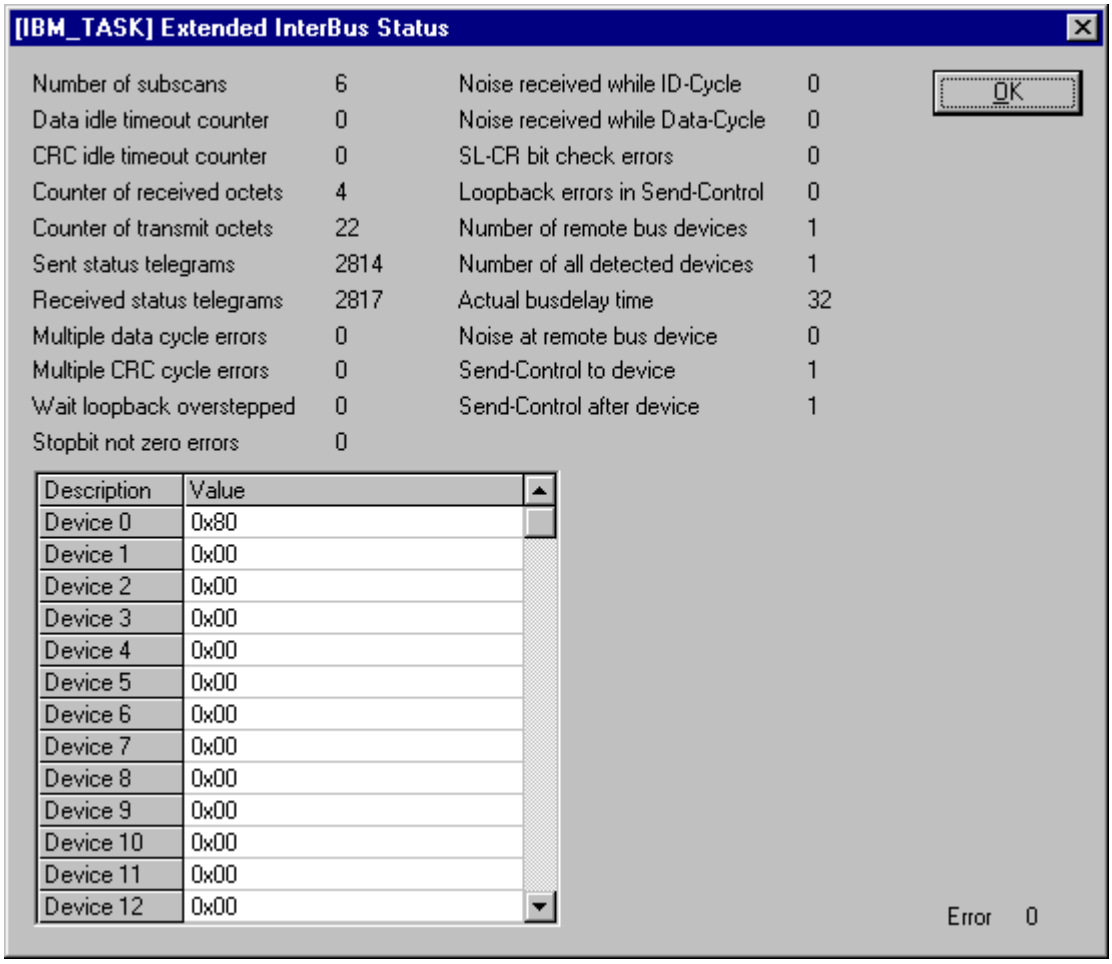

Figure 90: IBM_TASK Extended InterBus Status

The extended InterBus status displays special variables, which are stored directly after the first ID cycle. These values can help networks errors in special cases in again installed InterBus to localize. These values can be interpreted just with our Hotline and because of this they are not described here furthermore.

10.1.7 IBM_TASK PDL Requests

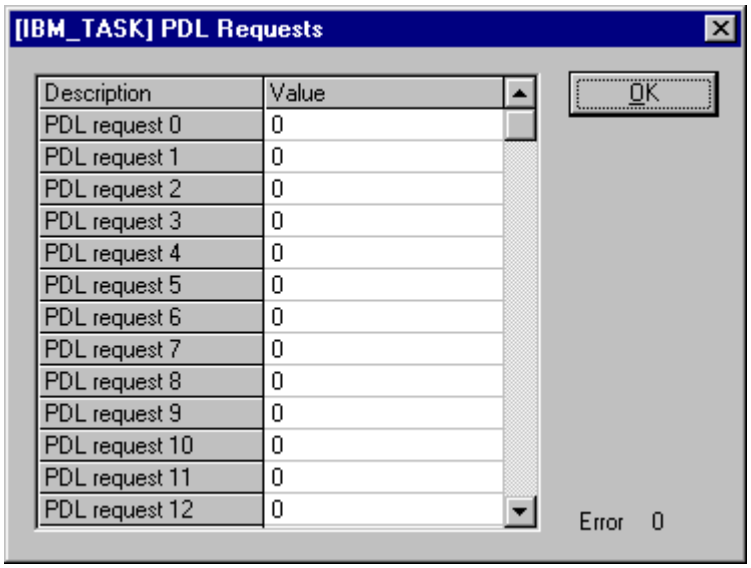

Figure 91: IBM_TASK PDL Requests

The Peripherals Data Link (PDL) layer is part of Data Link Layer (DLL) which is responsible for the safety transmission of data packages trough the PCP protocol and ensures that each PDL message is transported to the other remote station without any error.

The Counter for PDL Requests counts for each Slave the number of sent PDL service data units from the master to a PCP capable Slave device.

10.1.8 IBM_TASK PDL Confirmation

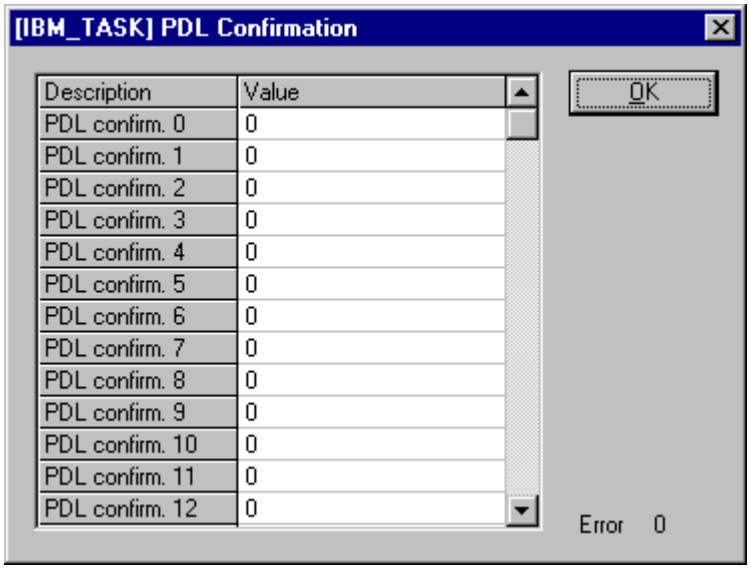

Figure 92: IBM_TASK PDL Confirmation

The Peripherals Data Link (PDL) layer is part of Data Link Layer (DLL) which is responsible for the safety transmission of data packages trough the PCP protocol and ensures that each PDL message is transported to the other remote station without any error.

The Counter for PDL Confirmations counts for each Slave the number of confirmed PDL service data units which were previously sent by the master as requests.

10.1.9 IBM_TASK PDL Indication

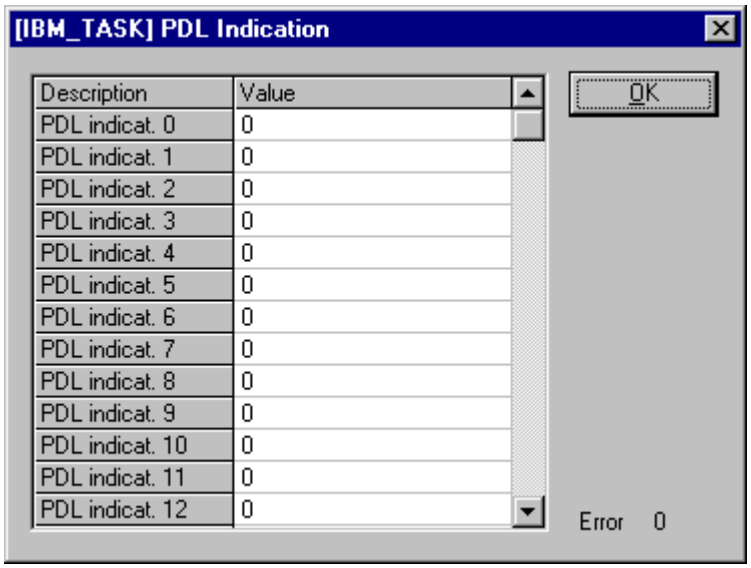

Figure 93: IBM_TASK PDL Indication

The Peripherals Data Link (PDL) layer is part of Data Link Layer (DLL) which is responsible for the safety transmission of data packages trough the PCP protocol and ensures that each PDL message is transported to the other remote station without any error.

The Counter for PDL Indications counts for each Slave the number of received PDL service data units which were sent by a PCP capable Slave device to the master. Usually an indication is received from a PCP server Slave when a previous request was sent before, or can be received at any time if a Slave works as PCP client Slave.

10.1.10 IBM_TASK Data Cycle Status

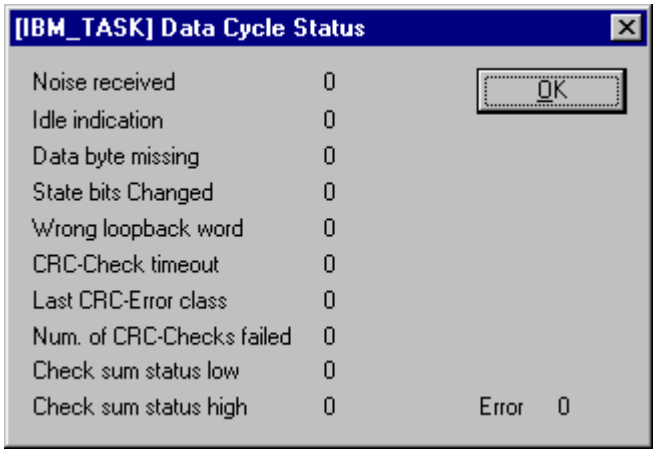

Figure 94: IBM_TASK Data Cycle Status

Variable	Meaning
Noise received	after a process data cycle is finished normally no further data should be received be the master in the backline of the InterBus ring. But in case of electronically disturbance the InterBus can be influence in this way that noise is produced in the shifting register. Before the master starts the next data cycle it looks for received noise telegrams. If noise was received it increments the counter and drives an ID-cycle to search for the error location.
Idle indication	the master supervises the incoming bit stream all the time. Because of the InterBus principle there exits always bus activity also in process data idle times. If the incoming bus activity is interrupted because of a cut wire for example, the master increment this value and drive ID cycles to search for the error.
Data byte missing	the master supervises the InterBus delay of incoming process data. If this time equidistant value is overstepped in its limit, the mater drives ID-cycles to search for the error.
State bits changed	each telegram that is sent into the InterBus ring has an IBS specific 3 bit head information included which is transported by each device back to the master transparently. If the master detects differences between the constellations it has sent and the constellation that comes back from the devices it drives an extra ID-cycle and searches for the error.
Wrong loop back word	the transmission of the process data, must be received back after all process input data was received without any change. If there are differences detected a transmission error has occurred and the master drives an extra I management cycle.
CRC-Check timeout	after each data cycle a CRC check procedure is following. This procedure is supervised by a timer. If the time limit is overstepped for the incoming CRC telegrams of the devices a transmission error has occurred and the master drives an ID-cycle.
Last CRC-Error class	1 = Stop bit unequal zero 2 = CRC indicated transmission error 3 = Faulty InterBus-Telegramstatusbits 4 = Process data transfer timeout 5 = Checksum transfer timeout
Num. of CRC-Checks failed	here the number of failed CRC procedures is counted.
Check sum status low	Counts the number of received invalid checksum-status low telegrams
Check sum status high	Counts the number of received invalid checksum-status high telegrams

Table 65:IBM_TASK Data Cycle Status

10.1.11 IBM_TASK Scanned ID Codes

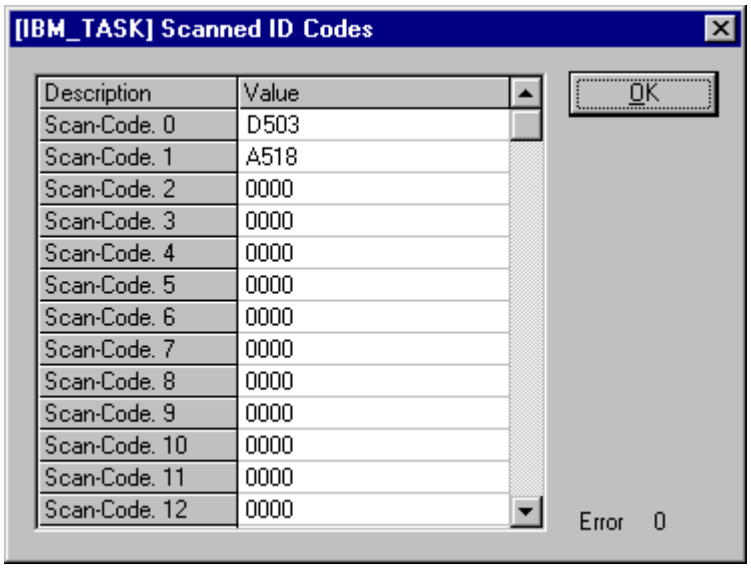

Figure 95: IBM_TASK Scanned ID Codes

This buffer represents always the last received ID code image of the current connected InterBus network. Is it updated by the master on each extra driven ID cycle during the process data cycle transfer. With its contents conclusions are possible for the kind of error and error location. For example the picture above shows a scanned ID-Code to D503hex and the next value to A518hex = loop back word. The master sends in case of a transmission error always the number of expected active (devices + 1) loop back words into the InterBus ring. Normally it will receive back all ID-Codes of the connected device instead of the loop back word, but in the picture it receives only the ID-Code of the first device. So it seems that the contact was interrupted to all the following Devices and this was actually the fault that was produced here in this example constellation.

10.1.12 ALPMLIP Common Variables

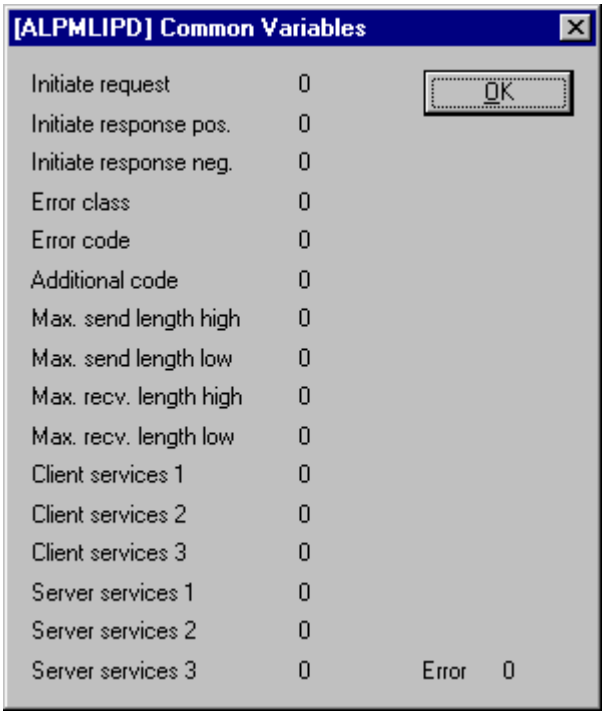

Figure 96: ALPMLIP Common Variables

This common variables structure is responsible for the indication of connection establishment errors during the initiate phase of the master in a PCP connection. The structure always shows the latest information of a failed connection initialization.

Variable	Meaning
Initiate request	Counts the number of initialization requests of all Client-Slaves.
Initiate response pos.	Counts globally the number of faultless master initializations to PCP Slaves.
Initiate response neg.	Counts globally the number of failed master initializations to PCP Slaves.
Error class	0 = Initiate 5 = Service 6 = Access 8 = Other
Error code	1 = Max. PCP length insufficient 2 = Service not supported.
Additional code	Actually not used.
Max. send length low	Maximum supported send PCP length with low priority of the last requested device to which the connection initialization has failed
Max. send length high	Not supported, always 0
Max. recv. length low	Maximum supported receive PCP length with low priority of the last requested device to which the connection initialization has failed.
Max. recv. length high	Not supported, always 0
Client services 1	Bit 7 (128) Get OV Long
Client services 2	Bit 5 (32) Read Bit 4 (16) Write
Client services 3	Bit 7 (128) Information Report
Server services 1	Bit 7 (128) Get OV Long
Server services 2	Bit 5 (32) Read Bit 4 (16) Write
Server services 3	Bit 7 (128) Information Report

Table 66: ALPMLIP Common Variables

10.1.13 ALPMLIPD ALI Information

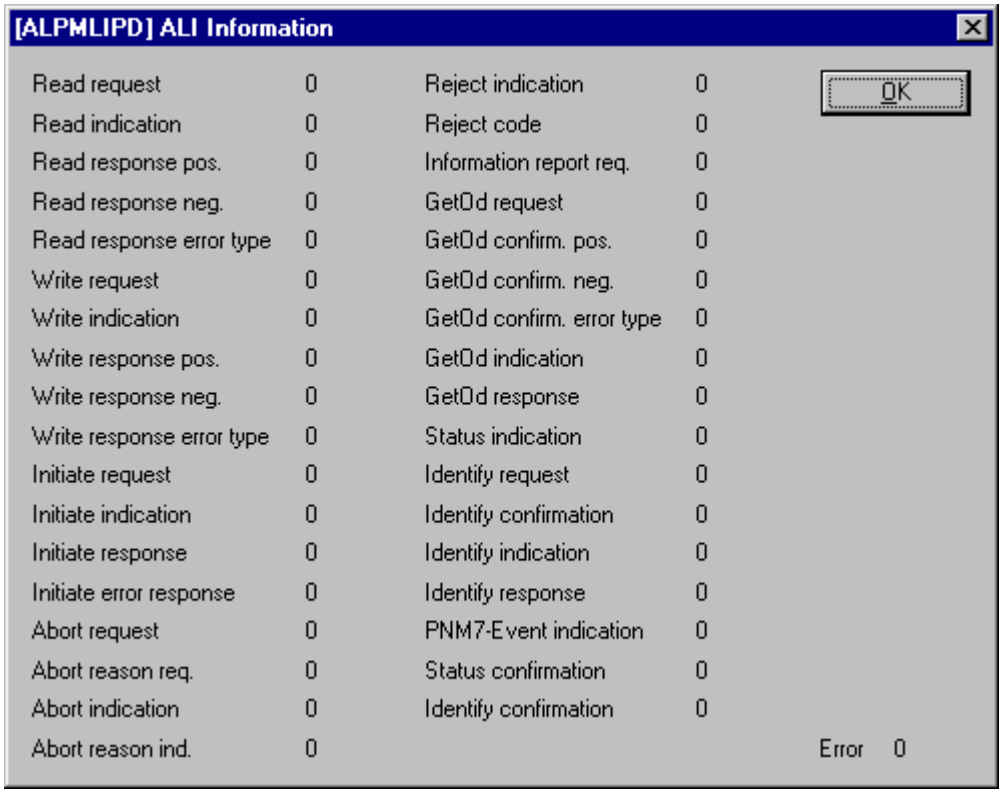

Figure 97: ALPMLIPD ALI Information

This table shows the actual status information of all ever requested and received services within the master since its last reset.

10.1.14 ALPMLIPD PMS Information

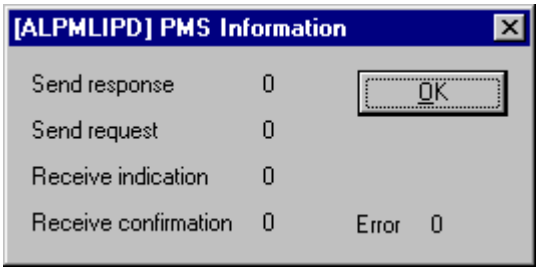

Figure 98: ALPMLIPD PMS Information

Variable	Meaning
Send response	Number of sent master response to previous corresponding Slave request.
Send request	Number of sent master requests.
Receive indication	Number of received Slave requests.
Receive confirmation	Number of received Slave response to previous corresponding master request.

Table 67: ALPMLIPD PMS Information

10.1.15 ALPMLIPD LLI Information

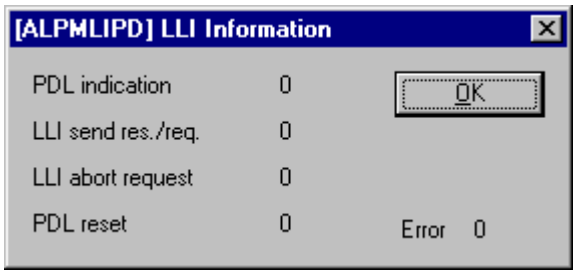

Figure 99: ALPMLIPD LLI information

Variable	Meaning
PDL receive ind./conf.	Number of all ever received Slave confirmation or indications.
LLI send res./req.	Number of all ever sent master requests or responses.
LLI abort request	Number of ever sent connection aborting requests.
PDL reset	Number of internal resets of the sub protocol stacks PDL.

Table 68: ALPMLIPD LLI information

10.2 Extended Device Diagnostic Slave

At the following pages you see the task state structures for the InterBus Slave.

10.2.1 ALI_TASK Common Variables

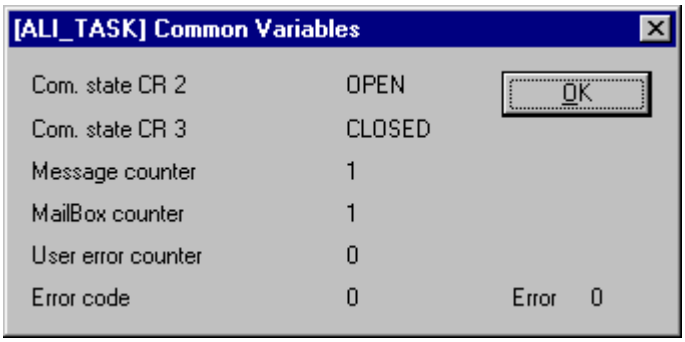

Figure 100: ALI_TASK Common Variables

Variable	Meaning
Com. State CR 2	displays the current status of CR2 (possible display: closed, init, open)
Com. State CR 3	displays the current status of CR3 (possible display: closed, init, open)
Message Counter	Counter for the number of received instruction messages
MailBox Counter	Counter for the number of received response messages
User Error Counter	is not used
Error Code	holds the last error, which occurred in the task

Table 69: ALI_TASK Common Variables

10.2.2 PCL_TASK Common Variables

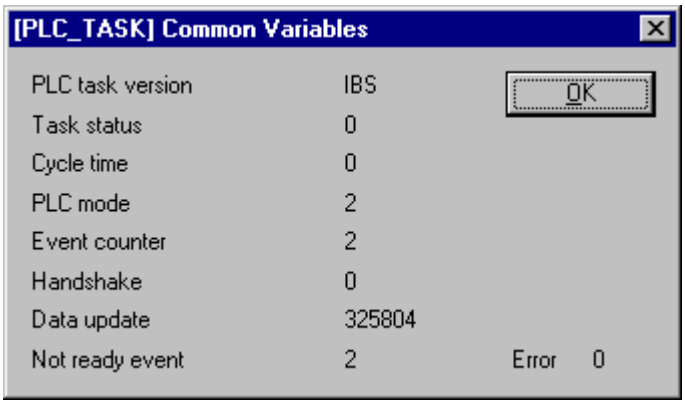

Figure 101: PCL_TASK Common Variables

Variable	Meaning
PLC Task Version	Task compiled for IB Slave status
Task Status	status of the task
Cycle Time	Is not used
PLC Mode	holds the actual PLC mode
Event Counter	counter as the number of finished events
Handshake	counters for the number of transacted user data cycle
Data update	counters for the number of transacted process data cycles
Not Ready Event	counters for the number of detected NOT ready events

Table 70: PCL_TASK Common Variables

10.2.3 SUPI_TASK Common Variables

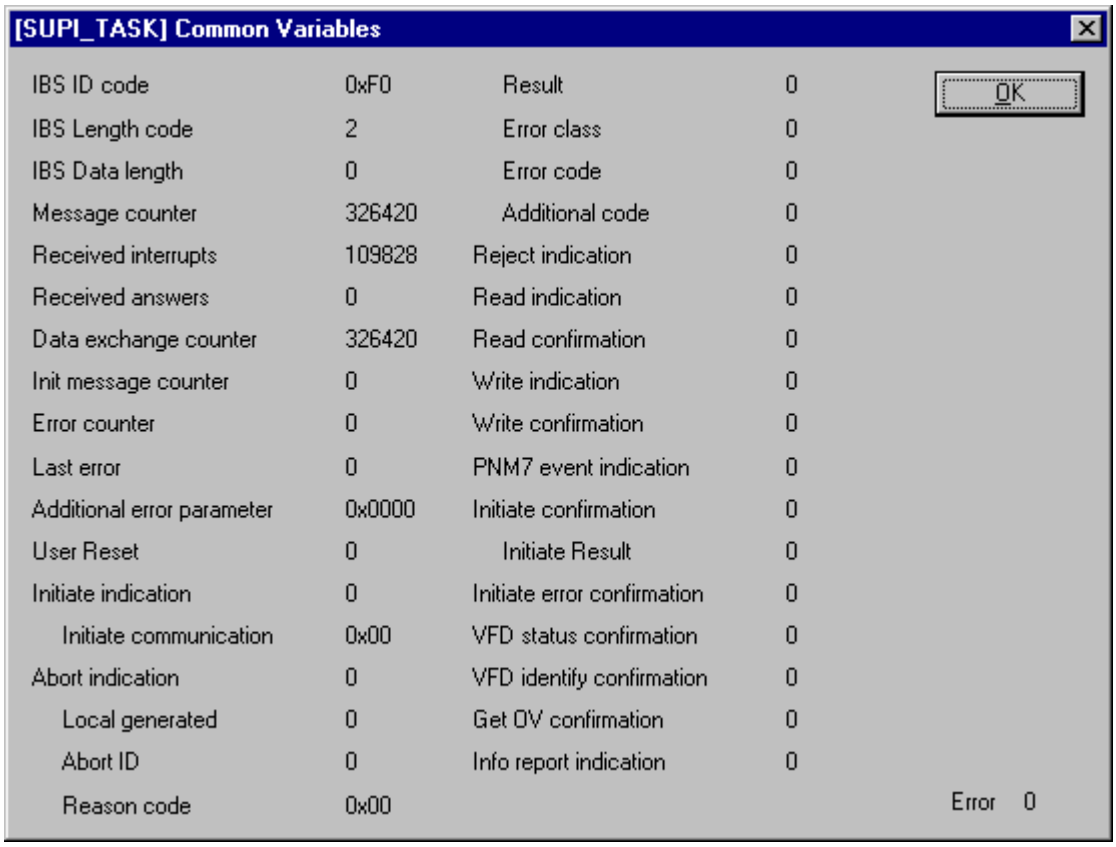

Figure 102: SUPI_TASK Common Variables

Variable	Meaning
IBS ID Code	holds the ID configured code
IBS Length Code	holds the Length configured code
IBS Data Length	holds the Length of the real (cyclic) process data
Message Counter	Counter for the number of received instruction Messages
Received Interrupts	Counter for the number of received program interrupts
Received Answers	Counter for the number of received response Messages
Data Exchange Counter	Counter for the number of transacted process data cycles
Init Message Counter	Counter for the number of received init Messages
Error Counter	Counter for the number of detected Message errors
Last Error	holds the last error, which occurred in the task
Additional Error Counter	holds an additional error description
User Reset	Counter for the number of executed user resets
Initiate Indication	Counter for the number of received Initiate.Indications
Initiate CR	with the Initiate.Indication detected CR
Abort Indication	Counter for the number of received Abort.Indications
Locally Generated	True or False, if locally or issued generates
Abort ID	ID code of the service
Reason Code	reason for Abort service
Result	result
Error Class	error class
Error Code	error Code
Additional Code	additional code
Reject Indication	Counter for the number of received Reject.Indications
Read Indication	Counter for the number of received Read.Indications
Read Confirmation	Counter for the number of received Read.Confirmations
Write Indication	Counter for the number of received Write.Indications
Write Confirmation	Counter for the number of received Write.Confirmations
PNM7 Event Indication	Counter for the number of received PNM7-Event.Indications
Initiate Indication	Counter for the number of received Initiate.Indications
Initiate Result	result of the Initiate attempt
Initiate Error Confirmation	Counter for the number of missed Initiate.Confirmations
VFD Status Confirmation	Counter for the number of received VFD Status.Confirmation
VFD Identify Confirmation	Counter for the number of received VFD Identify.Confirmation
Get OD Confirmation	Counter for the number of received Get-OD.Confirmation
Info Report Indication	Counter for the number of received InfoReport.Indications

Table 71: SUPI_TASK Common Variables

10.2.4 SUPI_TASK IBS Information

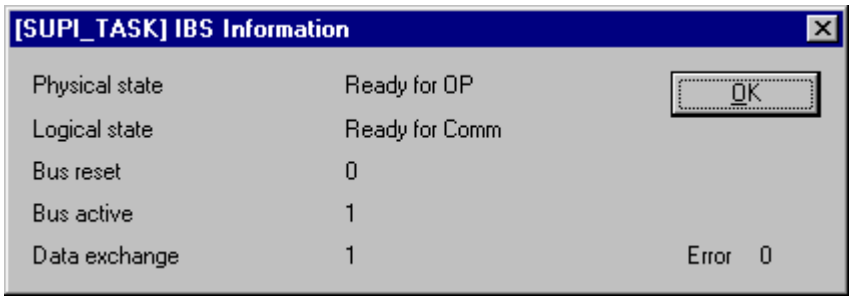

Figure 103: SUPI_TASK IBS Information

Variable	Meaning
Physical State	physical status of the Slaves (possible display: ready for OP, Partially ready, not ready for OP, service required)
Logical State	logical status of the Salves (possible display: Ready for Communication, Limited NO SVC)
Bus Reset	true or false
Bus Active	true or false
Data Exchange	true or false

Table 72: SUPI_TASK IBS Information

10.2.5 SUPI_TASK ALI Information

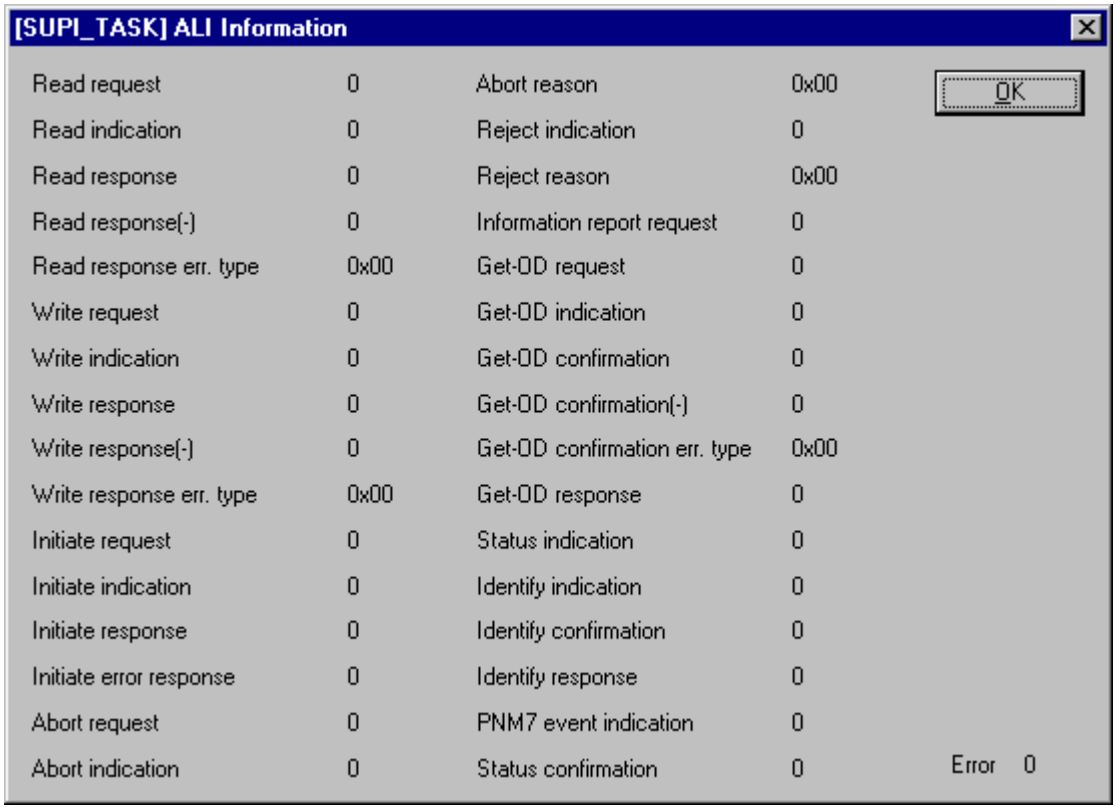

Figure 104:SUPI_TASK ALI Information

Variable	Meaning
Read Request	Counter for the number of transmitted Read.Requests
Read Indication	Counter for the number of received Read.Indications
Read Response	Counter for the number of transmitted Read.Response
Read Response (–)	Counter for the number of transmitted incorrect Read.Responses
Read Response Error Type	Result, if response incorrectly, otherwise 0
Write Request	Counter for the number of transmitted Write.Requests
Write Indication	Counter for the number of received Write.Indications
Write Response	Counter for the number of transmitted Write.Response
Write Response (–)	Counter for the number of transmitted incorrect Write.Responses
Write Response Error Type	Write Response error type
Initiate Request	Counter for the number of transmitted Initiate.Requests
Initiate Indication	Counter for the number of received Initiate.Indications
Initiate Response	Counter for the number of transmitted Initiate.Response
Initiate Error Response	Counter for the number of transmitted incorrect Initiate.Responses
Abort Request	Counter for the number of transmitted Abort.Requests
Abort Indication	Counter for the number of received Abort.Indications
Abort Reason	reason for the Abort service
Reject Indication	Counter for the number of received Reject.Indications
Reject Reason	reason for the Reject service
Information Report Request	Counter for the number of transmitted Report Requests
Get-OD Request	Is not used
Get-OD Indication	Counter for the number of received Get-OD.Indications
Get-OD Confirmation	Counter for the number of received Get-OD.Confirmation
Get-OD Confirmation (–)	Counter for the amount of received incorrect Get-OD.Confirmation
Get-OD Confirmation Error Type	Result, if response incorrectly, otherwise 0
Get-OD Response	Is not used
Status Indication	Counter for the number of received Status.Indications
Identify Indication	Counter for the number of received Identify.Indications
Identify Confirmation	is not used
Identify Response	is not used
PNM7 Event Indication	is not used
Status Confirmation	is not used

Table 73: SUPI_TASK ALI Information

10.2.6 SUPI_TASK PMS Information

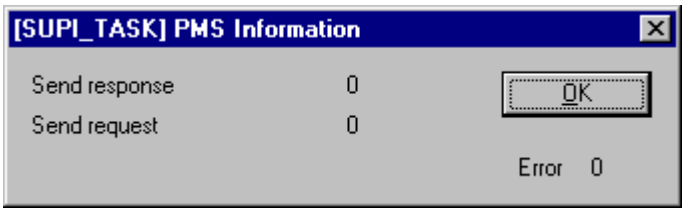

Figure 105: SUPI-TASK PMS Information

Variable	Meaning
Send Response	Counter for the number of transmitted Responses
Send Request	Counter for the number of transmitted Requests

Table 74: SUPI-TASK PMS Information

10.2.7 SUPI_TASK LLI Information

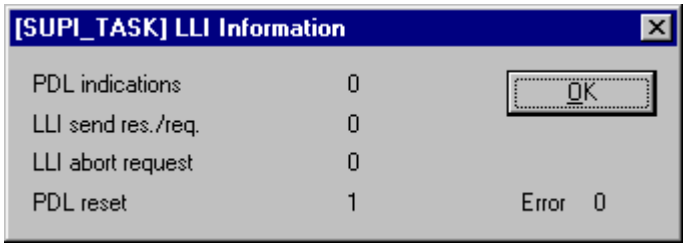

Figure 106:SUPI-TASK LLI Information

Variable	Meaning
PDL Indication	Counter for the number of received services
LLI Send Response/Request	Counter for the number of transmitted Requests or Responses
LLI Abort Request	Counter for the number of received Abort.Requests
PDL Reset	is not used

Table 75: SUPI-TASK LLI Information

10.2.8 SUPI_TASK PDL Information

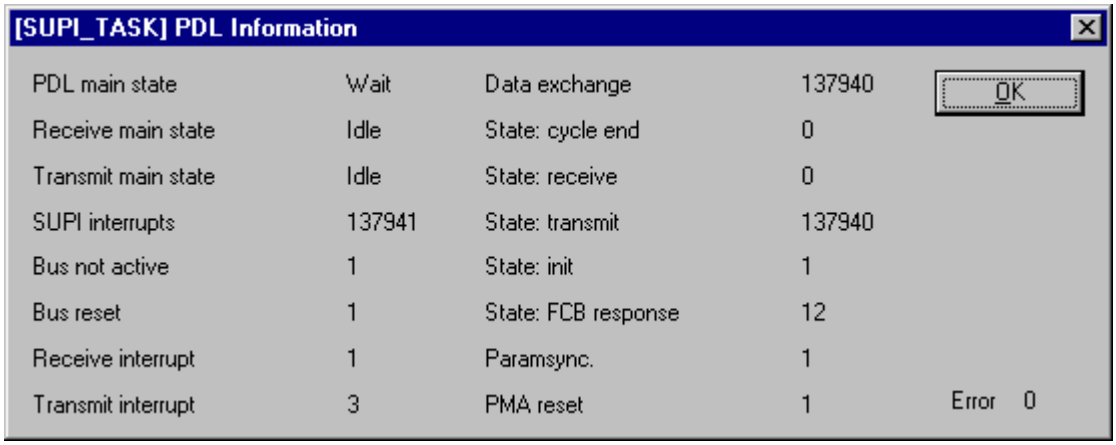

Figure 107: SUPI_TASK PDL Information

Variable	Meaning
PDL Main State	Current status of the PDL status machine
Receive Main State	Receive status of the PDL
Transmit Main State	Transmit status of the PDL
SUPI Interrupts	Counter for the number of detected program interrupts, causes through for the interface module SUPI
Bus Not Active	Counter for the number of the “BusNot Active“
Bus Reset	Counter for the number of the “BusResets“
Receive Interrupt	Counter for the number of detected Receive Program Interrupts
Transmit Interrupt	Counter for the number of detected Transmit Program interrupts
Data Exchange	Counter for the number of detected Data Exchange Program interrupts
State: Cycle End	Counter for the number of “CycleEnd“
State: Receive	Counter for the number of “Receive“
State: Transmit	Counter for the number of “Transmit“
State: Init	Counter for the number of “Init“
State: FCB Response	Counter for the number of “WaitFcbResponse“
Paramsync.	is not used
PMA Reset	Counter for the number of the PDL-Resets

Table 76:SUPI_TASK PDL Information

10.3 Length and ID Codes

10.3.1 Length Code

The Length Code contains information about the (max. possible) data weight of the Slave. The Master can read out the 5 bit containing Length Code over the Bus from the Slave. The following table shows the determination in accordance with the InterBus standard DIN EN 50254.

Decimal	Hexadecimal	Meaning	Alternatively Interpretation (Hex)
0	00	No Data	00
1	01	1 Word	01
2	02	2 Words	02
3	03	3 Words	03
4	04	4 Words	04
5	05	5 Words	05
6	06	8 Words	08
7	07	9 Words	09
8	08	4 Bit	41
9	09	1 Byte	81
10	0A	12 Bit	43
11	0B	3 Byte	83
12	0C	1 Bit	C1
13	0D	2 Bit	C2
14	0E	6 Words	06
15	0F	7 Words	07
16	10	reserved	-
17	11	26 Words	1A
18	12	16 Words	10
19	13	24 Words	18
20	14	32 Words	20
21	15	10 Words	0A
22	16	12 Words	0C
23	17	14 Words	0E
24	18	reserved	-
25	19	reserved	-
26	1A	reserved	-
27	1B	reserved	-
28	1C	reserved	-
29	1D	reserved	-
30	1E	reserved	-
31	1F	reserved	-

Table 77: Lengths Code

Note see next page.

Note: The given values in the column **Alternatively Interpretation** (8 Bits) are used partly by other configuration software and printed on the labels of Slaves or they are given in the product documentation. SyCon used the Length Code in accordance with DIN EN 50254. Is for example the Length Code 41H printed on the Slave (Alternatively Interpretation), you have to use 08H in SyCon.

10.3.2 ID Code

The ID Code contains information about the device type. A part of this are for example the information Remote Bus-, Local Bus Device, Bus Branch, digital or analog modules and further more the PCP capacity of the device.

Dec	Hex	Description of the Module Function
1	01	Remote Bus Device, digital Output modules
2	02	Remote Bus Device, digital Input modules
3	03	Remote Bus Device, digital In- and Output modules
4	04	Bus Branch with InterBus-Loop-Branch
5	05	Remote Bus Device (digital), ISO-Valve Ile (Output)
8	08	Bus Branch with 2-Conductor-Local Bus Branch
12	0C	Bus Branch with 2-Conductor-Remote Bus Branch
13	0D	Remote Bus Device (digital), profile concurring digital Output modules
14	0E	Remote Bus Device, profile concurring digital Input modules
47	2F	Remote Bus Device, profile concurring digital In- and Output modules
49	31	Remote Bus Device, analog Output modules
50	32	Remote Bus Device, analog Input modules
51	33	Remote Bus Device, analog In- and Output modules
52	34	Bus Branch with 8-Conductor-Local Bus Branch
53	35	Remote Bus Device, profile concurring analog Output modules
54	36	Remote Bus Device (analog), ENCOM with Input data
55	37	Remote Bus Device (analog), ENCOM with In- and Output data
56 *	38 *	Remote Bus Device with Parameter Cannel, "µP_Not_Ready" with register interlock
58	3A	Remote Bus Device, profile concurring analog Input modules
59	3B	Remote Bus Device, profile concurring analog In- and Output modules
60 *	3C *	Remote Bus Device with Parameter Channel, "µP_Not_Ready" for reinitialization
83	53	Local Bus Device, analog In- and Output modules with event Inputs and Configuration Outputs
91	5B	Local Bus Device, analog Output modules with event Inputs
95	5F	Local Bus Device, analog Input modules with Configuration Outputs
99 **	63 **	Local Bus Device, analog Loop In- and Loop Output modules with event Inputs and Configuration Outputs
102	66	Local Bus Device (analog), ENCOM with Input data
103	67	Local Bus Device (analog), ENCOM with In- and Output data
104 *	68 *	Local Bus Device with Parameter Channel, "µP_Not_Ready" for reinitialization, Loop
107 **	6B **	Local Bus Device, analog Loop Output modules with event Inputs
108 *	6C *	Local Bus Device with Parameter Channel, "µP_Not_Ready" for reinitialization, Local Bus
111 **	6F **	Local Bus Device, analog Loop Input modules with configuration Outputs
113	71	Local Bus Device, analog Loop Output modules
114	72	Local Bus Device, analog Loop Input modules
115	73	Local Bus Device, analog Loop In- and Output modules

120 *	78 *	Local Bus Device with Parameter Channel, "µP_Not_Ready" with register interlock
121	79	Local Bus Device, profile concurring analog Output modules
122	7A	Local Bus Device, profile concurring analog Input modules
123	7B	Local Bus Device, profile concurring analog In- and Output modules
125	7D	Local Bus Device, analog Output modules
126	7E	Local Bus Device, analog Input modules
127	7F	Local Bus Device, analog In- and Output modules
177	B1	Local Bus Device, digital-InterBus-Loop Output modules
178	B2	Local Bus Device, digital-InterBus-Loop Input modules
179	B3	Local Bus Device, digital-InterBus-Loop In- and Output modules
181	B5	Local Bus Device, profile concurring digital Output modules
182	B6	Local Bus Device, profile concurring digital Input modules
183	B7	Local Bus Device, profile concurring digital In- and Output modules
187	BB	Local Bus Device, screwing controller
189	BD	Local Bus Device, digital Output modules
190	BE	Local Bus Device, digital Input modules
191	BF	Local Bus Device, digital In- and Output modules
192 *	C0 *	Local Bus Device with Parameter Channel, DRIVECOM (2 PCP-Words)
193 *	C1 *	Local Bus Device with Parameter Channel, DRIVECOM (4 PCP-Words)
195	C3	Local Bus Device with Parameter Channel, DRIVECOM (1 PCP-Word)
212 *	D4 *	Local Bus Device with Parameter Channel, ENCOM (2 PCP-Words)
213 *	D5 *	Local Bus Device with Parameter Channel, ENCOM (4 PCP-Words)
215	D7	Local Bus Device with Parameter Channel, ENCOM (1 PCP-Word)
216 *	D8 *	Local Bus Device with Parameter Channel, profile concurring (2 PCP-Words)
217 *	D9 *	Local Bus Device with Parameter Channel, profile concurring (2 PCP-Words)
219	DB	Local Bus Device with Parameter Channel, profile concurring (1 PCP-Word)
220 *	DC *	Local Bus Device, module with Parameter Channel (2 PCP-Words)
221 *	DD *	Local Bus Device, module with Parameter Channel (4 PCP-Words)
223	DF	Local Bus Device, module with Parameter Channel (1 PCP-Word)
224 *	E0 *	Remote Bus Device with Parameter Channel, DRIVECOM (2 PCP-Words)
225 *	E1 *	Remote Bus Device with Parameter Channel, DRIVECOM (4 PCP-Words)
227	E3	Remote Bus Device with Parameter Channel, DRIVECOM (1 PCP-Word)
228 *	E4 *	Remote Bus Device with Parameter Channel, profile concurring modules (2 PCP-Words)
229 *	E5 *	Remote Bus Device with Parameter Channel, profile concurring modules (4 PCP-Words)
231	E7	Remote Bus Device with Parameter Channel, profile concurring modules (1 PCP-Word)

240 *	F0 *	Remote Bus Device, module with Parameter Channel (2 PCP-Words)
241 *	F1 *	Remote Bus Device, module with Parameter Channel (4 PCP-Words)
243	F3	Remote Bus Device, module with Parameter Channel (1 PCP-Word)
244 *	F4 *	Remote Bus Device with Parameter, ENCOM (2 PCP-Words)
245 *	F5 *	Remote Bus Device with Parameter, ENCOM (4 PCP-Words)
247	F7	Remote Bus Device with Parameter, ENCOM (1 PCP-Word)

Table 1: ID-Codes

* This ID Code is not supported until the InterBus Master Generation 4.

** This ID Code is not supported until the InterBus Master Firmware V 4.50.

11 Lists

11.1 List of Figures

11.2 List of Tables