

# PROFIBUS SYSTEM CONFIGURATOR HMS SYCON

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00.02.14	Revision 2.0	New document created by ToT, for HMS SyCon version 2.xxx
00.06.21	Revision 2.01	Added system requirements.
00.06.27	Revision 2.02	Added information about word/byte offset.
01.03.13	Revision 2.03	Additions and correction for version 2.701.

## Preface

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# 1 Overview

- **HMS SyCon** is a PROFIBUS-DP configurator

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

- **HMS 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 unmost detail of one device.

- **HMS SyCon** uses standardized configuration files

HMS SyCon supports standardized files containing information about all features and limitations of the slave device, and uses these files for the configuration.

- **HMS SyCon** is a diagnostic tool

After the configuration you can switch HMS SyCon into a diagnostic mode. You can watch all status information of fieldbus devices. See diagnostic information like e.g. life list or slave diagnostic information on PROFIBUS. In case a slave is not operating correctly it will be displayed in a different color.

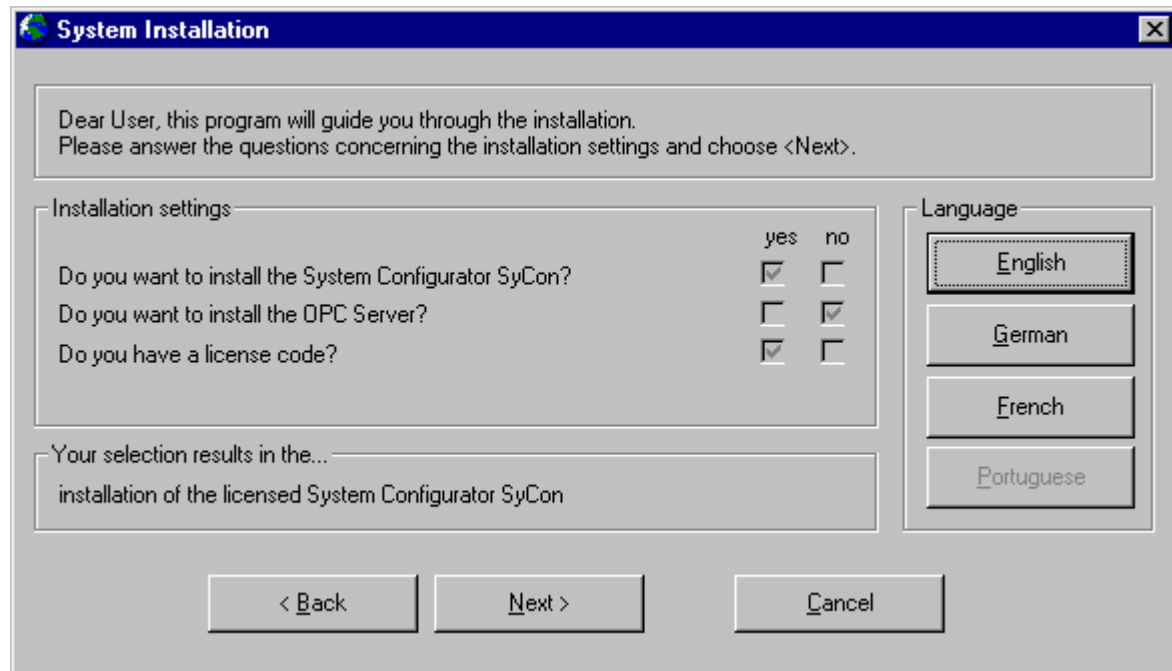
## 1.1 System requirements

HMS SyCon requires:

- A CD-ROM drive
- 486 or better CPU
- 20Mb of free hard disk space
- Minimum 16 Mb RAM
- A screen and graphics card capable of 800x600 resolution
- Windows 95, Windows 98, Win NT4 with Service Pack 3 or higher
- For Windows 95, minimum Service Pack 1
- For Windows NT 4.0, minimum Service Pack 3

## 2 Installation

Close all active applications before starting the installation program, and begin the installation by launching the program file SETUP.EXE. The installation program will ask for components to install, answer with yes – no – yes, as is shown in the figure below. HMS SyCon does not use the OPC server, and a license number must be entered in order to finish the installation.



The 'System Installation' dialog box contains a welcome message and two main sections: 'Installation settings' and 'Language'. The 'Installation settings' section has three questions with 'yes' and 'no' checkboxes. The 'Language' section has four buttons for language selection. At the bottom are '< Back', 'Next >', and 'Cancel' buttons.

Dear User, this program will guide you through the installation.  
Please answer the questions concerning the installation settings and choose <Next>.

Installation settings	yes	no
Do you want to install the System Configurator SyCon?	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Do you want to install the OPC Server?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Do you have a license code?	<input checked="" type="checkbox"/>	<input type="checkbox"/>

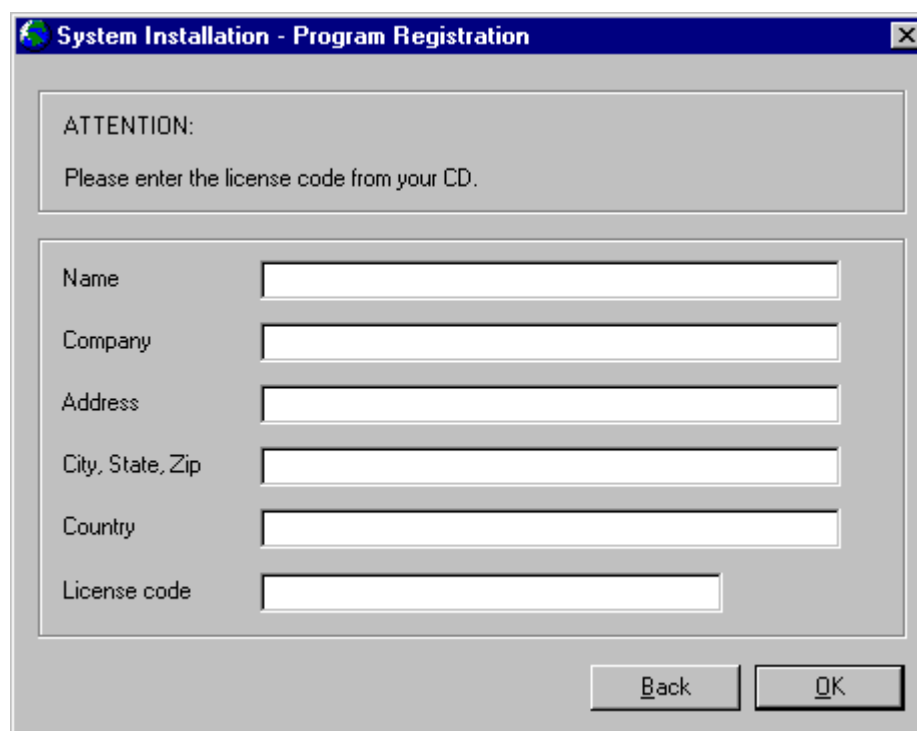
Your selection results in the...  
installation of the licensed System Configurator SyCon

Language

- English
- German
- French
- Portuguese

< Back   Next >   Cancel

When the installation program asks about the license code, enter it together with your company information.



The 'System Installation - Program Registration' dialog box features an 'ATTENTION' section with a message about the license code. Below this are input fields for Name, Company, Address, City, State, Zip, Country, and License code. At the bottom are 'Back' and 'OK' buttons.

ATTENTION:  
Please enter the license code from your CD.

Name:

Company:

Address:

City, State, Zip:

Country:

License code:

Back   OK

The System Installation program will automatically launch the HMS SyCon installation program, and when it asks for which components to install, mark the **Configurator**, as well as the **CIF Device Driver**.

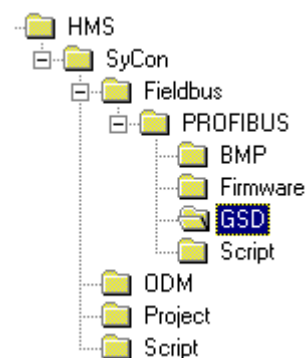
## 2.1 Available GSD Files

GSD (Electronical Data Sheet for the device) files define the different PROFIBUS devices. The set of these files build the device database.

At program start, HMS SyCon automatically reads in all GSD files that are in the **GSD** directory. Thus, for instance, device names are placed in an internal list. The device specific data is taken online directly from the GSD file during the configuration phase.

Should it be necessary to use a GSD file that is not included in the selection list during the configuration phase, it has to be copied into the GSD directory with the **File - Copy GSD** command. Another possibility to make a GSD file available in HMS SyCon online, is to manually copy it with the windows explorer into the HMS SyCon GSD directory. Afterwards the reread command of all included GSD files have to be activated by using the menu **Settings - Path** and **OK** acknowledgement.

In the menu **Tools - GSD Viewer** all GSD files of the directory are shown.



## 3 Configuration of PROFIBUS with HMS SyCon

### 3.1 Basic Steps of a Configuration

HMS SyCon helps you to configure your PROFIBUS system fast and successfully.

**Generally follow these steps:**

- First of all you have to create a new file. Select the menu item **File-New**. HMS SyCon will start the configuration mode and open the window with the bus line.
- Insert the Master you will have on the bus.
- First you have to insert DP slaves and assign them to the master. Next step is to configure these DP slaves with the actual I/O modules, parameter data etc. Be sure that you have selected the right addressing mode.
- Check the dependencies/connections between the devices by selecting one master after the other as actual master to check your configuration.
- Select the baud rate and bus parameters
- Set up the device assignment that defines how HMS SyCon can communicate with the devices.
- Save your configuration.
- Select the port that you want to configure and make a download to all devices.
- Connect the PROFIBUS cable to the device. Start the debug mode to check the communication and make some tests with the tool I/O-Monitor for DP.
- Finally print out the documentation of your PROFIBUS system.
- If PROFIBUS is running, start with the installation of your application.



## 3.2 GSD Files

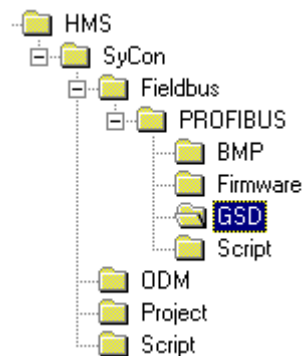
Each PROFIBUS-DP manufacturer uses standard device description files to define the PROFIBUS-DP device functionalities on the network. These definitions are called GSD files. The set of device description files (GSD file) build the device database.

- **HMS devices**  
The GSD files for HMS devices are already included in the delivery of the system configurator HMS SyCon.
- **Other devices**  
For other devices these files should be provided and updated by the device manufacturer.

You can also get the GSD files from the homepage of the PROFIBUS user association.

<http://www.profibus.com>

For all available configuration GSD files must be contained in the directory GSD, during installation of the program HMS SyCon the available files will be included. If you need another GSD file during HMS SyCon runtime you have to copy this file with the menu item **File - Copy GSD**.



The GSD directory path is changeable. To modify it from the default to another path use the menu **Settings - Path**.

All GSD files have to be present in this directory.

## 3.3 Selecting a Fieldbus System and Creating a new File

At the beginning of a design you have to create a new configuration file, which is done in the menu item **File - New**.

The name for the configuration can be assigned when you leave the system configurator or using the menu **File - Save As**.

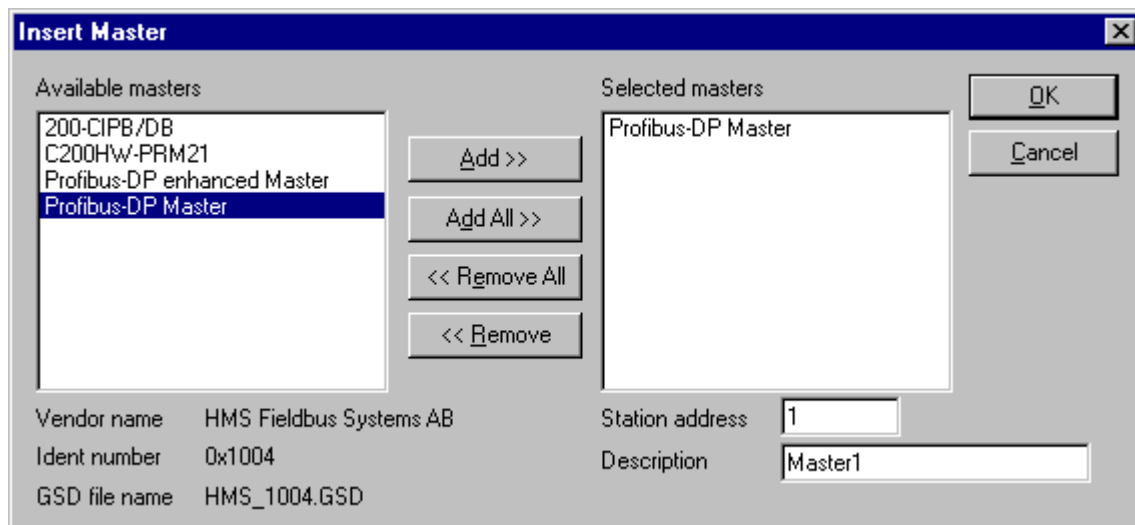
### 3.4 Insert Master

To insert a master in the configuration select the **Insert - Master** menu to open the selection window or click the following button: 

The mouse cursor changes automatically to the insert master cursor. Click on the position where you want to insert the new master. A dialogue box appears where you can to select one or more masters.

You can select the master types (depening on the vendor brand):

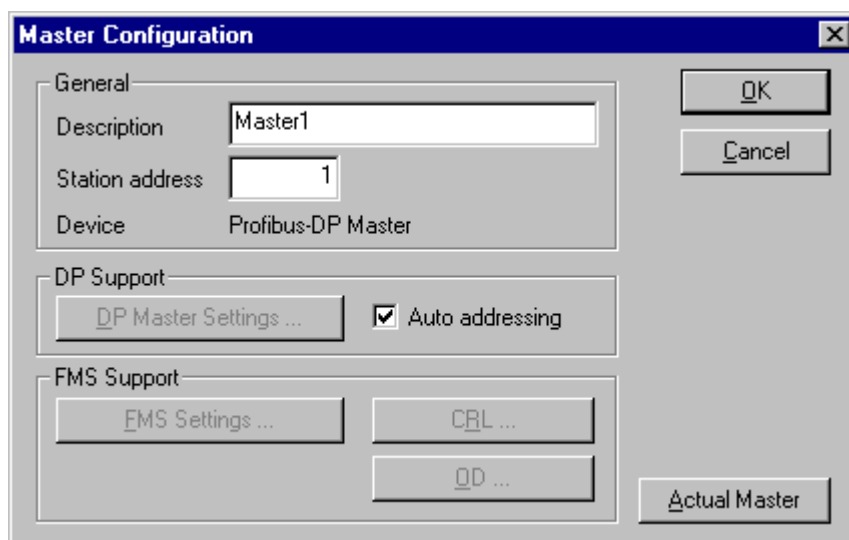
- Profibus-DP Master
- Profibus-DP Enhanced Master



In this example a PROFIBUS-DP Master will be added with the **Station address 1** and the Description **Master 1**.

### 3.5 Master Configuration


The master specific configuration has to be done in this window. Double-click the master that you want to configure. Following window appears.



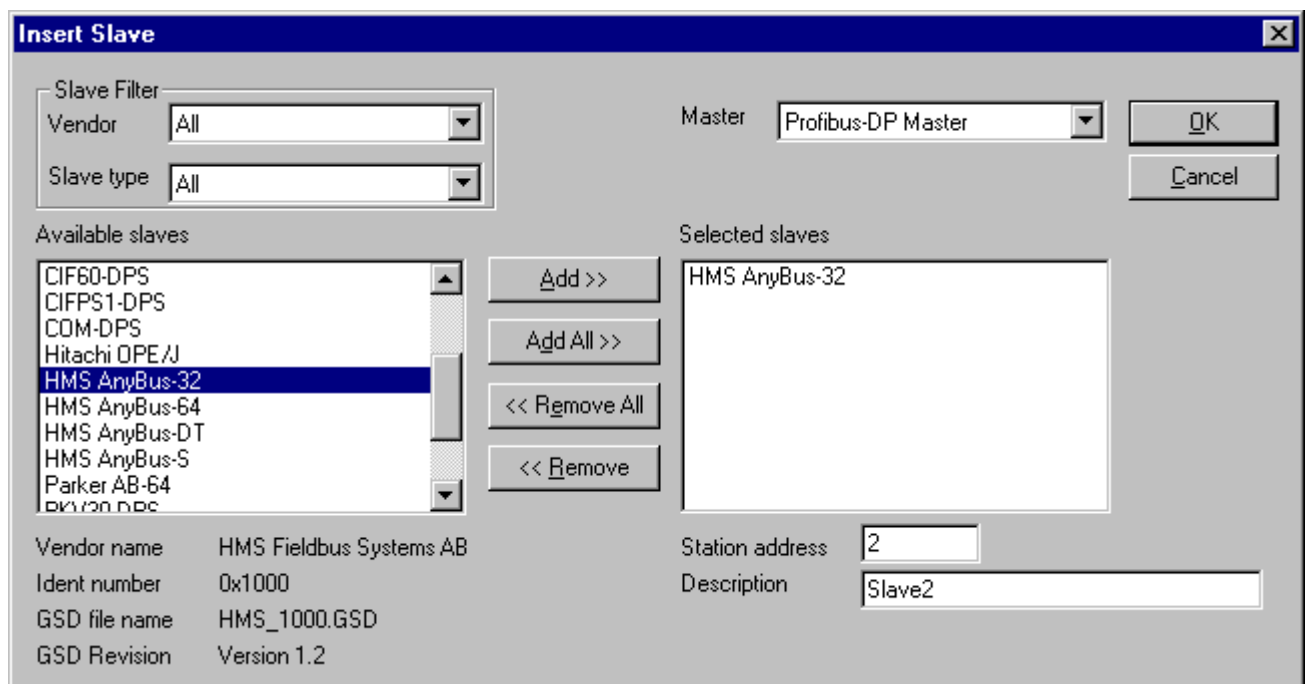
In this master configuration window you can assign

- The station address of the master
- A (symbolic) description for this master
- This master as actual master (to do a download for example)
- Activate or deactivate the auto addressing

### 3.6 Insert Slave

To insert new PROFIBUS-DP slaves in the configuration select the Insert – Slave menu to open the selection window or click the following button: 

The mouse cursor changes automatically to the insert slave cursor. Click on that position where you want to insert the new slave. A dialogue box appears where you have to select one or more slaves.



In the left list box are all slave devices listed, which are present in the GSD directory. If there are too many you can set a filter to select a special slave family. If one slave is selected you can see some additional information about that slave below the list box. With a double click or with the button **Add**, the slave appears in the right list box. All devices in this box will be connected to the active master that is displayed in the window. If you select the slave one by one you can give every device a name or a short description in the field **Description**.

With every slave the station address is incremented and can be overwritten in the field **Station address**.

Remark: It is possible to choose one slave several times. But each device must have its own station address to distinguish them in the network.

### 3.6.1 Slave Configuration

The slave specific configuration has to be done in this window. Here you have to assign the modules and their data to address of the process data image in the master device. Remember that these addresses correspond to the application in the PLC.

Select the menu **Settings - DP Slave Configuration** or double-click a slave to open this window.

There are two types of DP-slaves. A **simple slave** has a fixed data length. The data length of a **modular slave** is configurable. This type of slave can be understood as an assembly of one or more simple slaves with one bus address.

The **Slave Configuration** dialog box is divided into several sections:

- General:**
  - Device: HMS AnyBus-32
  - Station address: 2
  - Description: Slave2
  - ☒ Activate device in actual configuration
  - ☒ Enable watchdog control
  - GSD file: HMS\_1000.GSD
- Max. length of in-/output data:**
  - 4 Byte
  - Length of in-/output data: 4 Byte
- Max. length of input data:**
  - 2 Byte
  - Length of input data: 2 Byte
- Max. length of output data:**
  - 2 Byte
  - Length of output data: 2 Byte
- Max. number of modules:**
  - 1
  - Number of modules: 1
- Module List Table:**

Module	Inputs	Outputs	In/Out	Identifier
AB-PDP-32 I/O	2 Byte	2 Byte		0x21, 0x11
- Assigned master:**
  - Station address 1
  - Master1
  - 1 / Profibus-DP Master
- Actual slave:**
  - Station address 2
  - Slave2
  - 2 / HMS AnyBus-32
- Buttons:** OK, Cancel, Parameter Data..., DPV1 Settings, Append Module, Remove Module, Insert Module, Predefined Modules, Symbolic Names.
- I/O Configuration Table:**

Slot	Idx	Module	Symbol	Type	I Addr.	I Len.	Type	O Addr.	O Len.
1	1	AB-PDP-32 I/O	Module1	IB	0	2	QB	0	2

The upper table contains all available modules of the slave. In case of a simple slave there is only one module that is already copied in the lower table automatically by HMS SyCon. If it is a modular slave, this must be done by the user with a direct double click on the module or selected module in combination with the button **Append Module**.

If a module has several inputs or outputs (sub modules), then it gets more lines in the configuration table. These additional lines will be signed with a higher index in the column **Idx**. The column **Slot** counts the modules.

To configure the modules of the slave do the following steps:

- If not already present, select all modules from the upper table and insert them in the lower table to be configurable. The sequence of the modules in the lower list is important and must correspond to the real physical slave configuration.
- Assign the addresses of the module data in the process image for each module in the lower table. This is done in the columns **Type** and **Address** for input and output separately.

The I/O address can be entered by the user or set automatically by HMS SyCon. Therefore the flag **Auto Addressing** must be set in the window **Master Settings**. If active, HMS SyCon will place all I/O data offsets in physical order. This

is done during the download procedure and the assigned addresses can be checked in the **Address Table**. If the addresses are entered manually the default address 0 in the field **I Address** respectively **O Address** must be overwritten.

Note: Offset addresses are entered as a word (16-bit) address.

With the flag **Watchdog Control activated** it is fixed how the slave will react to the interruption of the communication with the belonging master. Is this flag activated and the slave recognized the interrupted communication over the control interval, the slave will set all outputs to 0 and will set itself into the main mode.

Caution: If **Watchdog Control** is switched off, possible set outputs will not be resetted by the slave, although the communication is broken.

## 4 Settings

### 4.1 Device Assignment

HMS SyCon is able to configure different devices in a PROFIBUS network. To run the online functions of such a device you must define how HMS SyCon can communicate with it. This is done in the menu item **Device Assignment**.

Driver Description						
Device Driver	CIF Serial Driver					
Board Selection						
Name	Type	Version	Date	Error		
<input checked="" type="checkbox"/> COM 1	DPM	HMS-DPM	V01.134	21.07.99	0	Connect COM 1
<input type="checkbox"/> COM 2					0	Connect COM 2
<input type="checkbox"/> COM 3					-20	Connect COM 3
<input type="checkbox"/> COM 4					-20	Connect COM 4

The external connection can be checked with the buttons **Connect COM 1** to **Connect COM 4**. HMS SyCon sends a request on that COM port and asks for the firmware. If there is a device connected the firmware is displayed otherwise there will be a timeout error.

### 4.2 Bus Parameter

For a PROFIBUS-DP system with one master the only parameter that must be selected is the baud rate.

The baud rate of the PROFIBUS is common for all bus devices. Changing the baud rate has the consequence that all other parameters will be re-calculated. The System Configurator checks if the baud rate is supported by all configured devices on basis of the entries in the GSD file. If the System Configurator finds at least one device in the configuration that does not support the selected baud rate an error message appears.

You can check the actual parameters if you open the **Edit Bus Parameter** window with the button **Edit**. Some of the parameters can be changed individually. Please note if you make any changes in the bus parameters the parameter for the field **Optimize** must be changed from **standard** to **by user**.

Parameter	Value	Unit
Baud rate	1500	kBits/s
Slot Time	300	tBit
Min. Station Delay of Responders	11	tBit
Max. Station Delay of Responders	150	tBit
Quiet Time	0	tBit
Setup Time	1	tBit
Tid1	37	tBit
Tid2	150	tBit
Target Rotation Time	2497	tBit
Target Rotation Time	1.6647	ms
GAP Actualization Factor	10	
Max Retry Limit	1	
Highest Station Address	2	
Poll Timeout	10	ms
Data Control Time	1200	ms
Min Slave Interval	1.700	ms
Watchdog control	200	ms

Auto Clear

☒ Auto clear modus OFF

☐ Auto clear modus ON

Caution: Changing the bus parameter individually can force a communication break.

The **Highest Station Address** is the highest bus address up to which the master will search for other active master stations to pass the send permission. This value should not be set below the master address.

### 4.3 DP Master Settings

The current version of HMS SyCon does not allow changing of DP-Master settings. These are the default parameters:

- Watchdog time: 1000 ms
- Addressing mode: Word addresses
- Storage formats: Big Endian

## 4.4 Parameter Data

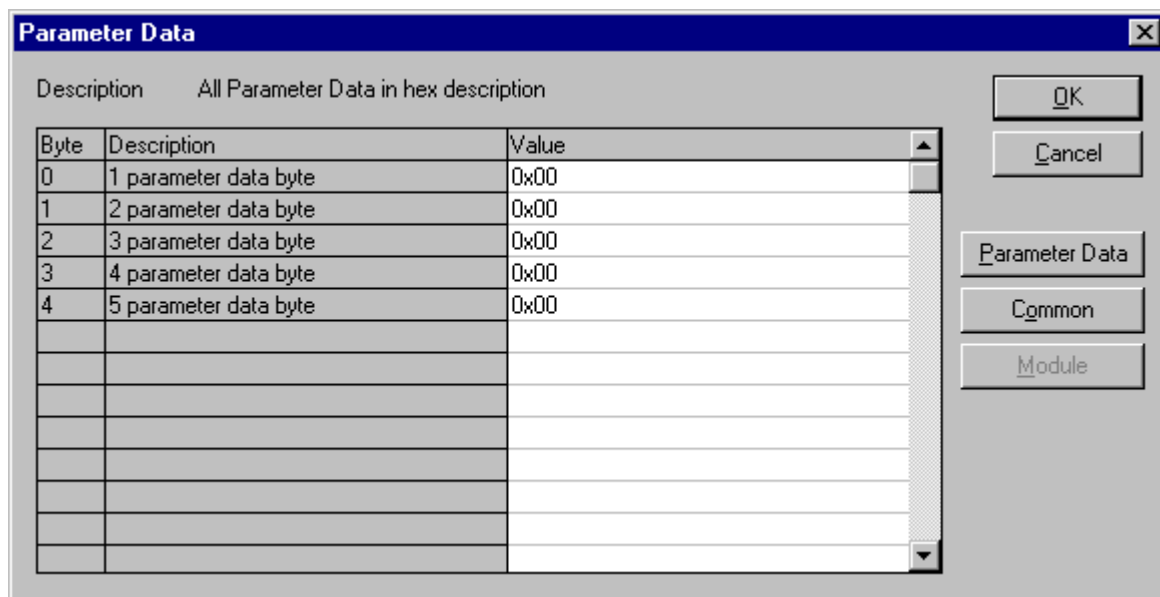
In the menu **Settings - Parameter Data** user parameter data can be edited.

If default parameters are configured in the GSD file for this slave, they are inserted automatically when the menu is chosen the first time.

Some DP-Slave devices need some further parameterization data, to change for example a measurement limitation or a value range. These data is slave specific and their functionality cannot be explained at this point.

The explanation can be normally found in the corresponding slave manual.

This window below shows an example of parameter data of a slave.



A modular PROFIBUS-DP slave station may need parameter data for one or more modules and for the slave station itself (head station). There are three selections possible:

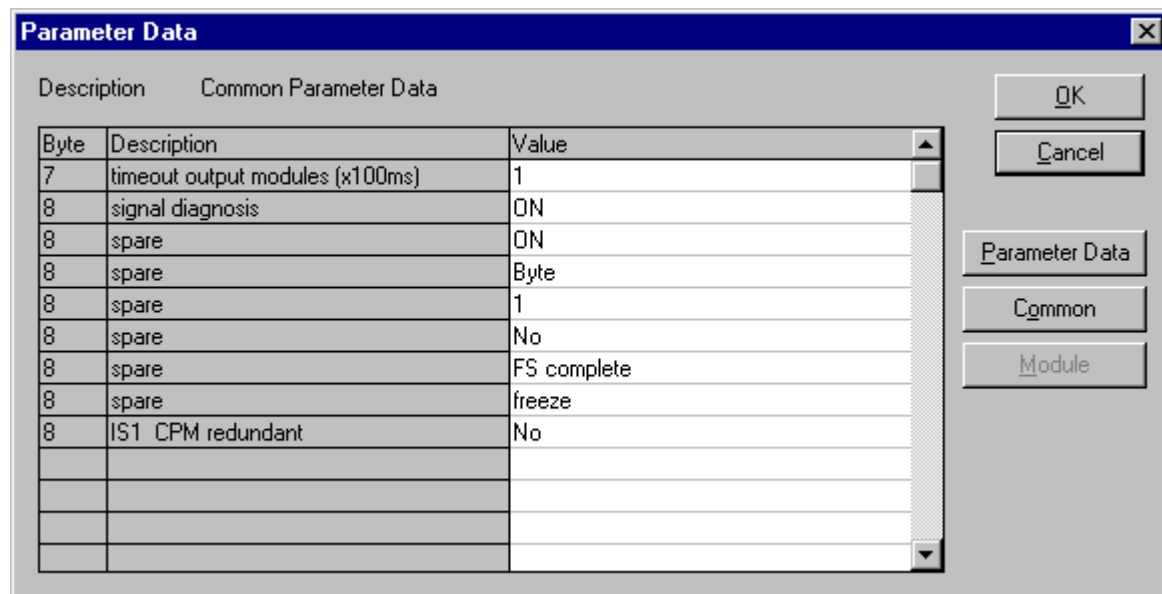
**Hex** All parameters of the slave are shown in hex representation

**Common** Parameter data of the head station

**Module** Parameter data of the separate modules

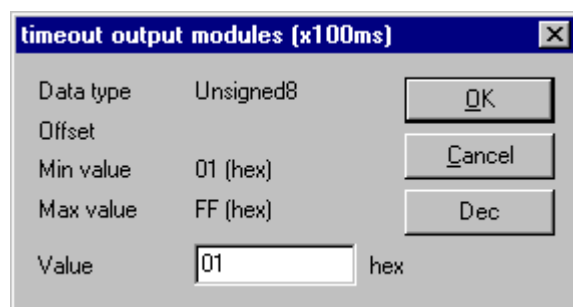
After selecting the Common button following window appears with the common parameter data. These parameters are for the head station.



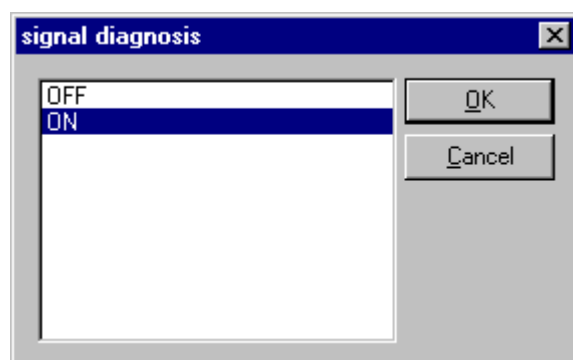


It is possible to change back into the hex description by selecting the Hex button.

With a double click on one row of the parameter data you are able to change the value.



Or you are able to select the description by common adjustment.

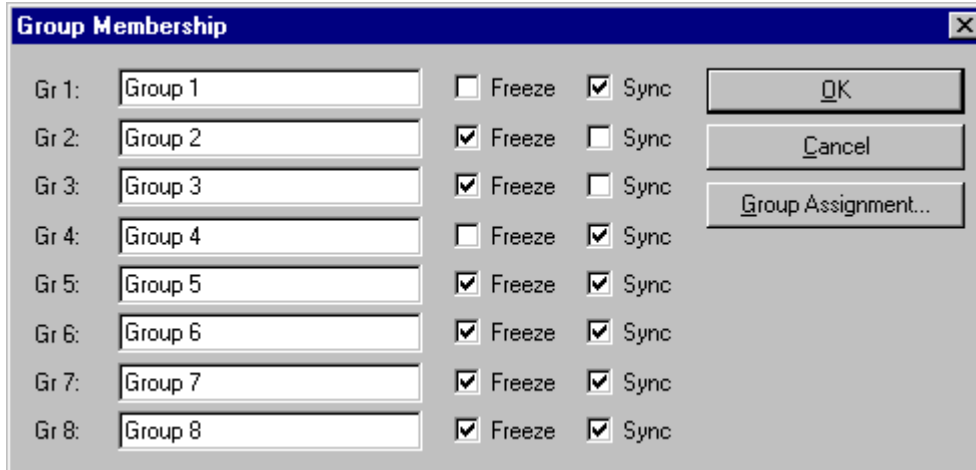


If there is more than one module configured then you have to select the relevant module at first.

All parameter dialogs are taken from the GSD file. If there is no text dialog, the input is only possible as a hex value.

## 4.5 Group Membership

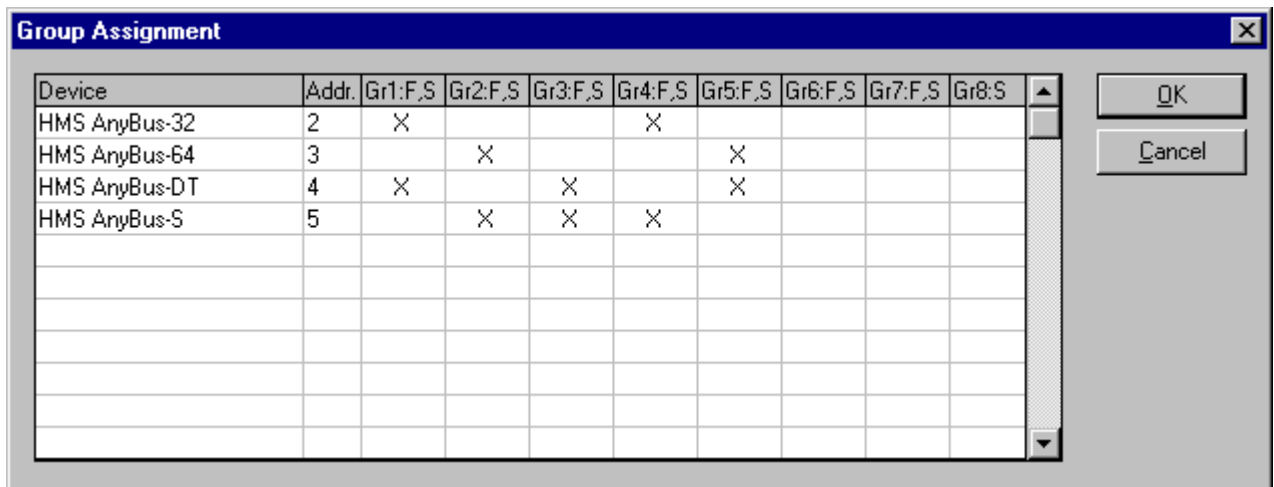
After you have chosen a master the slaves can be assigned to 8 different groups. These groups can be parameterized here. Select the Menu **Settings – Group Membership**. Make your selection which group should support the DP-Freeze and DP-Sync command.



The 'Group Membership' dialog box allows configuration of 8 groups. Each group has a text field for its name and two checkboxes for 'Freeze' and 'Sync' commands. The 'OK', 'Cancel', and 'Group Assignment...' buttons are on the right.

Group	Name	Freeze	Sync
Gr 1:	Group 1	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Gr 2:	Group 2	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Gr 3:	Group 3	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Gr 4:	Group 4	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Gr 5:	Group 5	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Gr 6:	Group 6	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Gr 7:	Group 7	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Gr 8:	Group 8	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

In the menu item **Group Assignment** you can assign the slaves to the groups with the desired characteristics. The upcoming table shows all configured slave devices from the main editor window. Here you can select to which of the 8 possible groups the slave should be assigned to.



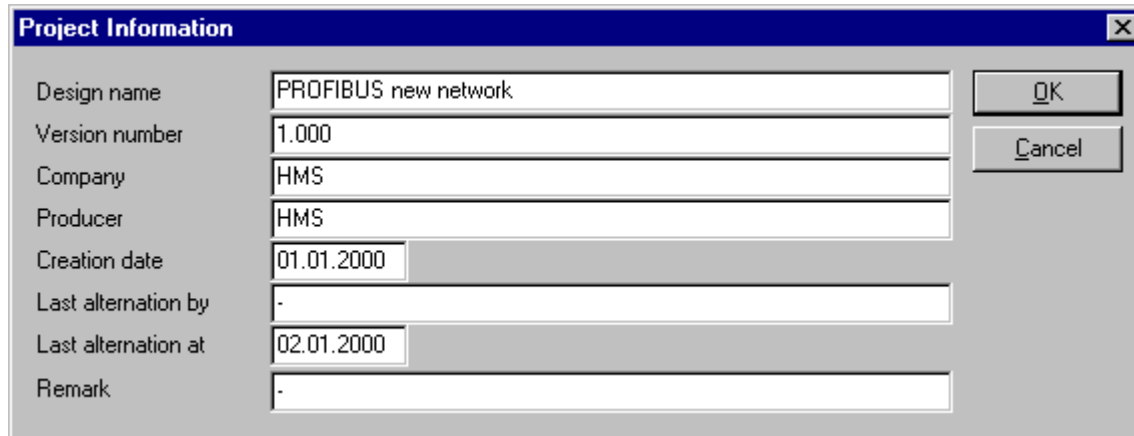
The 'Group Assignment' dialog box displays a table of configured slave devices and their group assignments. The table has columns for Device, Address, and group-specific Freeze/Sync settings. The 'OK' and 'Cancel' buttons are on the right.

Device	Addr.	Gr1:F,S	Gr2:F,S	Gr3:F,S	Gr4:F,S	Gr5:F,S	Gr6:F,S	Gr7:F,S	Gr8:S
HMS AnyBus-32	2	X			X				
HMS AnyBus-64	3		X			X			
HMS AnyBus-DT	4	X		X		X			
HMS AnyBus-S	5		X	X	X				

The chosen group selection is transferred to the slaves while their startup sequence. The group selection serves as a filter for a special DP command called 'global control', which can be sent as a broadcast message to selective groups. This command is normally used by an application program to send the output data Sync and the input data Freeze command.

## 4.6 Project Information

If you create your own project you can write down common information to the documentation of your configuration in the menu **Settings – Project Information**. This is printed out or the information can be shown in that menu.



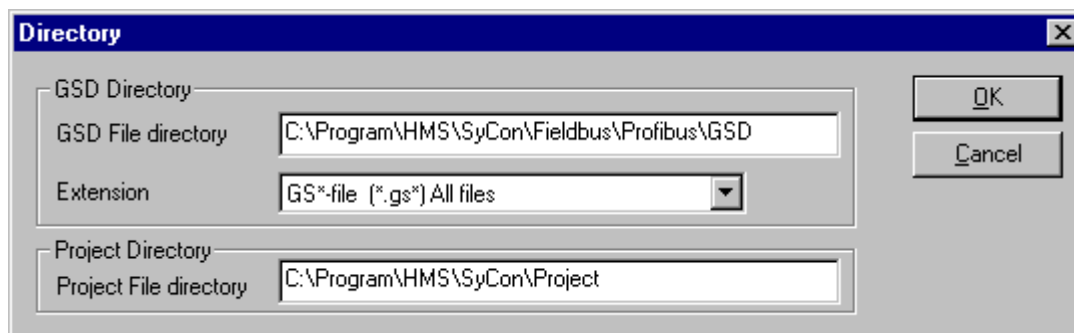
The 'Project Information' dialog box contains the following fields and buttons:

Field	Value
Design name	PROFIBUS new network
Version number	1.000
Company	HMS
Producer	HMS
Creation date	01.01.2000
Last alteration by	-
Last alteration at	02.01.2000
Remark	-

Buttons: OK, Cancel

## 4.7 Path

If the menu **Settings – Path** is selected the path directory of the GSD files are shown.



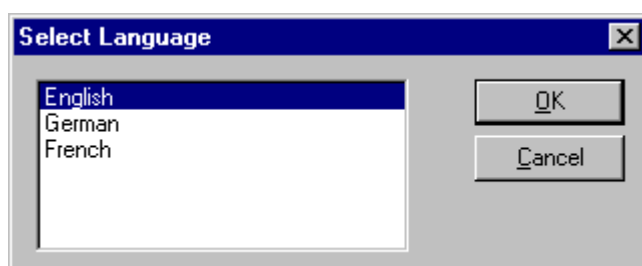
The 'Directory' dialog box contains the following fields and buttons:

Field	Value
GSD Directory	
GSD File directory	C:\Program\HMS\SyCon\Fieldbus\Profibus\GSD
Extension	GS*-file (*.gs*) All files
Project Directory	
Project File directory	C:\Program\HMS\SyCon\Project

Buttons: OK, Cancel

## 4.8 Language

Select the menu **Settings – Language** and following window will appear:



The 'Select Language' dialog box contains the following elements:

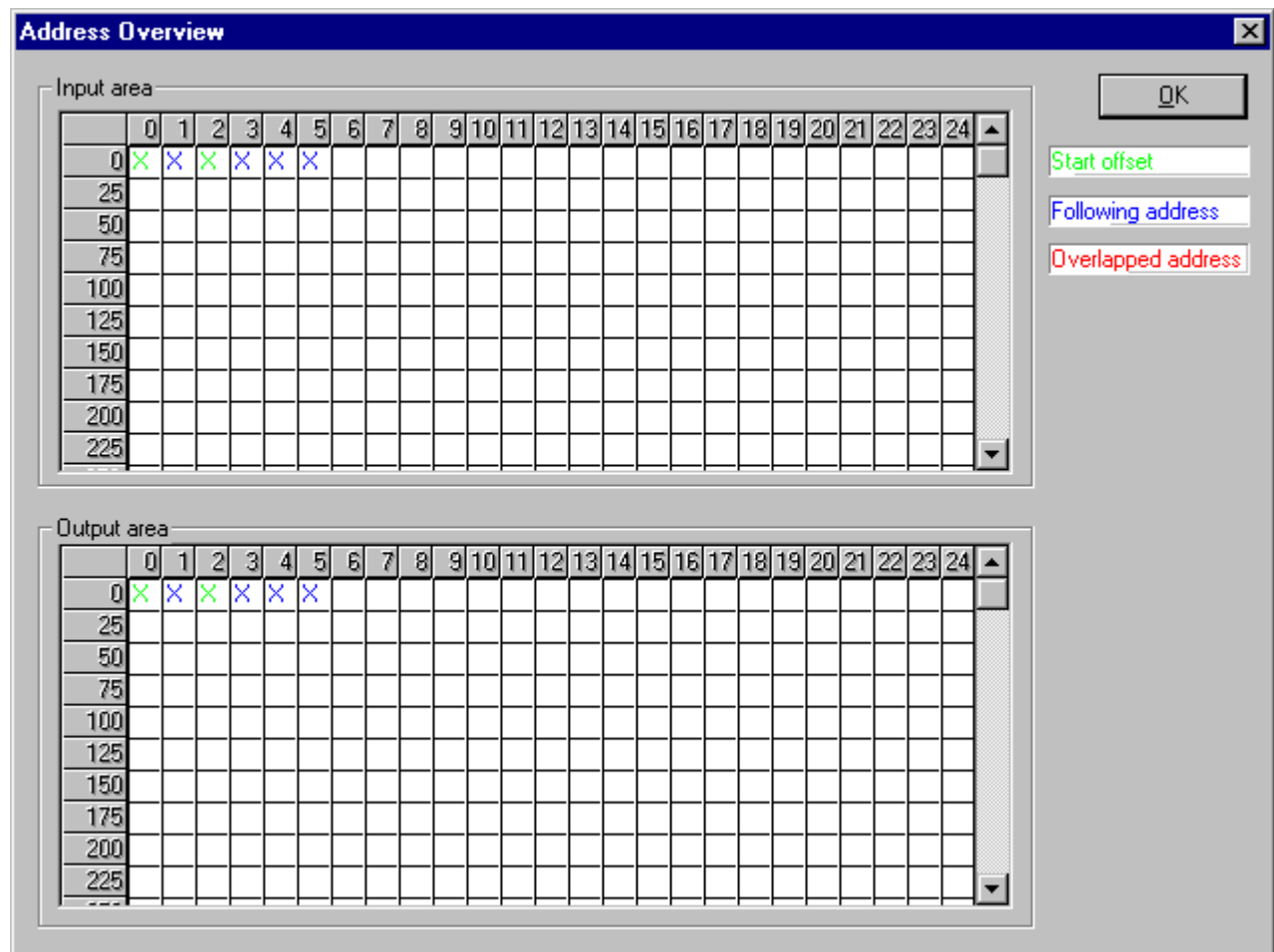
Language
English
German
French

Buttons: OK, Cancel

You are able to change the language for the system configurator. Select the desired language and confirm the entry with the **OK** button. A comment will appear and ask you to restart the application to make the changes effective. After a restart HMS SyCon will be changed into the selected language.



Select the button **Address Overview** to get an overview about the addresses in the input and output area.



The auto addressing has to be inactive to be able to change the assignment of the addresses. Click with the left mouse button to a cross and hold the button. The mouse pointer is changed to an arrow. Push the arrow (with pressed mouse button) to the desired new (still not used) position and let go of the mouse button. Then a question will appear, if the change should be executed or not.

The assignment of the offset addresses can be also selected by the menu **Slave Configuration**.

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

The information of which slave the address is used is shown by a double click to the corresponding cross. The **Byte Information Window** is opened.

Note: While the addresses are given in bytes (8-bit), a block of data can only be placed on a word (16-bit) boundary.

## 5.2 Print Documentation of your PROFIBUS System

After you have selected the actual printer with the menu item **Print Setup** you can print out the configuration with the menu item **Print**. If you want to have a preview of the print before printing you can use the function **Print Preview**.

## 5.3 Save the Configuration

You can save the configuration with the menu item **Save** if the file name is known otherwise you must use the function **Save as** with a new file name.

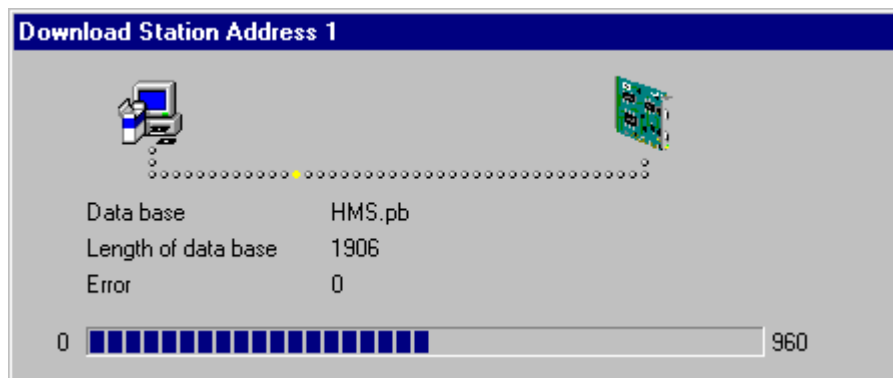
## 6 Online Functions

Here all the functions are gathered together that directly affect the PROFIBUS devices, e.g. ABMA-PDP.

*Please note that this will also permit interruption of a running communication or that outputs can be switched On or Off.*

### 6.1 Download the Configuration

To enable the configuration and network access, it has to be transferred (to download) to the master with the menu **Online - Download**. This will trigger a warning that the communication on the PROFIBUS will be interrupted. This has to be confirmed.



Before the download happens, the configurator will check the configuration. If there appears any error message, the configuration should be checked. Mostly errors are overlapped addresses, which could be located by looking into the **Address Table** overview.

Should the addressing of the slaves be performed automatically, choose **Auto addressing** in the window **Master Configuration**.

The configuration will be transmitted to the selected device and stored into a FLASH memory statically, so that it is available after the power is switched off and on in this device.

After the download procedure the device executes an internal restart and begins with the communication if the start condition in **DP Master Settings** has been set to **Automatic release of the communication by the device**.

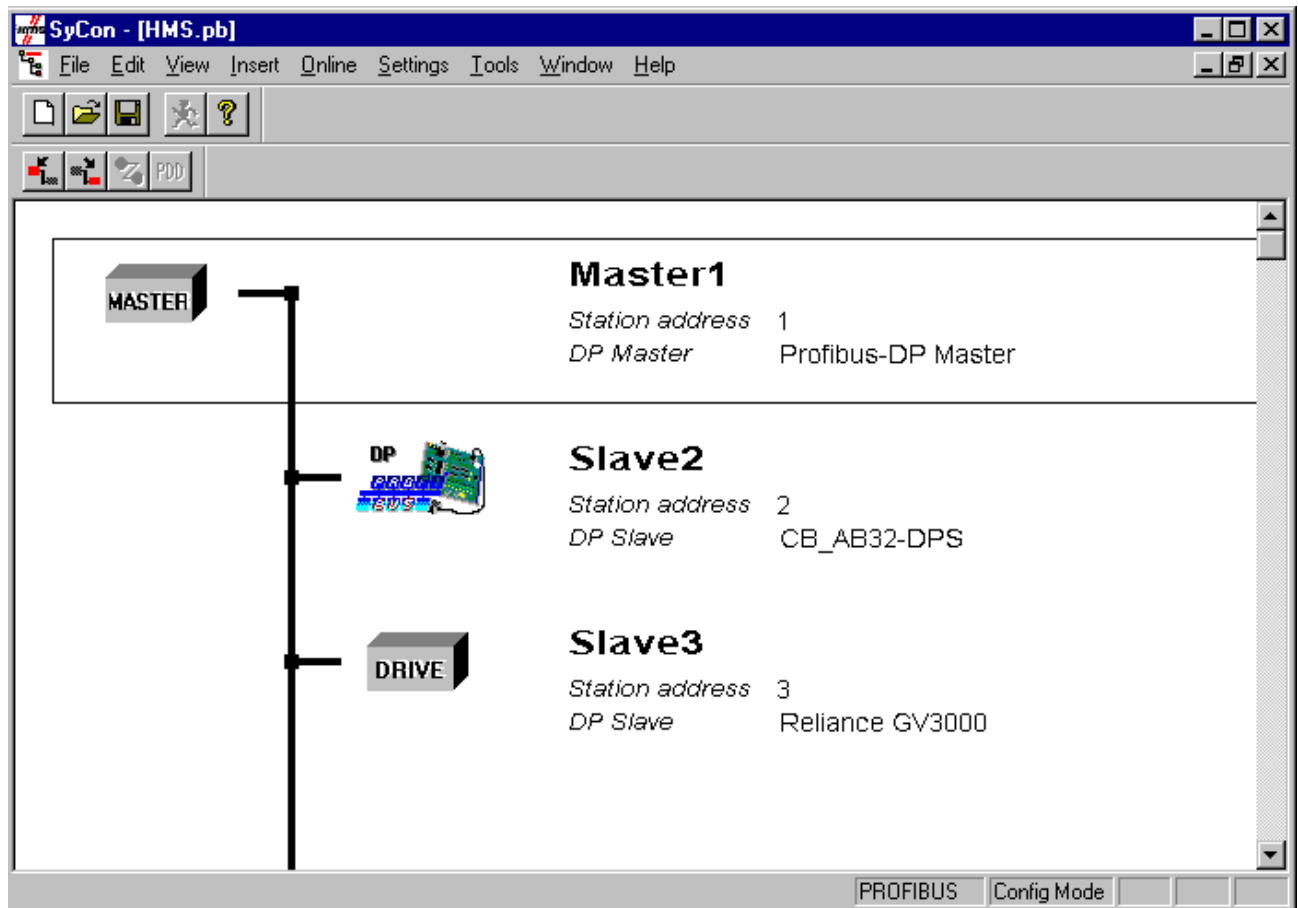
### 6.2 Starting the Debug Mode

Click the menu item **Online - Start Debug Mode**. The system configurator cyclically interrogates the status of the network communication on the master and the individual condition of the devices.

To end the Debug Mode, select the menu **Online - Stop Debug Mode**.

#### 6.2.1 The Debug Window

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



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**.

## 6.3 Device Diagnostic

After the debugger is started HMS SyCon requests the status of all devices from the master. If there is an error on a device the bus line to this device is drawn in red color otherwise it is green. HMS SyCon also displays the letters **Diag**, if the device signals diagnostic information. This information is displayed closer if you click with the mouse onto the corresponding device in debug mode.

To activate the debug mode select the menu **Online - Start Debug Mode**. The menu **Online - Device Diagnostic** activates the PROFIBUS device diagnostic. To end the Debug Mode, select the menu **Online - Stop Debug Mode**.

Diagnostic Station Address 2			
Station Status 1		Station Status 2	Station Status 3
<input type="checkbox"/> Master Lock	<input type="checkbox"/> Slave Deactivated	<input type="checkbox"/> Ext Diag Overflow	<input type="button" value="OK"/> <input type="button" value="Ext. Diagnostic"/> <input type="button" value="Compare Configuration"/>
<input type="checkbox"/> Parameter Fault	<input type="checkbox"/> reserved	<input type="checkbox"/> reserved	
<input type="checkbox"/> Invalid Slave Response	<input type="checkbox"/> Sync Mode	<input type="checkbox"/> reserved	
<input type="checkbox"/> Not Supported	<input type="checkbox"/> Freeze Mode	<input type="checkbox"/> reserved	
<input type="checkbox"/> Extended Diag	<input type="checkbox"/> Watchdog On	<input type="checkbox"/> reserved	
<input type="checkbox"/> Configuration Fault	<input type="checkbox"/> Slave Device	<input type="checkbox"/> reserved	
<input type="checkbox"/> Station Not Ready	<input type="checkbox"/> Static Diag	<input type="checkbox"/> reserved	
<input type="checkbox"/> Station Non Existent	<input type="checkbox"/> Parameter Req used	<input type="checkbox"/> reserved	
Assigned Master Address	0	Real Ident Number	0x0000
		GSD Ident Number	0x7508
			Error 0

The **Device Diagnostic** and its meaning.

- Master\_Lock**  
 The slave has already been parameterized by another master and is locked in its access. Check, if another master is present on the network and delete its assignment to this slave station or remove the other assigned master from the network to get the communication with this slave running.
- Parameter\_Fault**  
 This bit is set by the slave automatically, when the parameters sent by the master are containing wrong or insufficient data. On every received parameter telegram the slave executes a check routine on the whole parameter telegram. If the slave detects a faulty parameter value or illegal data during its check, it will report the 'parameterization error'. During the check routine the slave compares its ident\_number with the one sent by master. So if the slave reports this error, first compare the real ident\_number shown in the slave diagnostic field in debugger mode with the one read out of the GSD-File. For this take the menu 'View/Device table'. Another problem can be, if parameter data is configured in HMS SyCon, but the slave does not support any. If so, reduce the parameter data in HMS SyCon to a length of zero.
- Invalid\_Slave\_Response**  
 This bit is set by the master, when the master receives an invalid answer from the slave. So the physical contact to the slave works principally, but the logical doesn't or was interrupted. This can for example happen, if a PROFIBUS-FMS slave is connected to the DP-master. So the slave does not understand the DP-Telegrams and rejects these. It's handled as 'Invalid\_Slave\_Response'.
- Not\_Supported**  
 This bit is set by the slave, when a function should be performed which is not supported. Newer releases of slave stations normally support the Sync and Freeze-Mode for I/O data. This is fixed in the GSD-File and read out by HMS SyCon and transferred to the slave in the parameter telegram. If 'Not\_Supported' is reported the



GSD-File declares at least one of these commands as supported, but the slave do not. So ask the manufacturer of the slave device for other GSD-File or ask if the slave reports 'Not\_Supported' on other wrong parameter data.

- **Extended\_Diag**  
This bit is set by the slave, if optional extended diagnostic data are a containment of the slave diagnostic field. Extended diagnostic data is normally used by a slave station, if module specific diagnostic information like for example exceeded analog values or low power should be reported to the master. Click on the button 'Extended Diagnostic' to get a Hex-dump of the reported values.
- **Configuration\_Fault**  
During the PROFIBUS-DP startup procedure the slave compares its internal I/O configuration with the configured one in the master. If the slave detects differences it will report the 'Cfg\_Fault' error. That means that the master has another I/O module constellation for this slave configured than the slave device physically holds down. So first compare visually all configured I/O modules in the configuration data of HMS SyCon for this slave with its real physical constellation. Note that the order of the module is important and be compared also. Some slaves need virtual I/O modules to be configured first or empty slot modules to get an even number of modules to run. This slave specific I/O module behavior can normally be read out in the slave documentation. Last help to get the slave module constellation is to read out its constellation by a PROFIBUS-DP command **Compare Configuration**. So click on this button in the diagnostic field and you will get a Hex-Dump of the real slave configuration data and the configured one (**Real Configuration and HMS SyCon Configuration**). Note that the DP-configuration data is coded in bit defined byte arrays to hold the I/O information very compressed. Note, that the DP configuration is coded in a very compact form. The code for the modules is shown in the **slave configuration**.
- **Station\_Not\_Ready**  
When or at which event the slave sets this bit is not defined in the norm specification. The meaning 'Not\_Ready' can be seen as not ready to do the I/O data exchange, this can have several slave specific reasons. Usually the bit is set in combination with one the other fault bits.
- **Station\_Non\_Existent**  
This bit is set by the master automatically, if this slave is not responding on the bus. If this error occurs, compare the configured station address with the physical one of the slave. Then check, if the slave module supports the configured baud rate. Some old modules only support bps rates up to 1.5 Mbps. Other modules must be jumpered to DP-Norm behavior first, to be operative with a DP-Norm master. Then check your bus cable. Only the TX/RX-pins 3<->3 and 8<->8 must be connected to get the contact between two PROFIBUS components.
- **Slave\_Deactivated**  
This bit is set by the master automatically, if the slave in its parameter set is marked as inactive, so that it is taken out from the cyclic I/O processing.
- **Sync\_Mode**  
This bit is set by the slave, when it has received the sync-control command.
- **Freeze\_Mode**  
This bit is set by the slave, when is has received the freeze-control command.
- **Watchdog\_ON**  
This bit is set by the DP-slave, when its watchdog control is active to supervise its corresponding master connection.
- **Static\_Diag**  
The slave sets this bit to indicate the master system to be not operative for I/O because of a general error. In a case of a set static diagnostic bit the master has to collect diagnostic information as long as this bit is active. On which events or at what time this bit can be set by a slave device, is not defined in the norm description.
- **Parameter\_Req\_used**  
The slave sets this bit to force the master system to do a new parameterization. This bit is set as long as new parameterization must be performed.
- **Ext\_Diag\_Overflow**  
This bit is set, if there is more extended diagnostic information to report to the master than can be given to the master in one DP-diagnostic telegram. The DP-slave sets this bit for example if there is more diagnostic channel information than the slave can hold down in its diagnostic buffer.

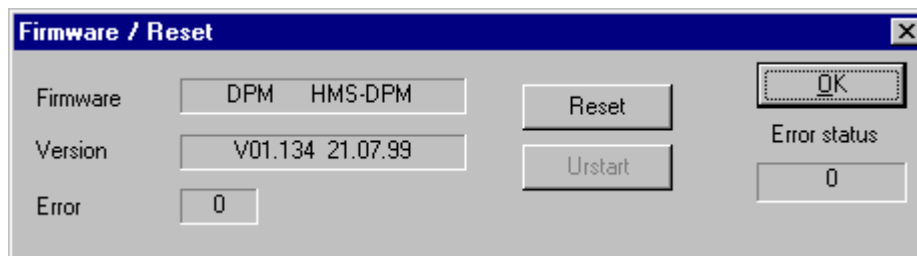
- **Assigned\_Master\_Address**  
In this octet the address of the DP-master that has done the parameterization of the slave is entered. If the DP-slave is not parameterized from any DP-master, the DP-slave puts the address 255 dec here.
- **Real\_Ident\_Number**  
With the Ident\_Number the slave reports its own unchangeable identification number that was assigned by the PROFIBUS user organization. This identification code can serve in HMS SyCon to compare it with the Ident code of the GSD-file when of the configured slave, if parameterization error is reported.

## 6.4 Firmware Download

If you want to make a Firmware download select the menu **Online – Firmware Download** and the open window appears. Select the new Firmware and confirm your entry with the open button. Now the new Firmware is downloaded.

## 6.5 Firmware / Reset

The menu **Online - Firmware Reset** shows the name of the firmware and the actual version of the firmware from the selected device.

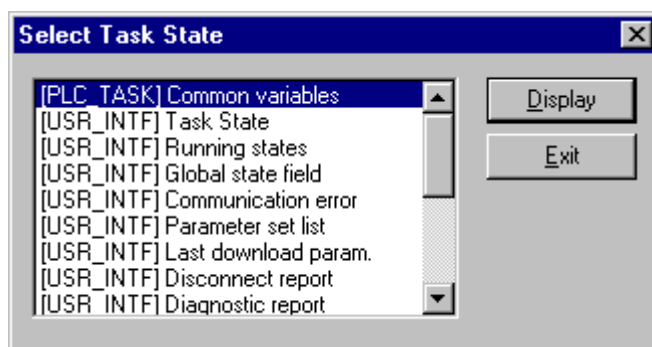


You can push the reset button to reset the device.

## 6.6 Extended Device Diagnostic

The menu item **Online - Extended Device Diagnostic** helps to find possible bus and configuration faults while trying to get the bus fully operative, when the normal debugger does not supply any helpful information any more to get the fault localization. This menu activates a list of available structures. The listed structures can be displayed to show the values.

There are online counters, values, parameters and states that can be displayed. Several task states are available.



**Note:** All items in this list do not work for this master.

## 6.7 Global State Field

Select the menu **Online - Global State Field** to see details about the global state field. The first row shows the Online master main state e.g. **OPERATE, STOP**. The next row shows the collective status bits. An activated bit is red. The meaning of the short cuts is listed below:

**Global state field**

Online master main state: OFFLINE

Collective status bits: ☐ TOUT ☐ NRDY ☐ EVE ☐ FAT ☐ NEXC ☐ ACLR ☐ CTRL

Collective online error location and corresponding error

Error at remote address: 0 dec

Corresponding error event: No error

Statistic bus information

Counter of detected bus short circuits: 0 dec

Counter of rejected telegram transmissions: 0 dec

Device specific status bits

Parameterized Devices  Activated Devices  Devices with Diagnostic

0	1	2	3	4	5	6	7	8	9	10	11	12	13
14	15	16	17	18	19	20	21	22	23	24	25	26	27
28	29	30	31	32	33	34	35	36	37	38	39	40	41
42	43	44	45	46	47	48	49	50	51	52	53	54	55
56	57	58	59	60	61	62	63	64	65	66	67	68	69
70	71	72	73	74	75	76	77	78	79	80	81	82	83
84	85	86	87	88	89	90	91	92	93	94	95	96	97
98	99	100	101	102	103	104	105	106	107	108	109	110	111
112	113	114	115	116	117	118	119	120	121	122	123	124	125
126													

Error: 0

#### Collective status bits

- **TOUT** (TIMEOUT-ERROR) the device has detected an overstepped timeout supervision time because of rejected PROFIBUS telegrams. It's an indication for bus short circuits while the master interrupts the communication. The number of detected timeouts are fixed in the statistic bus information variable. The bit will be set when the first timeout was detected and will not be deleted any more.
- **NRDY** (HOST-NOT-READY-NOTIFICATION) indicates if the host program has set its state to operative or not. If this bit is set the host program is not ready to communicate.
- **EVE** (EVENT-ERROR) the device has detected bus short circuits. The number of detected events are fixed in the statistic bus information variable. The bit will be set when the first event was detected and will not be deleted any more.
- **FAT** (FATAL-ERROR) because of heavy bus error, no further bus communication is possible.
- **NEXC** (NON-EXCHANGE-ERROR) at least one slave has not reached the data exchange state and no process data exchange with it is possible.
- **ACLR** (AUTO-CLEAR-ERROR) device stopped the communication to all slaves and reached the auto-clear end state.
- **CTRL** (CONTROL-ERROR) parameterization error.

Further contents are given:

### Collective online error location and corresponding error

### Statistic bus information

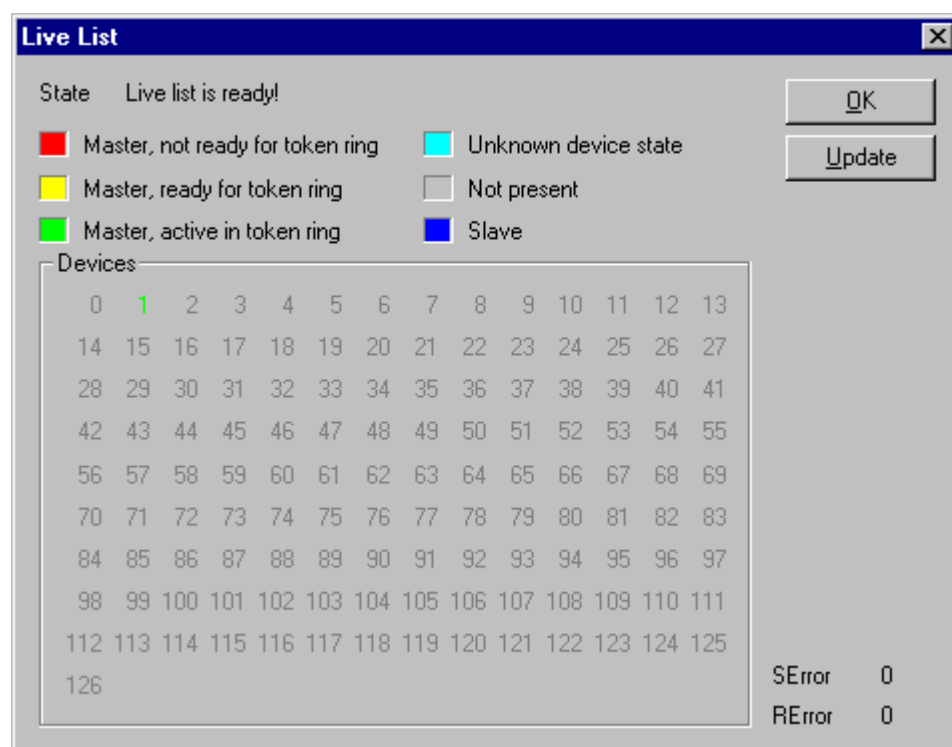
Device specific status bits: **Parameterized Devices**, **Activated Devices** and **Devices with Diagnostic** are shown if you click at that button. The activated addresses are white numbers.

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

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

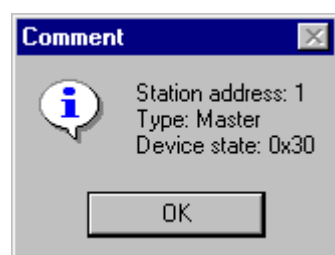
## 6.7.1 Live List

If you select the menu **Online - Live List** you have an overall view of all active devices on your PROFIBUS network.



A green number (the number is the station address) for the master and a blue number for the slave is norm. The meaning of the colors is in the list above the table.

If you click on a colored station address you are given the Device type and Device state.



The status of the live list is not automatically updated online. You have to click at the **Update** button after you changed your inputs to actualize this window.

## 6.7.2 I/O Monitor

This is only a simple tool that allows you to display and enter only the first 32 bytes of the process image. In the next release this will be more sophisticated.

**I/O Monitor**

Input data

dec	0	1	2	3	4	5	6	7	8	9
0	0	0	0	0	0	0	0	0	0	0
1	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0
3	0	0								
4										
5										
6										
7										

Output data

dec	0	1	2	3	4	5	6	7	8	9
0	0	0	0	0	0	0	0	0	0	0
1	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0
3	0	0								
4										
5										
6										
7										

Buttons: **OK**, **DEC/HEX**, **Update**

Error 0

## 6.7.3 Automatic Network Scan

This function is not yet implemented in the HMS Profibus-DP masters. This menu command is reserved for future use.

## 6.7.4 Set Slave Address

If you select the menu **Online - Set Slave Address** you are allowed to change a slave address.

Write the new address in the row **New Station Address**. If you do not want to allow further changes, select the field **No additional changing**. If necessary, you can add additional parameters in hex in the field **Slave parameter**. Activate the command with the **Set Address** button.

**Set Slave Address 2**

Old station address: 126

New station address: 2

No additional changing: ☐

Remote slave parameter:

Buttons: **Set Address**, **Exit**

Error

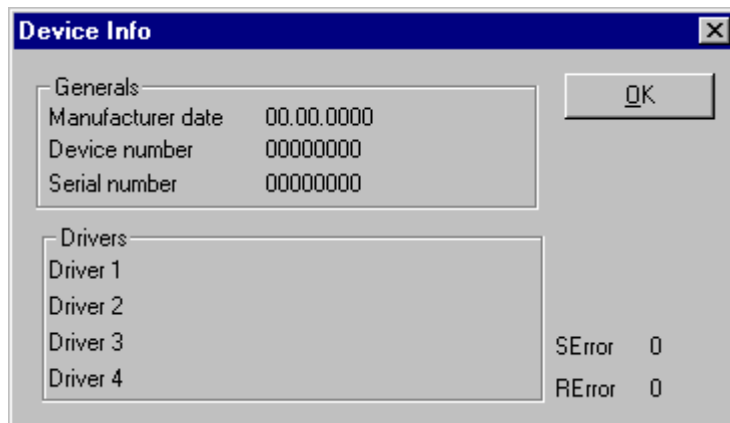
### 6.7.5 Start/Stop Communication

You can manually start or stop the communication between masters and slaves. Select **Online - Start Communication** and **Stop Communication** respectively.

### 6.7.6 Device Info

Select the menu **Online - Device Info** to see details about the selected hardware in your configuration.

The manufacturer date, the device number and the serial number is given.



## 7 Error Numbers

### 7.1 Serial Driver Error Numbers (-20 ... -71)

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

Error Number	Description
-20	DRIVER: No COM handle found
-21	DRIVER: COM port already opened
-22	DRIVER: Function call into driver 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: Set COM state error
-31	DRIVER: COM buffer setup failed
-32	DRIVER: COM set timeout failed
-33	DRIVER: RX buffer overrun
-34	DRIVER: RX buffer full
-35	DRIVER: TX busy
-36	DRIVER: Error during close driver

*Table of serial driver error numbers*

Error Number	Description
-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
-50	USER: Send message, timeout error
-51	USER: Could not send a message
-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 of serial driver error numbers*



## 7.2 RCS Error Numbers (4 ... 93)

This is the list of error numbers returned by the RCS (Real-time Communication System), that is the operating system. 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 master device. An example of this communication is the download of a configuration.

Error Number	Description
0	No error
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	Database not configured
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 does 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 database segment needs the bootstrap loader. The bootstrap loader 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 database created by the system configurator and the database expected by the firmware is not compatible
39	DBM module missing

*Table of RCS error numbers (answer message)*

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 of RCS error numbers (answer message)*

## 7.3 Data Server Error Numbers (1001 ... 1009)

This is the list of error numbers using the Data Server.

Error Number	Description
1001	Invalid handle value
1002	No Driver object found
1003	No dual-port memory driver object found
1004	No serial driver object found
1005	Driver not found
1006	Wrong device ID
1007	Create command error
1008	Command ID not found
1009	Null pointer given by the application

*Table of data server error numbers*

## 7.4 Command Administrator Error Numbers (2001 ... 2006)

This is the list of error numbers using the Command Administration.

Error Number	Description
2001	Function ID unknown
2002	Task ID unknown
2003	Wrong timeout value
2004	User function invalid
2005	User function pointer invalid
2006	User data invalid

*Table of data server error numbers*

## 7.5 Converting Functions Error Numbers (4000 ... 4098)

The following table lists the error numbers of the converting functions.

Error number	Description
4000	No table existing
4001	Success in comprimizing
4002	Set not existing
4003	Last respectively first entry reached
4004	Not enough memory
4005	Table 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
4034	Length of converting stream is 0
4035	Non equal data set found
4036	Writing of set 0 is no allowed
4037	No entry in this file
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 an other function
4042	New length of data base is smaller than used
4043	Unknown access mode
4044	Old databases 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

*Table of error numbers of converting functions*

Error Number	Description
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
4056	-
4057	File type 2 cannot 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
4061	The database was transmitted into the FLASH
4062	Set 0 contains no structure definition
4063	Set 0 cannot 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 database
4074	Download window can't be created
4075	Download not fully performable
4076	Parameter SourceType of table SourceTab not existing
4077	Parameter Translate of table CreateTab does not exists
4078	Parameter Sourcefile of table CreateTab does not exists
4079	Parameter Sourcetable of table CreateTab does not exists

*Table of error numbers of converting functions*

Error Number	Description
4080	Parameter Desttable of table CreateTab does not exists
4081	Parameter Special of table CreateTab does not exists
4082	More than 32 tables should be created
4083	No entry in element szSourceFile
4084	ODBC connection initialisation 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 database that is in DBM format
4086	Error in structure in the ACCESS database 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

*Table of error numbers of converting functions*

## 7.6 Data Base Functions Error Numbers (5001 ... 5008)

The following table lists the error numbers of data base functions DBM32.DLL.

Error number	Description
5001	Function PackLongToByteShort: Not enough space in pvD (Number of elements greater than reserved memory)
5002	Function PackLongToByteShort: Not enough space in pvD. Detected during converting of pvS
5003	Function StringToByte: Not enough space in pvD
5004	Function IntToByte: Not enough space in pvD
5005	Function LongToShort: Not enough space in pvD
5006	Function PackStringDumpToByteArray: Not enough space in pvD
5007	Function PackStringBumpToByteArray: A character was found, which does not match a HEX value
5008	Function PackStringDumpToByteArray: Number of character odd

*Table of error numbers of data base functions*

## 7.7 Protocol Functions Error Numbers (2 ... 21)

The following table lists the error numbers that may be returned when using special protocol functions.

Error number	Description
2	Station reports overflow
3	Function requested by the master is available in the slave
9	No response from the slave although the slave should respond
17	No response from the node
18	Master is not in the logical token ring
21	Faulty parameter in masters request

*Table of error numbers of protocol functions*