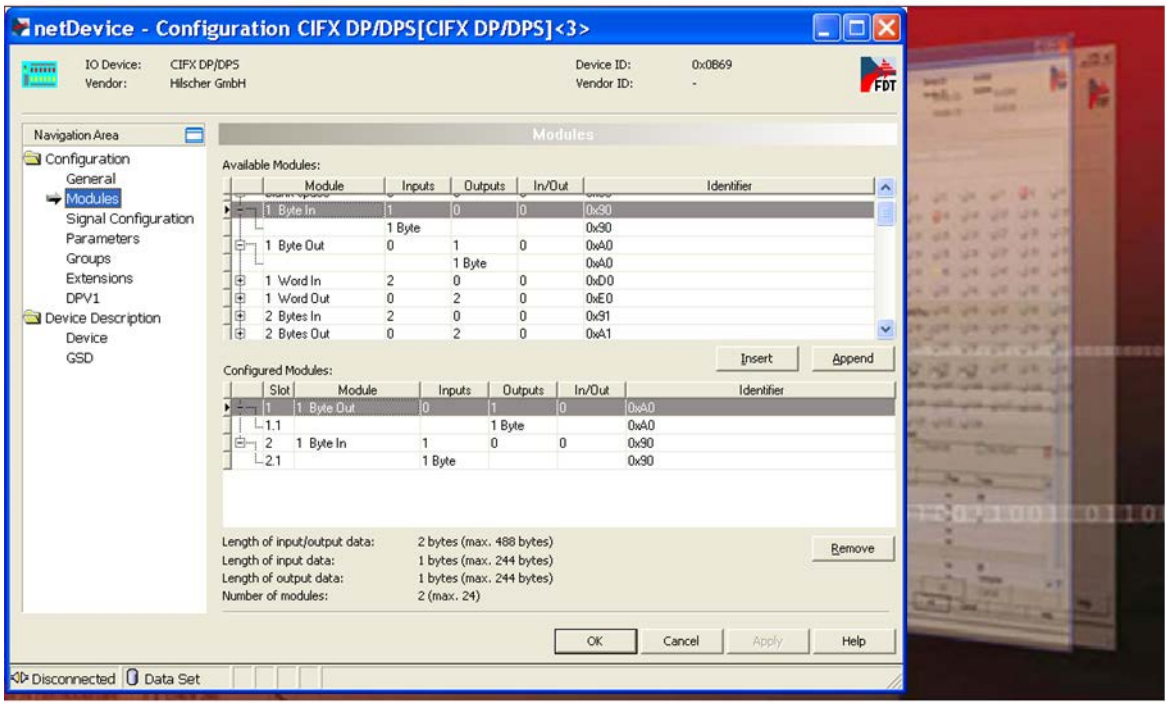
Operating Instruction Manual

Generic Slave DTM for PROFIBUS DP Slave Devices

Configuration of PROFIBUS DP Slave Devices

V2.301



Hilscher Gesellschaft für Systemautomation mbH

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DOC031001OI20EN | Revision 20 | English | 2018-04 | Released | Public

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1 Introduction

1.1 About this Manual

This manual describes how to configure PROFIBUS DP Slave devices (PROFIBUS DPV0, PROFIBUS DPV1 or PROFIBUS DPV2), which are described with GSD files. These devices can be configured by use of the PROFIBUS DP generic Slave DTM within a FDT Framework.

1.1.1 Descriptions of the Dialog Panes

The table below gives an overview for the individual dialog panes descriptions:

Section	Subsection	Manual Page
Configuration	*General*	21
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Table 1: Descriptions Dialog Panes

1.1.2 Online Help

The PROFIBUS DP Slave DTM contains an integrated online help facility.

- To open the online help, click on **Help** or press **F1**.
-

1.1.3 List of Revisions

Index	Date	Version	Chapter	Revision
19	17-02-27	2.301 (and 2.0301)	1.4.1 6.4	Section *Requirements*: updated. Section *Process Image Monitor* added.
20	18-04-10	2.301 (and 2.0301)		Versioning information revised (title page and this section).
			6.3	Section *Extended Diagnosis* updated (*Figure 32*).
			7.1, 7.1.2	Sections *DP Slave Diagnosis* (*Table 24*) and *Extended Slave Device Diagnosis* (*Table 32*, *Table 35*) updated.

Table 2: List of Revisions

1.1.4 Conventions in this Manual

Notes, operation instructions and results of operation steps are marked as follows:

Notes

Important: <important note you must follow to avoid malfunction>

Note: <general note>

<note, where to find further information>

Operation Instructions

1. <instruction>
2. <instruction>

or

➢ <instruction>

Results

<result>

1.2 Legal Notes

Copyright

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1.4 About PROFIBUS DP Generic Slave DTM

You can use the PROFIBUS DP generic Slave DTM to configure the PROFIBUS DP Slave devices described with GSD files within a FDT Framework.

The information necessary for the configuration of the PROFIBUS DP Slave devices is stored within the PROFIBUS DP Master device when using the PROFIBUS DP generic Slave DTM and thus the Master device is configured.

1.4.1 Requirements

System Requirements

- PC with 1 GHz processor or higher
- Windows® XP SP3,
  Windows® Vista (32-Bit) SP2,
  Windows® 7 (32-Bit and 64-Bit) SP1,
  Windows® 8 (32-Bit and 64-Bit),
  Windows® 8.1 (32-Bit and 64-Bit),
  Windows® 10 (32-Bit and 64-Bit)
- Administrator privilege required for installation
- Internet Explorer 5.5 or higher
- RAM: min. 512 MByte, recommended 1024 MByte
- Graphic resolution: min. 1024 x 768 pixel
- Keyboard and Mouse
- Restriction: Touch screen is not supported.

Note: If the project file is used on a further PC,

- this PC must also comply with the above system requirements,
- the device description files of the devices used in the project must be imported into the configuration software SYCON.net on the new PC,
- and the DTMs of the devices used in the project must also be installed on that further PC.

Requirements PROFIBUS DP Generic Slave DTM

Requirements for working with the PROFIBUS DP generic Slave DTM are:

- Installed FDT/DTM V 1.2 compliant frame application
- Installed PROFIBUS DP Master DTM
- GSD file of the devices to be configured
- The user needs to reload the Device Catalog

Loading GSD files

To add devices to the **netDevice** device catalog, you must import the GSD file of the used device via **netDevice** menu **Network > Import Device Descriptions ….** into the GSD folder of the DTM. Then the Device Cataloge must be reloaded. The folder GSD inclusively Windows® XP is located in the application data directory (All Users) of the configuration software (or from with Windows® 7 on in the *C:\ProgramData\ SYCONnet* directory).

For further information refer to section *Configuration Steps* on page 16 , under step 1 and 2.

1.5 Dialog Structure of the PROFIBUS DP Generic Slave DTM

The graphical user interface of the DTM is composed of different areas and elements listed hereafter:

1. A header area containing the **General Device Information**,
2. The **Navigation Area** (area on the left side),
3. The **Dialog Pane** (main area on the right side),
4. **OK**, **Cancel**, **Apply**, **Help**,
5. The **Status Line** containing information e. g. the online-state of the DTM.

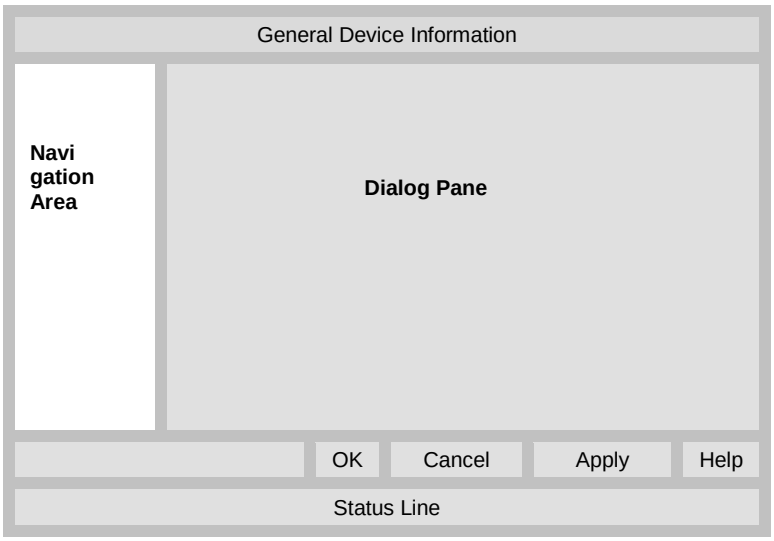


Figure 1: Dialog Structure of the Generic PROFIBUS DP Slave DTM

1.5.1 General Device Information

Parameter	Meaning
IO Device	Name of the device
Vendor	Vendor name of the device
Device ID	Identification number of the device
Vendor ID	Identification number of the vendor

Table 3: General Device Information

1.5.2 Navigation Area

The **Navigation Area** contains folders and subfolders to open the dialog panes of the DTM.

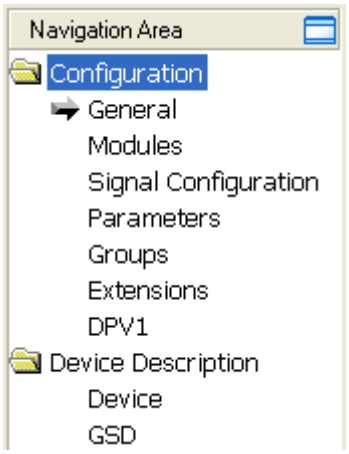


Figure 2: Navigation Area

➢ Select the required folder and subfolder.

➢ The corresponding Dialog pane is displayed.

Hide / display Navigation

	Hiding the navigation area (above right side).
Show navigation area	**Opening** the navigation area (below left side).

1.5.3 Dialog Panes

Configuration	
General	At the pane **General** the actual **Station Address** of the Slave device is displayed and can be changed if necessary. Further information to this you find in section *General* on page *21*.
Modules	At the **Modules** pane modules can be selected or assigned and configured. Further information to this you find in section *Modules* on page *22.*
Signal Configuration	At the **Signal Configuration** pane the data structure of the in- and output signals is provided. For further information see section *Signal Configuration* on page 26.
Parameters	The **Parameters** pane allows it to change the parameter settings of the modules. A detailed description you find in section *Parameters* on page *30.*
Groups	At the pane **Groups** the single Slaves devices can be assigned to up to eight different, after a Master was arranged. Further information to this you find in section *Groups* on page *31.*
Extensions	The **Extensions** pane contains adjustment possibilities for the extension parameters: Auto Clear, Fail Safe Behavior, Configuration Data Convention, Error on Cyclic Data Exchange and Diagnosis update delay. Further information to this you find in section *Extensions* on page *32.*
DPV1	The **DPV1** pane gives access to the DPV1 functions for an acyclic data exchange and to the functions read write and alarm handling. information to this you find in section *DPV1* on page *34.*
DPV2	The **DPV2** pane allows Time Sync configuration for the Slave. Further information to this you find in section *DPV2* on page 36.
Redundancy	The **Redundancy** pane allows redundancy configuration for the Slave. Further information to this you find in section *Redundancy* on page37.
Device Description	
Device	The **Device Info** pane contains the manufacturer information about the device. Further information to this you find in section *Device* on page *40.*
GSD	By use of the **GSD-Viewer** a GSD file can be searched through. Further information to this you find in section *GSD* on page *40.*
Diagnosis	
Diagnosis/ Extended Diagnosis	At the **Diagnosis** panes diagnosis information can be read. For further information, refer to section *Overview Diagnosis* on page 48.

Table 4: Overview Dialog Panes

Note: Accessing the **Diagnosis** panes of the PROFIBUS DP generic Slave DTM requires an online connection from the PROFIBUS DP generic Slave DTM to the PROFIBUS DP Master DTM.

For further information, refer to section *Connecting/Disconnecting Device* on page 41.

1.5.4 OK, Cancel, Apply and Help

OK, **Cancel**, **Apply** and **Help** you can use as described hereafter.

	Meaning
OK	To confirm your latest settings, click **OK**. All changed values will be applied on the frame application database. *The dialog then closes.*
Cancel	To cancel your latest changes, click **Cancel**. Answer to the safety query **Configuration data has been changed. Do you want to save the data?** by **Yes**, **No** or **Cancel**. **Yes**: The changes are saved or the changed values are applied on the frame application database. *The dialog then closes.* **No**: The changes are not saved or the changed values are not applied on the frame application database. *The dialog then closes.* **Cancel**: *Back to the DTM.*
Apply	To confirm your latest settings, click **Apply**. All changed values will be applied on the frame application database. *The dialog remains opened.*
Help	To open the DTM online help, click **Help**.

Table 5: OK, Cancel, Apply and Help

1.5.5 Table Lines

In the DTM dialog pane table lines can be selected, inserted or deleted.

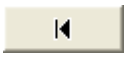
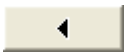
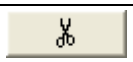
	Meaning
	To select the first line of a table use **First Line**.
	To select the previous line of a table use **Previous Line**.
	To select the next line of a table use **Next Line**.
	To select the last line of a table use **Last Line**.
	**Create a new Line** inserts new lines into the table.
	**Delete selected Line** deletes the selected line from the table.

Table 6: Selecting, inserting, deleting Table Line

1.5.6 Status Bar

The **Status Bar** displays information about the current state of the DTM. The current activity, e.g. the DTM connection state, is signaled graphically via icons in the status bar.

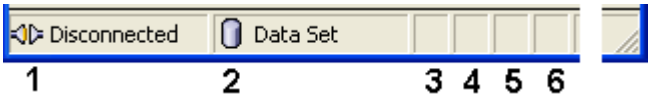
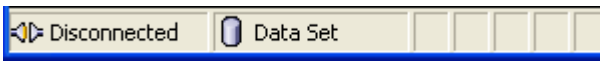


Figure 3: Status Bar – Status Fields 1 to 6

Status Field	Icon / Meaning	
1	**DTM Connection States**	
		Connected: Icon closed = Device is online
		Disconnected: Icon opened = Device is offline
2	**Data Source States**	
		Data set: The displayed data are read out from the instance data set (database).
		Device: The displayed data are read out from the device.
3	**States of the instance Date Set**	
		Valid Modified: Parameter is changed (not equal to data source).

Table 7: Status Bar Icons [1]

Offline State



Online State

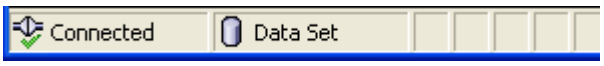


Figure 4: Status Bar Display Example

2 Getting started

2.1 Configuration Steps

The following overview describes the steps to configure a PROFIBUS DP Slave device with the PROFIBUS DP generic Slave DTM as it is typical for many cases. At this time it is presupposed that the PROFIBUS DP Master DTM installation was already done.

The overview lists all the steps in a compressed form. For detailed descriptions of each step refer to the sections noted in the column *For detailed information see section*.

#	Step	Short Description	For detailed information see section	Page
1	Add PROFIBUS DP Slave in the Device Catalog	Add the Slave in the Device Catalog by importing the device description file to the Device Catalog. Depending of the FDT Container. For netDevice: - **Network > Import Device Descriptions**.	*(See Operating Instruction Manual netDevice and netProject)*	-
2	Load device catalog	Depending of the FDT Container. For netDevice: - select **Network > Device Catalog**, - select button **Reload Catalog**.	*(See Operating Instruction Manual netDevice and netProject)*	-
3	Create new project /Open existing project	Depending of the frame application. For the configuration software: - select **File > New** or **File > Open**.	*(See Operating Instruction Manual of the Frame Application)*	-
4	Insert Master or Slave into configuration	Depending of the FDT Container: For netDevice: - in the Device Catalog click to the Controller, - and insert the device via drag and drop **to the line** in the network view, - in the Device Catalog click to the Slave, - and insert the device via drag and drop **to the Controller bus line** in the network view. **Note!** You can select a device PROFIBUS DPV0 (with cyclic communication), a device PROFIBUS DPV1 (with acyclic communication) as well as a device PROFIBUS DPV2 (with cyclic and acyclic communication and Time Sync configuration fo the Slave)	-	-
5	Configure Slave	Configure the Slave device. - Double click to the device icon of the Slave. - The Slave DTM configuration dialog is displayed. In the Slave DTM configuration dialog: - select **Configuration >General**, - set the Watchdog control and Interval, - select **Configuration >Modules**, - configure the Modules of the Slave, - select **Configuration > Signal Configuration**, - proceed the signal configuration, - select **Configuration >Parameters**, - set the module Parameters, - Select **Configuration > Groups**, - assign the Slave to a group, - select **Configuration > Extensions**, - set the Extension parameters, - select **Configuration > DPV1**, - configure the **DPV1** functions, - select **Configuration > DPV2**, - configure the **DPV2** functions, - select **Configuration > Redundancy**, - perform the redundancy configuration, - close the Slave DTM configuration dialog via **OK**.	*Configuring Slave Parameter* *General* *Modules* *Signal Configuration* *Parameters* *Groups* *Extensions* *DPV1* *DPV2* *Redundancy*	*19* *21* *22* 26 *30* *31* *32* *34* 36 37

#	Step	Short Description	For detailed information see section	Page
6	Configuration Steps Master device	Configure the Master device via PROFIBUS DP Master DTM.	*(See Operating Instruction Manual DTM for PROFIBUS DP Master devices)*	-
7	Save project	Depending of the frame application. For the configuration software: - select **File > Save**.	*(See Operating Instruction Manual of the Frame Application)*	-
8	Download Configuration	Depending of the FDT Container. For netDevice: - right click to the device icon of the generic Slave, - select **Download**.	*(See Operating Instruction Manual DTM for PROFIBUS DP Master devices)*	-

Table 8: Getting started - Configuration Steps

3 Configuration

3.1 Overview Configuration

Dialog Panes “Configuration”

The table below gives an overview about the available **Configuration** dialog panes descriptions:

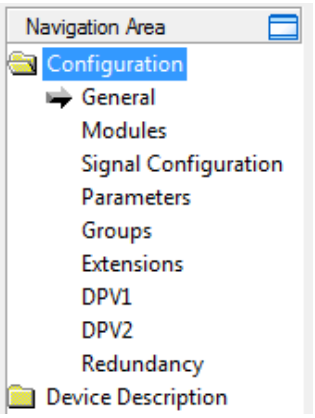
PROFIBUS DP generic Slave DTM	Folder Name / Section	Subsection	Page
 *Navigation Area - Configuration*	*Configuration*	*General*	*21*
		Modules	*22*
		Signal Configuration	26
		Parameters	*30*
		Groups	*31*
		Extensions	*32*
		DPV1	*34*
		DPV2	36
		Redundancy	37

Table 9: Descriptions of the Dialog Panes Configuration

Notice the descriptions in the section *Configuring Slave Parameters* on page 19.

For information to further steps as **Download Configuration** or **Diagnosis**, refer to the Operating Instruction Manual *DTM for PROFIBUS DP Master devices*.

3.2 Configuring Slave Parameters

The following steps are needed to set the Slave device parameters using the PROFIBUS DP generic Slave DTM:

General

1. Set the Watchdog control and Interval:

➢ Select **Configuration > General** in the navigation area.

Modules

2. Configure the **Modules** of the Slave:

➢ Select **Configuration > Modules** in the navigation area.

Signal Configuration

3. Proceed the **Signal Configuration**:

➢ Select **Configuration > Signal Configuration** in the navigation area.

Parameters

4. Set the module **Paramete**rs:

➢ Select **Configuration > Parameters** in the navigation area.

Groups

5. Assign the Slave to a group:

➢ Select **Configuration > Groups** in the navigation area.

Extensions

6. Set the **Extension** parameters:

➢ Select **Configuration > Extensions** in the navigation area.

DPV1

7. Configure the **DPV1** functions:

➢ Select **Configuration > DPV1** in the navigation area.

DPV2

8. Configure the Time Sync for the Slave.

➢ Select **Configuration > DPV2** in the navigation area.

Redundancy

9. Configure the Redundancy Mode and the Output Hold Time for the Slave.

➢ Select **Configuration > Redundancy** in the navigation area.

Close the Generic Slave DTM Configuration Dialog

10. Close the generic Slave DTM configuration dialog via **OK** in order to store your selections.

Further Information

For more information refer to section *General* on page *21*, to section *Modules* on page *22*, to section *Signal Configuration* on page 26, to section *Parameters* on page *30*, to section *Groups* on page *31*, to section *Extensions* on page *32* , to section *DPV1* on page *34*, to section *DPV2* on page 36 and to section *Redundancy* on page37*.*

3.3 General

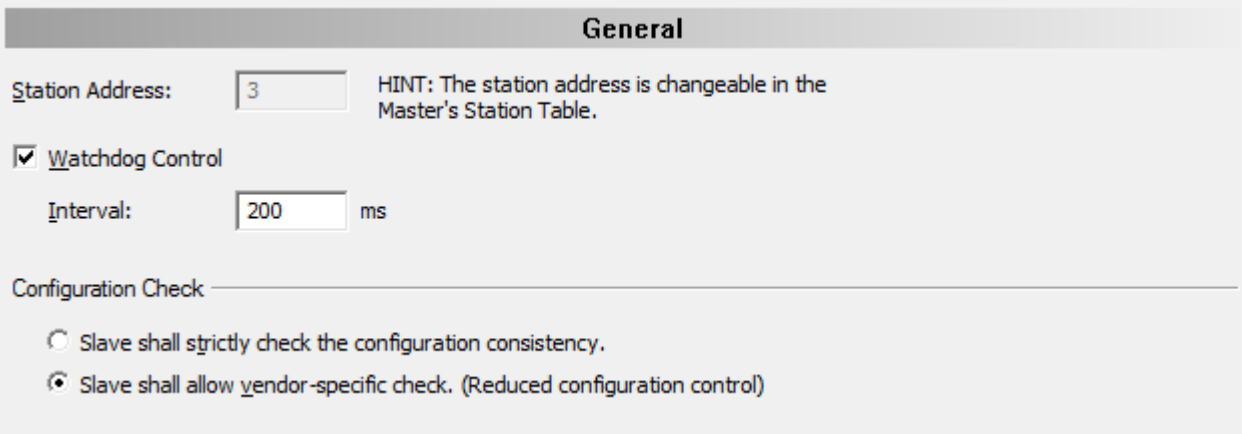


Figure 5: Configuration > General

At the pane **Configuration > General** the actual **Station Address** of the Slave device is displayed. You can set the station address of the PROFIBUS DP Slave device in the configuration of the PROFIBUS DP Master device.

The setting **Watchdog control** activates or deactivates in the PROFIBUS DP Slave the monitoring of communication errors to the assigned DP Master device. E. g. if the PROFIBUS DP Slave device detects an interruption of an already operational communication, defined by the Watchdog time, then the PROFIBUS DP Slave device sets the outputs into the secure condition.

Note: If the monitoring by means of the **Watchdog control** has been deactivated, there is the possibility, that the PROFIBUS DP Slave device does not set its outputs into a safe state, even though the communication has been interrupted.

In the field **Interval** you can set the monitoring time of the selected PROFIBUS DP Slave device.

Note:

- If the monitoring time chosen is too short for a low baud rate, there is the possibility, that the PROFIBUS DP Slave device will set its outputs into the safe state.
- If the monitoring time chosen is too long for a low baud rate, there is the possibility, that if an interruption occurs, the PROFIBUS DP Slave device will take a long time to set its outputs into the safe state.

Configuration Check

The slave device checks the configuration data which the master sends to the slave device during startup. The slave device accepts the configuration data or refuses incorrect configuration data by reporting a configuration fault. This behaviour corresponds to the setting **Slave shall strictly check the configuration consistency** (Default) and means “Startup when expected configuration matches actual configuration”.

Some slave device can startup, even when the expected configuration differs from the actual configuration. This is for example when the expected

configuration contains a module, but is not plugged in the slave device. This behaviour is vendor-specific and corresponds to the setting **Slave shall allow vendor-specific check. (Reduced configuration control)**. This setting is usable only when the slave device supports it.

3.4 Modules

At the **Modules** pane modules can be selected or assigned and configured.

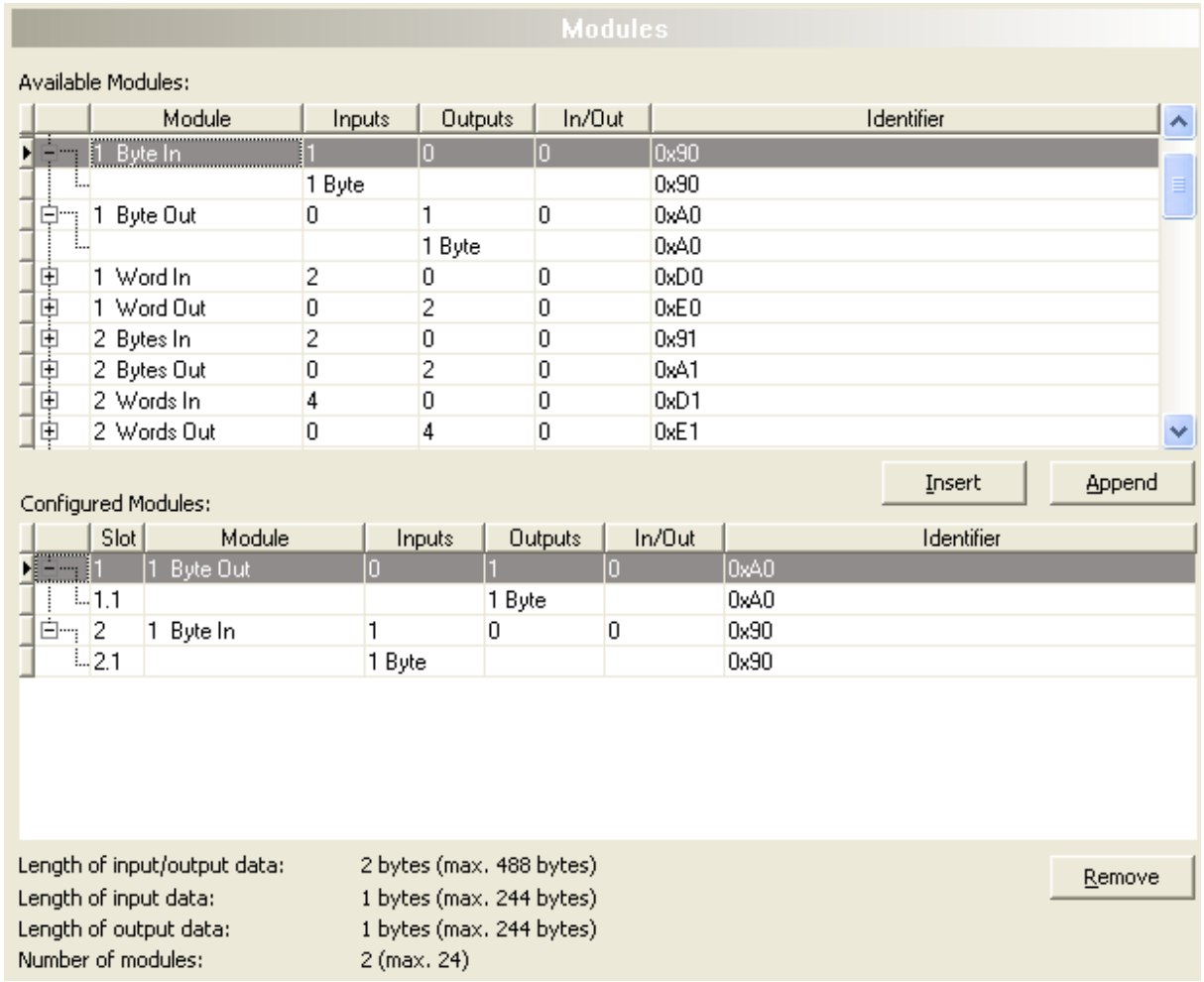


Figure 6: Configuration > Modules (CIFX DP/DPS, Example of a simple Slave)

There are two kinds of Slaves (Slave devices). A **simple Slave** has a fixed data length. The data length of a **complex** and **modular Slave** is configurable. The selection list **Available Modules** shows all possible modules of the Slave.

- **Module Configuration of a simple Slave**

In the case of a simple Slave, one module is shown and it is copied automatically into the list **Configured Modules**.

For simple Slaves in the column **Module** a module name is displayed. This one indicates the number of inputs, outputs or inputs/outputs of that module. In the line with the module name in the columns **Inputs**, **Outputs** and **In/Out** the number of inputs, the number of outputs or the number of inputs/outputs of the module will be displayed in Bytes. In the line below the module name, the number and the data type (byte or word) of the inputs, outputs or inputs/outputs of this module are displayed.

- **Module Configuration of a complex modular Slave**

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

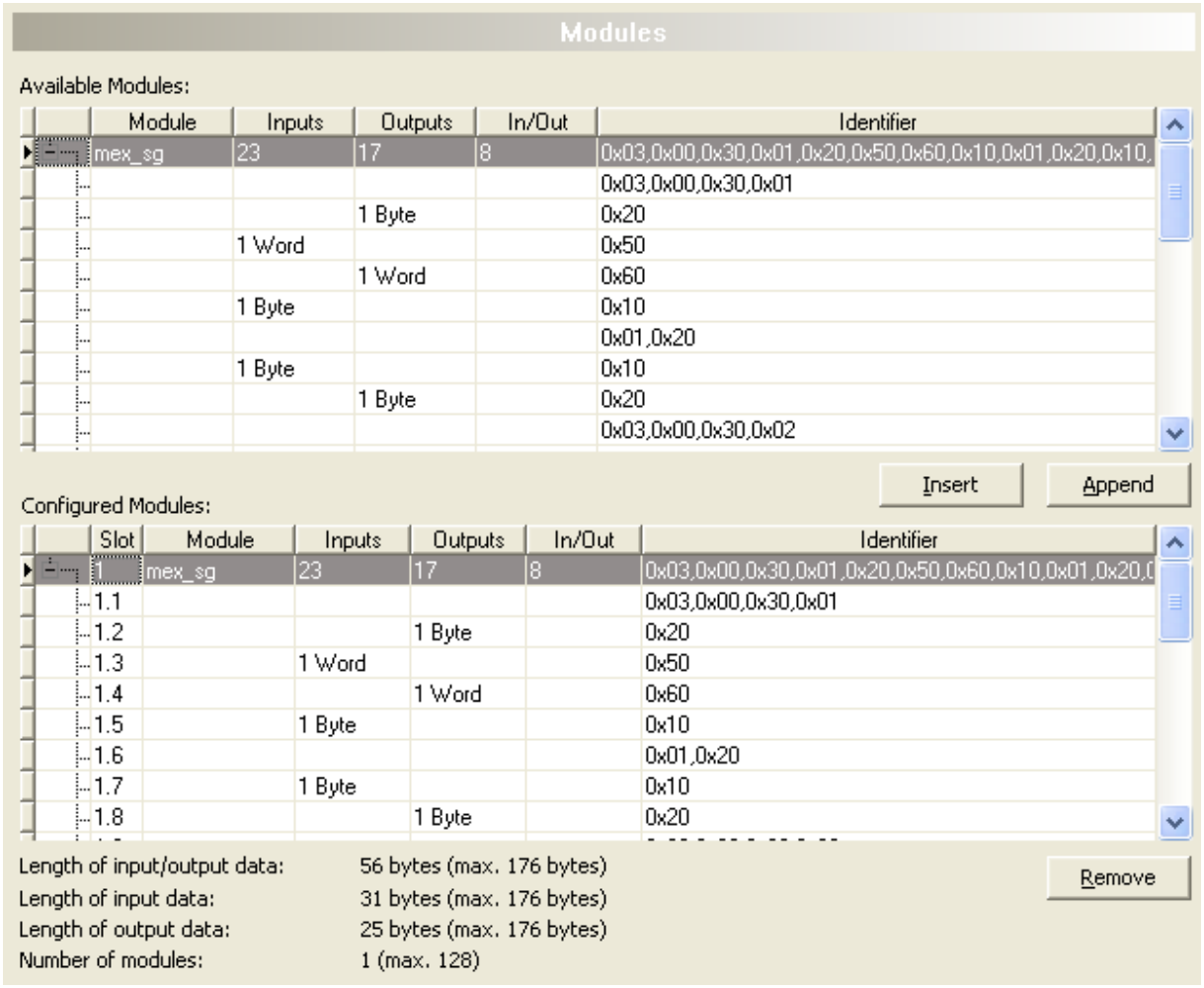


Figure 7: Configuration > Modules (XN-mex_sg, Example of a complex modulare Slave)

For modules consisting from several submodules, in the column **Module** the module name is displayed. In the line with the module name in the columns **Inputs**, **Outputs** and **In/Out** the number of inputs, the number of outputs or the number of inputs/outputs of the module will be displayed in Bytes. In the line below the module name, the number and the data type (byte or word) of the inputs, outputs or inputs/outputs of this module are displayed. In the columns **Inputs**, **Outputs** and **In/Out** for each submodule the number and the data type (byte or word) of the inputs, outputs or inputs/outputs are displayed.

In the column **Identifier** all identifier of the sub modules are displayed in the same line. A description of the Module Configuration Identifier you find in section *Identifier Bytes* on page *61*.

The **Slot** column shows a sequential number for the modules or a sequential subnumber for the submodules of a module.

3.4.1 Configuration of the Modules of a Slave

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

1. Insert all the required modules from the selection list **Available Modules** into the list **Configured Modules**. There are several possibilities to select available modules. This is described in section *Appending or inserting* available Modules on page 25.

The sequence of the modules in the list **Configured Modules** is important and must match with the sequence which exists in the Master. Typically, the sequence is the actual physical sequence. There are Slaves to which this rule does not apply and where for example first analogue modules and then digital modules must be entered, independent of their actual sequence.

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

Note: If the Slave device has only one module, this module is taken over automatically in the table **Configured Modules** and can not be deleted.

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

3.4.2 Appending or inserting available Modules

You can append or insert one or several modules to the list **Configured Modules**.

Note: A multiselection is possible. Therefore click in the list **Available Modules** on several modules while holding the SHIFT key.

Appending Modules

- Under **Available Modules** click on one or several modules and click on **Append**.
- Or double click on these modules.

↬ The modules appear at the lower end of the list **Configured Modules**.

Inserting Modules

- Under **Available Modules** click on one or several modules.
- Under **Configured Modules** click to the module before which the additional modules shall be inserted.
- Click **Insert**.

↬ The modules appear in the list **Configured Modules** before the selected module.

3.4.3 Remove configured Modules

From the **Configured Modules** list you can remove single modules.

- Therefore click under **Configured Modules** to the module you wish to remove from the list.
- Click **Remove**.

↬ The module is removed from the **Configured Modules** list.

3.5 Signal Configuration

In the **Signal Configuration** dialog you can define the data structure of the input or output data of your device transmitted at the bus. The input and output data coming from the bus and shown in the module configuration are not very meaningful for the further use. You can not read from it where a signal is generated, and how it is used. However, in the signal configuration you can specify the structure or the data types of the input and output data in more detail. Therefore you need to structure the input and output data as signals and enter appropriate signal names for each use case as well as to configure the data types for the signals. The generated signal configuration then allows an easy identification of the transmitted input and output data.

The default names for the signals assigned by the configuration software, as Input_1, Input_2, Output_1 or Output_2, are designed to distinguish between the input and output signals. These names you can replace by terms such as "reference" or "status", etc. Furthermore, you can specify the data type of a signal more accurately, and whether it is a signed or unsigned value.

Example for the Signal Configuration: For example you can specify that 4 bytes of input data together match with 1 input signal of the data type ‚UNSIGNED32'.

4 Byte (input) = 1 ‚UNSIGNED32’ (input)

The GSD file for your device includes the definition of the identifier bytes specified by the PROFIBUS DP standard and contains the data types BYTE and WORD, which are displayed in the signal configuration. For the shown example 4 ‚BYTE' input data correspond to 1 signal of the data type ‚UNSIGNED32'. That is to say, on the lower level the transmitted bytes are set, whereas on the level above it is set how the data are used and interpreted.

Note: The data types specified in the GSD file under Data_Area represent the **default** value for the data type. Data types that are not supported by the configuration software will not be built in the signal configuration. For these data types you must build the module configuration by creating signals from the provided data types.

3.5.1 Dialog Pane Signal Configuration

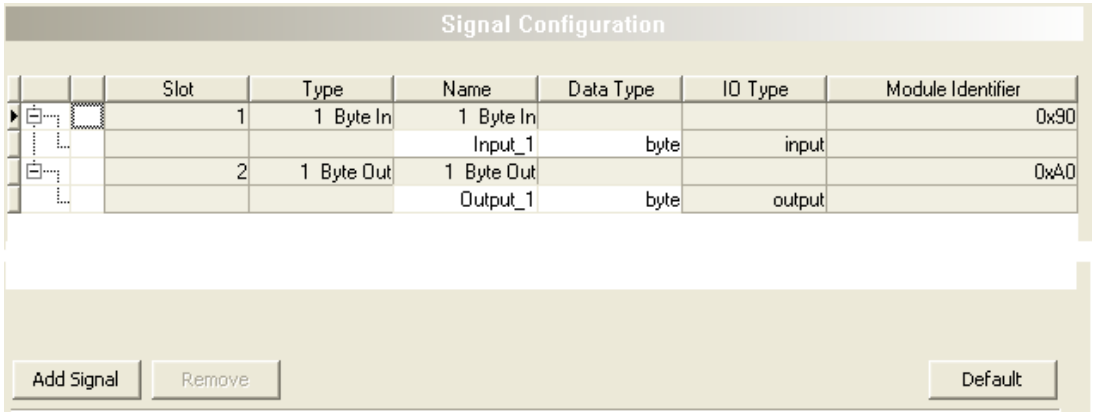


Figure 8: Configuration > Signal Configuration - Example

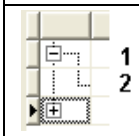
Parameter	Meaning	Range of Value/ Value
	The arrow symbol shows the current line in the table. This line is the reference for **Add Signal** and **Remove**.	checked, unchecked, Default: checked
	The tree shows the structure of the modules (1) with its configured signals (2).	
	The modified signal configuration is incorrect. For example, if a duplicate name is used or if the length of the signal exceeds the configured length for the data transferred on the bus.	
Slot	**Slot** shows a sequential number for the modules or a sequential subnumber for the submodules of a module.	
Type	Not editable names of the modules with the input or output signals.	Byte In, Byte Out
Name	Not editable names of the modules Editable name for the input or output signals, as for example Input_1, Input_2, Output_1 or Output_2	Modules: Byte In, Byte Out
Data Type	Data type of the single input or output signals. Depending by the used device profile the user can select the data type from a list.	BYTE, SIGNED8/16/32, UNSIGNED8/16/32
IO Type	Input signal or output signal	input, output
Module Identifier	Hexadecimal module identifier for every single module A description of the Module Configuration Identifier you find in section *Identifier Bytes* on page *61*.	
Add Signal	Using **Add Signal** you can insert additional signals to a module.	
Remove	Using **Remove** you can remove the current signal line from a signal configuration table.	
Default	Using **Default** you can reset the signal configuration to the configuration defined in the **Modules** pane.	

Table 10: Explanations to the Dialog Pane Signal Configuration

3.5.2 Configuration Steps

1. Select **Configuration** > **Signal Configuration** in the navigation area.

➢ The dialog pane **Signal Configuration** is displayed.

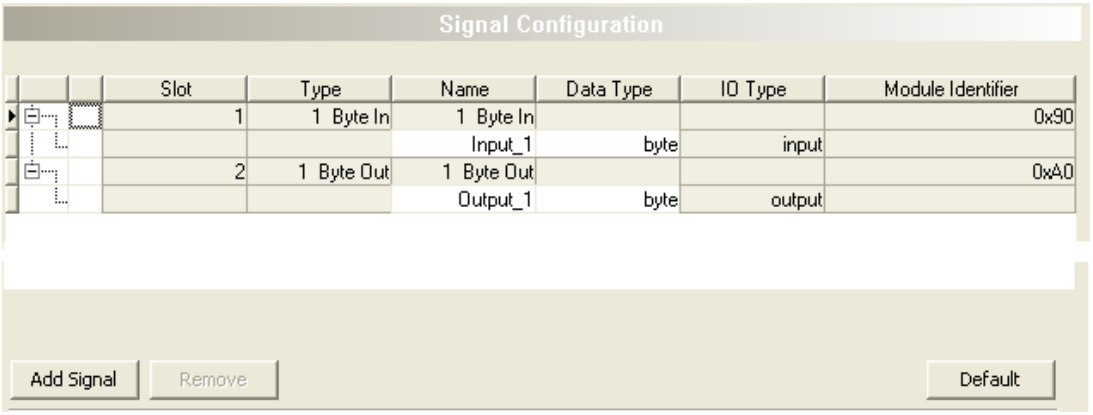


Figure 9: Configuration > Signal Configuration - Example

2. Adjust Signal Names.

➢ In the column **Name** adjust the names for the signals.

3. Define Data Types.

➢ In the column **Data Type** define the data types for the signals.

Note: For data types that are not supported by the configuration software you must build the module configuration by creating signals from the provided data types.

4. Add Signal.

➢ Click on the line of the module, to which you intend to add a new signal.

➢ Click **Add Signal**.

➢ At the lower end of the signal list of that module a new line for a new signal is inserted.

➢ The signals of the type ‚Input' are sequentially assigned to the input data.

➢ The signals of the type ‚Output' are sequentially assigned to the output data.

Note: As a maximum you can insert as many signals as input or output data are configured.

If you insert more input signals, than input data are configured or if you insert more output signals, than output data are configured, the *"Info - The total data length of signals exceeded module limit!"* is displayed:

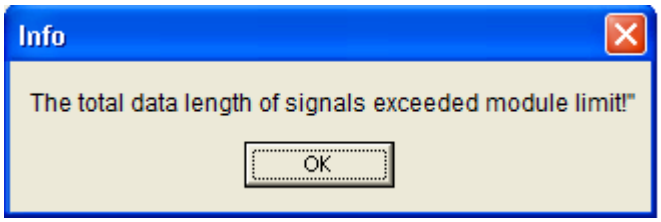


Figure 10: Info – Signal Length too large

If you afterwards click to **Apply** or **OK**, the *„Error – Signal Configuration is invalid "* is displayed.

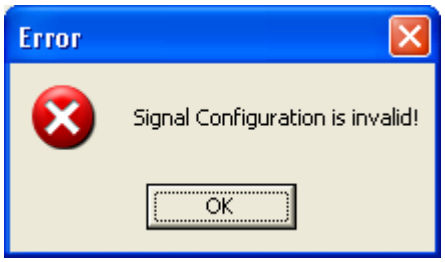


Figure 11: Error – Signal Configuration is invalid

5. If the configured signal length has been exceeded, remove signals from the configuration.

➢ Click to the line of the signal to be removed.

➢ Click **Remove**.

➢ The marked signal is removed from the configuration.

6. Save Configuration

➢ Save your configuration using **Apply** or **OK**.

3.5.3 Default

Important! First save your signal configuration before resetting the signal configuration to the default settings made in the **Modules** pane. Using **Default** all manually inserted signals and names get lost.

➢ Save your signal configuration using **Apply** or **OK**.

➢ Or save the entire project.

➢ Click **Default**.

➢ The signal configuration is reset to the configuration made in the **Modules** pane.

3.6 Parameters

The pane **Parameters** allows it to change the parameter settings of the modules.

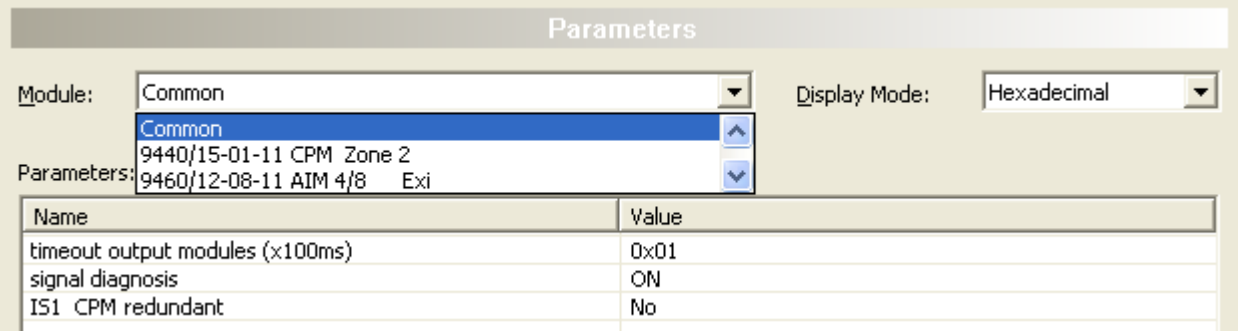


Figure 12: Configuration > Parameters

If default parameters are available in the GSD file of the Slave, they are automatically inserted.

Some of the DP Slave devices require further Parameter data, for instance in order to change a measuring limit or a value range. This type of data is manufacturer and slave specific. The meaning of the parameters is determined by the device manufacturer. The explanations can be taken from the manufacturers' manual.

- **Module**

In the Module field the module which should be displayed has to be selected. The modules have to be assigned in the Configuration before (see section *Modules* on page *22*).

- **Parameter and Value**

The Values of the Parameters can be changed by making a double click on the parameter.

The meaning of the single Parameters can be found in the manual of the device manufacturer.

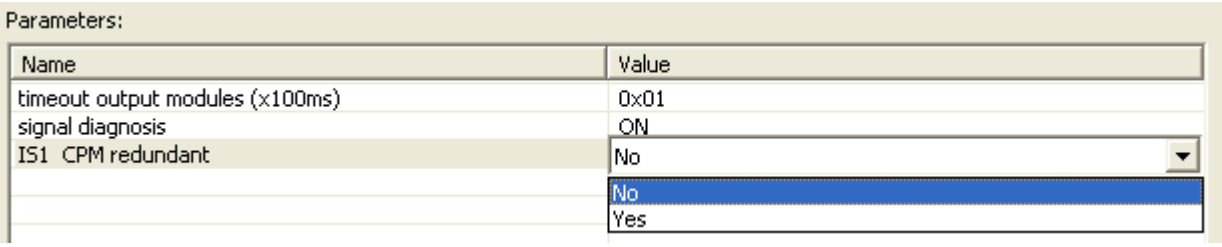


Figure 13: Change Parameter Values

The **Representation** of the parameter values is by default in hexadecimal representation. If in the drop down list **Display Mode** the item 'Decimal' is selected, the representation changes into the decimal representation.

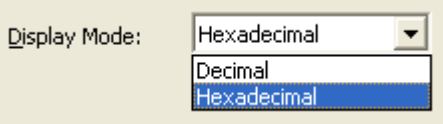


Figure 14: Decimal Representation of the Parameter Values

3.7 Groups

After a Master was arranged, the single Slaves devices can be assigned to up to eight different **Groups**.

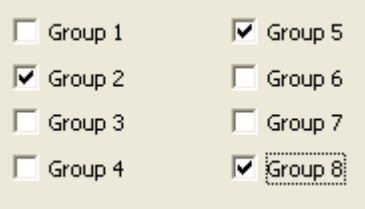


Figure 15: Configuration > Groups

The assignment of the actual Slave device to one or more groups takes place by enabling the group respectively groups with the desired characteristics.

The selected group membership is transferred to the Slave device during its start-up sequence. The group membership acts as a filter for the Sync and Freeze global commands. These are output as Broadcast telegrams in order to synchronize the input and output data of several Slaves. Only the Slaves in whose group these commands have been assigned react on it.

3.8 Extensions

The **Extensions** pane contains adjustment possibilities for the extension parameters: Auto Clear, Fail Safe Behavior, Configuration Data Convention, Error on Cyclic Data Exchange and Diagnosis update delay.

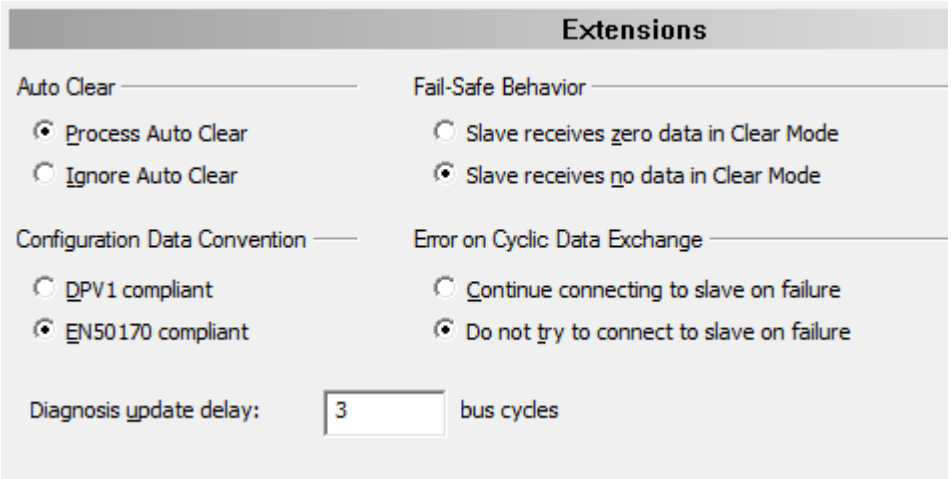


Figure 16: Configuration > Extensions (Example for Fail-Safe Behavior - Slave supports both functions)

Setting	Description	Range of Value/ Value
Auto Clear	The setting **Auto Clear** activates or respectively deactivates the 'Auto Clear' function of the current Slave. This function can only be used if the global Auto Clear is activated in the Master. The setting of the global 'Auto Clear' is typically configured with the bus parameters of the Master. If no data exchange occurs to at least one Slave (setting **Process Auto Clear**) or an existing data exchange takes place after the expiration of a monitoring time, then the Master leaves the data exchange and sets the outputs of **all** assigned DP Slaves into a secure condition. If the setting **Ignore Auto Clear** is selected, the Master tries to stay in the data exchange with the other Slaves.	Process Auto Clear, Ignore Auto Clear, Default: Process Auto Clear
Fail Safe Behavior	The setting for **Fail Safe Behavior** is read from the GSD file and is a fixed setting. The user can select between both options only if the Slave supports them. Depending by which pre-settings are contained in the GSD file, the **Fail Safe Behavior** mode can get the following settings: 1. **Slave receives zero data in Clear Mode** (fixed setting) 2. **Slave receives no data in Clear Mode** (fixed setting) 3. the user can select between - **Slave receives zero data in Clear Mode** - **Slave receives no data in Clear Mode** (Default). The **Fail Safe Behavior** mode indicates to the Master that the affected Slave is working in a so-called Fail_safe mode. If the Fail Safe mode is activated (setting **Slave receives zero data in Clear Mode**), in the CLEAR state the Slave will receive output data of the length zero instead of the zero output data. Based on this method (setting **Slave receives zero data in Clear Mode**), the Slave immediately recognizes that the Master is in the CLEAR condition even if a previous CLEAR command had been destroyed on the Bus.	Slave receives zero data in Clear Mode, Slave receives no data in Clear Mode, Default: The setting for **Fail Safe Behavior** is read from the GSD file. ('Slave receives no data in Clear Mode' = default if the Slave supports both functions.)

Setting	Description	Range of Value/ Value
Configuration Data Convention	The **Configuration Data Convention** determines whether the configuration data is interpreted according to **EN 50170** (supported) or additional configuration data according to PROFIBUS **DPV1** extension is used (not supported).	DPV1 compliant, EN 50170 compliant, Default: EN 50170 compliant
Error on Cyclic Data Exchange	If **Continue connecting to slave on failure** is selected, the Master remains in the state DATA_EXCHANGE and holds the connection to the Slave, although the Slave does not respond and the Master does not receive the response from the Slave. If **Do not try to connect to slave on failure** is selected, the Master does not remain in the DATA_EXCHANGE condition for the affected Slave if the Slave has been recognized as incorrect, but breaks off the connection to the Slave.	Continue connecting to slave on failure, Do not try to connect to slave on failure, Default: 'Do not try to connect to slave on failure'
Diagnosis update delay	Some Slave devices which are newer require more time for the consistency testing for the processing of the SET_PRM parameter zing telegrams. In this case the standard diagnosis cycle is not sufficient after the parameterizing phase, to detect the disposition of the Slave for the DATA_EXCHANGE. With the diagnosis delay, the number of diagnosis cycles is advanced after the parameterizing phase, which is the maximum that the Master waits for this disposition, before it starts a new parameterizing. The value range is 0..255.	3 bus cycles

Table 11: Configuration > Extensions

3.9 DPV1

DPV1 serves for an acyclic data exchange and supports the functions read write and alarm handling.

Note: DPV1 functions can only be used and configured, if the used DP Master supports DPV1 functions.

Enable DPV1

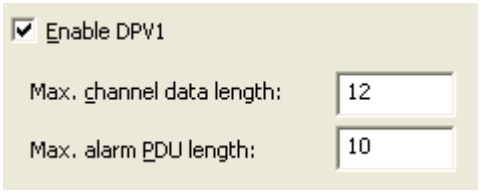


Figure 17: Configuration > DPV1 > Enable DPV1

The option **Enable DPV1** has to be enabled, to activate DPV1. All setting possibilities concerning DPV1 are grayed out before activating.

Note: In case of Slave devices which do not support DPV1, the **Enable DPV1** field is grayed out and can not be selected for this Slaves.

The **Max. channel data length** determines the maximum length of the DPV1 Alarm telegrams. The Slave will arrange its buffer size for the concerning number of data.

The **Max. alarm PDU length** determines the maximum quantity of active alarms.

Alarms

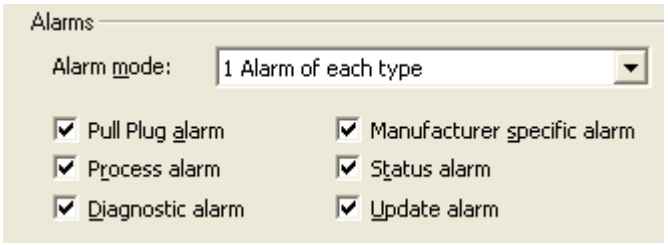


Figure 18: Configuration > DPV1 > Alarms

The **Alarm mode** defines the maximum number of possible active alarms: 1 alarm of each type respectively 2, 4, 8, 12, 16, 24 or 32 alarms in total.

The following alarms can be activated or deactivated by selecting it or not.

- Pull Plug alarm (module pulled),
- Process alarm,
- Diagnosis alarm,
- Manufacturer specific alarm,
- Status alarm and
- Update alarm.

Extra Alarm SAP

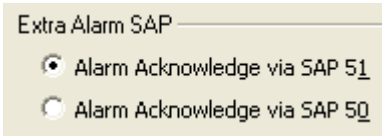


Figure 19: Configuration > DPV1 > Extra Alarm SAP

It the field **Extra Alarm SAP** it is set, if the DPV1 Master acknowledges an alarm to the DPV1 Salve via **SAP 51** or **SAP 50**.

Setting	Description	Range of Value/ Value
Extra Alarm SAP	**SAP 51** The PROFIBUS DPV1 Master acknowledges alarms via SAP 51. The Master uses SAP 51 for DPV1 read/write and for the alarm acknowledge to this Slave device. **SAP 50** The PROFIBUS DPV1 Master acknowledges alarms via SAP 50. The Master uses SAP 50 for the alarm acknowledge to this Slave. However, the Master still uses SAP 51 for DPV1 read/write services. This setting may cause a higher performance because SAP 50 is used exclusively for the alarm acknowledge and can not be delayed by a running DPV1 read/write service. To use this feature requires that the Slave supports it. This information is part of the GSD file.	Alarm Acknowledge via SAP 51, Alarm Acknowledge via SAP 50, Default: Alarm Acknowledge via SAP 51 is set if GSD file does not provide the default SAP. Otherwise the default SAP is read from the GSD file: - If GSD file delivers SAP 50, this value is used. - If GSD file delivers SAP 51, this value is used.

Table 12: Configuration > DPV1 > Extra Alarm SAP

3.10 DPV2

The **DPV2** pane contains adjustment possibilities for the Time Sync configuration for the Slave.

Activate Time Sync, Clock Sync Interval

For Time Sync configuration the settings **Activate Time Sync** and **Clock Sync Interval** must be used.

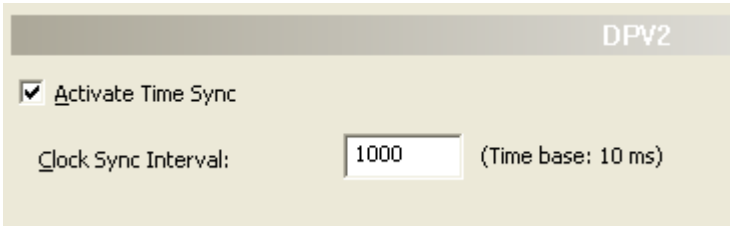


Figure 20: Configuration > DPV2 > Activate Time Sync, Clock Sync Interval

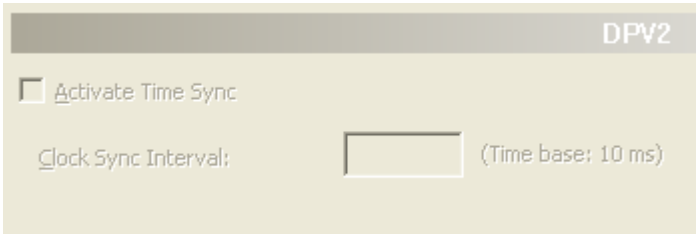


Figure 21: Configuration > DPV2 > Activate Time Sync, Clock Sync Interval - grayed out as Time Sync is not supported by the Slave (GSD)

Parameter	Meaning	Range of Value/Value
Activate Time Sync	**Activate Time Sync** is enabled (checked), if Time Sync is supported by the Slave (GSD). Otherwise the field is grayed out and can not be checked for this Slave.	checked, unchecked, Default: unchecked (*Time_Sync_supp* is set to true in GSD)
Clock Sync Interval (Time base 10 ms)	**Clock Sync Interval** of the Out signal in 10ms steps. Time base 10 ms: e.g. the value 1000 results as 10ms*1000=10s Clock Sync Interval	1 … 2^{16} – 1, Default: 1000

Table 13: Activate Time Sync, Clock Sync Interval

- Respectively adjust **Clock Sync Interval**.

3.11 Redundancy

The **Redundancy** pane contains adjustment possibilities for the Redundancy configuration for the Slave.

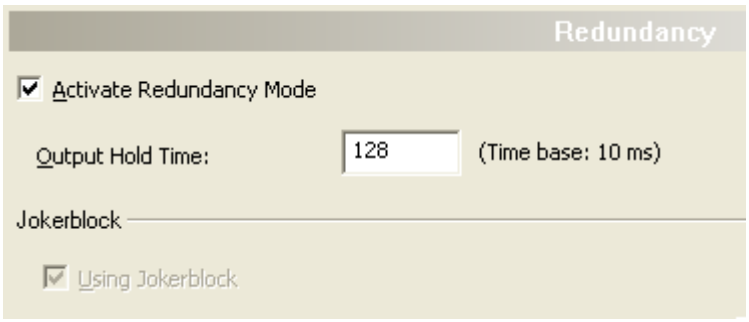


Figure 22: Configuration > Redundancy

Activate Redundancy Mode, Output Hold Time

For Redundancy configuration of the Slave the settings **Activate Redundancy Mode,** and **Output Hold Time** must be used.

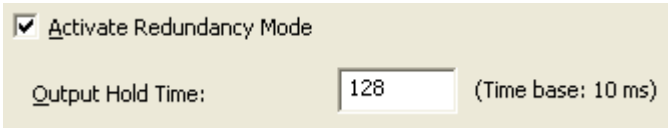


Figure 23: Configuration > Redundancy > Activate Redundancy Mode, Output Hold Time

Parameter	Meaning	Range of Value/Value
Activate Redundancy Mode	**Activate Redundancy Mode** is enabled (checked), if Redundancy is supported by the Slave (GSD). Otherwise the field is grayed out and can not be checked for this Slave. **Note:** When Redundancy Mode is activated, Station Address Offset will be set to 0 always.	checked, unchecked, Default: unchecked (*Slave_Redundancy_supp* and *PrmCmd_supp* are set to true in GSD)
Output Hold Time (Time base 10 ms)	**Hold Time of the Out signal** in 10ms steps. Time base 10 ms: e.g. the value 128 (0x0080) results as 10ms*128=1280ms=1,28s Hold Time	0 … 2^{16} – 1, Default: *Slave_Max_Switch_Over_Time +1* (if specified in GSD), otherwise:128

Table 14: Activate Redundancy Mode, Output Hold Time

➢ Adjust **Output Hold Time**.

Using Jokerblock

Figure 24: Configuration > Redundancy > Using Jokerblock (enabled)

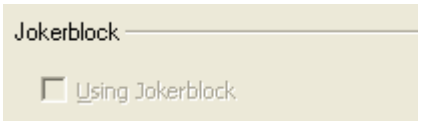


Figure 25: Configuration > Redundancy > Using Jokerblock (disabled)

Parameter	Meaning	Range of Value/Value
Using Jokerblock	The field is grayed out and can not be checked/unchecked by the user. **Using Jokerblock** is enabled (checked) if GSD for the Slave specifies *Jokerblock_supp = 1 & Jokerblock_Location = 0 or 1 & Jokerblock_Type=129* Otherwise this option is disabled (unchecked) for this Slave. Note: Ext-Prm-Telegram is not supported!	checked, unchecked, Default: checked (*Jokerblock_supp = 1 & Jokerblock_ Location = 0 or 1 & Jokerblock_Type=129* are set to true in GSD)

Table 15: Using Jokerblock

4 Device Description

4.1 About Device Description

Dialog Panes “Device Description”

The table below gives an overview for the **Device Description** dialog panes descriptions:

PROFIBUS DP generic Slave DTM	Folder Name / Section	Subsection	Page
 *Navigation Area - Description*	*Device Description*	*Device*	40
		GSD	40

Table 16: Descriptions of the Dialog Panes Device Description

4.2 Device

The **Device Info** dialog contains manufacturer information about the device, which is defined in the GSD file. The following information is indicated:

Parameter	Meaning
Vendor name	Vendor name of the device
Product name	Name of the device
Ident number	Identification number of the device
Revision	Hardware reference

Table 17: General Device Information

4.3 GSD

The **GSD Viewer** shows the content of the GSD file in a text view.

Under **Filename** the file directory path and the file name of the displayed GSD file is displayed. **Find what** offers a search feature to search for text contents within the text of the GSD file.

In the GSD Viewer window on the left side, the line number is displayed for simple overview, the further entries show the GSD file in text format.

Parameter	Meaning
Filename	File directory path and the file name of the displayed GSD file.
Find what	Search feature to search for text contents within the text of the GSD file.
Match case	Search option
Match whole word	Search option

Table 18: Device Description – GSD Viewer

5 Online Functions

5.1 Connecting/Disconnecting Device

Note: To access to the **diagnosis** panes and to use the diagnosis, requires an online connection from the generic PROFIBUS DP Slave DTM to the PROFIBUS DP Master DTM. This online connection can only be build up if a driver is assigned to the PROFIBUS DP Master device.

For information on how to select a driver, to scan for a device and to select it in the Master DTM dialog, refer to the Operating Instruction Manual *DTM for PROFIBUS DP Master devices*.

Connecting Device

The following steps are needed to establish a connection from the generic PROFIBUS DP Slave DTM to the PROFIBUS DP Master DTM:

1. In the Master DTM dialog verify that the default driver is checked and respectively check another or multiple drivers.
2. Configure the driver, scan for the device and select it and select and download the firmware.
3. Close the user dialog of the PROFIBUS DP Master DTM via the **OK** button.
4. Put a right-click on the device icon of the generic PROFIBUS DP Slave.
5. Select the **Connect** command from the context menu (right mouse button).

↬ The generic PROFIBUS DP Slave DTM now is connected to the PROFIBUS DP Master DTM via an online connection. In the network view the device description at the device icon is displayed with a green colored background.

Disconnecting Device

The following steps are needed to disconnect an online connection from the generic PROFIBUS DP Slave DTM to the PROFIBUS DP Master DTM:

1. Close the user dialog of the generic PROFIBUS DP Slave DTM via the **OK** button.
2. Right-click on the device icon of the generic PROFIBUS DP Slave.
3. Select the **Disconnect** command from the context menu (right mouse button).

↬ The online connection from the generic PROFIBUS DP Slave DTM to the PROFIBUS DP Master DTM is disconnected. In the network view the device description is displayed not any more with a green colored background.

5.2 Upload

Using the **Upload** function of the PROFIBUS DP generic Slave DTM, you can upload the configuration of a PROFIBUS DP Slave device via the PROFIBUS DP Master device and the PROFIBUS DP Master DTM to the PROFIBUS DP generic Slave DTM and then generate the module configuration. Then you must download the changed configuration of the PROFIBUS DP Slave device via **Download** to the PROFIBUS DP Master device.

Steps for Upload and Download

1. Upload the PROFIBUS DP Slave device configuration and generate the module configuration.

➢ In netDevice: right-click on the device symbol of the PROFIBUS DP generic Slave DTM.

➢ Select **Upload** from the context menu.

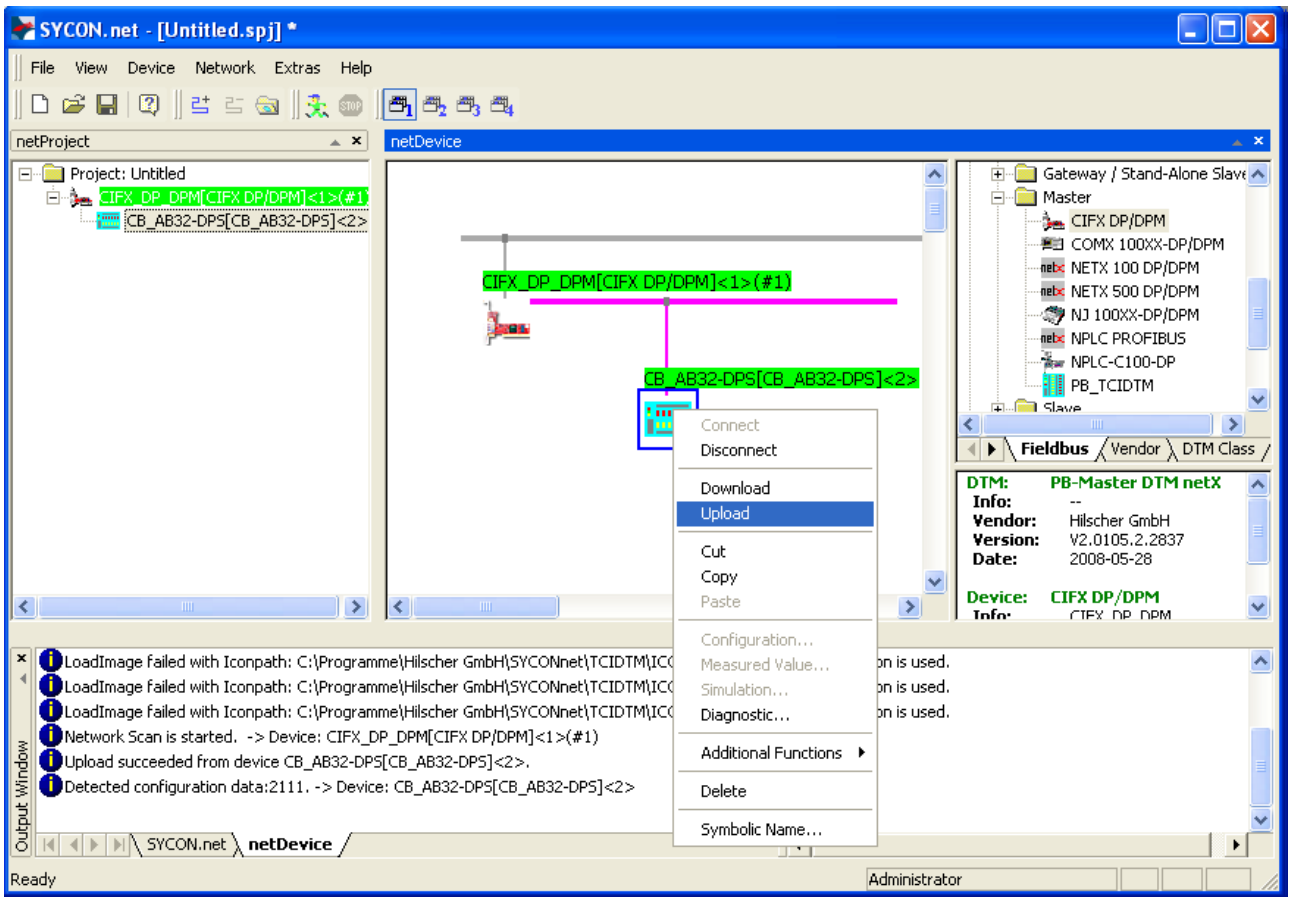


Figure 26: ‚Upload' - Configuration of a Slave Device (Example ‚CB_AB32-DPS')

➢ If in the PROFIBUS DP generic Slave DTM already a module configuration is present, the dialog **Question – Upload function will overwrite any existing module configuration. Do you wish to proceed?** is displayed.

➢ To proceed the upload, select **Yes**.

- The dialog **Devices** *Symbolic Name of the Device [Device Description] <Device Address>* **Starting Upload …** appears. The dialog shows the progress of the upload process. (Depending on the manufacturer of the respective device, also a dialog with some slight deviations from this one may be displayed.)
- Additionally you are asked whether the module configuration of the PROFIBUS DP Slave device should be generated.

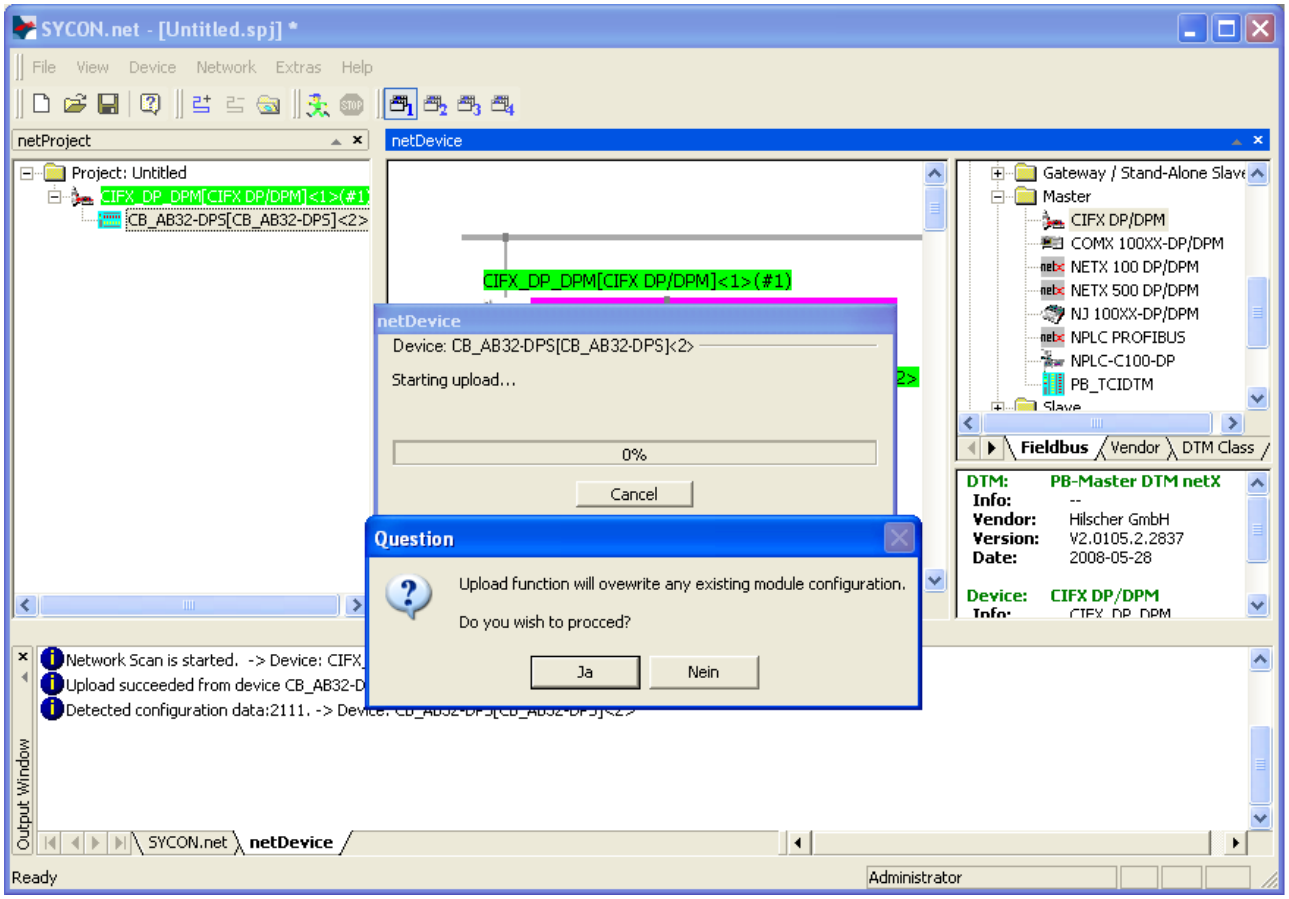


Figure 27: Query about the Generation of the Module Configuration (Example ‚CB_AB32-DPS')

- Answer the query by **Yes**.
- The current configuration of the PROFIBUS DP Slave device is uploaded via the PROFIBUS DP Master device and the PROFIBUS DP Master DTM to the PROFIBUS DP generic Slave DTM.
- The success of the upload procedure is reported in the output window.

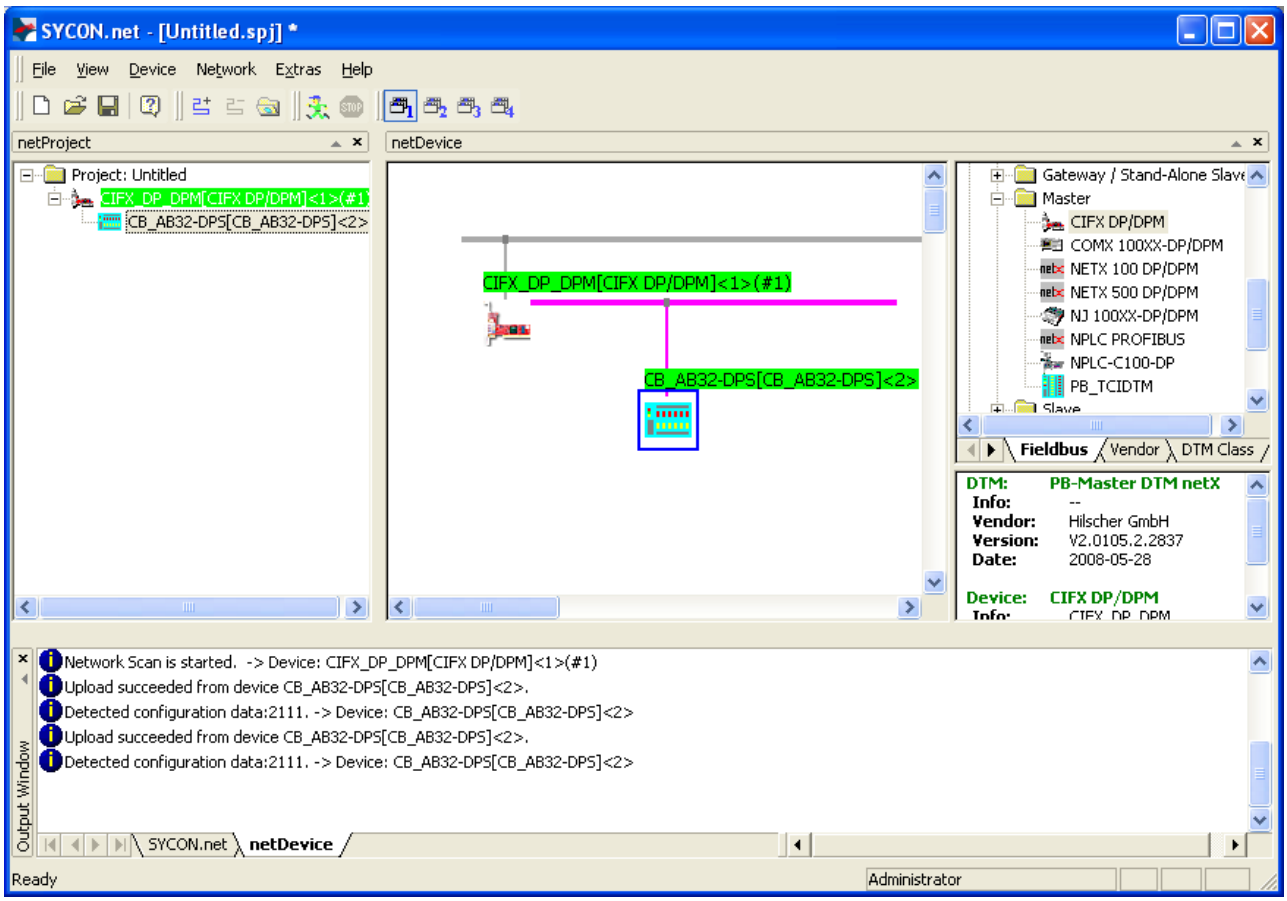


Figure 28: Upload succeeded (Example ‚CB_AB32-DPS')

Note: If a module identifier conflict occurs when scanning the module configuration, the **Upload** dialog appears, where occurred conflicts are displayed in red. For information to resolve identified module identifier conflicts refer to section *Resolving Module Identifier Conflicts* on page 45.

2. Download the current configuration of the PROFIBUS DP Slave device to the PROFIBUS DP Master device.

- In netDevice: right-click on the device symbol of the PROFIBUS DP Master DTM.
- Select **Download** from the context menu.

5.2.1 Resolving Module Identifier Conflicts

5.2.1.1 Upload Dialog

The **Upload** pane will be displayed only if modules are detected, which show a module identifier conflict, i. e., modules which have the same module identifier and not a unique one each. These modules then are listed under **Configured Modules** marked in red.

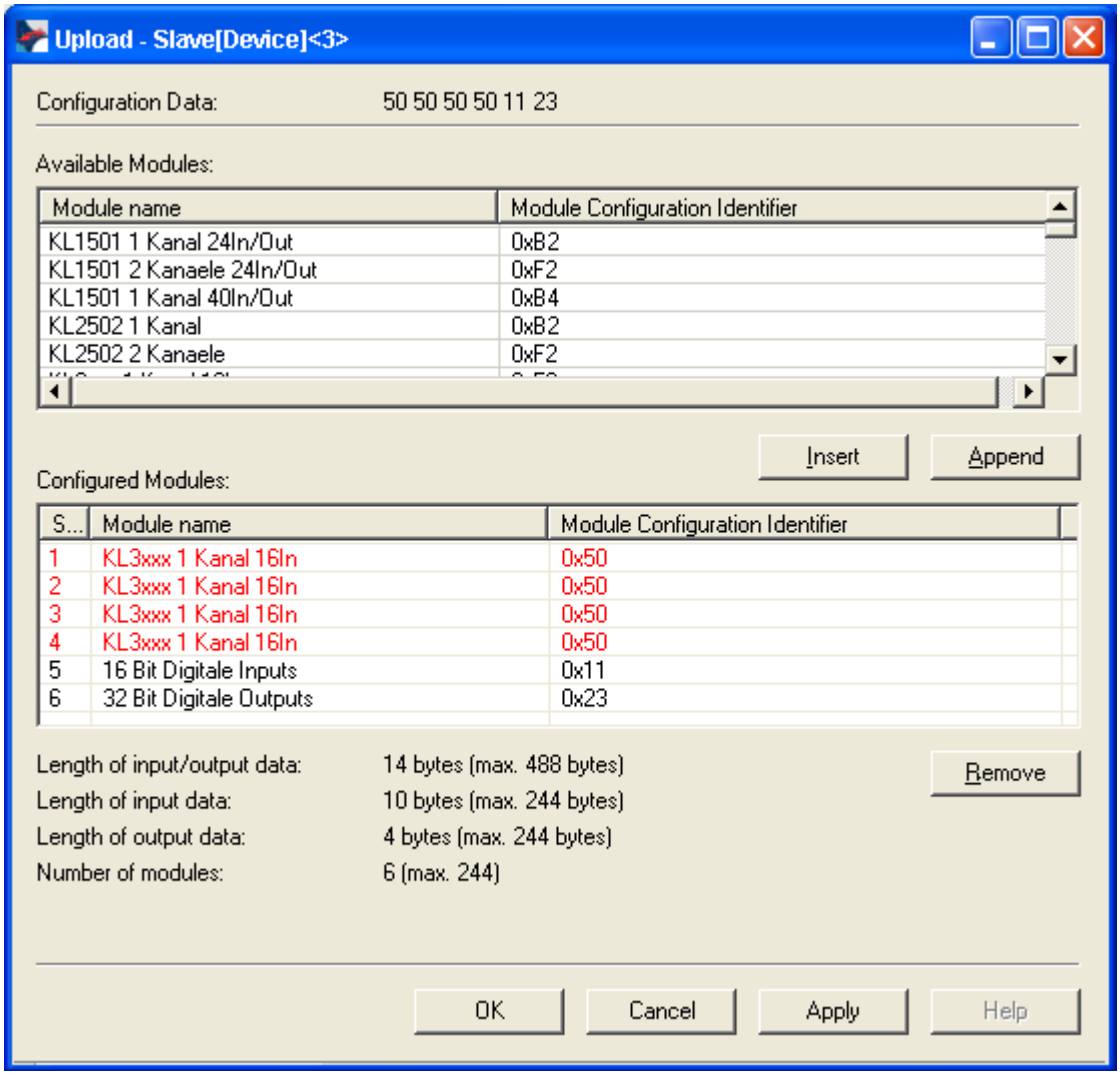


Figure 29: > Upload

Column	Description
Configuration Data	Shows the scanned module configuration (sequence of the module configuration identifier).
Available Modules	Shows all possible modules of the Slave. A simple Slave has a fixed data length. The data length of a modular Slave is configurable.
Configured Modules	In the case of a simple Slave, one module is displayed here. In case of a modular Slave, the scanned module configuration is displayed here.
Module name	Shows the name of the available respectively of the configured modules.
Module Configuration Identifier	Shows all identifier of the sub modules in the same row. For more information refer to the Operating Instruction Manual of the Generic Slave DTM.
Slot	Shows a sequential number for modules.

Table 19: Upload

5.2.1.2 Module Identifier Conflicts

During the upload detected module identifier conflicts are displayed in the **Upload** dialog marked in red. This allows the user to clarify whether the scanned module configuration of a Slave corresponds to the actual physical module sequence in the Slave device or not. The user must replace scanned modules indicating a conflict using **Remove**, **Insert** or **Append**.

5.2.1.3 Resolving Module Identifier Conflicts

If the module configuration of a Slave device is indicated with a conflict, you must check and manually adapt this scanned module configuration.

Note: The sequence of the modules in the list **Configured Modules** is important and must match with the sequence which exists in the Slave. Typically, the sequence is the actual physical sequence. There are Slaves to which this rule does not apply and where for example first analogue modules and then digital modules must be entered, independent of their actual sequence.
If the Slave device has only one module, this module is taken over automatically in the table **Configured Modules** and can not be deleted.

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

1. Check if the scanned module configuration of a Slave corresponds to the actual physical module sequence in the Slave device or not.
2. Replace scanned modules which do not correspond to the physical module sequence using the **Remove**, **Insert** or **Append** buttons:

➢ Delete these scanned modules from the list **Configured Modules** using the **Remove** button.

➢ Then Insert the required modules from the selection list **Available Modules** into the list **Configured Modules**.

You can append or insert one or several modules to the list **Configured Modules**.

Note: A multiselection is possible. Therefore click in the list **Available Modules** on several modules while holding the SHIFT key.

- Appending Modules

➢ Under **Available Modules** click on one or several modules and click on **Append**.

➢ Or double click on these modules.

↘ The modules appear at the lower end of the list **Configured Modules**.

- Inserting Modules

➢ Under **Available Modules** click on one or several modules.

➢ Under **Configured Modules** click to the module before which the additional modules shall be inserted.

➢ Click **Insert**.

↬ The modules appear in the list **Configured Modules** before the selected module.

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

6 Diagnosis

6.1 Overview Diagnosis

The dialog **Diagnosis** serves to diagnose the device behavior and communication errors. For diagnosis the device must reside in online state.

Diagnosis Panes

The table below gives an overview for the individual **Diagnosis** dialog panes descriptions:

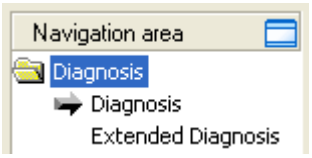
PROFIBUS DP generic Slave DTM	Folder Name / Section	Manual Page
 *Navigation Area - Diagnosis*	*Diagnosis*	49
	Extended Diagnosis	51

Table 20: Descriptions of the Diagnosis Panes

Online Connection to the Master DTM

Note: Accessing the **Diagnosis** panes of the PROFIBUS DP generic Slave DTM requires an online connection from the PROFIBUS DP generic Slave DTM to the PROFIBUS DP Master DTM. For further information refer to section *Connecting/Disconnecting Device* on page 41.

Extended Diagnosis

The **Extended Diagnosis** helps to find communication and configuration errors, when default diagnosis fails. For further information refer to section *Extended Diagnosis* on page 51.

6.2 Diagnosis

The diagnosis information of a DP Slave can be 6 to 244 bytes. The first 6 bytes are standard Diagnosis information (specification). The meaning of these 6 bytes is according to the PROFIBUS specification and contains the **Station Status**, the **Assigned Master Address** and the **Device internal Ident Number** of the Slave.

The Extended Device Diagnosis starts at the 7th Byte. It is manufacturer specific and can contain, station related diagnosis, module related diagnosis and/or channel related diagnosis.

The range of the displayed diagnosis bytes can be restricted by the used DP Master. The following figure shows the analysis of the first 6 byte of the standard diagnosis.

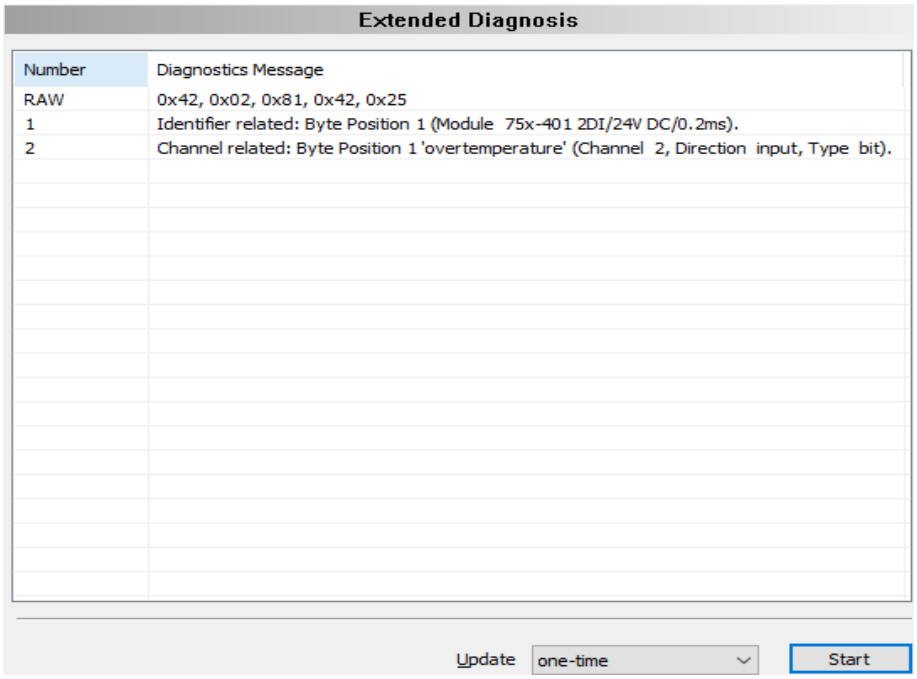


Figure 30: Diagnosis

Diagnosis	Description
Station Status	The Station Status 1, 2 and 3 in detail are described in section *Station Status of the Slave Diagnosis* on page *54*.
Assigned Master Address	At **Assigned Master Address** the address of the master is shown, that has parameterized and configured this Slave. The value 255 displays, that the Slave is not parameterized or configured yet or that the received parameter information and configuration information are rejected because of an error.
Device internal Ident Number	In the field **Device internal Ident Number** the (real) ident number of the used Slave is displayed. If the **Device internal Number** shows the value 0000, the master still has no connection via the PROFIBUS to the DP Slave.
Update	Actualizes the displayed diagnosis states.

Table 21: Diagnosis

Note: The **Device internal Ident Number** has to agree with the **Ident Number of the GSD file** (see section *General Device Information* on page 12). When they are different the reason could be that the wrong GSD file is used or a wrong DP Slave was connected to the PROFIBUS.

Detailed information about the diagnosis of a DP Slave device you find in section *DP Slave Diagnosis* on page *54*.

6.2.1 Update

The diagnosis information can be updated cyclic or one-time.

Figure 31: Diagnosis - Update

Updating the diagnosis information cyclical:

- Under **Update** select Cyclic.
- Select the button **Start**.
- The display of the diagnosis information is updated cyclical.
- To stop the cyclic update, select the button **Stop**.

Updating the diagnosis information one-time:

- Under **Update** select one-time.
- Select the button **Start**.
- The diagnosis information are updated one-time.

6.3 Extended Diagnosis

Note: The extended diagnosis is only activated if the Slave device supports the extended diagnosis.

The **Extended Diagnosis** helps to find bus and configuration errors.

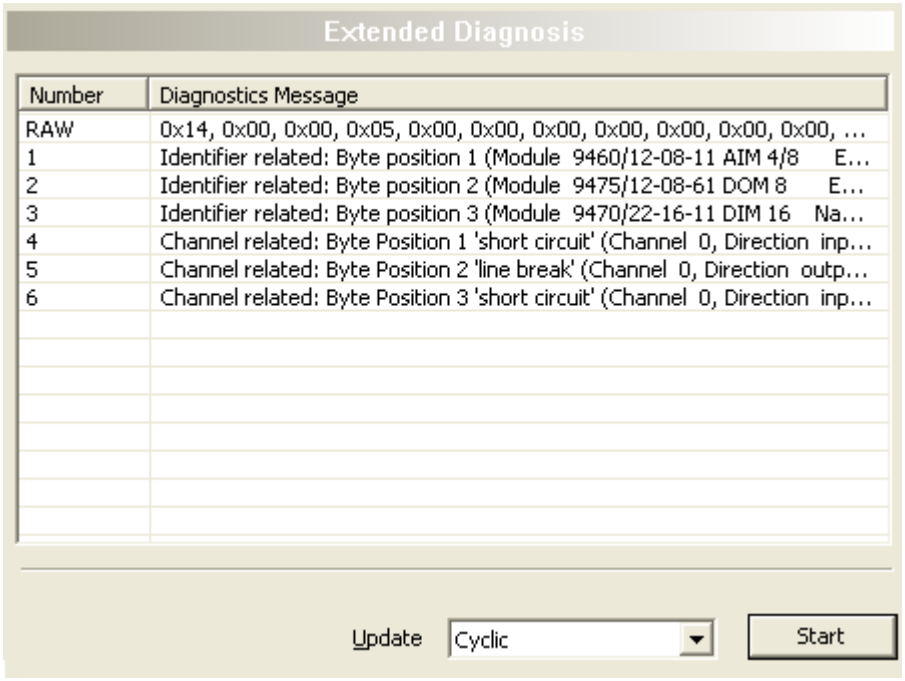


Figure 32: Extended Diagnosis

This field shows a list of **extended Diagnosis Messages**. The first entry in this list, characterized with **RAW** contains the undecoded extended diagnosis data (Ext_Diag_Data) of the actual Slave.

Note: To view for **RAW** the **Diagnosis Message** column completely, double click to the right border of the column head. Move to the left or the right column side using the scroll bar.

The following lines contain three categories of messages:

- Device related
- Identifier related
- Channel related

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

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

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

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

Diagnosis	Section	Page
Device related diagnosis	*Device-related Diagnosis*	*57*
Identifier related diagnosis	*Identifier/module-related Diagnosis*	*58*
Channel related diagnosis	*Channel Related Diagnosis*	*59*

Table 22: Extended Diagnosis

Note: An analysis of the extended device diagnosis can only takes place, if texts are provided for the analysis in the GSD by the device manufacturer.

6.3.1 Update

The diagnosis information can be updated cyclic or one-time.

Figure 33: Diagnosis - Update

Updating the diagnosis information cyclical:

- Under **Update** select Cyclic.
- Select the button **Start**.
- The display of the diagnosis information is updated cyclical.
- To stop the cyclic update, select the button **Stop**.

Updating the diagnosis information one-time:

- Under **Update** select one-time.
- Select the button **Start**.
- The diagnosis information are updated one-time.

6.4 Process Image Monitor

The window **Process Image Monitor** lists the configured modules or input or output signals of the devices. This makes the fieldbus structure and the data structure of the device's input and output data transmitted at the bus visible. Furthermore the values of the signal data provided to the OPC server are displayed here.

➢ Open **Diagnosis** > **Process Image Monitor**.

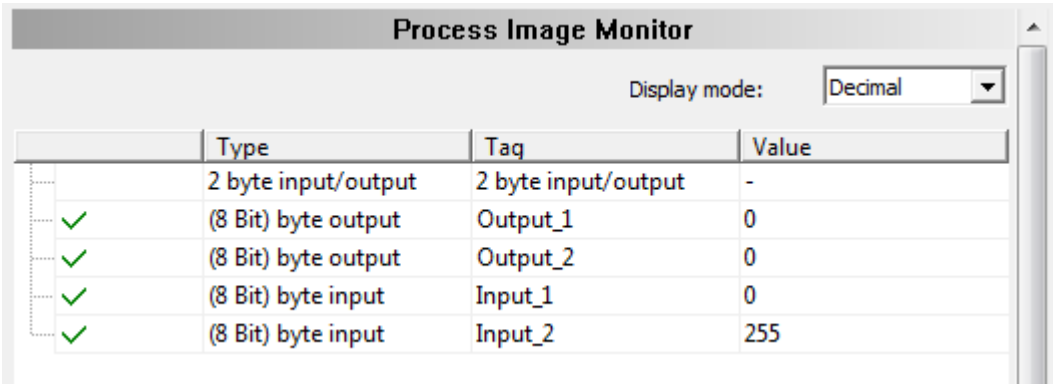


Figure 34: Window 'Process Image Monitor'

Parameter	Meaning	Range of Value / Value
Display Mode	Display of the values in the column **Value** in decimal or hexadecimal mode.	Decimal (Default), Hexadecimal
?	Display when the input and output data are not completely read and analyzed.	
!	Display when the input and output data are not valid.	
✓	Display when the input and output data are valid.	
Typ	Device labeling provided by the hardware: Also description of the modules or input or output signals configured to the device.	
TAG	Device name provided by the hardware (not changeable in the FDT container) or symbolic name for the modules configured to the device or for the input or output signals.	
Value	Display of the valid input and output data values.	

Table 23: Notes to the Window 'Process Image Monitor'

7 Appendix

7.1 DP Slave Diagnosis

A PROFIBUS-DP Master can read out diagnosis information of a DP Slave. The diagnosis telegram contains standard diagnostic and as the case maybe extended diagnostic.

Length	Description
6 bytes	Standard Diagnosis
0 … N bytes	Extended Diagnosis (if available) with one or several blocks.

Table 24: DP Slave Diagnosis

The **Standard Diagnosis** of the first 6 Byte for DP Slave devices is described in section *Station Status of the Slave Diagnosis* on page *54*.

If an **Extended Diagnosis** is available for this device, you find a description in section *Extended Slave Device Diagnosis* on page *57*.

7.1.1 Station Status of the Slave Diagnosis

7.1.1.1 The meaning of Station Status 1

Station-Status 1	Set by	Meaning and Remedy
Master lock (Bit 7)	Master	**Meaning:** The Slave has already been parameterized by another Master and is locked in its access. **Remedy:** This is security mechanism of PROFIBUS DP. First clarify which master should have access to this Slave. Then add this Slave to the configuration of the master that should have access to this Slave and remove this Slave from the configuration of the other master.
Parameter fault (Bit 6)	Slave	**Meaning:** This bit is set by the Slave automatically, when the parameters sent by the Master are containing wrong or insufficient data. On every received parameter telegram the Slave executes a check routine on the whole parameter telegram. If the Slave detects a faulty parameter value or illegal data during its check, it will report the **Parameter fault**. During the check routine the Slave compares its ident number with the one sent by Master. **Remedy:** So if the Slave reports this error, first compare the **Device internal Number** with the **GSD Ident Number**. If they are different, either a wrong GSD file is used or a wrong device was connected to the bus. If this two Ident numbers are the same, check the parameter data
Invalid Slave response (Bit 5)	Master	**Meaning:** This bit is set by the Master, when the Master receives an invalid answer from the Slave. So the physical contact to the Slave works principally, but the logical answer was not understood. **Remedy:** An error at the physical transmission line could have appeared like twisted cable, missing bus termination or missing shield connection. Use standardized DP Slave. This also can happen, for example if a PROFIBUS-FMS Slave is connected to the DP-Master instead of a DP Slave. So the Slave does not understand the DP-Telegram and rejects it. It's handled as 'Invalid Slave Response'.

Table 25: PROFIBUS DP Diagnosis Station state 1 (Bit 7 to 5)

Station-Status 1	Set by	Meaning and Remedy
Function not supported (Bit 4)	Slave	**Meaning:** This bit is set by the Slave, when a function should be performed which is not supported. Newer releases of Slave stations normally support the Sync and Freeze-Mode for I/O data. This is fixed in the GSD-File and read out by SyCon and sent to the Slave in the parameter telegram. **Remedy:** If this error occurs the GSD-File declares at least one of these commands as supported, but the Slave does not. In this case contact the manufacturer of the Slave device for the right GSD-File for the used Slave.
Extended Diagnosis (Bit 3)	Slave	**Meaning:** This bit is set by the Slave, if extended diagnosis data are a read out. Extended diagnosis data is optionally and normally used by a Slave to hand out manufacturer specific diagnosis information. **Remedy:** Click on the button **Extended Diagnosis** to get a Hex-dump of the diagnosis data and read about their meaning in the manual of the manufacturer. If the GSD-File contains information about the Extended Device Diagnosis it can be analyzed with the DTM.
Configuration fault (Bit 2)	Slave	**Meaning:** During the PROFIBUS DP startup procedure the Slave compares its internal I/O configuration with the configuration of the Master. If the Slave detects differences it will report a configuration error. That means that the Master has another I/O module constellation as the Slave. **Remedy:** So first compare visually all configured I/O modules in the configuration data of SyCon for this Slave with its real physical constellation. Note that the order of the module has to agree. Some Slaves need virtual I/O modules to be configured first or empty slot modules to get an even number of modules to run. This Slave specific I/O module behavior has to be written down in the Slave documentation because it can not be read out from the GSD file. Please read the configuration notes of the manufacturer.
Station not ready (Bit 1)	Slave	**Meaning:** The DP Slave is still not ready for the data exchange. **Remedy:** When or at which event the Slave sets this bit is not defined in the specification. That means it can have several Slave specific reasons. Usually the bit is set in combination with one the other fault bits. Check especially the parameter and the configuration. Often the report **Station not ready** results in case of parameter fault or configuration faults. It is possible that the supply voltage at the Slave was just first switched on. Wait until the device is initialized.
Station not existent (Bit 0)	Master	**Meaning:** This bit is set by the Master automatically, if this Slave does not answer or is not reachable on the bus. **Remedy:** Please check your PROFIBUS cable. Both signal wires need to be connected correctly between all devices. In addition the connectors at the end of the cable need to be provided with termination resistors. Check that the device is connected to the bus cable. Check the power supply at the Slave device. Compare the station address at the Slave with the configuration of the Master. Check, if the Slave supports the configured baud rate. Some Slaves only work with up to 1.5 MBaud or need to be set for a PROFIBUS DP conform behavior. Check the intermediated LWL (optical) connector's converters and repeaters.

Table 26: PROFIBUS DP Diagnosis Station state 1 (Bit 4 to 0)

7.1.1.2 The meaning of Station State 2

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

Table 27: PROFIBUS DP Diagnosis Station State 2

7.1.1.3 The meaning of Station State 3

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

Table 28: PROFIBUS DP Diagnosis Station State 3

7.1.1.4 Master Address

This byte of the standard diagnosis shows the address of the DP Master which has parameterized the DP Slave and which has read and write access to the DP Slave. The value 255 (FFH) displays that the DP Slave was not parameterized or faulty parameterized by the DP Master.

7.1.1.5 Ident Number

The Ident Number is the manufacturer code of the DP Slave device.

7.1.2 Extended Slave Device Diagnosis

7.1.2.1 Device-related Diagnosis

This extended diagnosis refers to the device. The length of the device related diagnosis has at least 2 and up to 63 bytes.

Length	Byte	Description
2 … 63 bytes	1	Header byte (always present)
	2	Manufacturer-specific meaning (always present)
	…	Manufacturer-specific meaning (optional)
	63	Manufacturer-specific meaning (optional)

Table 29: Device-related Diagnosis

The following table describes the meaning of the header byte.

Bit	Description
0 … 5	Block length in bytes including header byte.
6 … 7	Always 00 = device-related diagnosis

Table 30: Device-related Diagnosis (Header byte)

The meaning of the 1 to max. 62 diagnosis bytes following the header byte is specified by the device manufacturer. For further analysis, the device description file or the device description of the manufacturer can be used.

7.1.2.2 Identifier/module-related Diagnosis

This extended diagnosis refers to the module (identifier byte). The length of the identifier-related diagnosis has at least 2 an up to 63 bytes.

length	Byte	Description
2 … 63 bytes	1	Header byte (always present)
	2	Module 7 … 0 (always present)
	3	Module 15 … 8 (optional)
	4	Module 23 … 16 (optional)
	5	Module 31 … 24 (optional)
	…	Module N … N-7 (optional)

Table 31: Identifier/module-related Diagnosis

One bit is reserved for each used identifier byte in the configuration. It is padded to byte limit. Unused bits are set to zero. A set bit means there is diagnosis for this module (identifier byte).

Header Byte

Bit	Description
0 … 5	Block length in bytes including header byte.
6 … 7	Always 01 = identifier/module-related Diagnosis

Table 32: Identifier/module-related Diagnosis (Header byte)

Bit structure for identifier-related diagnosis

Bit	Description
0	Identifier byte / module 0 has diagnostic
1	Identifier byte / module 1 has diagnostic
…	
7	Identifier byte / module 7 has diagnostic

Table 33: Identifier/module-related Diagnosis (Bit structure)

7.1.2.3 Channel Related Diagnosis

This extended diagnosis refers to a channel and has a length of 3 bytes.

Byte	Description
Byte 1	Identifier number
Byte 2	Channel number
Byte 3	Type of diagnosis

Table 34: Channel-related Diagnosis

In a block the diagnosed channels and the diagnosis reason are present. Several blocks with channel-related diagnosis can appear.

Byte 1: Identifier Number

Bit	Description
0 … 5	Identifier number / module 0 to 63
6 … 7	Always 10 = channel-related dignostic

Table 35: Channel-related diagnosis Byte 1: Identifier Number

Byte 2: Channel Number

Bit	Description
0 … 5	Channel number 0 to 63 in the module
6 … 7	Input/Output 00 reserved 01 Input 10 Output 11 Input/Output

Table 36: Channel-related diagnosis Byte 2: Channel Number

For identifier bytes which contain both input and output, the direction of the diagnosed channel is indicated in bit 7 and bit 6 of the cannel number.

Byte 3: Type of Diagnosis

Bit	Description
0 … 4	Error type 00000 reserved 00001 short circuit 00010 under voltage 00011 over voltage 00100 overload 00101 over temperature 00110 line break 00111 upper limit value exceeded 01000 lower limit value exceeded 01001 Error 01010 … 01111 reserved 10000 … 11111 manufacturer-specific
5 … 7	Channel type 000 reserved 001 bit 010 two bits 011 four bits 100 byte 101 word 110 two words 111 reserved

Table 37: Channel-related diagnosis Byte 3: Type of Diagnosis

7.2 Identifier Bytes

In the configuration telegram identifier bytes are used. The meaning of them is specified in the PROFIBUS specification.

The following table is an overview.

	Value		Meaning			
GIF/SIF	0x00	00	free place			
	0x01-0x0F	01-15	see SIF			
GIF	0x10-0x1F	16-31	1-16	Byte	Input	Consistency over Byte
GIF	0x20-0x2F	32-47	1-16	Byte	Output	Consistency over Byte
GIF	0x30-0x3F	48-63	1-16	Byte	Input/Output	Consistency over Byte
	0x40-0x4F	64-79	see SIF			
GIF	0x50-0x5F	80-95	1-16	Word	Input	Consistency over Word
GIF	0x60-0x6F	96-111	1-16	Word	Output	Consistency over Word
GIF	0x70-0x7F	112-127	1-16	Word		Consistency over Word
	0x80-0x8F	128-143	see SIF			
GIF	0x90-0x9F	144-159	1-16	Byte	Input	Consistency over whole length
GIF	0xA0-0xAF	160-175	1-16	Byte	Output	Consistency over whole length
GIF	0xB0-0xBF	176-191	1-16	Byte		Consistency over whole length
	0xC0-0xCF	192-207	see SIF			
GIF	0xD0-0xDF	208-223	1-16	Word	Input	Consistency over whole length
GIF	0xE0-0xEF	224-239	1-16	Word	Output	Consistency over whole length
GIF	0xF0-0xFF	240-255	1-16	Word		Consistency over whole length

Table 38: Identifier bytes (overview)

7.2.1 Identifier Bytes (General Identifier Format GIF)

For the identifier bytes in general identifier format the following table shows the meaning.

MSB							LSB	
7	6	5	4	3	2	1	0	**Meaning**
								Bit 3 to 0: Length 0000 = 1 Byte or 1 Word 0001 = 2 Byte or 2 Word ... 1111 = 16 Byte or 16 Word
								Bit 5 and 4: Input/Output 00 = special identifier format (SIF) 01 = Input 10 = Output 11 = Input and Output
								Bit 6: Format 0 = Byte 1 = Word
								Bit 7: Consistency over 0 = Byte or Word 1 = whole length

Table 39: Identifier Bytes (General Identifier Byte Format GIF)

	Value		Meaning			
GIF/SIF	0x00	00	Free place			
SIF	0x01 – 0x0F		see SIF			
GIF	0x10	16	1	Byte	Input	Consistency over Byte
GIF	0x11	17	2	Byte	Input	Consistency over Byte
GIF	...	...	...	Byte	Input	Consistency over Byte
GIF	0x1F	31	16	Byte	Input	Consistency over Byte
GIF	0x20	32	1	Byte	Output	Consistency over Byte
GIF	0x21	33	2	Byte	Output	Consistency over Byte
GIF	...	...	...	Byte	Output	Consistency over Byte
GIF	0x2F	47	16	Byte	Output	Consistency over Byte
GIF	0x30	48	1	Byte	Input/Output	Consistency over Byte
GIF	0x31	49	2	Byte	Input/Output	Consistency over Byte
GIF	...	...	...	Byte	Input/Output	Consistency over Byte
GIF	0x3F	63	16	Byte	Input/Output	Consistency over Byte
SIF	0x40 – 0x4F		see SIF			
GIF	0x50	80	1	Word	Input	Consistency over Word
GIF	0x51	81	2	Word	Input	Consistency over Word
GIF	...	...	...	Word	Input	Consistency over Word
GIF	0x5F	95	16	Word	Input	Consistency over Word
GIF	0x60	96	1	Word	Output	Consistency over Word
GIF	0x61	97	2	Word	Output	Consistency over Word
GIF	...	...	...	Word	Output	Consistency over Word
GIF	0x6F	111	16	Word	Output	Consistency over Word
GIF	0x70	112	1	Word	Input/Output	Consistency over Word
GIF	0x71	113	2	Word	Input/Output	Consistency over Word
GIF	...	...	...	Word	Input/Output	Consistency over Word
GIF	0x7F	127	16	Word	Input/Output	Consistency over Word
SIF	0x80 – 0x8F		see SIF			
GIF	0x90	144	1	Byte	Input	Consistency over whole length
GIF	0x91	145	2	Byte	Input	Consistency over whole length
GIF	...	...	...	Byte	Input	Consistency over whole length
GIF	0x9F	159	16	Byte	Input	Consistency over whole length

Table 40: Identifier Bytes 0x10 .. 0x3F, 0x50 .. 0x7F, 0x90 .. 0x9F (GIF)

	Value		Meaning			
GIF	0xA0	160	1	Byte	Output	Consistency over whole length
GIF	0xA1	161	2	Byte	Output	Consistency over whole length
GIF	...	...	...	Byte	Output	Consistency over whole length
GIF	0xAF	175	16	Byte	Output	Consistency over whole length
GIF	0xB0	176	1	Byte	Input/Output	Consistency over whole length
GIF	0xB1	177	2	Byte	Input/Output	Consistency over whole length
GIF	...	...	...	Byte	Input/Output	Consistency over whole length
GIF	0xBF	191	16	Byte	Input/Output	Consistency over whole length
SIF	0xC0 – 0xCF		see SIF			
GIF	0xD0	208	1	Word	Input	Consistency over whole length
GIF	0xD1	209	2	Word	Input	Consistency over whole length
GIF	...	...	...	Word	Input	Consistency over whole length
GIF	0xDF	223	16	Word	Input	Consistency over whole length
GIF	0xE0	224	1	Word	Output	Consistency over whole length
GIF	0xE1	225	2	Word	Output	Consistency over whole length
GIF	...	...	...	Word	Output	Consistency over whole length
GIF	0xEF	239	16	Word	Output	Consistency over whole length
GIF	0xF0	240	1	Word	Input/Output	Consistency over whole length
GIF	0xF1	241	2	Word	Input/Output	Consistency over whole length
GIF	...	...	...	Word	Input/Output	Consistency over whole length
GIF	0xFF	255	16	Word	Input/Output	Consistency over whole length

Table 41: Identifier Bytes 0xA0 .. 0xBF, 0xD0 .. 0xFF (GIF)

7.2.2 Special Identifier Byte Format (SIF)

The special identifier byte format (SIF) is an extension of the general identifier byte format and offers more flexibility. Also manufacturer specific information can be used with it.

MSB							LSB	Meaning
7	6	5	4	3	2	1	0	
								Bit 0 to 3: Length of manufacturer specific data according to the length byte for In- and/or Output In case of DDLM_Chk_Cfg: 0000 = no manufacturer specific data follow 0001 = 1 manufacturer specific data follow ... 1110 = 14 manufacturer specific data follow 1111 = no manufacturer specific data follow In case of DDLM_Get_Cfg: 0000 = no manufacturer specific data follow 0001 = 1 manufacturer specific data follow ... 1110 = 14 manufacturer specific data follow 1111= not allowed
								Bit 5 and 4: solid 00 = solid
								Bit 7 and 6: Input/Output 00 = free place 01 = a length byte for Input follows 10 = a length byte for Output follows 11 = a length byte for Input and Output follows

Table 42: Special Identifier Format (SIF)

Length Byte

MSB							LSB	Meaning
7	6	5	4	3	2	1	0	
								Bit 0 to 5: Length 000000 = 1 Byte or 1 Word 000001 = 2 Byte or 2 Word ... 111111 = 64 Byte or 64 Word
								Bit 6: Format 0 = Byte 1 = Word
								Bit 7: Consistency over 0 = Byte or Word (element) 1 = whole length

Table 43: Length Byte of the SIF

	Value		Meaning
GIF/SIF	0x00	00	free place
GIF	0x01 – 0x0E	01 – 14	free place and 1-14 manufacturer specific data
GIF	0x0F	15	free place and no manufacturer specific data
GIF	0x40	64	1 length byte Input
GIF	0x41 – 0x4E	65 – 78	1 length byte Input and 1-14 manufacturer specific data
GIF	0x4F	79	1 length byte Input and no manufacturer specific data
GIF	0x80	128	1 length byte Output
GIF	0x81 – 0x8E	129 – 142	1 length byte Output 1 and 1-14 manufacturer specific data
GIF	0x8F	143	1 length byte Output 1 and no manufacturer specific data
GIF	0xC0	192	1 length byte Output and 1 length byte Input
GIF	0xC1 – 0xCE	193 – 206	1 length byte Output, 1 length Input byte and 1-14 manufacturer specific data
GIF	0xCF	207	1 length byte Output, 1 length Input byte and no manufacturer specific data

Table 44: Special Identifier bytes 0x01 .. 0x0F, 0x40 .. 0x4F, 0x80 .. 0x8F, 0xC0 .. 0xCF (SIF)

Length Byte

Value		Meaning		
0x00 – 0x3F	00-63	1-64	Byte	Consistency over Byte
0x40 – 0x7F	64-127	1-64	Word	Consistency over Word
0x80 – 0xBF	129-191	1-64	Byte	Consistency over whole length
0xC0 – 0xFF	193-255	1-64	Word	Consistency over whole length

Table 45: Length byte of the special identifiers (SIF)

7.3 User Rights

User-rights are set within the FDT-container. Depending on the level the configuration is accessible by the user or read-only.

To access the **Configuration**, **Device Description** and **Diagnosis** panes of the PROFIBUS DP generic Slave DTM you do not need special user rights. Also all users can select the decimal or hexadecimal Display mode or sort table entries.

Note: To edit, set or configure the parameters of the **Configuration** panes, you need user rights for *Maintenance,* for *Planning Engineer* or for *Administrator*.

The following tables give an overview of the user right groups and which user rights you need to configure the single parameters.

7.3.1 Configuration

	Observer	Operator	Maintenance	Planning Engineer	Administra-tor
General	D	D	X	X	X
Modules	D	D	X	X	X
Signal Configuration	D	D	X	X	X
Parameters	D	D	X	X	X
Groups	D	D	X	X	X
Extensions	D	D	X	X	X
DPV1	D	D	X	X	X
DPV2	D	D	X	X	X
Redundancy	D	D	X	X	X

Table 46: Configuration (D = Displaying, X = Editing, Configuring)

7.4 References

[1] Device Type Manager (DTM) Style Guide, Version 1.0 ; FDT-JIG - Order No. <0001-0008-000>

[2] PROFIBUS DP Slave Protocol API Manual, Revision 19, Hilscher GmbH 2017

7.5 List of Figures

7.6 List of Tables

7.7 Glossary

GSD

GSD = General Station Description

The 'General Station Description' describe the characteristics of a device type in a stipulated format. The GSD are created individually for each device type. And they are allocated in form of a GSD file for the user by the manufacturer of the device.

The project system can read in and consider the GSD for any PROFIBUS DP device automatically because of the pegged file format during the configuration of the bus system.

FDT

Field Device Tool

FDT specifies an interface, in order to be able to use DTM (Device Type Manager) in different applications of different manufacturers.

Freeze

After receiving the control command FREEZE, the DP-Slave freezes the actual state of the Inputs and transmits them cyclically to the DP-Master. After each new control command FREEZE, the Slave freezes the state of the Inputs again. The actual Input data are not transmitted cyclically from the DP-Slave to the DP-Master until the DP-Master sends the control command UNFREEZE. The DP-Slave has to be assigned to a group for the control command FREEZE in the configuration.

DPV0

PROFIBUS DP with cyclic communication

DPV1

PROFIBUS DP with acyclic communication

DPV2

PROFIBUS DP with cyclic and acyclic communication and Time Sync configuration for the Slave

DTM

Device Type Manager

The Device Type Manager (DTM) is a software module with graphical user interface for the configuration and/or for diagnosis of devices.

Sync

With the control command SYNC the DP-Master arranges the DP-Slave, that the DP-Slave freezes the states of the Outputs on the actual value. During the following telegrams the DP-Slave saves the Output data in each case, which it has save as Output data. The Outputs are first updated cyclically until the DP-Master sends the control command UNSYNC. The DP-Slave has to be assigned to a group for the control command SYNC in the configuration.

7.8 Contacts

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