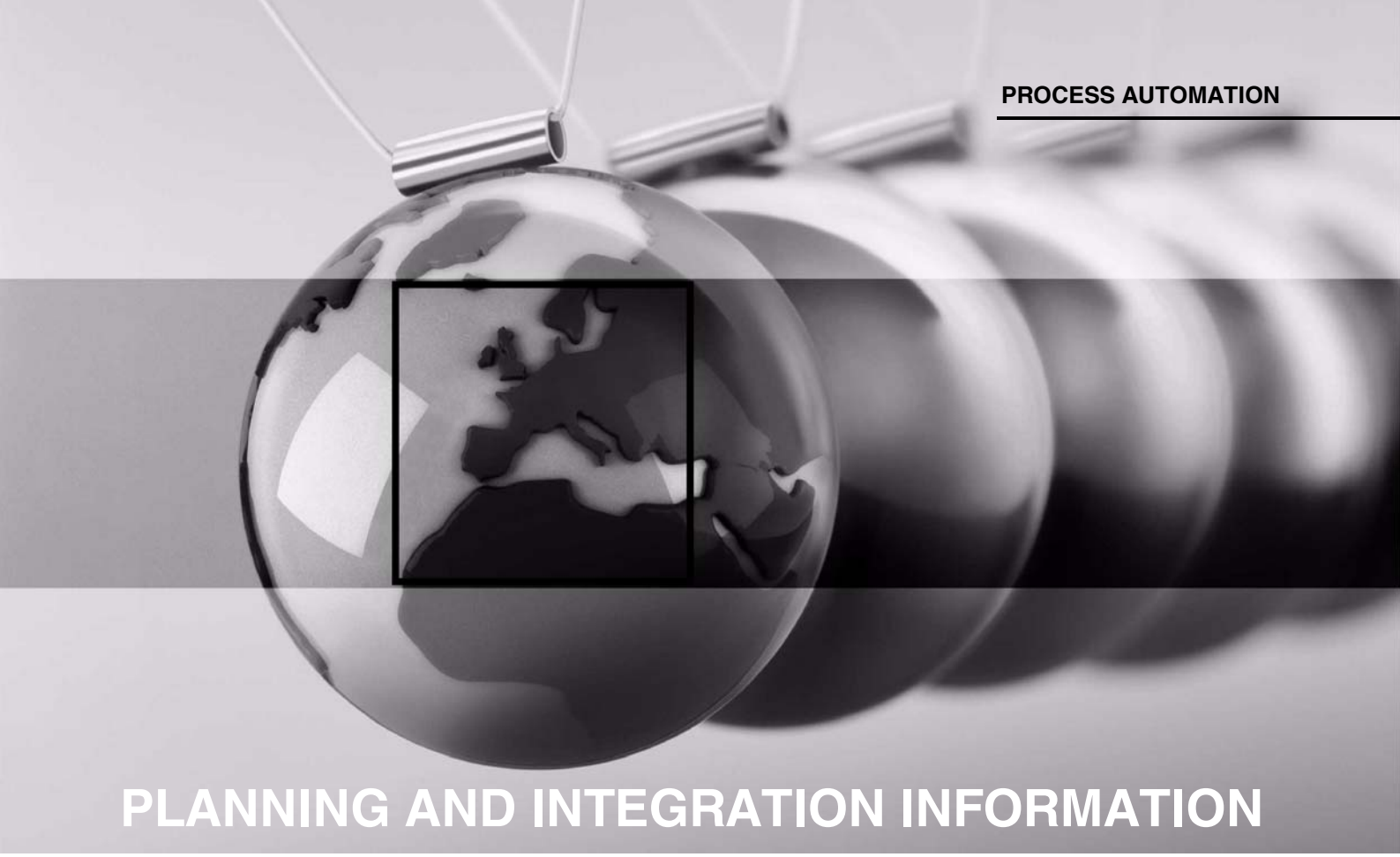

PLANNING AND INTEGRATION INFORMATION

LB8106*

Integration in Yokogawa CENTUM VP

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PROTECTING YOUR PROCESS

With regard to the supply of products, the current issue of the following document is applicable: The General Terms of Delivery for Products and Services of the Electrical Industry, published by the Central Association of the Electrical Industry (Zentralverband Elektrotechnik und Elektroindustrie (ZVEI) e.V.) in its most recent version as well as the supplementary clause: "Expanded reservation of proprietorship"

1 Introduction

This document describes how to integrate a remote I/O unit into Yokogawa CENTUM VP and how to define the communication settings.

This document provides system-related information that is not included in the manual of the device itself.

Software and Hardware Revisions

Product Name	Revision	
Yokogawa CENTUM VP	R5.02	
ALP121 PROFIBUS DP communication module	U	0
	H1	1
	H2	3
	F	2
LB8106*	FW 6.28	
GSE file `PFV61711.gse`	V 1.12	

2 Add Communication Module

To communicate with the remote I/O unit, add a PROFIBUS DP communication module to Yokogawa CENTUM VP.

Create new Input Output Module

1. Navigate to the **IOM** folder in the **System View** window.
2. Right-click the subnode **NODE1** and select **Create New > IOM...**.

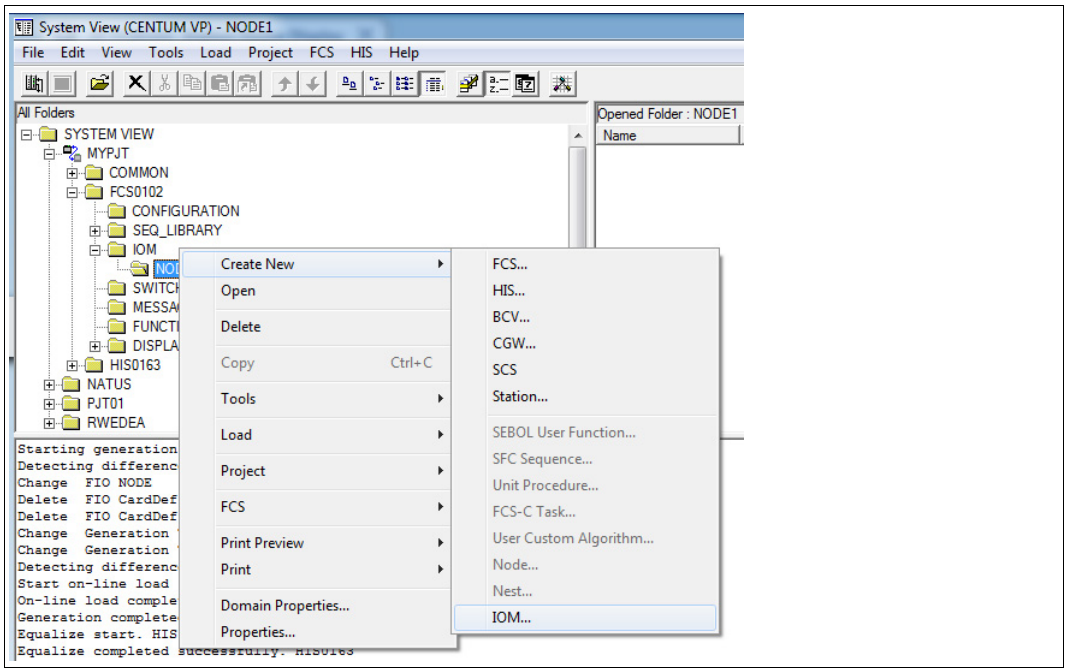

Figure 2.1 **Create New > IOM...**

↳ The **Create New IOM** window appears.

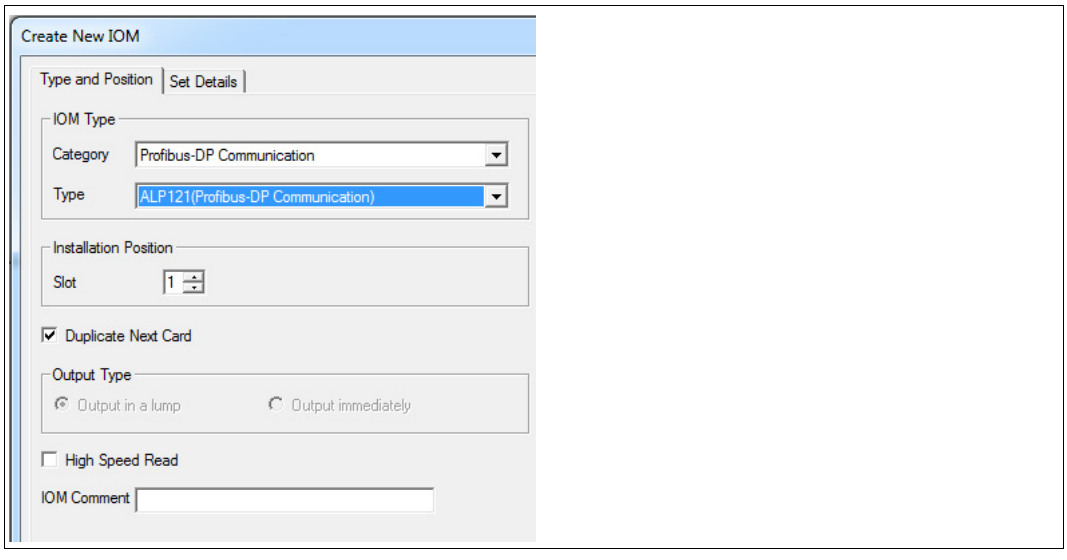

Figure 2.2 **Type and Position** tab

3. Select **PROFIBUS-DP Communication** from the **Category** drop-down list in the **IOM Type** area.
4. Select the communication module from the **Type** drop-down list, in this example **ALP121(Profibus-DP Communication)**.

5. Enter the slot number of the rack in which the communication module has been installed in the **Slot** field.
6. Select the **Set Details** tab.

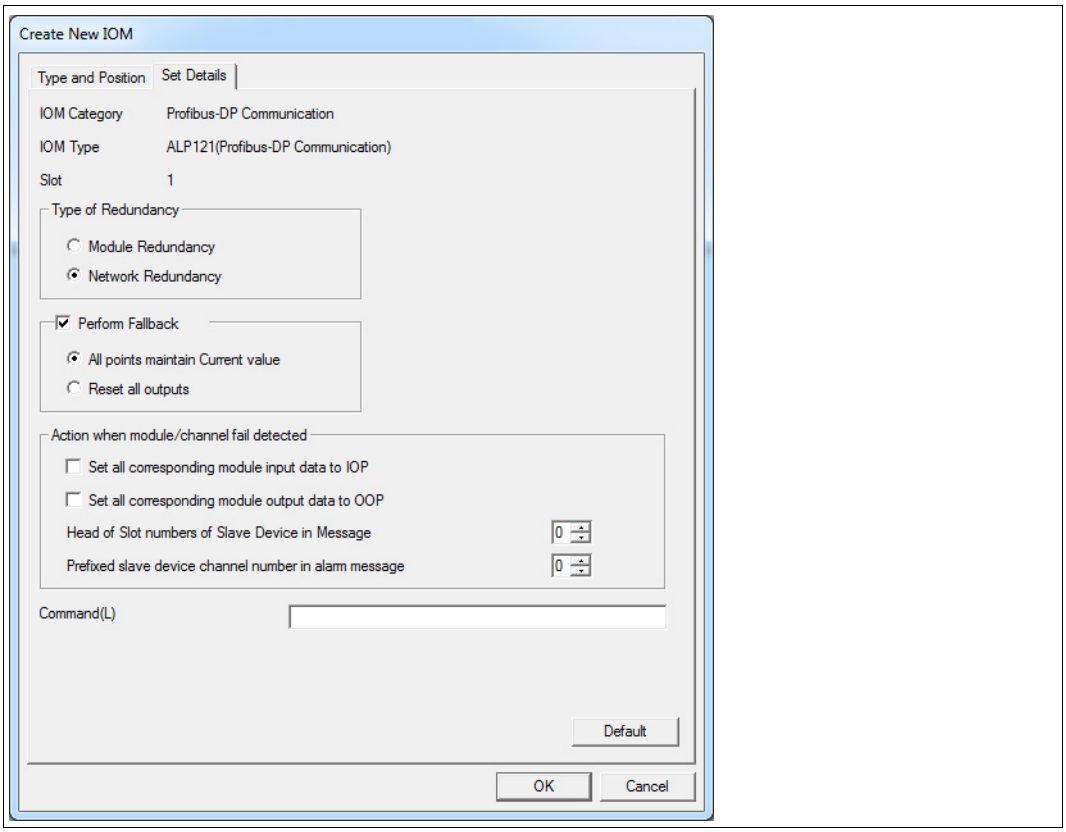

Figure 2.3 **Set Details** tab

7. Select a redundancy mode. For more information on redundancy strategies, see chapter 8.1.
8. The **Perform Fallback** area defines the behavior in case of an error. You can adopt the default settings.
9. Deactivate **Set all corresponding module input data to IOP** and **Set all corresponding module output data to IOP**. For more information on channel-specific diagnostics, see chapter 8.3.
10. Enter **0** for **Head of Slot numbers of Slave Device in Message** and **0** for **Prefixed slave device channel number in alarm message**.
11. Click **OK**. If redundancy has been selected, two communication modules are created automatically.

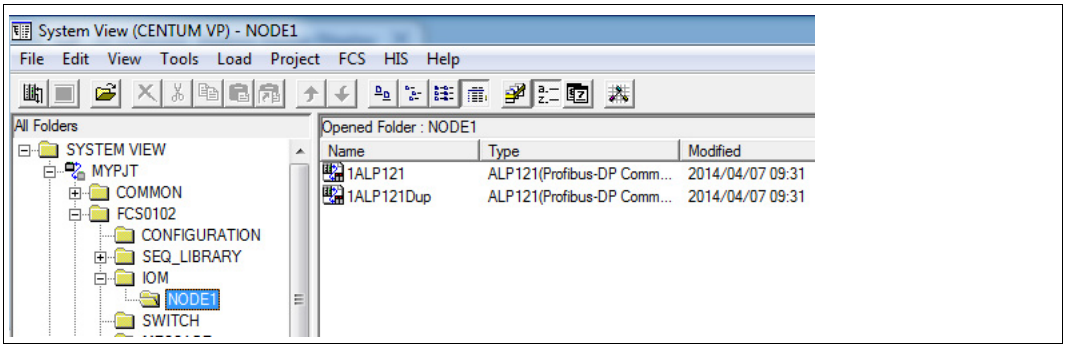

Figure 2.4 Communication modules in the **System View** window

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3 Import GSE File

To integrate the remote I/O unit, import the GSE file of the com unit which describes the communication options and available diagnostics of the remote I/O unit.

Note!

If using the LB8106* respectively FB8206* com unit, use the **PFV61711.gse** GSE file.

If using the LB8105* or LB8109* respectively FB8205* or FB8209* com units, use the **PFV61710.gse** GSE file. These com units must be configured using an external FDT/DTM framework, for example, PACTware™. For more information, see the software manual of the com unit.

Import GSE File

1. Double-click the PROFIBUS DP communication module in the **System View** window.

   ↳ The **Start Builder** window appears.

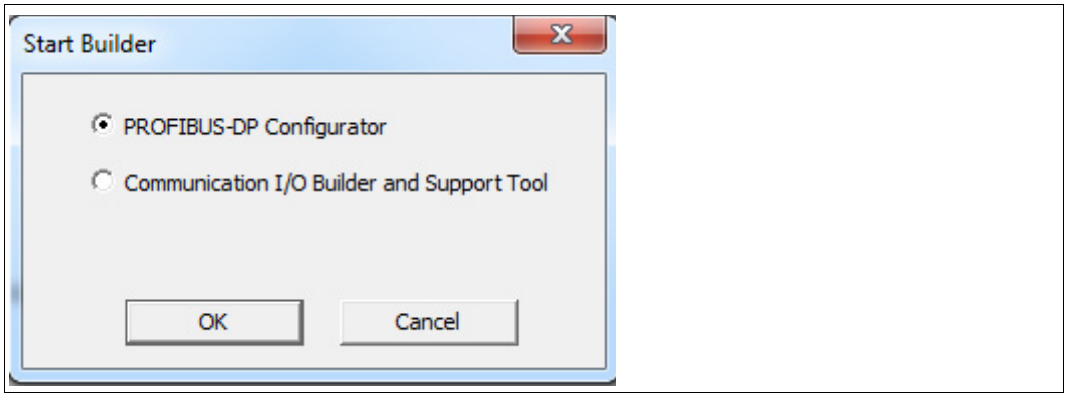

Figure 3.1 **Start Builder** window

2. Select **PROFIBUS-DP Configurator** and click **OK**.

   ↳ The **SYCON.net** window opens.

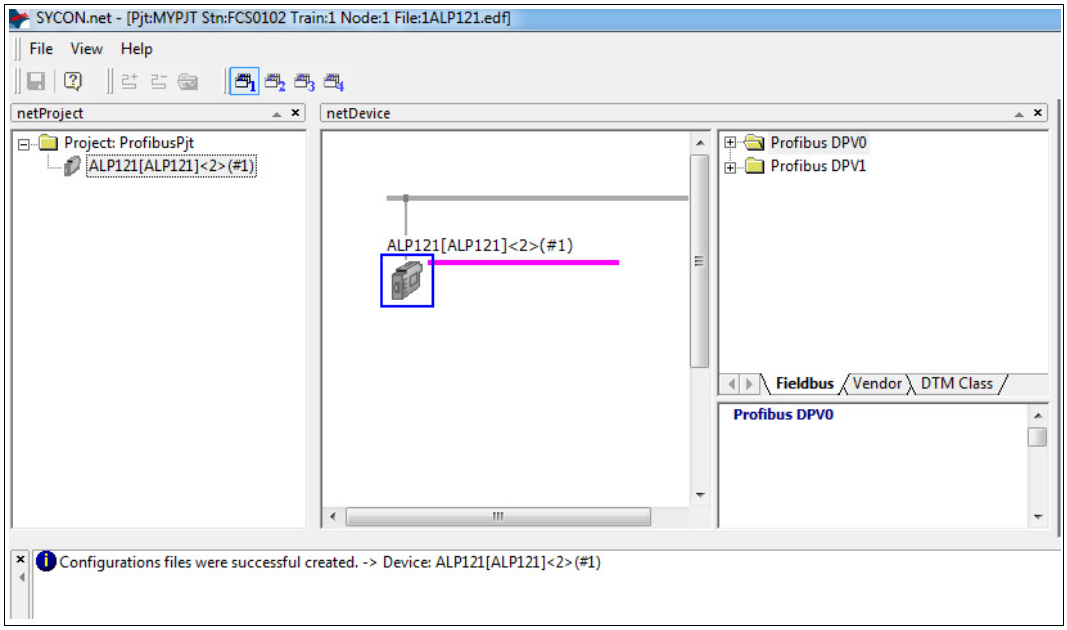

Figure 3.2 **SYCON.net** window

3. To import a GSE file, select **Network > Import Device Descriptions...**. To get the correct display in the network area, we recommend that you import the **PF_LB_FB.bmp** image file as well.

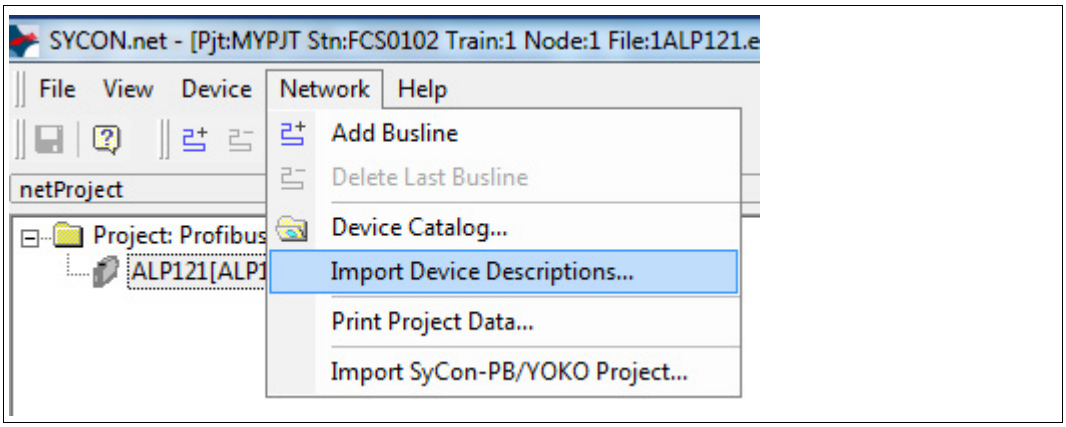

Figure 3.3 **Network > Import Device Descriptions...**

↳ After you imported the GSE file, the com unit is available in the library area on the right.

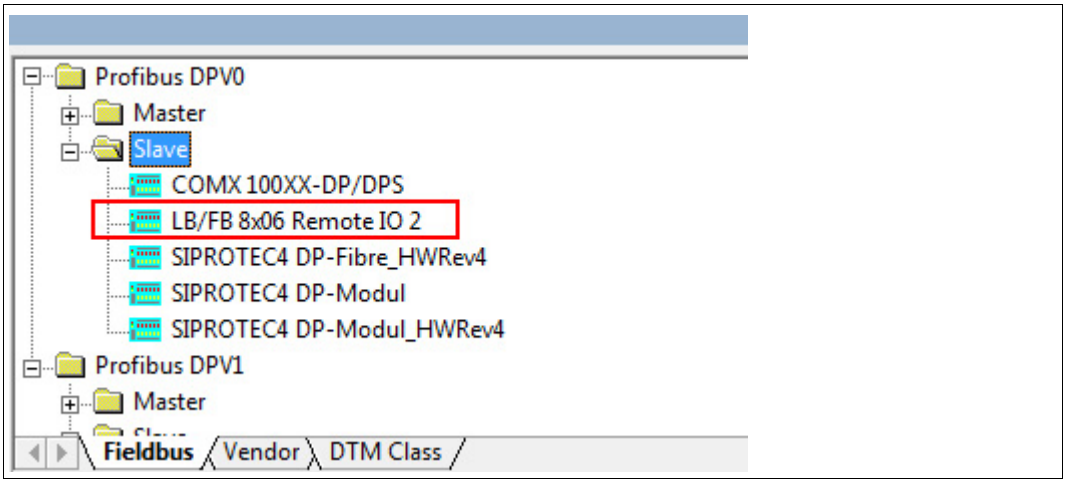

Figure 3.4 Com unit in the library area

Add Remote I/O Unit to PROFIBUS Line

Drag and drop the com unit from the library into the network area on the PROFIBUS line.

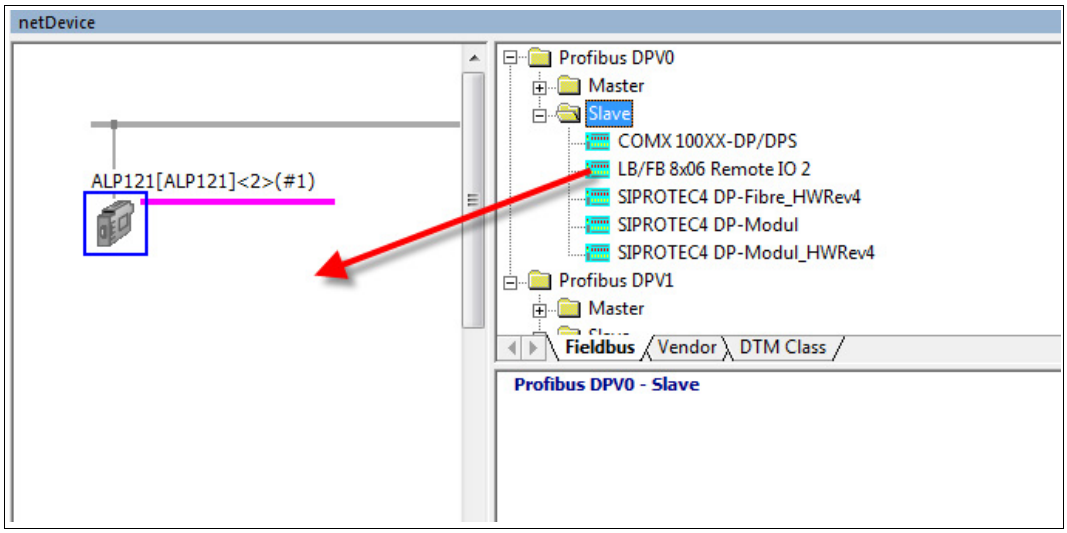

Figure 3.5 Drag and drop the com unit on the PROFIBUS line

↳ The remote I/O unit has been added to the PROFIBUS line. The system automatically assigns the next free PROFIBUS address. If there are no other slaves configured yet, the remote I/O unit receives the address that follows the address of the master. For more information on the communication settings, see chapter 5.

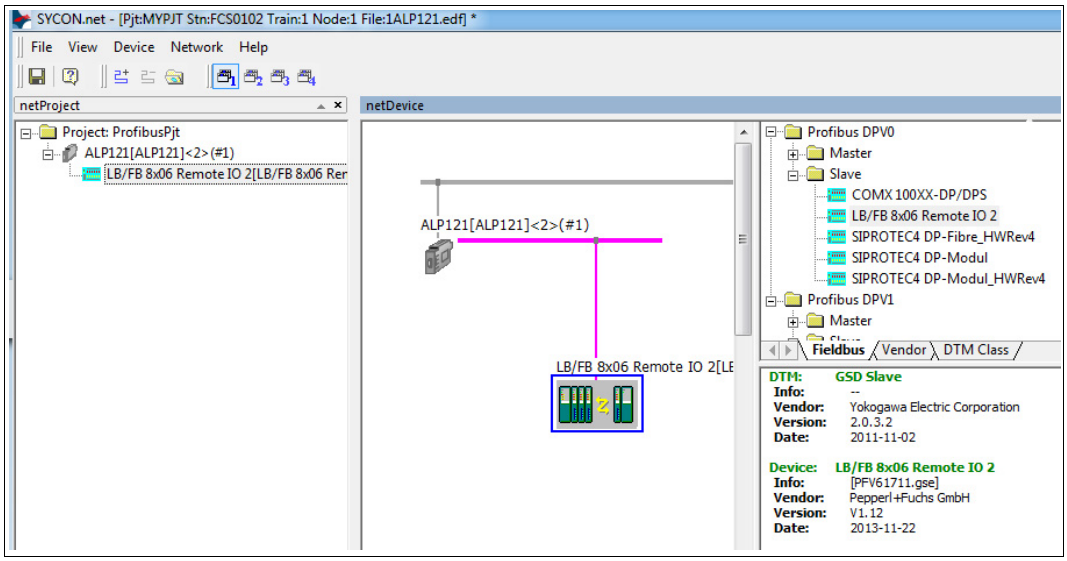

Figure 3.6 Remote I/O unit on PROFIBUS line

4 Configure Remote I/O Modules

Note!

You can configure the I/O modules only if using the LB8106* respectively FB8206* com unit. If using the LB8105* or LB8109* respectively FB8205* or FB8209* com units, the I/O modules must be configured using an external FDT/DTM framework, for example, PACTware™. For more information, see the software manual of the com unit.

Rebuild Structure of the Remote I/O Unit

1. To open the configuration editor, double-click the remote I/O unit in the network area.

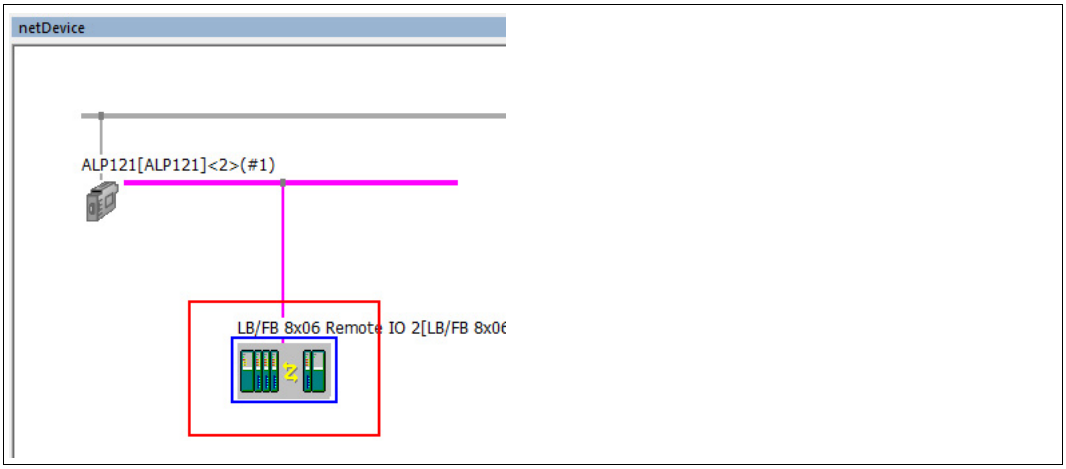

Figure 4.1 Remote I/O unit on PROFIBUS line

↳ The **netDevice** window opens.

2. Select **Configuration > Modules** in the **Navigation Area**.

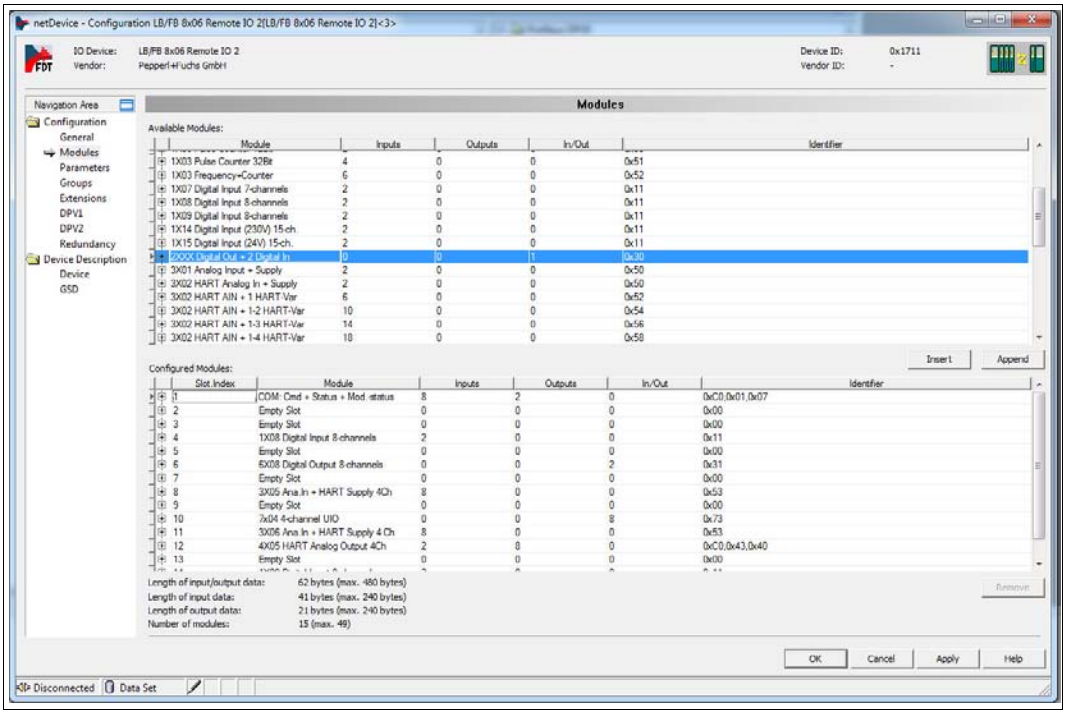

Figure 4.2 **Configuration > Modules**

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3. Select an I/O module from the **Available Modules** list and click **Insert** or **Append** to rebuild the structure of the remote I/O unit in the **Configured Modules** list. Respect the following rules while rebuilding the structure of the remote I/O unit.

- The first I/O module is always the com unit. You can select between four different configuration types that provide different diagnostic data.
  - **COM Unit without data**
    The com unit does not provide any diagnostic data.
  - **COM: Gl.-Status + Command Reg.**
    The com unit provides the global status register and the command register as cyclic I/O data.
  - **COM: Mod. Status (1 Bit/Mod.)**
    The com unit provides the module status register as cyclic I/O data.
  - **COM: Cmd + Status + Mod.-Status**
    The com unit provides the global status register, the command register, and the module status register as cyclic I/O data.

  For more information on cyclic diagnostic information, see chapter 8.2.
- Because the com unit is located at slot no. 1, the slot numbering in the configuration editor differs from the actual numbering in the remote I/O unit. If the remote I/O unit contains a non-redundant backplane, the configuration of the I/O modules starts with slot no. 2. If the remote I/O unit contains a redundant backplane with two com unit slots, the configuration of the I/O modules starts with slot no. 3.
- Dual width modules that occupy two slots are configured like single width modules, followed by an empty slot. Note that the last slot must not be an empty slot. If the last I/O module is a dual width module, configure this module like a single width module and omit the following empty slot.

Define Parameters for I/O Modules

1. Select **Configuration > Parameters** in the **Navigation Area**.

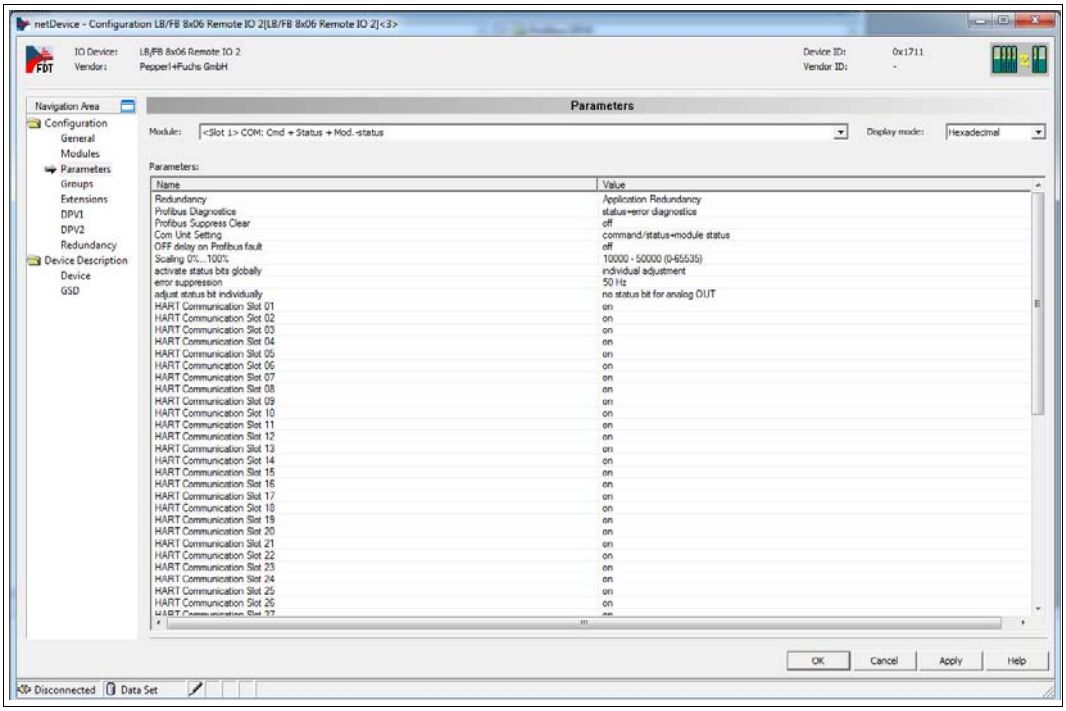


Figure 4.3 **Configuration > Parameters**

2. To define the parameters of an I/O module, select an I/O module from the **Module** drop-down list and define its parameters in the **Parameters** list. Note that for LB/FB2* modules and LB/FB6* modules you must specify the exact type of module in the **Parameters** list.

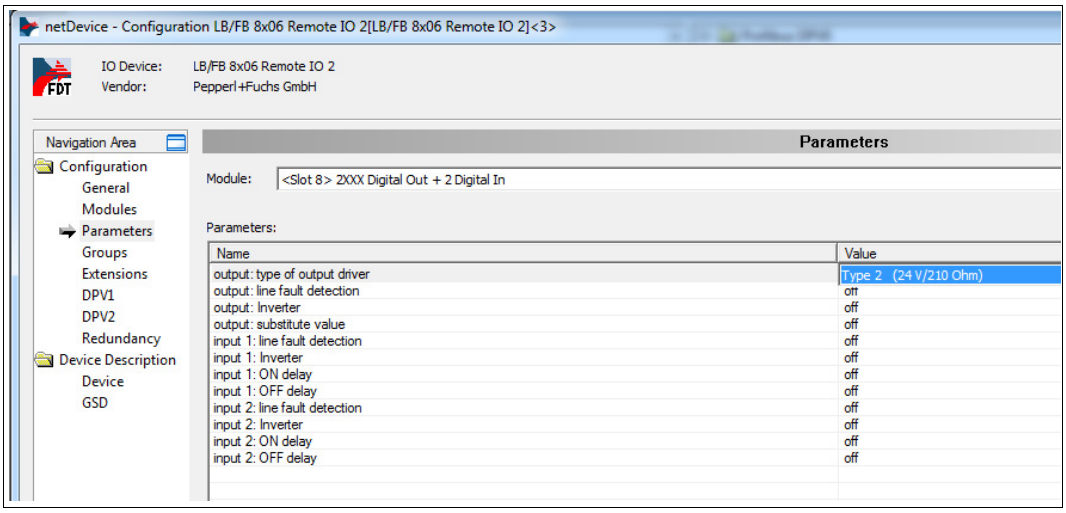


Figure 4.4 Parameters for LB/FB2*

5 Configure PROFIBUS Master

To communicate with the remote I/O unit, the bus parameters of the PROFIBUS DP communication module must be adjusted. After these parameters have been adjusted, download the updated parameters to the communication module. See chapter 7

Define Bus Parameters

1. To open the configuration editor, double-click the PROFIBUS DP communication module in the network area.

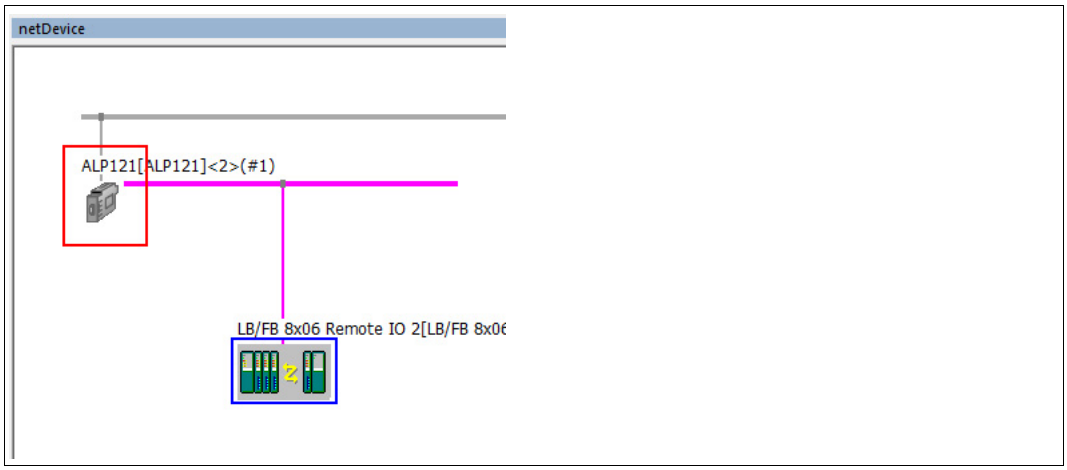


Figure 5.1 PROFIBUS DP communication module in network area

↳ The **netProject** window opens.

2. Select **Configuration > Bus Parameters** in the **Navigation Area**.

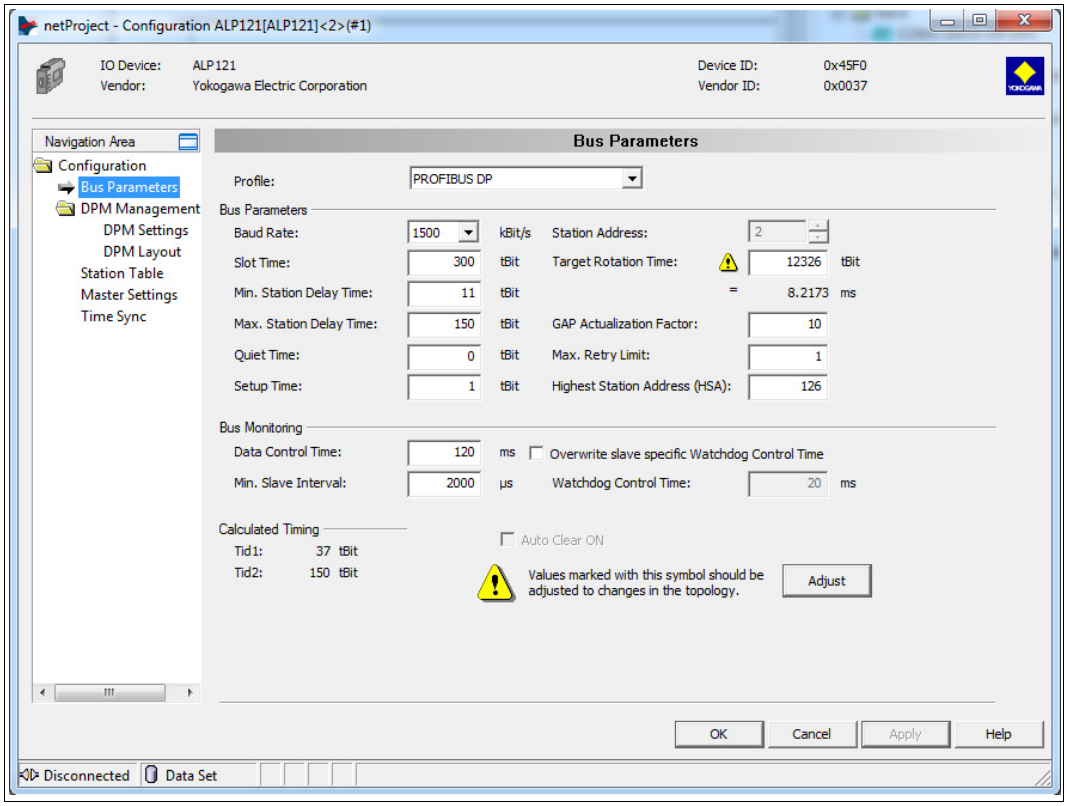


Figure 5.2 **Configuration > Bus Parameters**

3. Define the bus parameters as required. An exclamation sign indicates that the corresponding parameter must be adjusted to match the settings of the remote I/O unit. Click **Adjust** to correct the bus parameters automatically.
4. Select **Configuration > Station Table** in the **Navigation Area**.

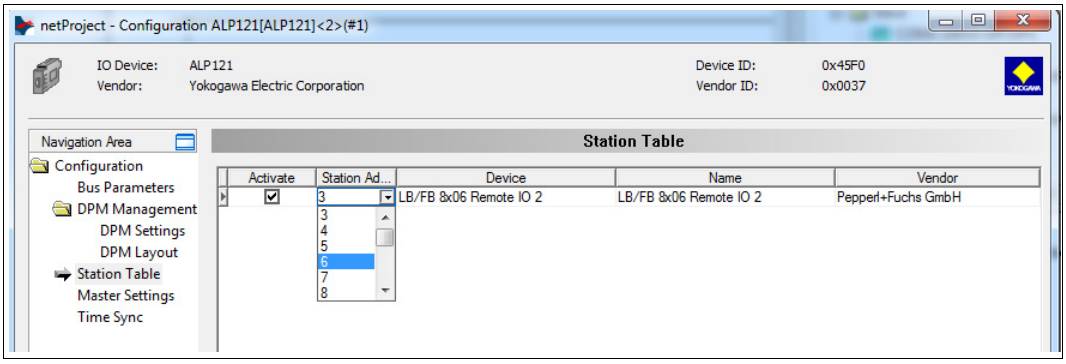


Figure 5.3 **Configuration > Station Table**

5. Select the PROFIBUS address of the remote I/O unit in the **Station Address** column. Note that the ALP121 PROFIBUS DP communication module does not support the DP-V0 command **Set PROFIBUS Address** in combination with Yokogawa CENTUM VP. This command can only be used in combination with the Yokogawa Plant Resource Manager (PRM). Thus, the PROFIBUS address of the remote I/O unit must be set using a class 2 master or via the service bus. For more information on the service bus connection, see the software manual of the com unit.

6 Define Communication Settings

Before the data of the I/O modules can be used by other processes, the PROFIBUS communication settings must be defined. After these settings have been defined, download the updated communication settings to the PROFIBUS DP communication module. See chapter 7

Import Data into Communication I/O Builder

1. Double-click the PROFIBUS DP communication module in the **System View** window.

   ↳ The **Start Builder** window appears.

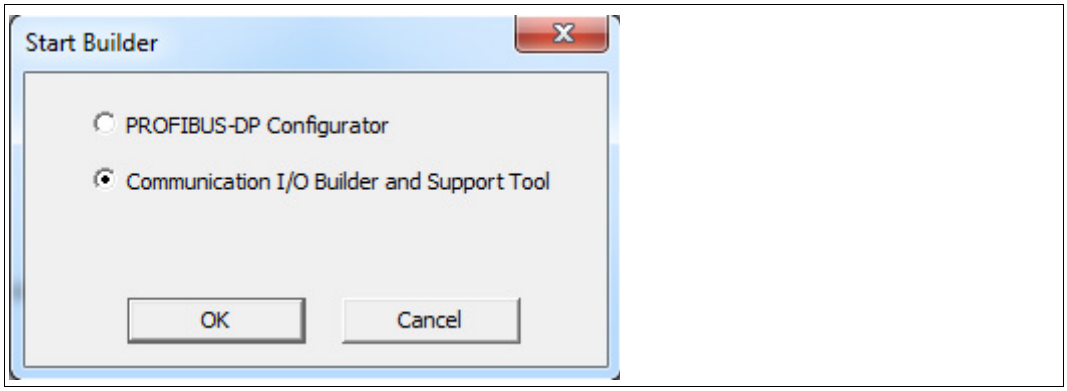


Figure 6.1 **Start Builder** window

2. Select **Communication I/O Builder and Support Tool** and click **OK**.

   ↳ The **Communication I/O Builder** window and the **Communication I/O Support Tool** window open. The **Communication I/O Support Tool** provides a complete list of the data provided by the remote I/O unit.

3. Select all entries in the **Communication I/O Support Tool** window and drag and drop the selection into the configuration table of the **Communication I/O Builder** window.

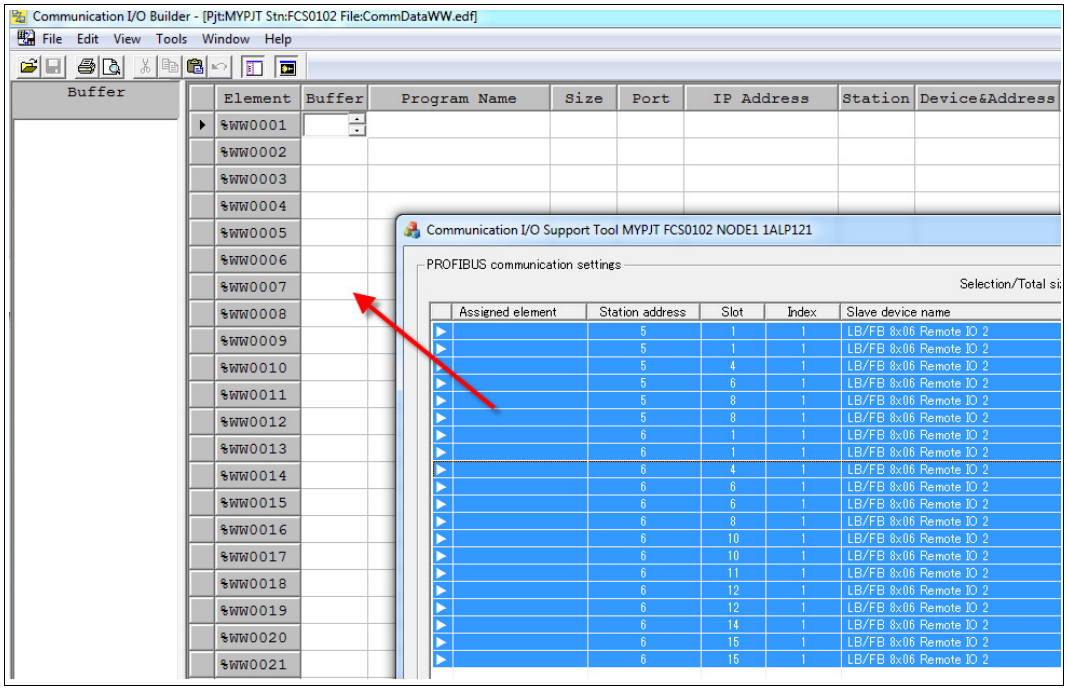
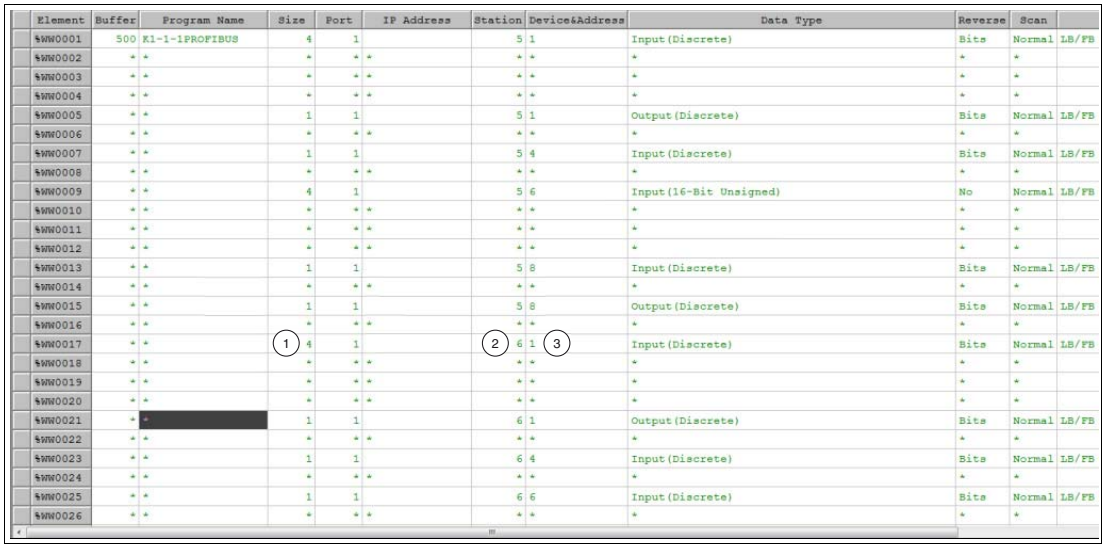


Figure 6.2 Drag and drop the selection into the **Communication I/O Builder**



Element	Buffer	Program Name	Size	Port	IP Address	Station	Device&Address	Data Type	Reverse	Scan	
%WW0001	500	K1-1-1PROFIBUS	4	1		5	1	Input(Discrete)	Bits	Normal	LB/FB
%WW0002	*	*	*	*	*	*	*	*	*	*	
%WW0003	*	*	*	*	*	*	*	*	*	*	
%WW0004	*	*	*	*	*	*	*	*	*	*	
%WW0005	*	*	1	1		5	1	Output(Discrete)	Bits	Normal	LB/FB
%WW0006	*	*	*	*	*	*	*	*	*	*	
%WW0007	*	*	1	1		5	4	Input(Discrete)	Bits	Normal	LB/FB
%WW0008	*	*	*	*	*	*	*	*	*	*	
%WW0009	*	*	4	1		5	6	Input(16-Bit Unsigned)	No	Normal	LB/FB
%WW0010	*	*	*	*	*	*	*	*	*	*	
%WW0011	*	*	*	*	*	*	*	*	*	*	
%WW0012	*	*	*	*	*	*	*	*	*	*	
%WW0013	*	*	1	1		5	8	Input(Discrete)	Bits	Normal	LB/FB
%WW0014	*	*	*	*	*	*	*	*	*	*	
%WW0015	*	*	1	1		5	8	Output(Discrete)	Bits	Normal	LB/FB
%WW0016	*	*	*	*	*	*	*	*	*	*	
%WW0017	*	*	(1) 4	1		(2) 6	1 (3)	Input(Discrete)	Bits	Normal	LB/FB
%WW0018	*	*	*	*	*	*	*	*	*	*	
%WW0019	*	*	*	*	*	*	*	*	*	*	
%WW0020	*	*	*	*	*	*	*	*	*	*	
%WW0021	*	*	1	1		6	1	Output(Discrete)	Bits	Normal	LB/FB
%WW0022	*	*	*	*	*	*	*	*	*	*	
%WW0023	*	*	1	1		6	4	Input(Discrete)	Bits	Normal	LB/FB
%WW0024	*	*	*	*	*	*	*	*	*	*	
%WW0025	*	*	1	1		6	6	Input(Discrete)	Bits	Normal	LB/FB
%WW0026	*	*	*	*	*	*	*	*	*	*	

Figure 6.3 Configuration table of the **Communication I/O Builder**

1 4 registers of input data

2 PROFIBUS address

3 Configured slot

You can enter variables for analog values directly into the table. Note that the variable must start with %%.

%WW0008	*	*	*	*	*	*	*	*	*	*	
%WW0009	*	*	4	1	6	Input(16-Bit Unsigned)		No	Normal	LB/FB 8x06 Remote IO,Input_03	%%AI01
%WW0010	*	*	*	*	*	*		*	*		

Figure 6.4 Variable for analog value

Edit Tag Elements

1. To edit the tag elements that can be used in control drawings, select **Tools > %WB Tag Number Definition Call(W)**.

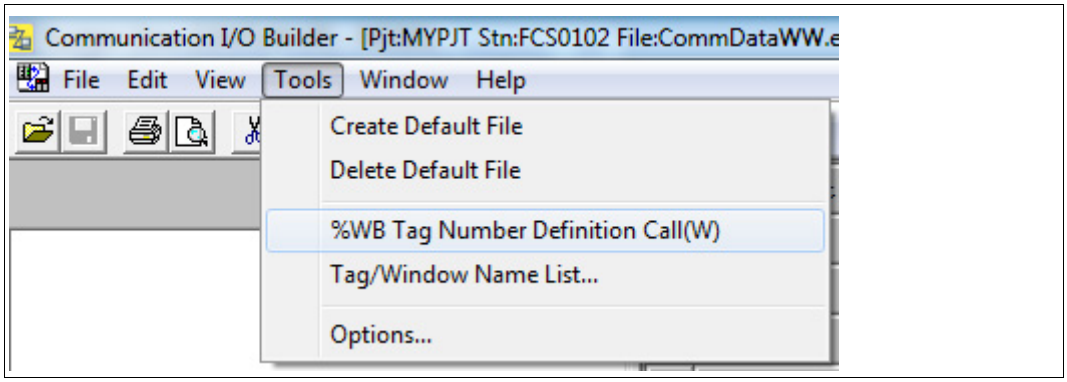


Figure 6.5 **Tools > %WB Tag Number Definition Call(W)**

↳ A new window opens that enables you to edit the tag elements.

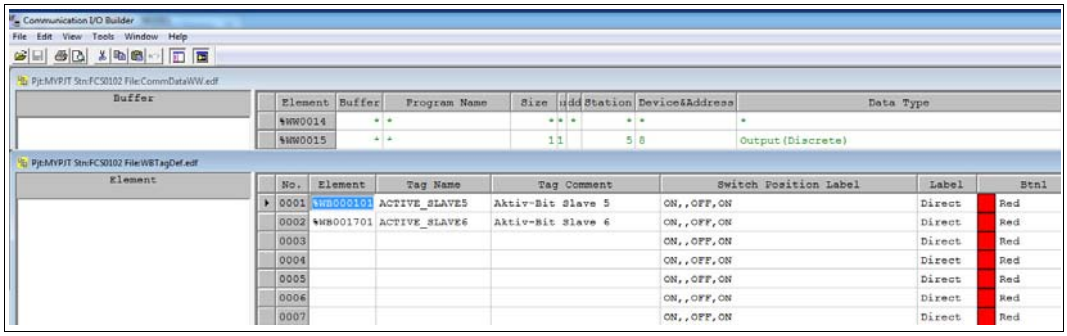


Figure 6.6 Tag editor in **Communication I/O Builder**

2. In addition to the bit and word used, you can define multiple settings that affect the behavior of the value controls. The values you defined in the tag editor can directly be used in the **Control Drawing Builder**.

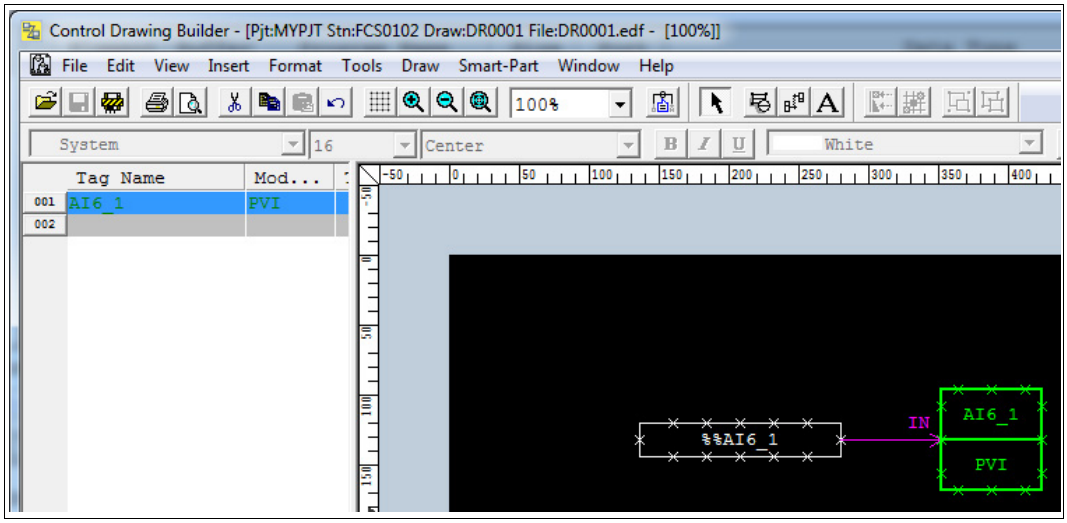


Figure 6.7 **Control Drawing Builder** window

7 Download Parameters

After you defined the parameters for the I/O modules and the PROFIBUS master, or after you defined the PROFIBUS communication settings in the **Communication I/O Builder**, download the updated configuration to the PROFIBUS DP communication module in the rack.

Download Parameters to Communication Module

1. Right-click the PROFIBUS DP communication module in the **System View** window and choose **Tools > PROFIBUS DP > Download PROFIBUS communication settings...**.

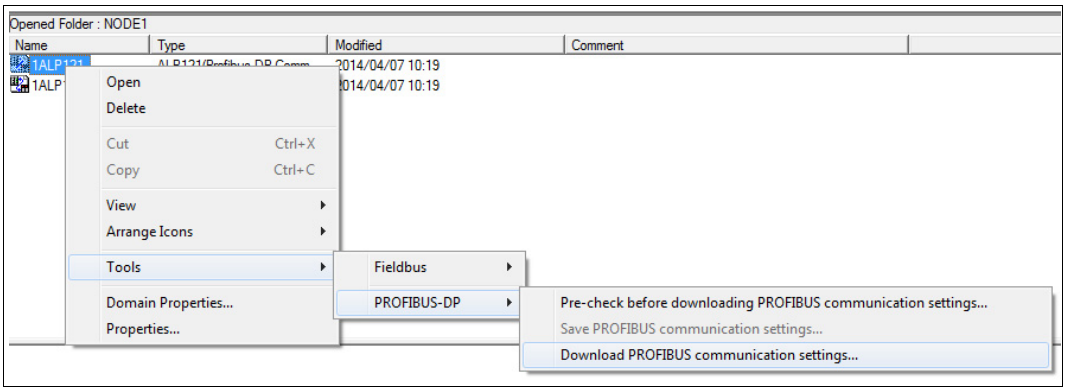


Figure 7.1 **Tools > PROFIBUS DP > Download PROFIBUS communication settings...**

↳ If the parameters of the communication module itself have been changed, the system displays a notification message.

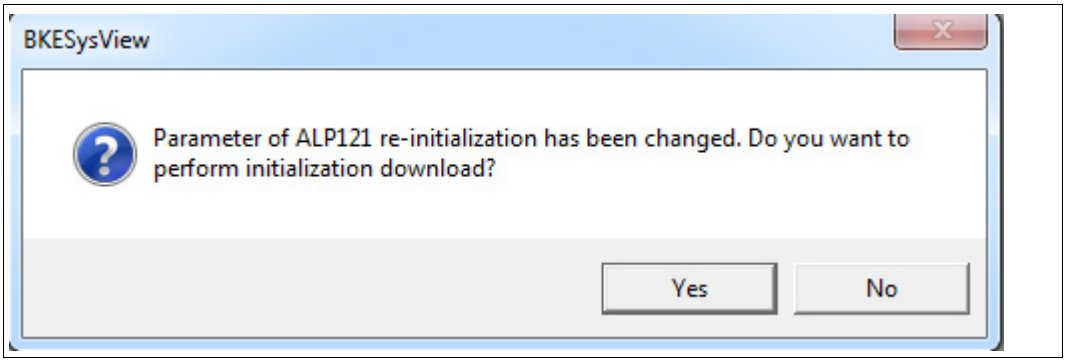


Figure 7.2 Download confirmation window

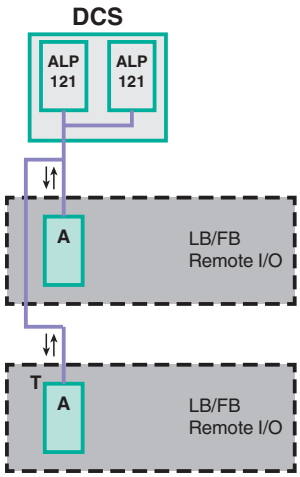
2. To download the new parameters to the communication module, click **Yes**.

8 Appendix

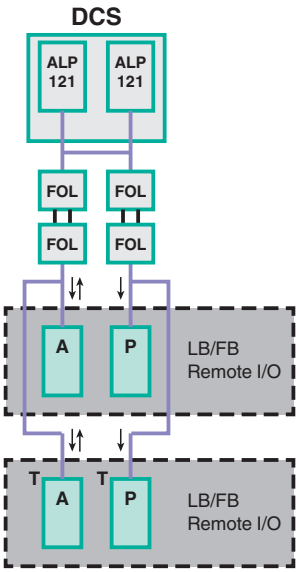
8.1 Redundancy Modes

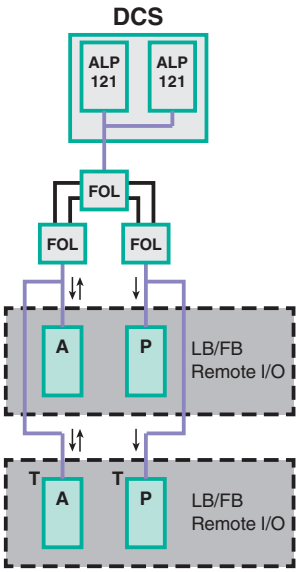
Module Redundancy

The first ALP121 PROFIBUS DP communication module is communicating actively with the remote I/O units, while the second module is on standby, ready to take over the communication if the first module fails. Both modules are connected to one single PROFIBUS line.



In general, field devices are non-redundant because there is only one PROFIBUS line. Nevertheless, you can use redundant com units in the remote I/O unit if the com units are set to **Line Redundancy**. In this case, the first com unit has an active communication to the DCS, while the second com unit is on standby, ready to take over the communication if the first com unit fails. If using fiber optic couplers (FOL), different topologies are possible.



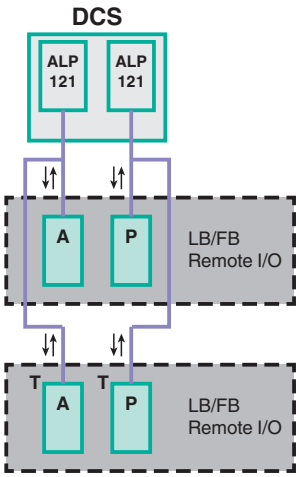


T terminator
A active com unit
P passive com unit
↓↑ active communication
↓ passive communication

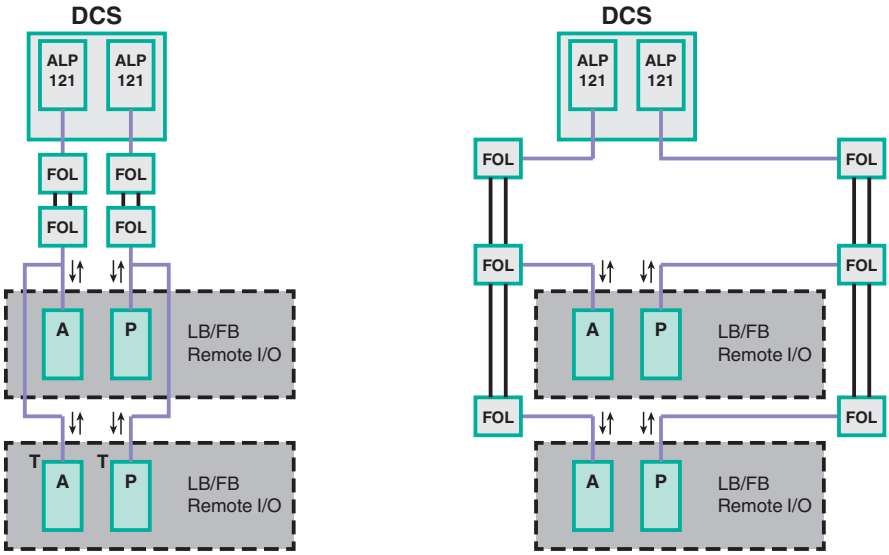
Network Redundancy

If a com unit in the remote I/O unit fails or if a PROFIBUS line is interrupted, the process control system (DCS) switches to the second ALP121 PROFIBUS DP communication module to communicate with the remote I/O units. If using this setting, the com units in the remote I/O units must be set to **Application Redundancy**.

This strategy refers to system redundancy as defined by the PROFIBUS user organization.



If using fiber optic couplers (FOL), different topologies are possible.



T terminator
A active com unit
P passive com unit
⇅ active communication

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8.2 Cyclic Diagnostic Information

Cyclic diagnostic information is transferred like regular I/O data during cyclic bus communication. The following data is available.

- 2 bytes global status register
- 2 bytes command register
- 6 bytes module status register

Global Status Register

The global status register contains an overall diagnostic of the entire remote I/O unit.

If only one error occurs, the type of error and its position can be provided. If multiple errors occur, only the type of the error with the highest priority and the total number of errors can be provided.

Some process control systems (DCS) use the global status register in combination with the module status register to analyze the situation of the remote I/O unit.

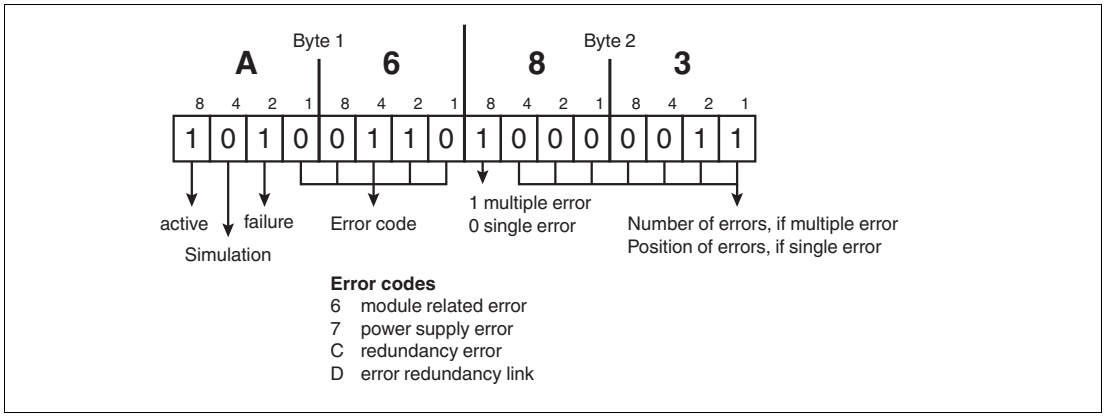

Figure 8.1 Structure of global status register

Command Register

The command register enables you to send a command to the remote I/O unit. For example, you can reset a 32-bit counter (LB/FB1*03), switch from the primary com unit to the redundant com unit, or force a certain com unit to be active or passive.

Parameter	Command	Description
module no. all modules = 0	0x08	reset counter
	0xF7	switch to redundant com unit (requires com unit firmware > 6.20)
	0xF5	make passive
	0xF6	make active

Example!

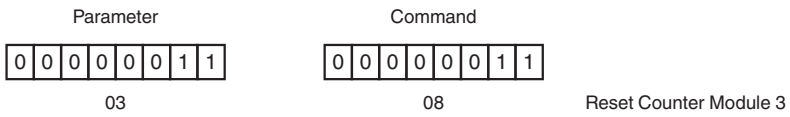

Figure 8.2 Example

Module Status Register

The module status register provides only 1 bit per slot. Thus, it cannot differentiate between an empty slot and a faulty slot or a missing module. Some process control systems (DCS) use the global status register in combination with the module status register to analyze the situation of the remote I/O unit.

Example!

6 byte of diagnostic data containing 1 bit per slot (6 byte = 48 bit)

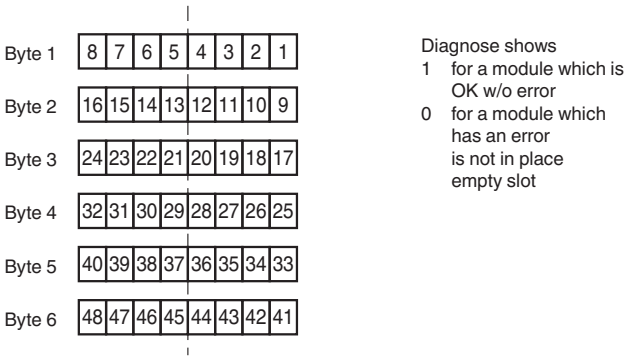

Figure 8.3 Example

8.3 Asynchronous Diagnostic Information

Asynchronous diagnostic information is transferred only if requested by the master. Thus, it is not part of the cyclic bus communication. The remote I/O unit supports the following diagnostics.

Standard PROFIBUS Diagnostics

This includes communication diagnostics like `ConfigFault`, `PrmFault`, `Slave_not_ready`, `Diagnostic Data Overflow`, etc. All messages are standard messages, defined by the PROFIBUS user organization.

Device-Specific Diagnostics

Device-specific diagnostics are specific to the com unit used. The structure and meaning of the diagnostic bits are defined in the GSE file. For more information, see the software manual of the com unit. The com units LB8106* and FB8206* provide 19 bytes of diagnostic information.

- 2 bytes global status register of the active com unit
- 2 bytes of standard PROFIBUS diagnostics of the passive com unit
- 2 bytes global status register of the passive com unit
- 12 bytes of additional module-specific diagnostics, containing 2 bits per slot
  - 00: no error
  - 01: module error
  - 10: wrong module
  - 11: missing module

Module-Specific Diagnostics

Module-specific diagnostics are defined by the PROFIBUS user organization. They provide the slot numbers for which an error occurred. The numbering is based on the numbering of the PROFIBUS configuration string. The numbering has an offset, depending on whether the numbering in the master starts with 0 or with 1.

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Channel-Specific Diagnostics

Channel-specific diagnostics are defined by the PROFIBUS user organization. The messages contain slot number, channel number, type of error and information on the channel type (input/output, byte/word).

Yokogawa CENTUM VP cannot process diagnostic information for digital channels, due to the data structure for digital channels (channel and status information in the same byte). Therefore we recommend that you do not use channel-specific diagnostics for digital input/outputs.

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