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Technology CPUs
FAQ

Controlling a SINAMICS ALM via PROFIBUS

SIEMENS

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Question

How can I control a SINAMICS “Active Line Module” (ALM) via Profibus DP Drive?

Answer

Follow the steps of the description.

1 Background

There is no technology object for the SINAMICS ALM (active line module) and it can consequently not be powered up like an axis via MC_Power. However, the option (from S7-Technology V2.0 on) of limited access to devices at PROFIBUS DP Drive (byte address 0-63) exists via the MC blocks MC_ReadPeriphery and MC_Write Periphery. This enables to power up the ALM from the user program.

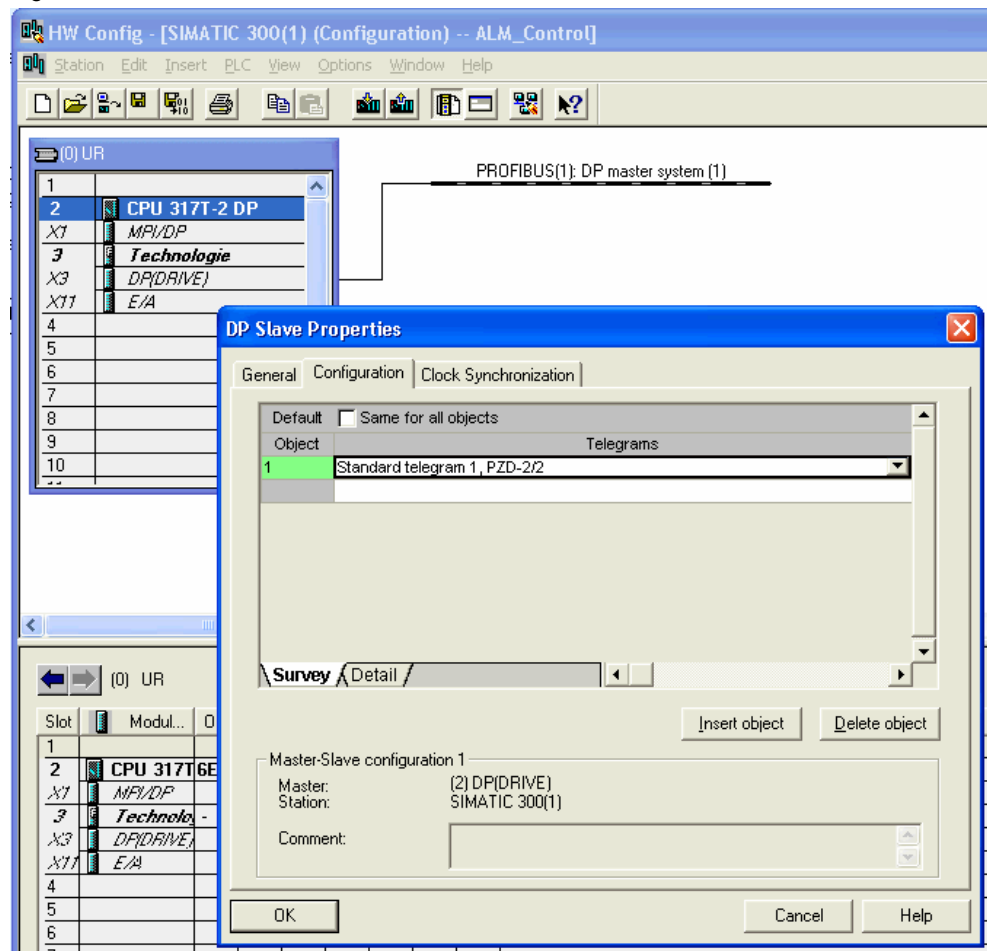
In the following, an example is used to describe this process.

2 Configuration Instructions

2.1 HW Config

1. Create the SINAMICS drive in the hardware configuration (in the example PROFIBUS address 4 is to be assigned to the drive).

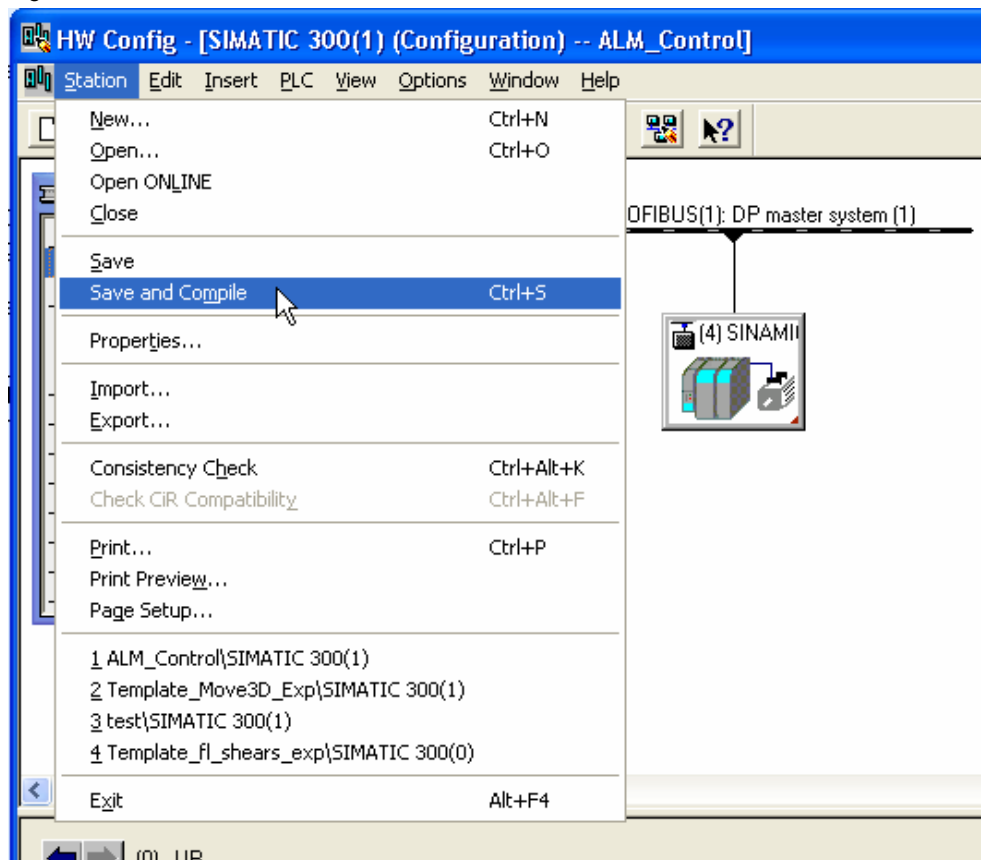
Figure 2-1



Controlling a SINAMICS ALM via Profibus Entry ID: 21971603

2. For the moment, do not modify the telegram setting
Standard telegram 1, PZD2/2.
3. Do not forget to select clock synchronization for SINAMICS in the
Clock Synchronization tab.
4. Save and compile your hardware configuration.

Figure 2-2

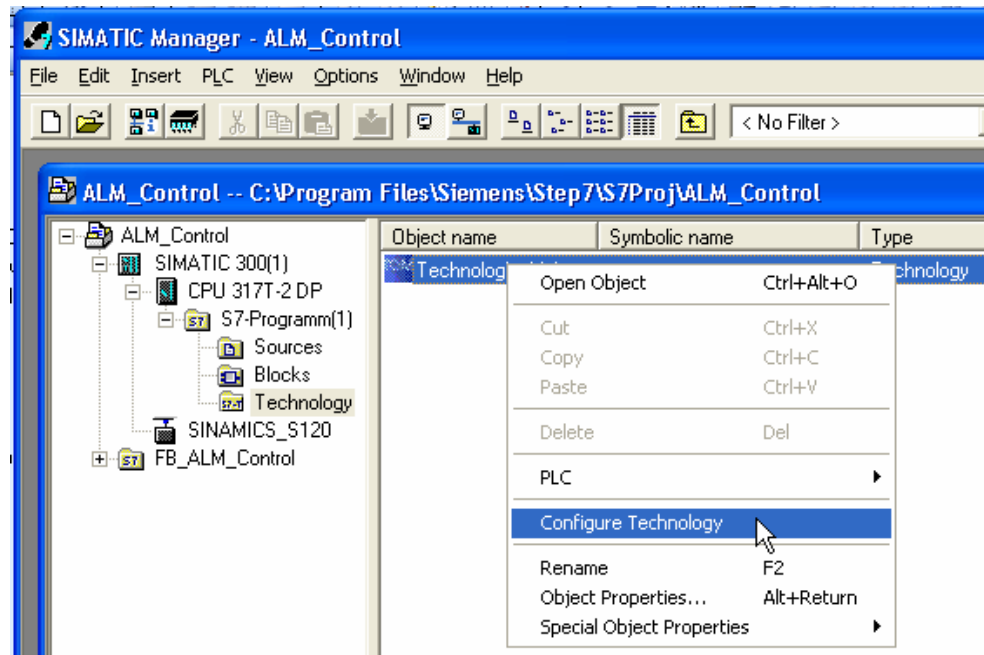


5. Subsequently exit the hardware configuration.

2.2 S7T Config

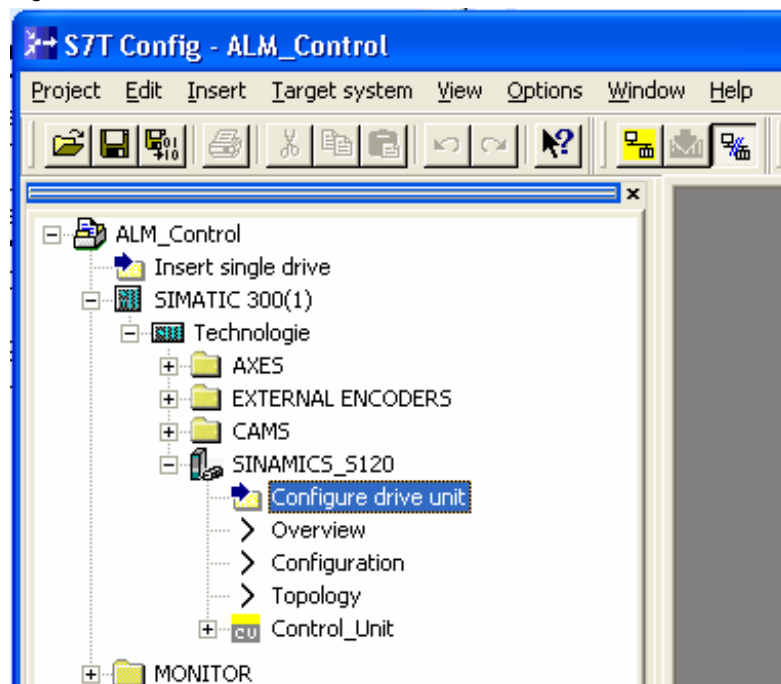
1. Open the technology
Opening for the first time immediately opens S7T Config.

Figure 2-3



2. Now configure your SINAMICS drive (you can of course also perform an automatic configuration online).

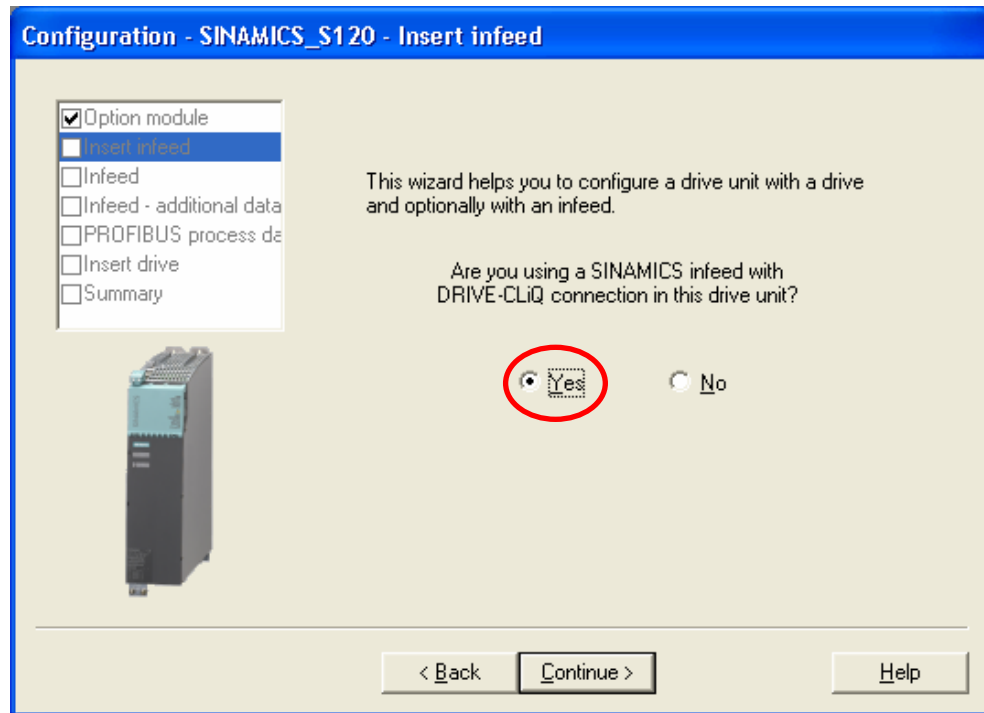
Figure 2-4



2.2.1 Configuration SINAMICS

1. Double-clicking `Configure drive unit` results in the menu-driven configuration of SINAMICS.

Figure 2-5



2. Select **Yes** and **Continue**, subsequently the ALM is selected

Figure 2-6

Configuration - SINAMICS_S120_1 - Infeed

Option module
 Insert infeed
 Infeed
 Infeed - additional data
 PROFIBUS process data
 Insert drive
 Summary

Configure the infeed:

Name:

Operating type:

Supply voltage range:

Cooling method:

Type:

Selection

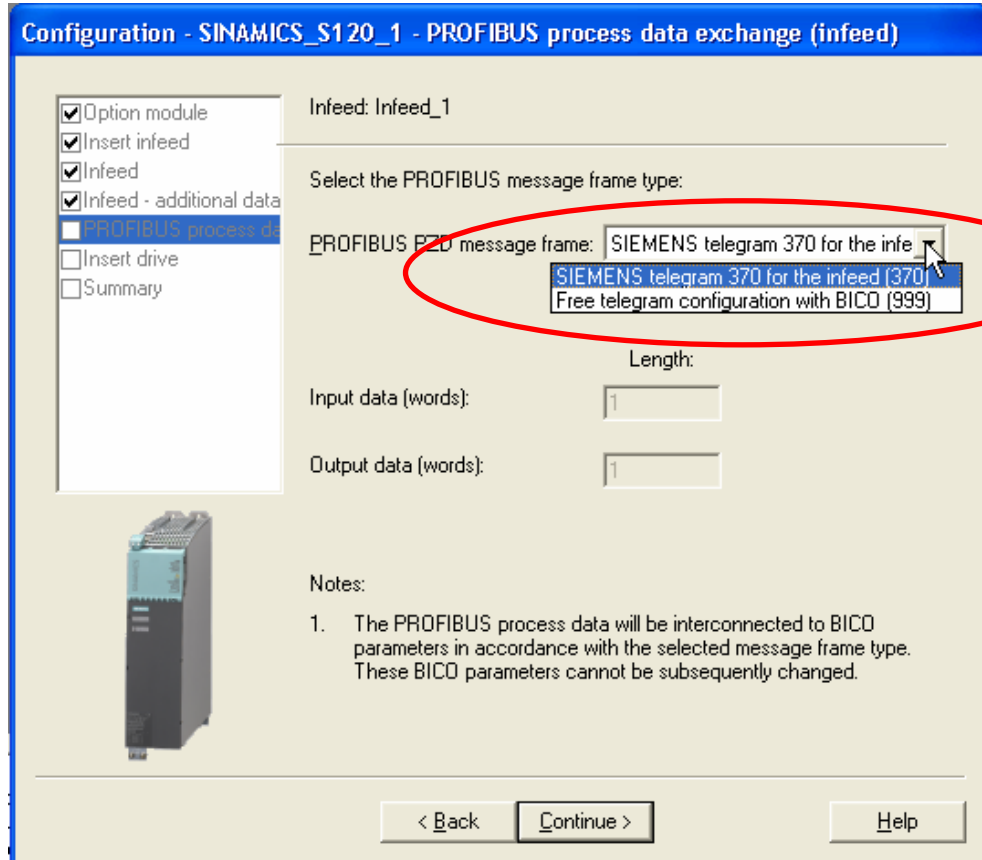
| Type (order no.) | Rate... | Rated... | Code num... |
|--------------------|---------|----------|-------------|
| 6SL3130-7TE21-6AAx | 16 kW | 27 A | 10015 |
| 6SL3130-7TE23-6AAx | 36 kW | 60 A | 10016 |
| 6SL3130-7TE25-5AAx | 55 kW | 92 A | 10017 |
| 6SL3130-7TE28-0AAx | 80 kW | 134 A | 10018 |
| 6SL3130-7TE31-2AAx | 120 ... | 200 A | 10019 |
| 6SL3330-7TE32-1AAx | 132 ... | 210 A | 16001 |
| 6SL3330-7TE32-6AAx | 160 ... | 260 A | 16002 |
| 6SL3330-7TE33-8AAx | 235 ... | 380 A | 16004 |
| 6SL3330-7TE35-0AAx | 300 ... | 490 A | 16005 |
| 6SL3330-7TE36-1AAx | 380 ... | 605 A | 16006 |
| 6SL3330-7TE38-1AAx | 500 ... | 840 A | 16008 |

Line filter available
 Voltage sensing module available
 Parallel connection

< Back Continue > Help

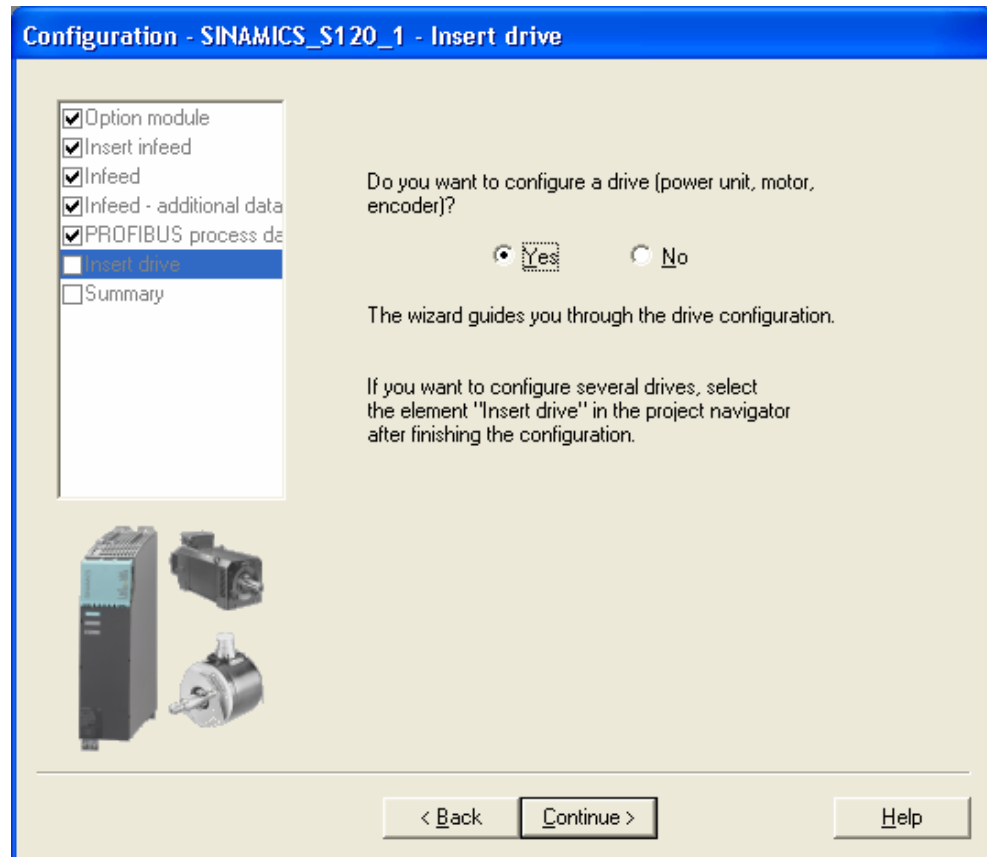
3. In the next window, select Siemens telegram 370 for the infeed (370)

Figure 2-7



4. You are then prompted to define your power unit(s).

Figure 2-8



Note The following steps, the configuration of SINAMICS, are not described explicitly since they are not part of the FAQ.

The following components or settings were used in the example and the respective information is displayed in the figures below:

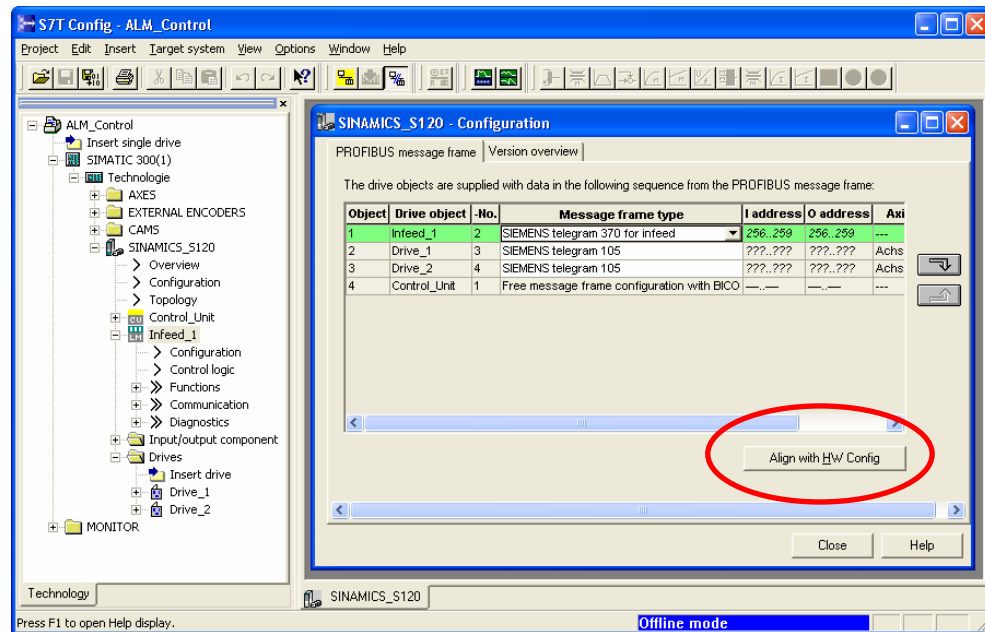
- A double motor module is used.
- The motors feature a Drive-CliQ interface.
- The selected Profibus message frame is 105 to ensure that DSC can be used.

2.3 Aligning S7T Config with HW Config

1. After completing the SINAMICS configuration (Chapter 2.2.1), in the Navigator in SINAMICS S120 open Configuration.

Now you see the PROFIBUS communication of your configured SINAMICS drive:

Figure 2-9



2. Click the Align with HW Config button.
3. Click Yes in the message box to start the hardware addressing.

Figure 2-10

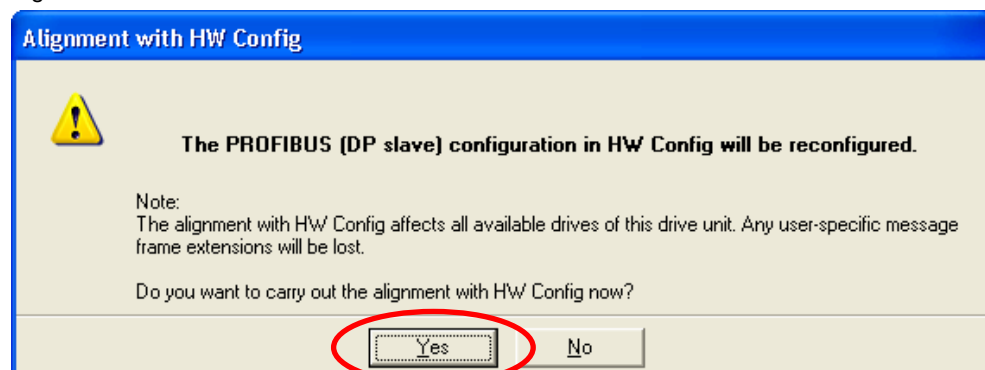
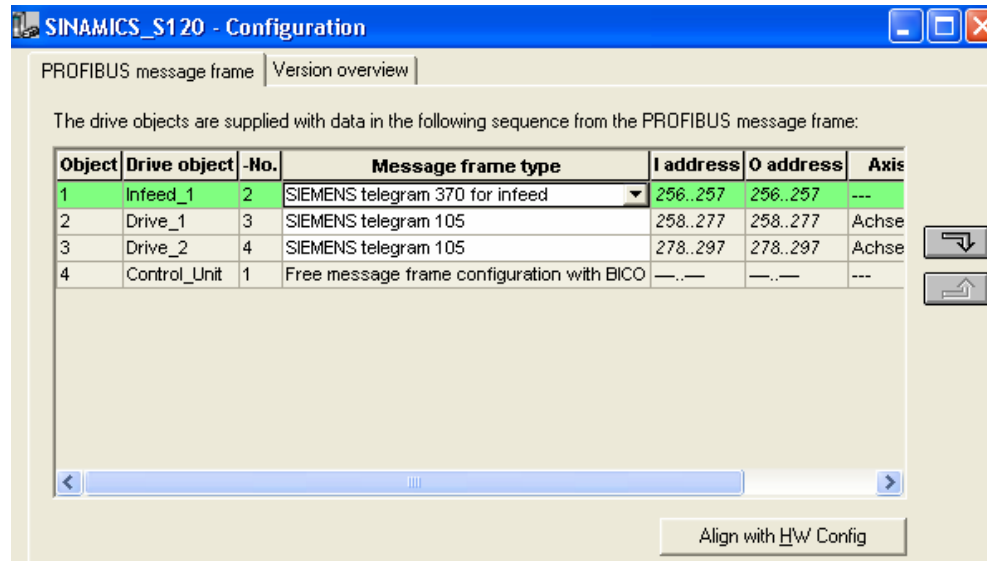


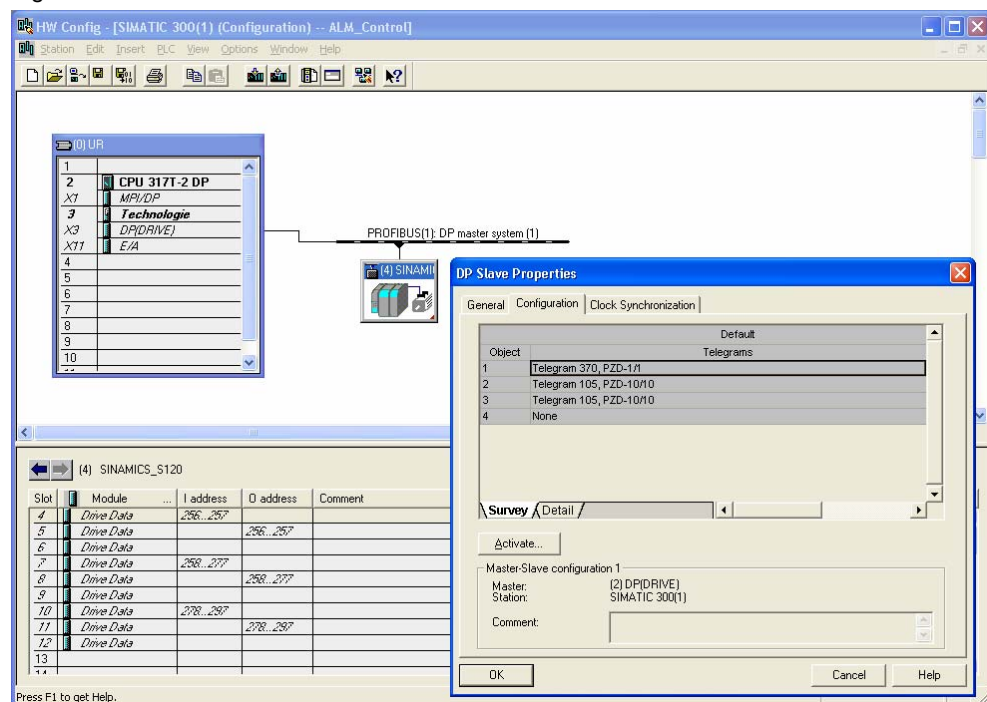
Figure 2-11



The addressing is stored outside the process image and has to be changed for the ALM.

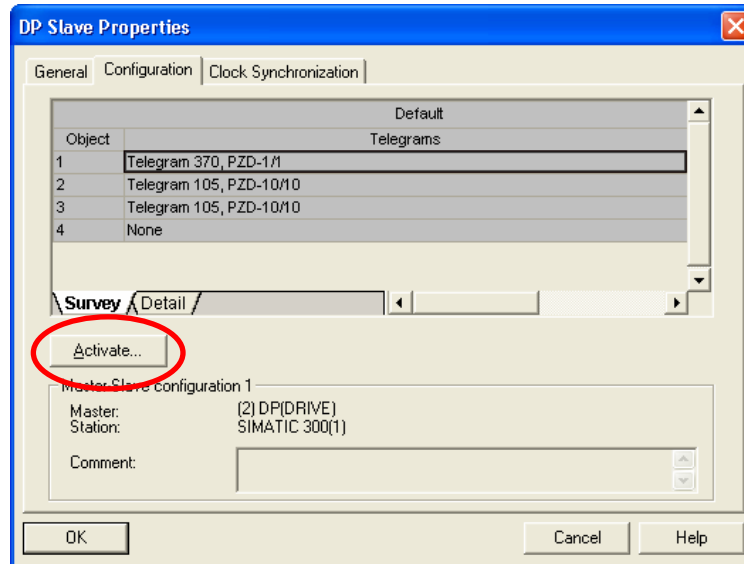
4. Close the configuration by clicking the `Close` button. It is important to close this window; if it is not closed, the changes made later are not applied in HW Config.
5. Reopen your HW configuration in HW Config. Select the object properties of the drive and select the `Configuration` tab.

Figure 2-12



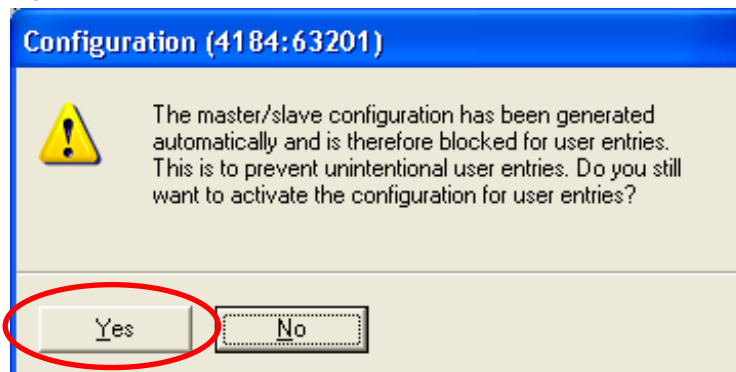
6. The configuration is locked for inputs and has to be activated. Click Activate...

Figure 2-13



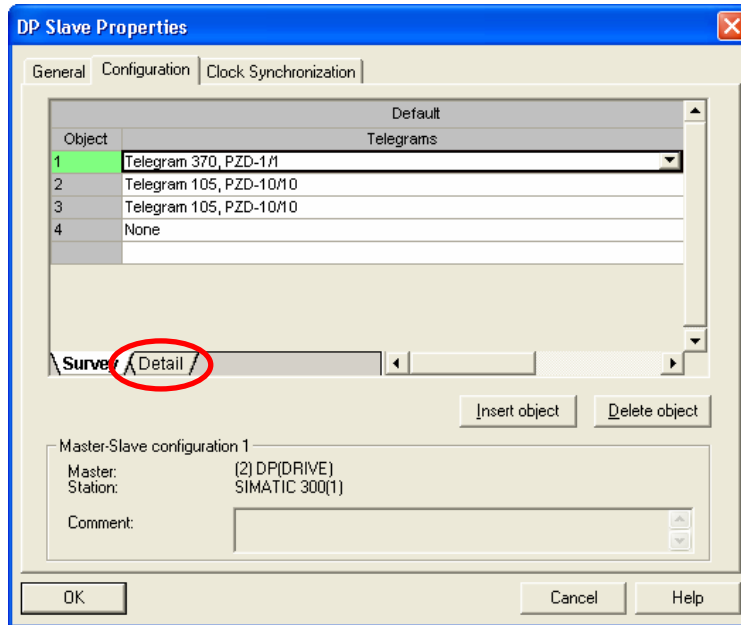
7. Click Yes to confirm the message box.

Figure 2-14



8. Select the Detail tab

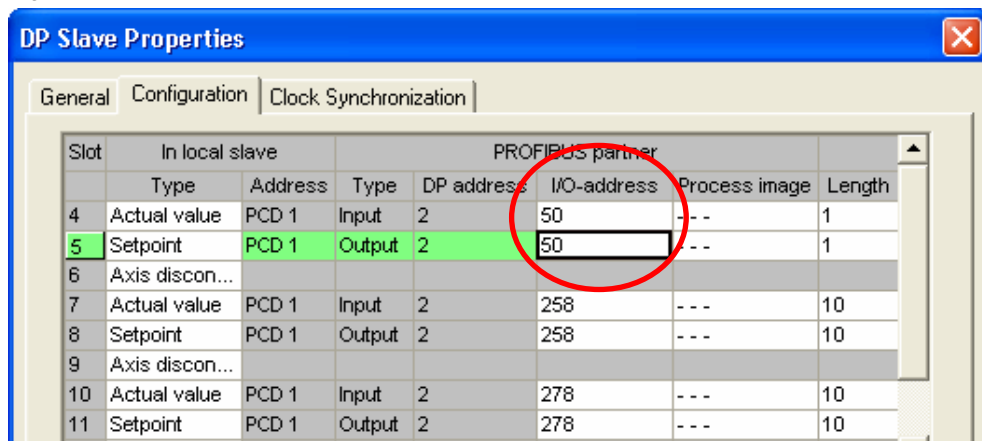
Figure 2-15



Note

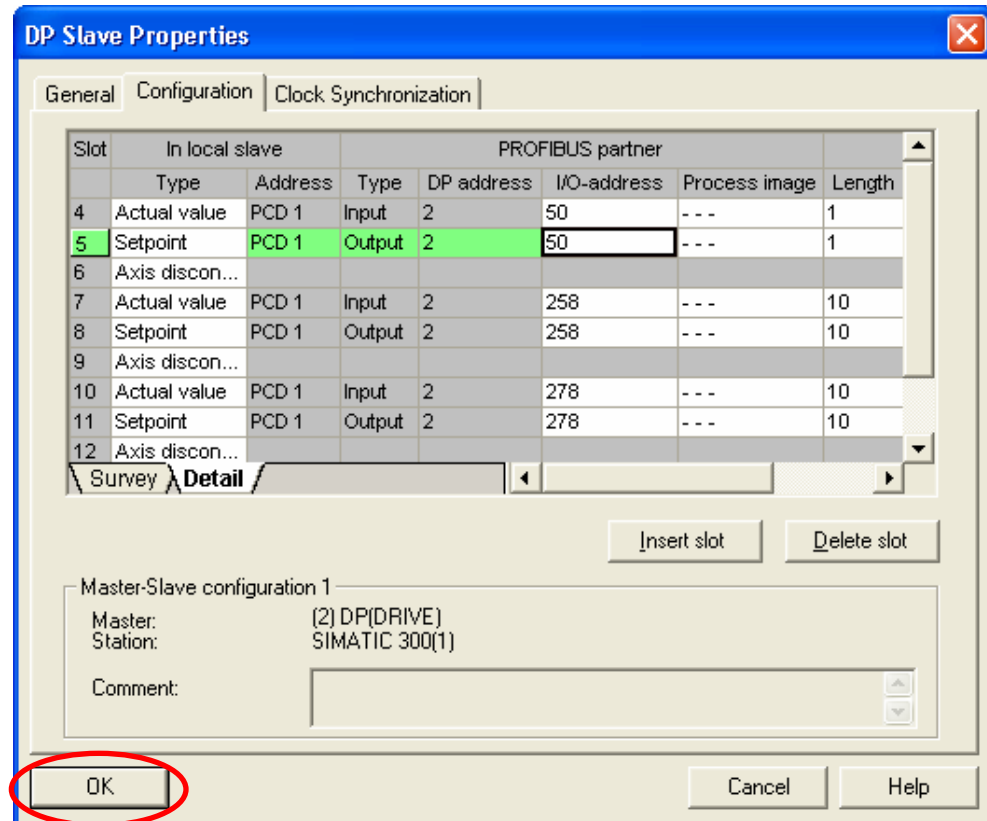
To ensure that the ALM can be addressed with the blocks MC_ReadPeriphery and MC_WritePeriphery, it is required that the input and output addresses are located in the area 0-63.

Figure 2-16



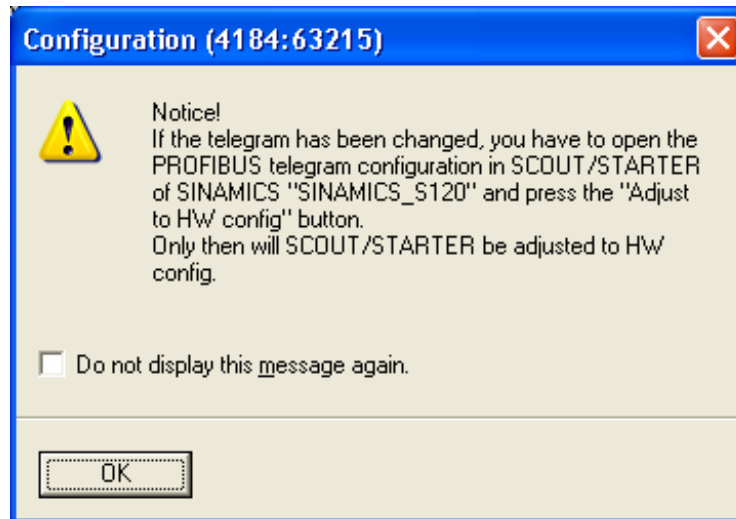
9. Change the I/O addresses so that they are located in the area 0-63.
In the example, the address area from byte 50 should be used; it is thus required to change address 256 to address 50 in SLOT 4 and in SLOT 5.
10. Click OK to apply the changes.

Figure 2-17



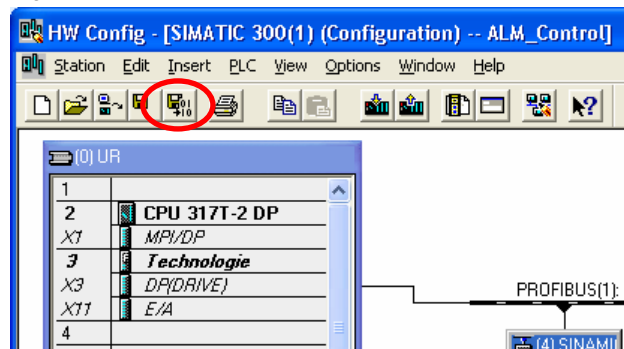
- A message box for the further proceeding is displayed.
Confirm by clicking OK

Figure 2-18



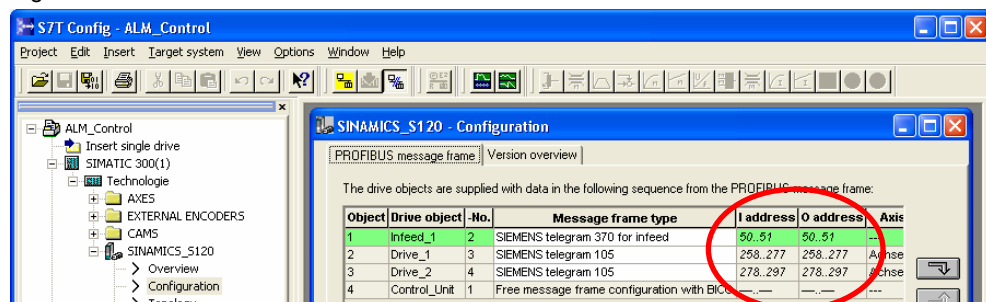
- Save and compile the hardware configuration and (**important**) exit it.

Figure 2-19



- In the Navigator, reopen the SINAMICS configuration

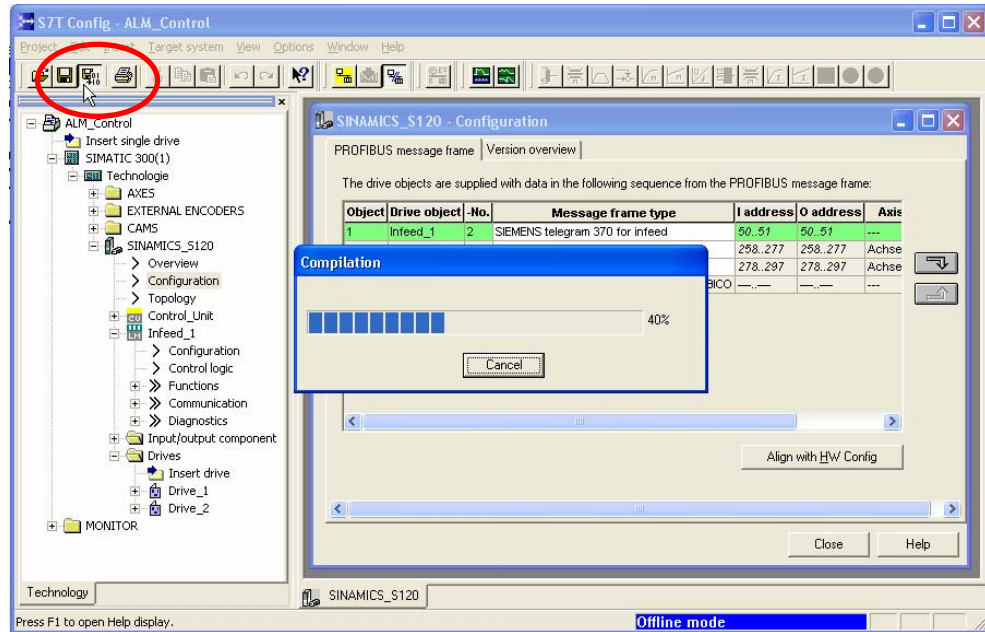
Figure 2-20



The address area of the infeed must display the addresses set in HW Config!

14. Save and compile your technology.

Figure 2-21



15. You can now configure your technology objects. This step is not displayed explicitly.

16. After completing the configuration of the technology objects, save and compile the technology (the consistency can also be checked) and subsequently exit S7T Config.

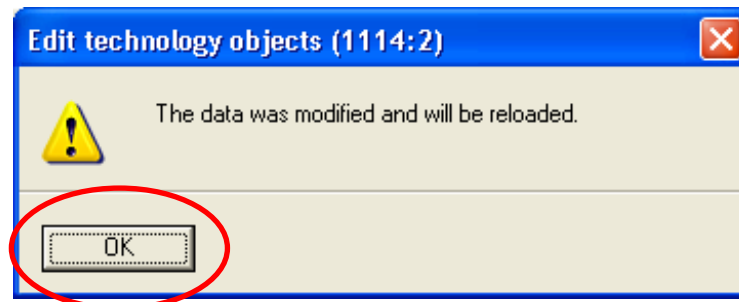
2.4 Technology Objects Manager (TOM)

Two simple positioning axes were created for our example, Achse_1 was assigned to Antrieb_1 and Achse_2 was assigned to Antrieb_2.

If the TOM was opened and if new technology objects were added, the data are reloaded after exiting S7T Config.

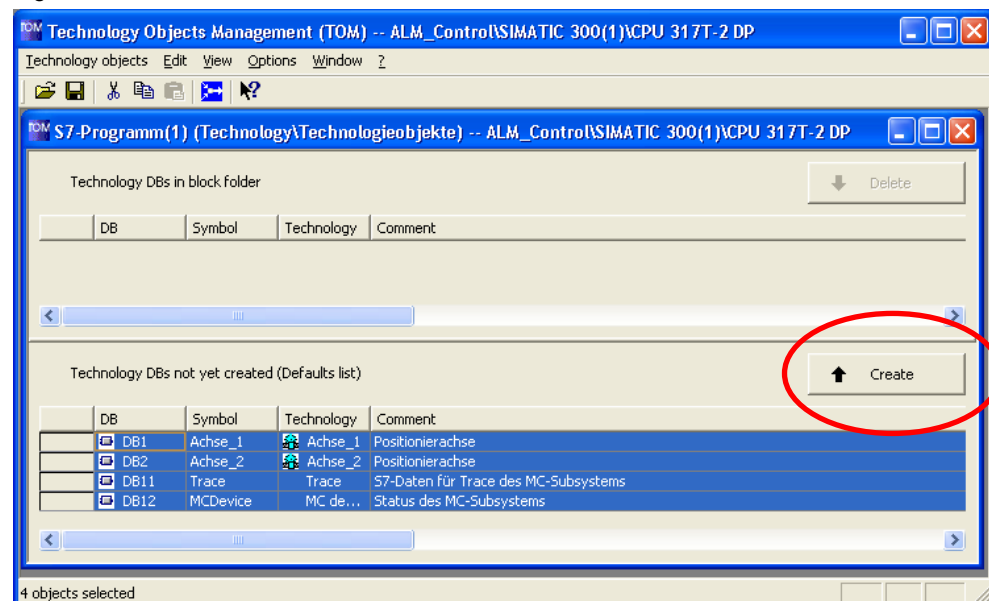
1. Confirm the message box by clicking OK

Figure 2-22



2. Create or update the technology DBs

Figure 2-23



3. The TOM can now be exited.

2.5 Simatic Manager

If the MC blocks have not yet been copied into the project from the S7-Tech library, this should be done now.

The technology DBs also have to be transferred.

3 The Block ALM_Control

The MC_WritePeriphery block is used to control the ALM. The MC_ReadPeriphery block is used to read back the status information of the ALM.

The block ALM_Control was written to make this process more convenient. It takes the control of the ALM and uses the above-mentioned blocks.

To simplify the control, a block was created which includes these two blocks and a small control logic.

| ALM_Control | | | |
|-------------------|----------------|---------------|--------------------------------|
| | BO EN | Rdy_PowerUp | BO Ready for power-up |
| Power up | BO ON | RUN | BO Run |
| Acknowledge fault | BO Acknowledge | On_inhibit | BO On inhibit |
| ALM | | | |
| No Profibus error | BO DP_Slave_OK | Alarm | BO Warning |
| Input address | I IN_Addr | Fault | BO Fault |
| Output address | I OUT_Addr | ZSW_ALM | W Status word (370) |
| | | ErrorID_Read | W ErrorID of MC_ReadPeriphery |
| | | ErrorID_Write | W ErrorID of MC_WritePeriphery |
| | | ENO | BO |

3.1 Input parameters

Table 3-1

| Parameter | Data type | Initial value | Description |
|-------------|-----------|---------------|---|
| ON | BOOL | FALSE | As long as ON=True, it is tried to power up the ALM. The ALM goes to RUN mode if there are no errors preventing the enable. |
| Acknowledge | BOOL | FALSE | In the event of a fault of the ALM, this fault can be acknowledged with Acknowledge =TRUE. |
| DP_Slave_OK | BOOL | FALSE | The signal of the "StationLifeList[x]" (node accessible at DP Drive) from the MCDevice data block has to be connected to this input |
| IN_Addr | INT | 0 | Byte input start address of the ALM from the hardware configuration (possible values: 0-62). |
| Addr | INT | 0 | Byte output start address of the ALM from the hardware configuration (possible values: 0-62). |

3.2 Output parameters

Table 3-2

| Parameter | Data type | Initial value | Description |
|---------------|-----------|---------------|---|
| Rdy_PowerUp | BOOL | FALSE | Feedback of the ALM indicating that it is in Ready for power-up mode. |
| RUN | BOOL | FALSE | Feedback of the ALM indicating that it is in Run mode. |
| On_inhibit | BOOL | FALSE | Feedback of the ALM that it is in On_inhibit mode. |
| Alarm | BOOL | FALSE | There is a warning at the ALM. |
| Fault | BOOL | FALSE | There is a fault at the ALM. |
| ZSW_ALM | WORD | 0 | Complete status word (370) of the ALM for additional information. |
| ErrorID_Read | WORD | 0 | "ErrorID" output of the MC_ReadPeriphery block |
| ErrorID_Write | WORD | 0 | "ErrorID" output of the MC_WritePeriphery block. |

3.3 DP_Slave_OK connection

This connection signals the ALM_Control block whether the connection to SINAMICS is established.

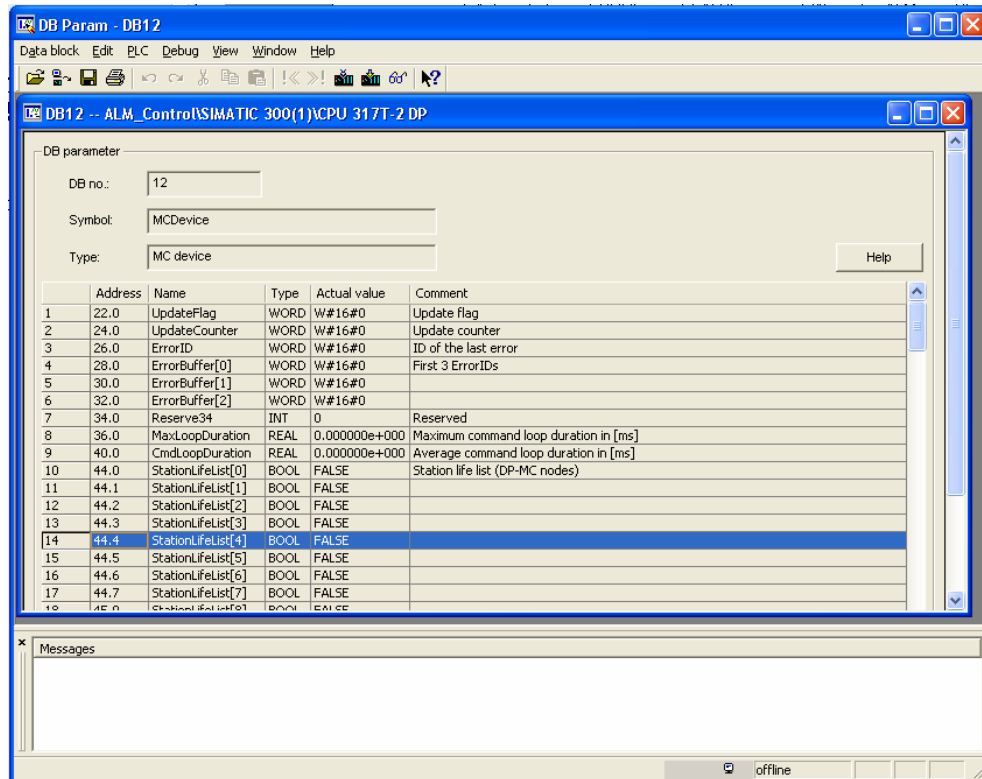
The technology data block MCDevice contains the variable `StationLifeList [0..127]`. This variable displays a list of the accessible nodes at PROFIBUS DP(DRIVE) in an ARRAY. The number of the ARRAY element corresponds to the PROFIBUS address. Value 1 of the element means that the node is accessible, value 0 means that the node is not accessible.

The bit representing the SINAMICS station now has to be transferred to the DP_Slave_OK connection.

Example

The Profibus address of SINAMICS selected in HW Config is 4 (see above). From MCDevice (DB 12 was selected in the example during generating the technology DBs) the data bit `DBX44.4` ensues for the Profibus node with address 4. Thus the overall address is `DB12.DBX44.4`

Figure 3-1

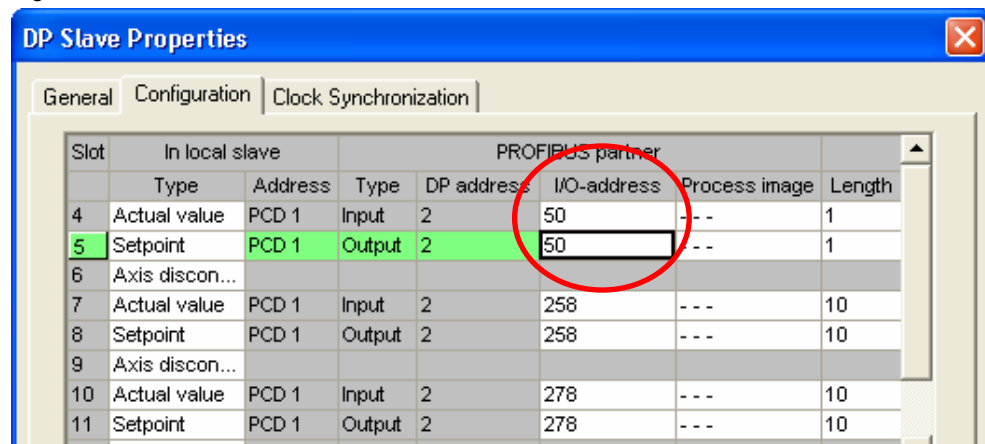


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FAQ_ALM_e.doc

3.4 Connections IN_Addr and OUT_Addr

In the example, address 50 (hardware configuration) was set as input and output address for the ALM. For this reason, this number is to be specified at the inputs IN_Addr and OUT_Addr.

Figure 3-2



3.5 Recommendations

We recommend locking the “RUN” feedback with the “Enable” for the MC_Power of the axis. An axis should only be activated during the infeed.

In addition, it should be avoided to deactivate the infeed during operating an axis.

3.6 LAD and FBD

The block is also available as source. To be able to compile the source, it is required to specify an FBxxx with ALM_Control symbol in the symbol editor. The generated block can be opened and the view can be set to FBD or LAD.