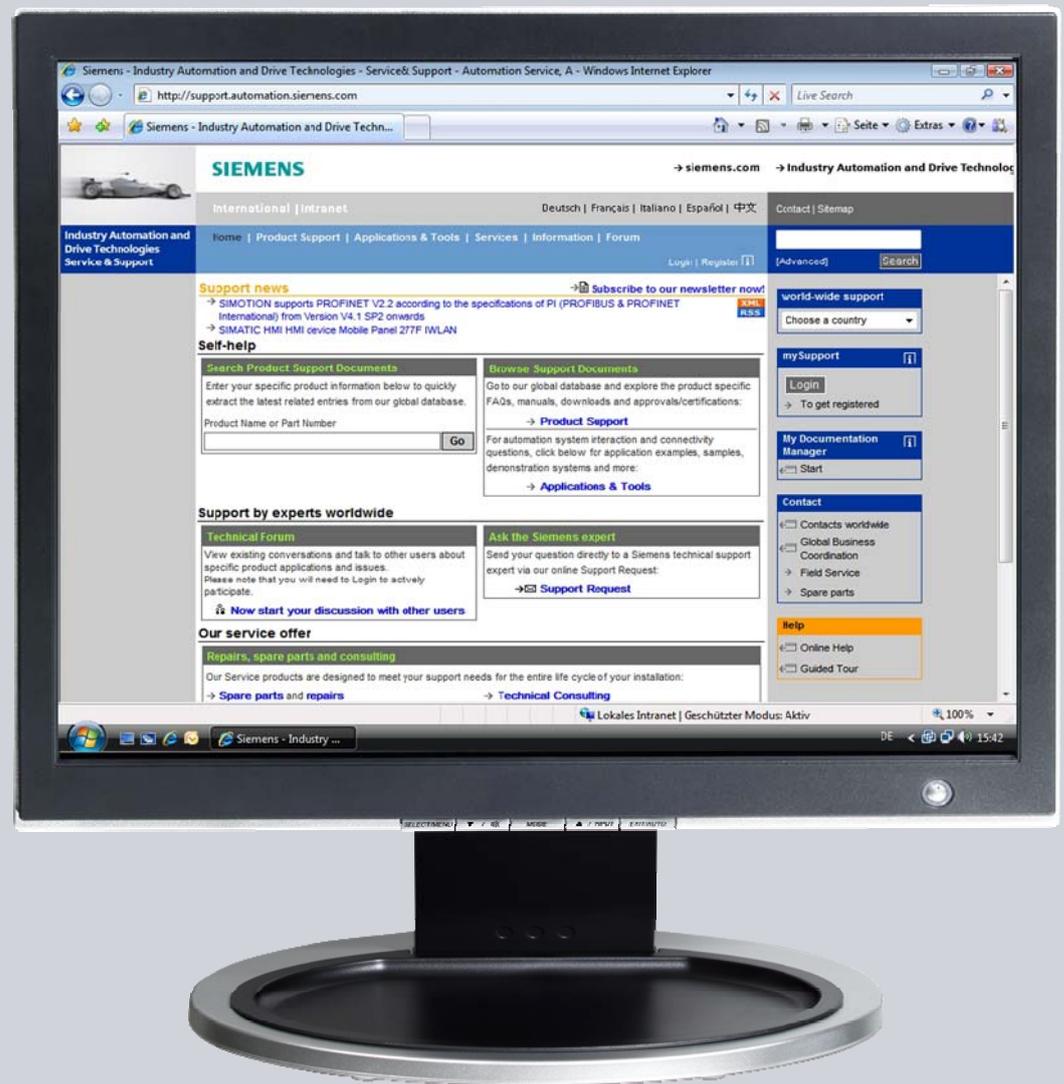


Configuration of an S7-300 CPU as DP Slave to a CP 342-5 as DP Master

PROFIBUS DP

FAQ • May 2010



Service & Support

Answers for industry.

SIEMENS

This entry originates from the Service&Support Portal of Siemens AG, Sector Industry, Industry Automation and Drive Technologies. The conditions of use specified there apply (www.siemens.com/nutzungsbedingungen).

Go to the following link to download this document.

<http://support.automation.siemens.com/WW/view/de/6518938>

Question

How do you configure an S7-300 CPU as DP slave to a CP 342-5 as DP master?

Answer

Follow the instructions and notes listed in this document for a detailed answer to the above question.

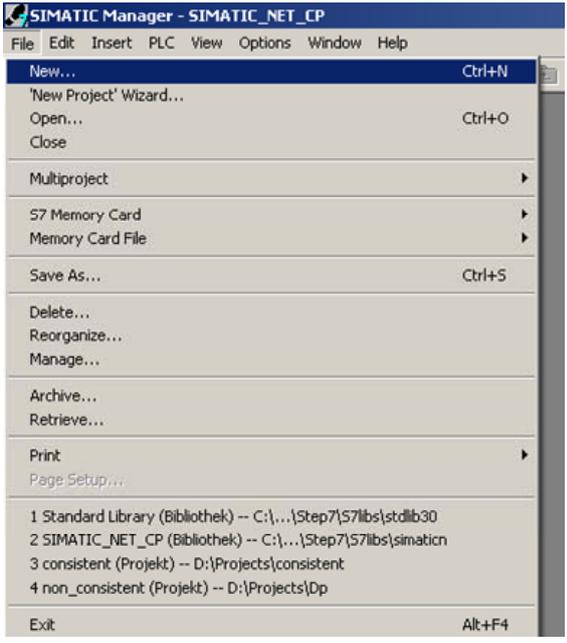
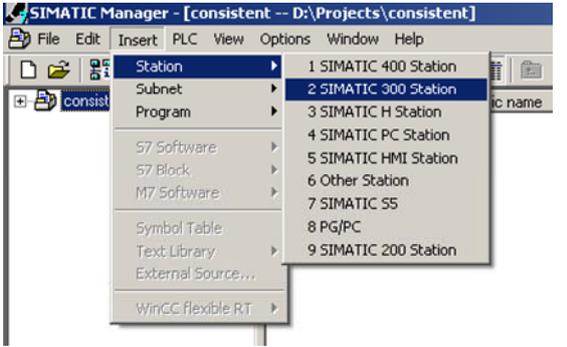
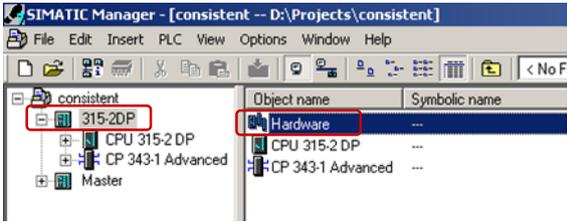
Contents

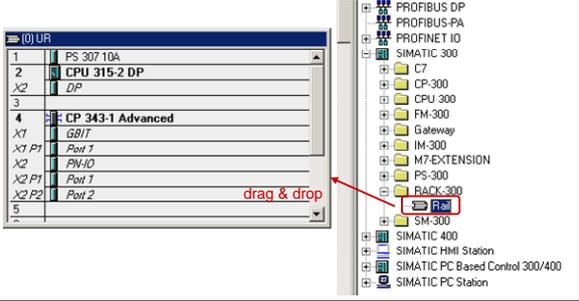
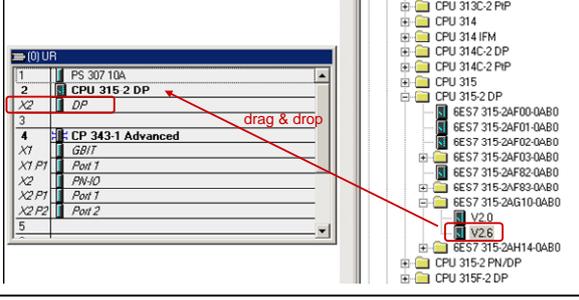
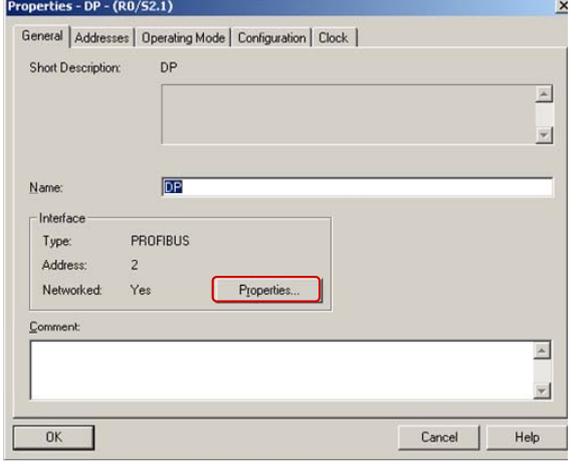
1	Configuration of an S7-300 CPU as DP Slave.....	4
2	Configuration of the CP342-5 as DP Master	8
3	S7 Program in the DP Slave	11
3.1	Data transfer with load and transfer commands	11
3.2	Data transfer with system functions	11
	Parameterization of SFC14 "DPRD_DAT"	11
	Parameterization of SFC14 "DPWR_DAT"	11
4	S7 Program in the DP Master	13
	Parameterization of FC1 "DP_SEND"	13
	Parameterization of FC2 "DP_RECV"	13

1 Configuration of an S7-300 CPU as DP Slave

This example shows how to configure a CPU 315-2DP as DP slave to a CP 342-5 as DP master. Proceed as follows to configure CPU 315-2DP as DP slave.

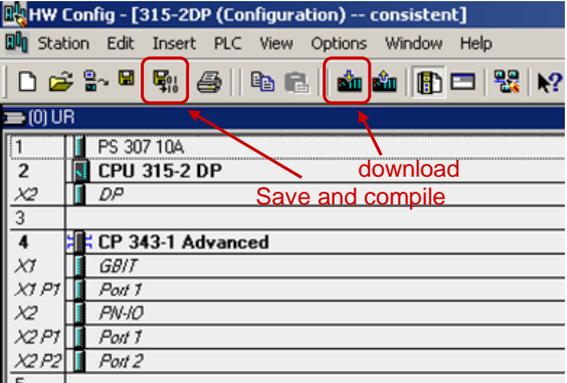
Table 1-1

No.	Action	Note								
1.	In the SIMATIC Manager, you create a new STEP 7 project via the menu "File > New".	 <p>The screenshot shows the 'File' menu in SIMATIC Manager. The menu items include: New... (Ctrl+N), 'New Project' Wizard..., Open... (Ctrl+O), Close, Multiproject, S7 Memory Card, Memory Card File, Save As... (Ctrl+S), Delete..., Reorganize..., Manage..., Archive..., Retrieve..., Print, Page Setup..., and Exit (Alt+F4). A list of libraries is visible at the bottom: 1 Standard Library (Bibliothek) -- C:\...Step7\S7libs\stdlib30, 2 SIMATIC_NET_CP (Bibliothek) -- C:\...Step7\S7libs\simatic, 3 consistent (Projekt) -- D:\Projects\consistent, and 4 non_consistent (Projekt) -- D:\Projects\Dp.</p>								
2.	Add a SIMATIC 300 station via "Insert > Station".	 <p>The screenshot shows the 'Insert > Station' menu in SIMATIC Manager. The menu items include: Station (1 SIMATIC 400 Station, 2 SIMATIC 300 Station, 3 SIMATIC H Station, 4 SIMATIC PC Station, 5 SIMATIC HMI Station, 6 Other Station, 7 SIMATIC SS, 8 PG/PC, 9 SIMATIC 200 Station), Subnet, Program, S7 Software, S7 Block, M7 Software, Symbol Table, Text Library, External Source..., and WinCC flexible RT.</p>								
3.	Mark the SIMATIC 300 station "315-2DP". Then double-click on Hardware to open the hardware configuration of the SIMATIC 300 station.	 <p>The screenshot shows the hardware configuration in SIMATIC Manager. The 'consistent' project is expanded to show '315-2DP', 'CPU 315-2 DP', 'CP 343-1 Advanced', and 'Master'. The 'Hardware' object is selected, and the hardware configuration table is visible:</p> <table border="1" data-bbox="1034 1599 1358 1821"> <thead> <tr> <th>Object name</th> <th>Symbolic name</th> </tr> </thead> <tbody> <tr> <td>Hardware</td> <td>...</td> </tr> <tr> <td>CPU 315-2 DP</td> <td>...</td> </tr> <tr> <td>CP 343-1 Advanced</td> <td>...</td> </tr> </tbody> </table>	Object name	Symbolic name	Hardware	...	CPU 315-2 DP	...	CP 343-1 Advanced	...
Object name	Symbolic name									
Hardware	...									
CPU 315-2 DP	...									
CP 343-1 Advanced	...									

No.	Action	Note
4.	<p>In the Hardware Catalog, under SIMATIC 300, select the mounting channel and drag-and-drop this into the Hardware Configuration.</p>	
5.	<p>In the Hardware Catalog, select the CPU being and drag-and-drop this to slot 2 of the mounting channel. Double-click on the DP interface of the CPU to open the "Properties" dialog of the DP interface.</p>	
6.	<p>In the Properties dialog of the DP interface, select the "General" tab and click on the "Properties" button.</p>	
7.	<p>Specify a PROFIBUS address for the CPU and assign a PROFIBUS subnetwork to the CPU. If you have not yet created a PROFIBUS subnetwork, click on the "New" button to create a new PROFIBUS subnetwork. Confirm the settings with "OK".</p>	

1 Configuration of an S7-300 CPU as DP Slave

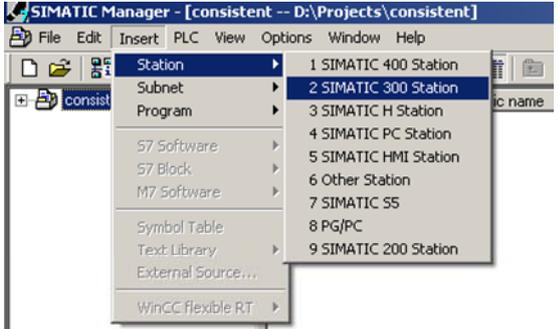
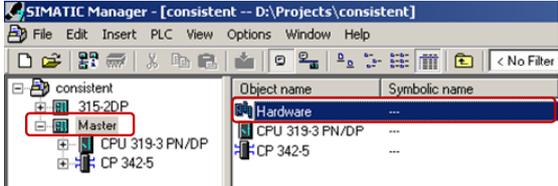
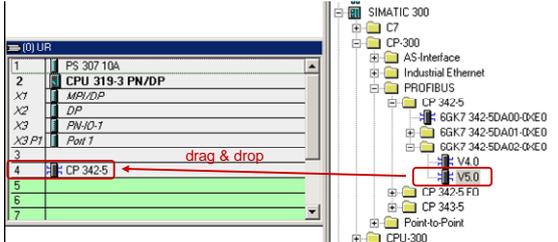
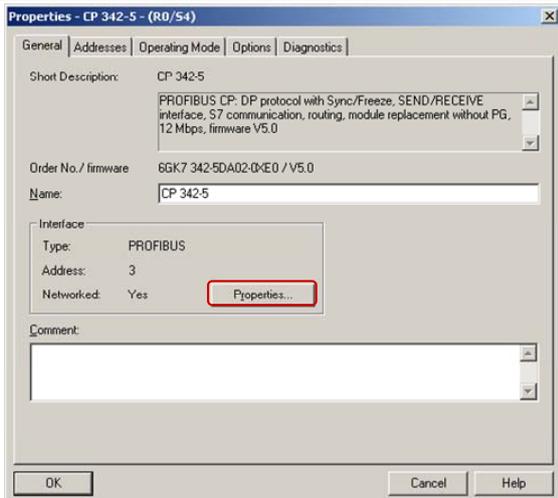
No.	Action	Note
8.	In the Properties dialog of the DP interface, you switch to the "Operating Mode" tab. Select "DP slave" as the operating mode.	
9.	In the Properties dialog of the DP interface, you switch to the "Configuration" tab. Click on the "New" button to configure the inputs and outputs for the DP slave and DP master.	
10.	Define the input and output addresses, the length, the unit and the consistency. Specify "All" for "Consistency" to transfer the data consistently in the block. Confirm the settings with "OK". Then close the Properties dialog of the DP interface with "OK".	

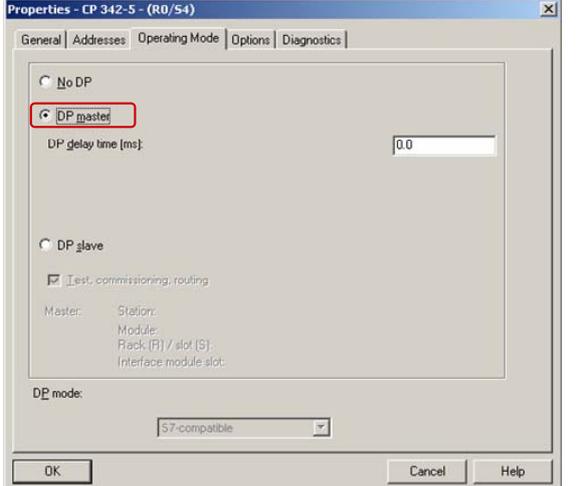
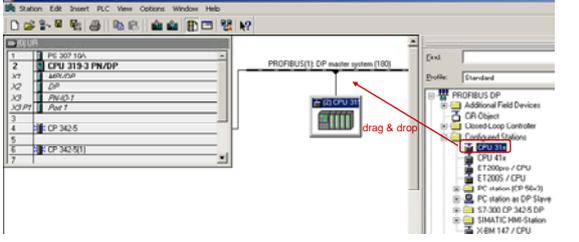
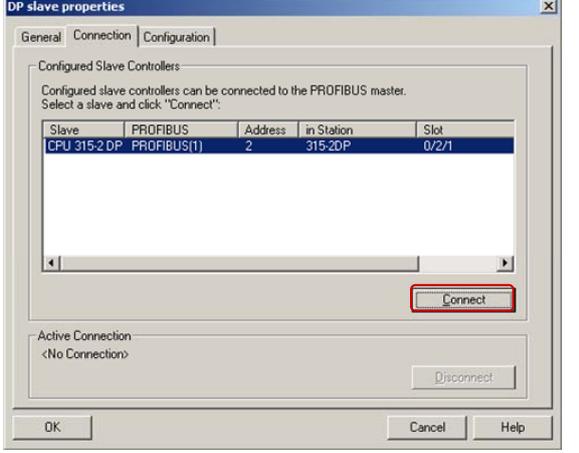
No.	Action	Note
11.	Save and compile the hardware configuration of the S7-300 station. Load the configuration into the CPU.	 <p>The screenshot shows the HW Config software interface. The title bar reads "HW Config - [315-2DP (Configuration) -- consistent]". The menu bar includes "Station", "Edit", "Insert", "PLC", "View", "Options", "Window", and "Help". The toolbar contains various icons, with two red boxes highlighting the "download" icon (a computer with a downward arrow) and the "save and compile" icon (a document with a downward arrow). The hardware rack is visible, showing the following components:</p> <ul style="list-style-type: none"> 1 PS 307 10A 2 CPU 315-2 DP (highlighted with a red arrow from the "download" icon) X2 DP (highlighted with a red arrow from the "save and compile" icon) 3 4 CP 343-1 Advanced X1 GBIT X1 P1 Port 1 X2 PN-IO X2 P1 Port 1 X2 P2 Port 2 <p>Red text labels "download" and "save and compile" are placed near the arrows pointing to the CPU 315-2 DP and DP slots, respectively.</p>

2 Configuration of the CP342-5 as DP Master

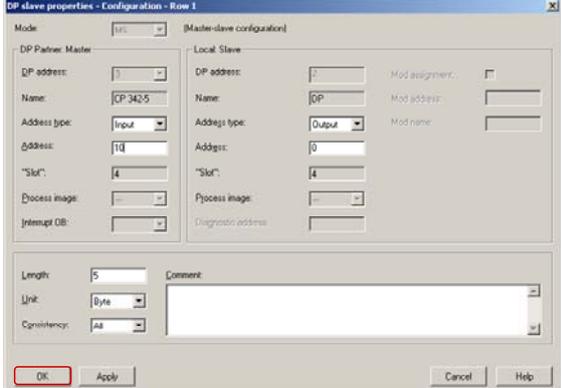
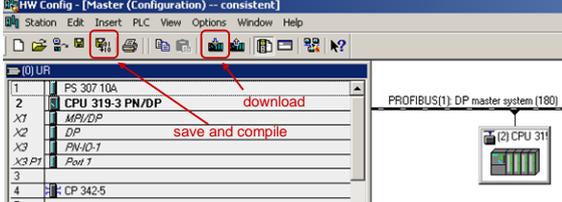
In the example, a CP342-5 is configured as a DP master. Please follow the instructions below for configuring the CP342-5 as DP master.

Table 2-1

No.	Action	Note
1.	If you have configured the S7-300 CPU as DP slave, add another S7-300 station to your STEP 7 project.	
2.	Mark the SIMATIC 300 station "Master". Then double-click on Hardware to open the hardware configuration of the SIMATIC 300 station.	
3.	In the Hardware Catalog, under SIMATIC 300, select the mounting channel, the appropriate CPU and the CP342-5 and drag-and-drop them into the Hardware Configuration. Double-click on the CP342-5 to open the Properties dialog of the CP342-5.	
4.	In the Properties dialog of the CP342-5, select the "General" tab and click on the "Properties" button.	

No.	Action	Note										
5.	<p>Specify a PROFIBUS address for the CP342-5 and assign a PROFIBUS subnetwork to the CP342-5.</p> <p>The DP slave and the DP master are assigned to the same PROFIBUS subnetwork.</p> <p>Confirm the settings with "OK".</p>											
6.	<p>In the Properties dialog of the CP342-5, you switch to the "Operating Mode" tab. Select "DP master" as the operating mode.</p> <p>Confirm the settings with "OK".</p>											
7.	<p>In the Hardware Catalog, under PROFIBUS DP > Configured Stations, select the CPU 31x and drag-and-drop it into the Hardware Configuration.</p> <p>Double-click on the DP slave to open the Properties dialog.</p>											
8.	<p>In the Properties dialog of the DP slave, select the "Connection" tab and click on the "Connect" button.</p>	 <table border="1" data-bbox="821 1624 1348 1792"> <thead> <tr> <th>Slave</th> <th>PROFIBUS</th> <th>Address</th> <th>in Station</th> <th>Slot</th> </tr> </thead> <tbody> <tr> <td>CPU 315-2 DP</td> <td>PROFIBUS(1)</td> <td>2</td> <td>315-2DP</td> <td>0/2/1</td> </tr> </tbody> </table>	Slave	PROFIBUS	Address	in Station	Slot	CPU 315-2 DP	PROFIBUS(1)	2	315-2DP	0/2/1
Slave	PROFIBUS	Address	in Station	Slot								
CPU 315-2 DP	PROFIBUS(1)	2	315-2DP	0/2/1								

2 Configuration of the CP342-5 as DP Master

No.	Action	Note
9.	In the Properties dialog of the DP interface, you switch to the "Configuration" tab. Click on the "New" button to configure the inputs and outputs for the DP slave and DP master.	
10.	Define the input and output addresses, the length, the unit and the consistency. Specify "All" for "Consistency" to transfer the data consistently in the block. Confirm the settings with "OK". Then close the Properties dialog of the DP slave with "OK".	
11.	Save and compile the hardware configuration of the S7-300 station. Load the configuration into the CPU.	

3 S7 Program in the DP Slave

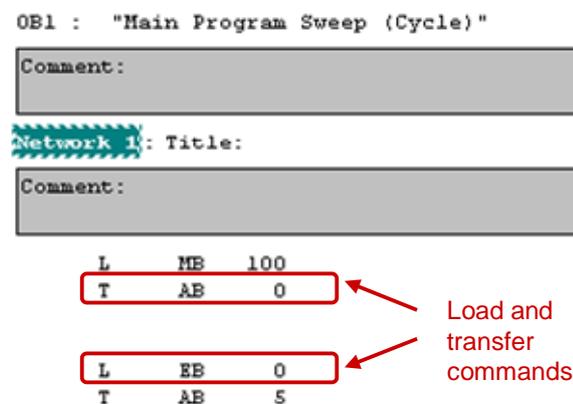
3.1 Data transfer with load and transfer commands

You use the load and transfer commands to send data to the configured outputs of the DP slave and receive data from the configured inputs of the DP slave. The load and transfer commands support consistent read/write transfer of a maximum of 4 bytes.

1 byte from the marker area is written with the transfer command to the output area of the DP slave and transferred to the DP master.

1 byte is read with the load command from the input area of the DP slave and received by the DP master.

Figure 3-1



3.2 Data transfer with system functions

To transfer more than 4 bytes of data consistently you call the system functions SFC14 "DPRD_DAT" and SFC15 "DPWR_DAT" in the S7 program of the CPU.

These system functions are available in the Standard Library > System Function Blocks > Blocks.

At the LADDR parameter of system functions SFC14 and SFC15 you specify the start address of the inputs and outputs in accordance with the hardware configuration.

In this example a maximum of 5 bytes are transferred.

Parameterization of SFC14 "DPRD_DAT"

At the RECORD input parameter of SFC14 "DPRD_DAT" you specify the address and length of the data area in which the receive data is to be stored. The length of the data area must be at least the total length of the input address area.

In this example the SFC14 "DPRD_DAT" transfers 5 bytes from the input area of the DP slave into DB2 as from address 0.

Parameterization of SFC15 "DPWR_DAT"

At the RECORD input parameter of SFC15 "DPWR_DAT" you specify the address and length of the data area in which the send data is to be stored. The length of the data area must be at least the total length of the output address area.

In this example the SFC15 "DPWR_DAT" transfers 5 bytes from DB1 as of address 0 into the output area of the DP slave for transfer to the DP master.

Figure 3-2

```
OBI : "Main Program Sweep (Cycle)"
Comment:
Network 1: Title:
Comment:

CALL "DPRD_DAT"
LADDR :=W#16#0 ← Start address of inputs
RET_VAL:=MW10
RECORD :=P#DB2.DEX0.0 BYTE 5

CALL "DPWR_DAT"
LADDR :=W#16#0 ← Start address of outputs
RECORD :=P#DB1.DEX0.0 BYTE 5
RET_VAL:=MW12
```

4 S7 Program in the DP Master

The CP342-5 always transfers the data consistently. For data exchange via PROFIBUS you call functions FC1 "DP_SEND" and FC2 "DP_RECV" in the user program of the CPU.

Functions FC1 and FC2 are available in the SIMATIC_NET_CP > CP 300 > Blocks library.

Parameterization of FC1 "DP_SEND"

FC1 "DP_SEND" transfers the data of a specified output area to the CP342-5 for output to the S7-300 CPU.

In this example, the output address area for the CP342-5 is configured as from address 10 with a length of 5 bytes (QB0 up to QB14), i.e. the total length of the output address area is 15 bytes.

At the SEND input parameter of FC1 you specify the address and length of the data area in which the send data are to be stored. The length of the data area must be at least the total length of the output address area.

In this example FC1 "DP_SEND" transfers 15 bytes from DB1 as of address 0 into the output area of the CP342-5 for transfer to the DP slave.

The following table shows the assignment of the data area in which the send data are to be stored and the configured output address area.

Table 4-1

Data area of send data	Output address area
DB1.DBB0	QB0
DB1.DBB1	QB1
...	
DB1.DBB14	QB14

Parameterization of FC2 "DP_RECV"

FC1 "DP_RECV" reads the process data of the S7-300 CPU into a specified input address area.

In this example, the input address area for the CP342-5 is configured as from address 10 with a length of 5 bytes (IB0 up to IB14), i.e. the total length of the input address area is 15 bytes.

At the RECV input parameter of FC2 you specify the address and length of the data area in which the received data are to be stored. The length of the data area must be at least the total length of the output address area.

In this example FC1 "DP_RECV" reads 15 bytes from the input area of the CP342-5 into DB2 as from address 0.

The following table shows the assignment of the data area in which the received data are to be stored and the configured input address area.

Table 4-2

Data area of received data	Input address area
DB2.DBB0	IB0
DB2.DBB1	IB1
...	
DB2.DBB14	IB14

Figure 4-1

```
Obl : "Main Program Sweep (Cycle)"
Comment:
Network 1: Title:
Comment:

CALL "DP_SEND"
CPLADDR:=W#16#110
SEND :=P#DB1.DEX0.0 BYTE 15
DONE :=M10.0
ERROR :=M10.1
STATUS :=MW12

CALL "DP_RECV"
CPLADDR :=W#16#110
RECV :=P#DB2.DEX0.0 BYTE 15
NDR :=M20.0
ERROR :=M20.1
STATUS :=MW22
DPSTATUS:=MB24
```

Address and length of data area for the send data

Address and length of data area for the receive data