# Training document for the company-wide automation solution Totally Integrated Automation (T I A)

### MODULE D5

### **PROFIBUS DP** with

### Master CPU 315-2DP / Slave ET 200S

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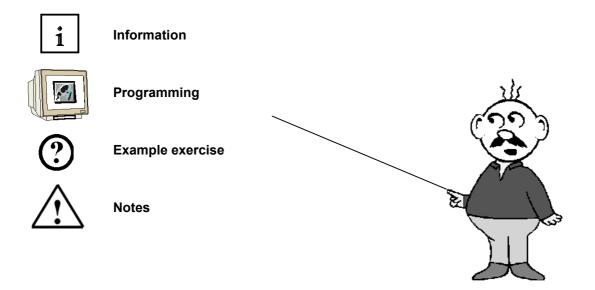
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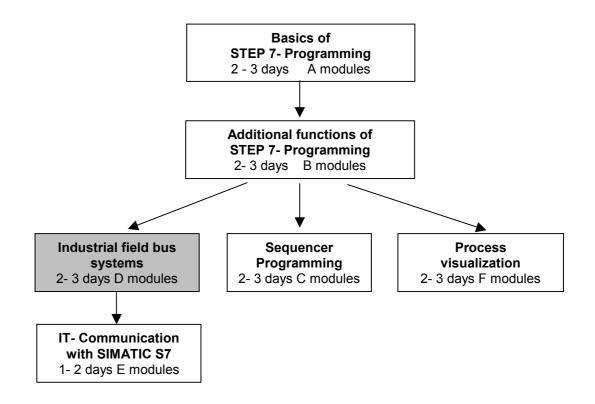
The following symbols stand for the specified modules:



### 1. FORWARD

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The module D5 is assigned content wise to **Industrial field bus systems**.



#### Learning goal:

In this module, the reader should learn how the PROFIBUS DP is taken into operation with the CPU 315-2DP as a master and the ET 200S with the integrated CPU as a slave. The module shows the principle procedure by means of a short example.

#### **Requirements:**

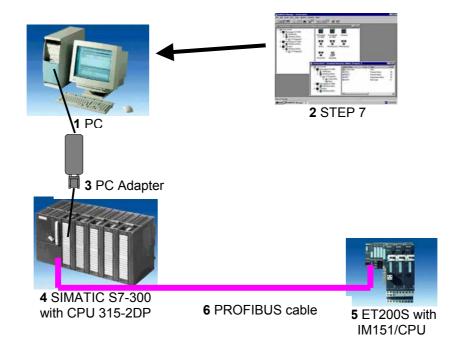
For the successful use of this module, the following knowledge is assumed:

- Knowledge in the use of Windows 95/98/2000/ME/NT4.0
- Basics of PLC- Programming with STEP 7 (e.g. Module A3 'Startup' PLC programming with STEP 7)
- Basics of the PROFIBUS DP (e.g. Appendix IV Basics of field bus systems with SIMATIC S7-300)

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#### Required hardware and software

- 1 PC, Operating system Windows 95/98/2000/ME/NT4.0 with
  - Minimal: 133MHz and 64MB RAM, approx. 65 MB free hard disk space
  - Optimal: 500MHz and 128MB RAM, approx. 65 MB free hard disk space
- 2 Software STEP 7 V 5.x
- 3 MPI- Interface for the PC (e.g. PC- Adapter)
- 4 PLC SIMATIC S7-300 with the CPU 315-2DP with at least one digital in- and output. Example configuration:
  - Network: PS 307 2A
  - CPU: CPU 315-2DP
  - Digital inputs: DI 16x DC24V
  - Digital outputs: DO 16x DC24V / 0.5A
- **5** Distributed I/O ET 200S with integrated CPU and with at least one digital in- and output. Example configuration:
  - PROFIBUS connection with integrated CPU: IM 151/CPU
  - Power supply: PM-E DC24V
  - Digital inputs: 4 DI DC24V
  - Digital outputs: 4 DO DC24V / 0.5 A
- 6 PROFIBUS cable with 2 PROFIBUS slots



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### 2. NOTES FOR THE OPERATION OF THE CPU 315-2DP

The CPU 315-2DP is a CPU that is made available with an integrated PROFIBUS DP interface. For the CPU 315-2DP, the following PROFIBUS protocol profiles are available at your disposal:

DP- Interface as a master or slave in accordance with EN 50170. PROFIBUS-DP (Distributed I/O) is the protocol profile for the connection of distributed I/O/Field equipment with fast reaction time.

A further characteristic is that the addresses of the in- and output modules can be parameterized by this CPU.

The CPU capability is given with the following data:

- 16K statements. 48Kbyte RAM (integrated) 80Kbyte RAM
- 1024 Byte DI/DO
- 128 Byte Al/AO
- 0.3 ms / 1K Instructions
- 64 Counters
- 128 Timers
- 2048 memory bits



**Note:** The CPU 315-2DP is appointed here on the PROFIBUS as a master.

#### 3. NOTES TO THE OPERATION OF ET 200S/CPU



The ET 200S/CPU is a distributed I/O system with a modular configuration and an integrated CPU. The ET200S/CPU functions as a slave to the PROFIBUS DP.

The PROFIBUS address is adjusted by a binary coded DIL- switch block.

Another possible adjustment of the PROFIBUS address is with the power recovery. Therefore, the ET 200S must be turned off and then back on.

The CPU capability is given with the following data:

- 8K Statements. 24Kbyte RAM (integrated) 40Kbyte RAM
- 128 Byte DI/DO
- 128 Byte AI/AO
- 0.3 ms / 1K Instructions
- 64 Counters
- 128 Timers
- 2048 Memory bits

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#### 4. COMMISSIONING THE PROFIBUS (MASTER CPU315-2DP / SLAVE ET200S/CPU)



In the following example, the commissioning of a mono master system with the CPU315-2DP as a master and an ET 200S as a slave is described.

For the testing of the configuration, a program will be written in which a display lamp H1 is triggered by the simultaneous activation of the switch S0 by the CPU 315-2DP and the switch S1 by the ET 200S/CPU.

#### Assignment list CPU 315-2DP:

10.0	S0	Switch S0
Q10.0	Comm_Q1	Output communication Bit1

#### Assignment list ET 200S/CPU:

110.0	Comm_I1	Input communication Bit1
l1.0	S1	Switch S1
Q2.0	H1	Display lamp



 The central tool in STEP 7 is the SIMATIC Manager, which is opened here with a double click (→ SIMATIC Manager).



Forward	Notes	Commission	



2. STEP 7- Programs are administered in projects . Such a project will be created (  $\rightarrow$  File  $\rightarrow$  New).

Ite       PLC       View       Options       Window       Help         New.       Ot/I+N       Ot/I+N         New Project' Wigard       Ot/I+O       Open         Open       Ot/I+O       Open       Ot/I+O         Open Version 1 Project       Ot/I+O       Open Version 1 Project         S7 Memory Card       >       P         Memory Card File       >       P         Delete       Regraphice       P         Manage       Archive       P         Archive       P       P       P         Page Setup       P       P       P         Labeling fields       P       P       P         Pint Setup       I       tester (Project) C:\Siemens\Step7\S7proj\tester       P         1 tester (Project) C:\Siemens\Step7\S7proj\tester       Z       P       P         2 Convert (Project) C:\Siemens\Step7\S7proj\tester       Z       P       P         3 Testproject_FB (Project) C:\Siemens\Step7\S7proj\tester]       Alt+F4       P	SIMATIC Manager	
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	E <u>x</u> it	Alt+F4
	Creates a new project or a new library.	

3. Give the Name ET200S to the project (  $\rightarrow$  ET200S  $\rightarrow$  OK).

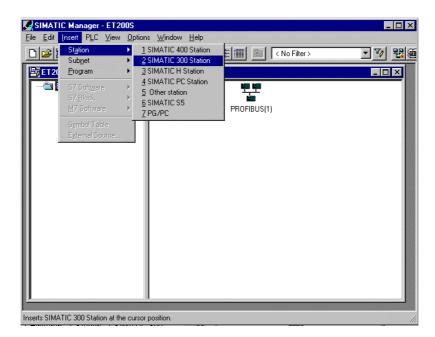
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ОК	Cancel	Help

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4. Highlight your project and insert a **PROFIBUS Subnet** ( $\rightarrow$  ET200S  $\rightarrow$  Insert  $\rightarrow$  Subnet  $\rightarrow$  PROFIBUS).

5. Then insert a **SIMATIC 300-Station** ( $\rightarrow$  Insert  $\rightarrow$  Station  $\rightarrow$  SIMATIC 300-Station).



Foi	rward	Notes	Commission

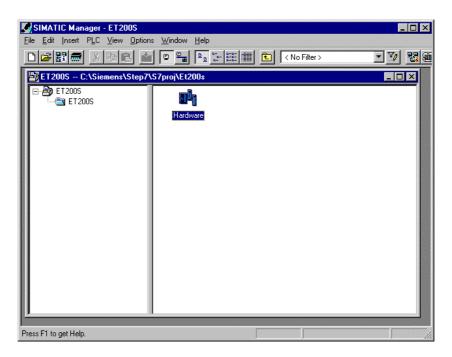
6.



Modify the name of the station to **ET200S** ( $\rightarrow$  ET200S).

SIMATIC Manager - ET200S         File       Edit         Insert       PLC         View       Options         Image: State Stat		- 📰 🏢 📖 🔇 No	ı Filter >	
ET200S C:\Siemens\Step7\S	MPI(1)	PROFIBUS(1)	ET2005	
Press F1 to get Help.				

7. Open the configuration tool for the **Hardware** with a double click ( $\rightarrow$  Hardware).



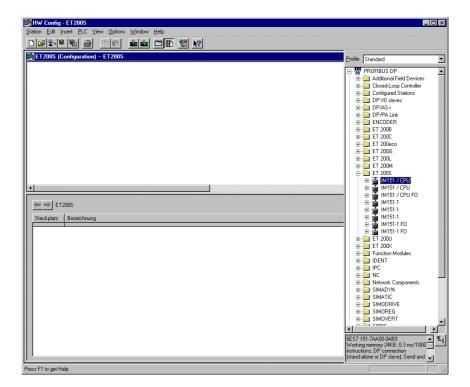
Forward	Notes	Commission



8. Open the hardware catalog with a click on the symbol  $(\rightarrow \square)$ . There you will see the directories are divided into the following:

- PROFIBUS-DP, SIMATIC 300, SIMATIC 400 and SIMATIC PC Based Control, all module racks, modules and interface modules for the projection of your hardware configuration are made available.

Insert IM151/CPU with a double click (  $\rightarrow$  PROFIBUS-DP  $\rightarrow$  ET 200S  $\rightarrow$  IM151/CPU ).



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9. By the entering of the slave, the following window appears, in which you assign a PROFIBUS address. This address must be adjusted identical with the address by the ET200S ( $\rightarrow$  3  $\rightarrow$  OK)

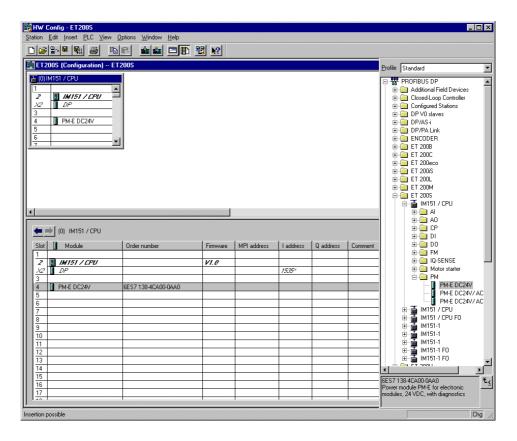
Properties - PROFIBUS interface DP (R0/S2.1)	×
General Parameters	
Address: 3	
Transmission rate: 1.5 Mbps	
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not networked PROFIBUS(1) 1.5 Mbps	<u>N</u> ew
	P <u>r</u> operties
	Delete
OK Abb	rechen Hilfe



10. Now all modules can be chosen out of the hardware catalog and inserted into the configuration table and are also inserted into your real ET200S.

To insert, you must click on the name of the respective module, hold the mouse button and Drag & Drop the module into a line of the configurations table.

We begin with the power module **PM-E DC24V**, which is dropped into slot 4. ( $\rightarrow$  PROFIBUS-DP  $\rightarrow$  ET 200S  $\rightarrow$  IM151/CPU  $\rightarrow$  PM-E DC24V)





**Note:** If your hardware differs from what is shown above, then you must select the appropriate modules from the catalog and insert them into the rack. The part numbers of the individual modules, which are found on the components, are indicated in the footer of the catalog.

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In the next step, we dorp the digital input module 4 DI DC24V into the fifth slot. There the order number and version of the module can be read (→ PROFIBUS-DP → ET 200S → IM151/CPU → 4 DI DC24V).

Image: Head Config - ET200S         Station       Edit         Image: Head Config - ET200S         Station       Edit         Image: Head Config - ET200S         Image: Head Config - ET200S <th>(iew Options Window Help ■ 📄 🏜 🏜 🗖 🏗</th> <th>98 N2</th> <th></th> <th></th> <th></th> <th></th> <th></th>	(iew Options Window Help ■ 📄 🏜 🏜 🗖 🏗	98 N2					
ET200S (Configuration							Profile Standard
1         1           2         1           2         0           2         0           3         0           4         PM-E DC24V           5         4 DI DC24V           6         7							
Slot Module	Order number	Firmware	MPI address	l address	Q address	Comment	2 DI AC 120V
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X2 DP 3				1535*			2 DI DC24V High
4 PM-E DC24V	6ES7138-4CA00-0AA0						4 DI DC24V High
5 4 DI DC24V	6ES7 131-4BD00-0AA0			1.01.3			- 📄 🗖
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14							
16							ES7 131-4BD00-0AA0 Digital input module DI 4x24 VDC,
				1	1	-	standard
Insertion possible							Chg /

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12. In the next step, we dorp the digital output module **4 DO DC24V/0.5A** into the sixth slot. There the order number and version of the module can be read. The configuration table is saved and

compiled now with a click on 🖼. Then the hardware configuration is closed with a click on 🛛

 $(\rightarrow \text{PROFIBUS-DP} \rightarrow \text{ET 200S} \rightarrow \text{IM151/CPU} \rightarrow 4 \text{ DO DC24V/0.5A} \rightarrow \blacksquare \rightarrow \square$ 

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							- 斎 IM151 / CPU
(0) IM151 / CPU							AI A0 CP CP CP DI
Slot 🚺 Module	Order number	Firmware	MPI address	I address	Q address	Comment	Al - CP - CP - DI - DI - DO
Slot Module	Order number		MPI address	I address	Q address	Comment	⊕         AI           ⊕         AI           ⊕         AI           ⊕         CP           ⊕         DI           ⊖         DI           ⊖         DI           □         DI
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Slot Module           Module           1           2         IM151 / CPU           X2         DP           3         4           PM-E DC24V	6ES7138-4CA00-0AA0		MPI address	1535*	Q address	Comment	Al     Al     B     Al     CP     CP     C     C     D     C     D     C     D
Slot Module	6ES7 138-4CA00-0AA0 6ES7 131-4BD00-0AA0		MPI address			Comment	a         A           b         A           b         CP           b         D           c         D           c         200 0 C24V/054
Stot         Module           1	6ES7138-4CA00-0AA0		MPI address	1535*	Q address	Comment	Al     Al     CP     Al     CP     CP     CP     D    D
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Image: State         Module           2         Image: State         Image: State           2/2         Image: State         Image: State           3         Image: State         Image: State           4         Image: State         Image: State           5         Image: State         Image: State           6         Image: State         Image: State           7         Image: State         Image: State	6ES7 138-4CA00-0AA0 6ES7 131-4BD00-0AA0		MPI address	1535*		Comment	B         AI           B         AD           B         CP           B         DI           C         DO           D         DO
Module         Module           1         2         Mulsi J CPU           2/2         Mulsi J CPU         2/2           3/4         PM-E DC24V         4           5         4 D DC24V         6           6         2 DD DC24V/05A         7           9         10         11	6ES7 138-4CA00-0AA0 6ES7 131-4BD00-0AA0		MPI address	1535*		Comment	B         AI           B         AD           B         CP           B         CP           B         D           C         D           D         D
Module         Module           1         Δ           2         M/157 / CPU           ×2         Δ           4         PMEDC26V           5         4 DI DC26V           6         2 DD DC24V/05A           7         8           9         10           11         12	6ES7 138-4CA00-0AA0 6ES7 131-4BD00-0AA0		MPI address	1535*		Comment	B         AI           B         AO           B         CP           B         DI           C         DO           D         DE           C         DO           D         DO
Module         Module           1         2         M/157 / CPU           2/2         0/P         0/P           3         4         PME DC24V           5         4 01 DC24V         6           6         2 0D DC24V/0.5A         7           8         9         10           10         11         12           13         3         14	6ES7 138-4CA00-0AA0 6ES7 131-4BD00-0AA0		MPI address	1535*		Comment	B         AI           B         AD           B         CP           B         CP           B         D           C         D           D         D
Image: Weight of the second	6ES7 138-4CA00-0AA0 6ES7 131-4BD00-0AA0		MPI address	1535*		Comment	a)         a)           b)         a)           b)         c)           b)         c)           c)         <
Module         Module           1         2         Mr157 / CPU           X2         0P         3         4           4         PM-E DC24V         5         4 D1 DC24V           5         4 D1 DC24V         5         4 D1 DC24V           6         2 DD DC24V/05A         7         8           9         10         10         11           12         13         14         15	6ES7 138-4CA00-0AA0 6ES7 131-4BD00-0AA0		MPI address	1535*		Comment Comment	
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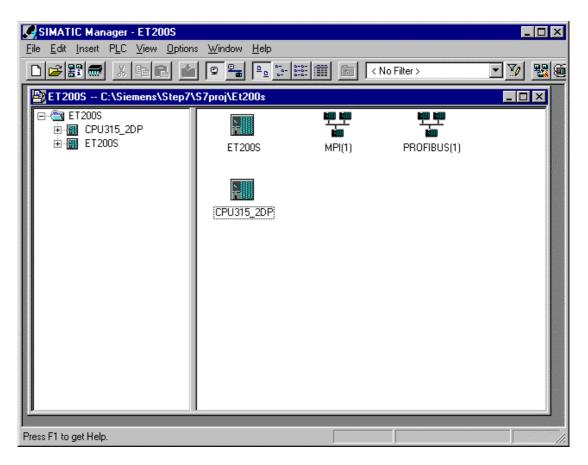
13. In the **SIMATIC Manager** a further **SIMATIC 300 Station** is inserted for the CPU 315-2DP  $(\rightarrow \text{SIMATIC Manager} \rightarrow \text{Insert} \rightarrow \text{Station} \rightarrow \text{SIMATIC 300-Station}).$ 

SIMATIC Manager		-1-		
Elle Edit Insett PLC Station Subpet PTC D T ETC Source S7 Software S7 Block M7 Software Symbol Telt Egternal So	re <u>5</u> Uther station <u>6</u> SIMATIC S5 <u>7</u> PG/PC	ation	< No Filter > PROFIBUS(1)	
, Inserts SIMATIC 300 Static	on at the cursor position.			li.

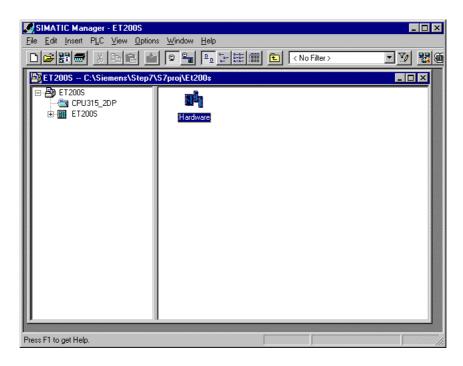
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14. Modify the name of the station to CPU315\_2DP ( $\rightarrow$  CPU315\_2DP).



15. Open the configuration tool for the **Hardware** with a double click ( $\rightarrow$  Hardware).



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16. Open the hardware catalog with a click on the symbol  $(\rightarrow \square)$ . There you will see the directories are divided into the following:

- PROFIBUS-DP, SIMATIC 300, SIMATIC 400 and SIMATIC PC Based Control, all module racks, modules and interface modules for the projection of your hardware configuration are made available.

Insert a **Rail** with a double click(  $\rightarrow$  SIMATIC 300  $\rightarrow$  RACK-300  $\rightarrow$  Rail).

Stat	IW Config - CPU315_2DP ion Edit Insert PLC View Q  ☞  ≌~  ♥  ♥    ●    ●    ●		al 50					
_	denomination de la constitución de							
	CPU315_2DP (Configuration)	ET200S						Profile Standard
								PROFIBUS DP     PROFIBUS PA     SIMATIC 200     P     SIMATIC 200     P     SIMATIC PC Station
lΓ	Slot Module 1 2	Order number	Firmware	MPI address	I address	Q address	Comment	
F	1 2 3	Order number	Firmware	MPI address	I address	Q address	Comment	
	1	Order number	Firmware	MPI address	I address	Q address	Comment	
	1 2 2 3 3 4 5 6	Order number	Firmware	MPI address	I address	Q address	Comment	
	1 2 2 3 3 4 5 6 7	Order number	Firmware	MPI address	I address	Q address	Comment	
	1 2 2 3 3 4 4 5 5 6 6 7 7 8	Order number	Firmware	MPI address	I address	Q address	Comment	
	1	Order number	Firmware	MPI address	address	Q address	Comment	
	1 2 2 3 3 4 4 5 5 6 6 7 7 8	Order number	Firmware	MPI address	address	Q address	Comment	
	1	Order number	Firmware	MPI address	laddess	Q address		BES7 330.17??0-0AA0 Available in Various lengths

After the insert, a configurations table for the configuration of the Rack 0 appears automatically.

Forward	Notes	Commission



17. Now all modules can be chosen out of the hardware catalog and inserted into the configuration table and are also inserted into your rack.

To insert, you must click on the name of the respective module, hold the mouse button and Drag & Drop the module into a line of the configurations table. We will begin with the power supply **PS 307 2A** ( $\rightarrow$  SIMATIC 300  $\rightarrow$  PS-300  $\rightarrow$  PS 307 2A).

HW Config - CPU315_2DP	_ 🗆 🗙
Station Edit Insett ELC View Options Window Help	
CPU315_2DP (Conliguration) ET200S	Polie Standard
Image: Point of the second	□         ■
Sist Module Older number Firmware MPI address	I address Q address Comment
1 PS 307 2A 6ES7 307-18A00 0AA0	
2	
4	
5	
6	
7	
9	
10	
11	
	8557 307-18400 0440 Land supply-voltage 120/230 VAC: 24 VDC / 2A
Insertion possible	Chg 🦽



**Note:** If your hardware differs from what is shown above, then you must select the appropriate modules from the catalog and insert them into the rack. The part numbers of the individual modules, which are found on the components, are indicated in the footer of the catalog.

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18. In the next step, we drop the CPU 315-2DP into the second card location. This allows for the part number and version of the CPU to be read off. ( $\rightarrow$  SIMATIC 300  $\rightarrow$  CPU-300  $\rightarrow$  CPU 315-2DP  $\rightarrow$  6ES7 315-2AF03-0AB0  $\rightarrow$  V1.1 ).

Image: How Config - CPU315_2DP       Station       Edit       Image: Imag	Options Window Help	<u>₩</u>					
CPU315_20P (Configuration           1         PS 307 2A           2         3           3         -           4         -           5         -           6         -           7         -           8         -           9         -	) ET2005						Potile         Standard         ▼           ●
(0) UR Slot Module 1   PS 307 2A 2 3	Drder number 6ES7 307-1BA00-0AA0	Firmware	MPI address	I address	Q address	Comment	
4         5           5         6           7         8           9         10           11         11							
Press F1 to get Help.							Charlen of the second

By the entering of the CPU, the following window appears, in which you assign a PROFIBUS address to the CPU 315-2DP and must already choose the first PROFIBUS net. When you want to alter the parameter of the PROFIBUS net, you must highlight it and then click on **Properties** ( → Properties).

Properties - PROFIBUS interface DP (R0/S2.1)	×
General Parameters	
Address:	
Highest address: 126	
Transmission rate: 1.5 Mbps	
<u>S</u> ubnet:	
not networked PROFIBUS(1) 1.5 Mbps	<u>N</u> ew
	P <u>r</u> operties
	Delete
ОК	rechen Hilfe

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20. Now you can choose the **Highest PROFIBUS Address** (here  $\rightarrow$  126), the **Transmission Rate** (here  $\rightarrow$  1,5 Mbit/s) and the **Profile** (here  $\rightarrow$  DP). ( $\rightarrow$  OK).

Properties - PROFIBUS	E
Highest PROFIBUS Address:	126 Change
Iransmission Rate:	45.45 (31.25) Kbps 93.75 Kbps 187.5 Kbps 500 Kbps 1.5 Mbps 3 Mbps
<u>P</u> rofile:	DP Standard Universal (DP/FMS) User-Defined <u>Bus Parameters</u>
OK	Abbrechen Hilfe

 In the next step we see the input module for 16 inputs on fourth slot place. There the order number of the module is read off the front (→ SIMATIC 300→ DI-300 → SM 321 DI16xDC24V).

HW Config - CPU315_2									×
Station Edit Insert PLC V									
CPU315_2DP (Configu	ation) ET200S						<u>P</u> rofile	Standard	-
CPUB     CPU 315-2 DP     CP     CPU 315-2 DP     CP     CP		): DP master s	ystem [1]				PS-30 RACK SM-31	300 90 90 91 92 93 93 90 93 93 93 93 93 93 93 93 93 93 93 93 93	*
Slot Module	Order number	Firmware	MPI address	I address	Q address	Comment		SM 321 DI16xDC24V	
1 PS 307 2A	6ES7 307-1BA00-0AA0		1					SM 321 DI16xDC24V	
2 CPU 315-2 DP	6ES7 315-2AF03-0AB0	V1.1	2					SM 321 DI16xDC24V SM 321 DI16xDC24V	
X2 DP		_		1023"				SM 321 DI16xDC24V SM 321 DI16xDC24V	
3 4 DI16xDC24V	6ES7 321-1BH82-0AA0	-		01			<b>1</b>	SM 321 DI16xNAMUR	
5	6E37 321110H02104040			01		-	l	SM 321 DI16xUC24/48V	
							[	SM 321 DI32xAC120V	
7							[	SM 321 DI32xDC24V	
8								SM 321 DI32xDC24V	
9								SM 321 DI4xNAMUR, Ex	
10								SM 321 DI8xAC120/230V	
11								SM 321 DI8xAC120/230V	
								SM 321 DI8xAC230V SM 321 DI8xAC230V	
							h 🚗 👸	UD0 300 .	<b>_</b>
							•		•
							Digital i	21-18H82-0AA0 nput module D116 24 V, grouping ended environmental conditions	₹ <u>≺</u>
Insertion possible									19 <i>//.</i>



**Note:** Slot number 3 is reserved for interface modules and remains empty. The order number of the module is displayed in the footer of the catalog.

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 In the next step we see the output module for 16 outputs on fifth slot place. There the order number of the module is read off the front (→ SIMATIC 300→ DO-300 → SM 322 DO16xDC24V/0.5A).

HW Config - CPU315_2DP									
Station Edit Insert PLC ⊻iew	<u>0</u> ptions <u>W</u> indow <u>H</u> elp								
		<b>12</b>							
CPU315_2DP (Configuration	on) ET200S						Profil	e Standard	1
OUR     PS 307 2A     PS 307 2A     OPU 315-2 DP     A2     OPU 315-2 DP     A2     OPU 315-2 DP     A     OPU 315-2 DP     OPU 315-		I): DP master s	ystem (1)					SM 322 D016xAC120V/0.5A SM 322 D016xAC120V/230V SM 322 D016xDC24V/0.5A	230V
	Order number	Firmware	MPI address	I address	0 address	Comment			×
Slot Module	6ES7 307-1BA00-0AA0	rimware	MFI address	1 address	Q address	Comment			4
2 CPU 315-2 DP	6ES7 315-24E03-04B0	¥1.1	2	-			-	SM 322 D08xAC230V/2A	
X2 DF			-	1023*			-		
3							1-0	SM 322 D08xDC24V/0,5A	
4 DI16xDC24V	6ES7 321-1BH82-0AA0			01					
5 D016xDC24V/0.5A	6ES7 322-1BH01-0AA0				45			SM 322 DO8xDC24V/2A	
6								SM 322 D08xDC24V/2A	.
7								SM 322 D08xDC48-125V/1.5 SM 322 D08xBEL AC230V	۹
8							-1111	SM 322 DU8xHEL AC230V SM 322 D08xRel AC230V	
9		_					-		
10							-	SM 322 D08xRel AC230V SM 322 D08xRel AC230V/84	、 、
11			1		<u> </u>	1	-	SM 322 D08xRel, AC230V/84 SM 322 D08xRel, AC230V/84	
							<b> </b>	SM 322 DOBxRelav	
									i el
							<u> </u>		11
							Digit	7 322-18H01-0AA0 al output module D016 24 V / 0.9 ouping 8	5 _
Insertion possible							-		Chg



Note: The order number of the module is displayed in the footer of the catalog.

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23. Then a bar chart for the Master system is shown to the right of the CPU315-2DP, in which you can arrange the PROFIBUS. This happens by clicking the desired module (Here the ET200S/CPU as Configured Stations) from the hardware catalog in path ET200S/CPU. By Drag & Drop click with the mouse, it can be dropped into the master system (→ PROFIBUS DP → Configured Stations → ET 200S/CPU).

🔣 HW Config - CPU315_2DP							
<u>Station Edit Insert PLC View 0</u>	]ptions <u>W</u> indow <u>H</u> elp						
	E 🛍 🛍 🗖 🖪	<b>₩</b>					
CPU315_2DP (Configuration)	ET200S						Profile Standard
(0) UR     (0) UR     (0) UR		IBUS(1): DP m	aster system [1]				PROFIBUS DP     Additional Field Devices     Closed-Loop Controller     Consed-Loop Controller     CrU 31x     CPU 31x     PC station as DP Slave     PC station as DP Slave
Slot Module	Order number	Firmware	MPI address	I address	Q address	Comment	🗄 💼 ET 2005
1 PS 307 2A	6ES7 307-1BA00-0AA0						🛉 🖶 🛅 ET 200U 🚽
2 🚺 CPU 315-2 DP	6ES7 315-2AF03-0AB0	V1.1	2				
X2 DP				1023*			E-     Function Modules
3							
4 DI16xDC24V	6ES7 321-1BH82-0AA0			01			
5 D016xDC24V/0.5A	6ES7 322-1BH01-0AA0				45		Horizon NC     Horizon NC     Horizon NC     Horizon NC
6							
8							
8							
10		+			+		
			1				SIMOVERT
	1	1	1	1	1	1	🗄 🧰 SIPOS
							😟 🧰 Switching Devices 📃
							Long Long Long Long Long Long Long Long
							ET 200S basic module with programmable preprocessing as DP slave
Press F1 to get Help.							Cha //

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24. By the entering of the ET 200S/CPU as a slave, the following window is displayed in which you must **Connect** the already projected slave (PROFIBUS- Address 3) to the CPU 315-2DP (master) ( → Connect).

DP slave properti	ies			×
General Connec	tion Configuration			
Configured Sla	ve Controllers			
	we controllers can be c and click "Connect":	connected to t	he PROFIBUS m	aster.
Slave	PROFIBUS	Address	in Station	Slot
IM151 / CPL	J PROFIBUS(1)	3	ET200S	0/2/1
- Active Connec	tion			
<no connecti<="" td=""><td></td><td></td><td></td><td>Disconnect</td></no>				Disconnect
ОК				Cancel Help

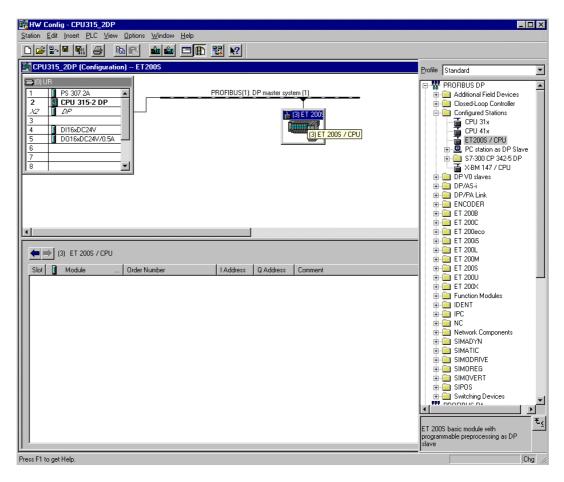
25. After the connection, the ET 200S is entered as an active connection. This connection is then accepted with **OK** ( $\rightarrow$  OK).

slave properti	6.5				
eneral Connec	tion Configuration				
– Configured Sla	ve Controllers				
	ve controllers can be co and click "Connect":	onnected to t	he PROFIBUS ma	ster.	
Slave	PROFIBUS	Address	in Station	Slot	
•					Þ
•				Conn	
-				Conn	
Active Connec	tion			Corn	
Slave ET200S	tion : / CPU PROFIBUS Add	dr.=3 in Statio	n=ET200S Slot	Com	
		dr.=3 in Statio	n=ET200S Slot	<u>C</u> onn <u>D</u> iscon	
Slave ET200S		dr.=3 in Statio	n=ET200S Slot		
Slave ET200S		dr.=3 in Statio	n=ET200S Slot		

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25. With a double click, the entered (3) ET200S/CPU by the master system is selected (  $\rightarrow$  (3) ET200S/CPU ).





27. In the following dialog, the data range can be adjusted for the communication between the ET200S/CPU and the CPU 315-2DP.

#### From CPU 315-2DP to ET200S/CPU:

Mode: Master/Slave

Output range CPU 315-2DP: Q10; Length 1 word; Consistency by the unit of a word Input range ET 200S/CPU: I10; Length 1 word; Consistency by the unit of a word **From ET200S/CPU to CPU 315-2DP:** 

#### Mode: Master/Slave

Output range ET 200S/CPU: Q10; Length 1 word; Consistency by the unit of a word Input range CPU 315-2DP: I10; Length 1 word; Consistency by the unit of a word This adjustment is then accepted with **OK** ( $\rightarrow$  OK).

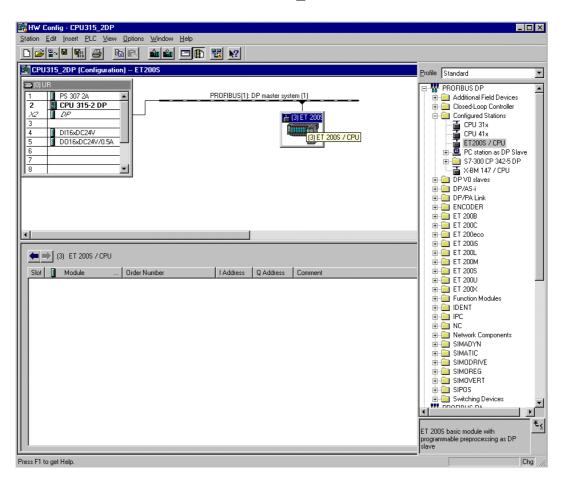
SIGAG	propertie	es						
eneral	Connecti	ion Cor	figuration					
Row	Mode		rDPa	Partner addr	Local addr	Length	Consiste	
1 2	MS MS	2		0 10	l 10 O 10	1 Word 1 Word	Unit Unit	
								1
								Ť
		_						
	<u>N</u> ew		<u>E</u> dit		Delete			
		e configu			Delete			
	aster-slave	e configu			Delete			
-MS M Mas Stat	aster-slave ster: ion:	e configu	ration		<u>D</u> elete			
-MS M Mas Stat	aster-slave ster:	e configu	ration (2) DP	_2DP	Delete		<u>^</u>	
-MS M Mas Stat	aster-slave ster: ion:	e configu	ration (2) DP		Delete		* *	
-MS M Mas Stat	aster-slave ster: ion:	e configu	ration (2) DP	_2DP	Delete		× y	

DP slave propertie	s - Configuration ·	Ro	w 1			×
Mode:	MS 💌		Master-slave configurat	ion)		
DP Partner: Master			Local: Slave			
<u>D</u> P address:	2 🔻		DP address:		3	
Name:	DE		Name:		DP	
Address type:	Output 💌		Address type:		Input	•
<u>A</u> ddress:	10		Addr <u>e</u> ss:		10	
"Slot":	4		"Slot":		4	
Process image:	OB1 PI 💌		P <u>r</u> ocess image:		OB1 PI	-
Interrupt OB:	Y		Diagnostic address:		<b></b>	
Length:	1	<u>C</u> omr	nent:			
<u>U</u> nit:	Word 💌					
C <u>o</u> nsistency:	Unit 💌					•
OK	Apply			Cancel	+	lelp

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28. The configuration table should first be saved and compiled with a click on  $\mathbb{R}$ . Then the hardware configuration is closed with a click on  $\mathbb{R}$  (  $\rightarrow \mathbb{R} \rightarrow \mathbb{R}$ ).



29. From the **SIMATIC Manager**, open the block **OB1** for the **ET200S** with a double click ( $\rightarrow$  OB1).

SIMATIC Manager - ET200S File Edit Insett PLC View Options D 2 27 11 11 11 11 11 11 11 11 11 11 11 11 11		E < No	o Filter >	
E T2005 - C:\Siemens\Step7X E T2005 Sources Sources Blocks	System data	:		
Press F1 to get Help.				

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30. Optional: Enter the properties of the OB1 for documentation and accept with OK ( $\rightarrow$ OK).

Properties - Organization	n Block			×
General - Part 1 General	- Part 2 Calls Attributes			
<u>N</u> ame:	OB1			
<u>S</u> ymbolic Name:				
Symbol <u>C</u> omment:				
Created in Language:	STL			
Project path:				
Storage location of project:	C:\Siemens\Step7\S7proj\Et200s			
Date created:	Code 26/09/2002 01:42:55	Interface		
Last modified:	07/02/2001 03:03:43	15/02/1996 04:51:1	2	
C <u>o</u> mment:	"Main Program Sweep (Cycle)"		<u>^</u>	
			_	
			~	
OK			Cancel	Help

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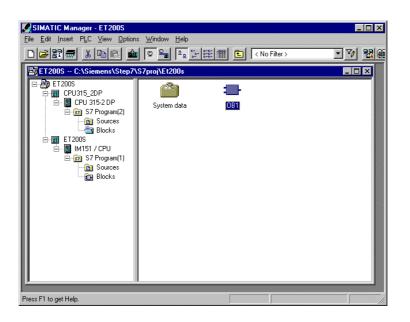


31. With LAD, STL, FBD: Program blocks, you now have an editor which gives you the possibility to generate your STEP 7- Program. Here the organization block OB1 was already opened with the first network. In order to generate your first logical operation, you must highlight the first network. Now you can write your first STEP 7- Program. Several programs can usually be

divided into networks. Open a new network by clicking on the network symbol The STEP 7- Program to be tested can now be saved with  $\square$  (  $\rightarrow$   $\square$  ).

Ele       Edit       Insert       PLC       Debug       View       Options       Window       Help         D       D       D       D       D       D       D       D       D         661       I       I       I       I       I       I       I       I		
OB1 ET200S\ET200S\IM151 / CPU           OB1 : "Main Program Sweep (Cycle)"           Comment:           Network 1: Title:           A I 10.0           A I 1.0           = Q 2.0		<ul> <li>New network</li> <li>FB blocks</li> <li>FC blocks</li> <li>FF blocks</li> <li>FF blocks</li> <li>FF blocks</li> <li>FF blocks</li> <li>Libraries</li> </ul>
Image: Constraint of the second sec	offline	Abs Nw 1 Ln 4

32. From the SIMATIC Manager, open the block OB1 for the CPU315\_2DP with a double click  $(\rightarrow OB1).$ 



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33. Optional: Enter the properties of the OB1 for documentation and accept with OK ( $\rightarrow$ OK).

Properties - Organization Block						
General - Part 1 General	- Part 2 Calls Attributes					
<u>N</u> ame:	OB1			9		
<u>S</u> ymbolic Name:						
Symbol <u>C</u> omment:						
Created in <u>L</u> anguage:	STL					
Project path:						
Storage location of project:	C:\Siemens\Step7\S7proj\Et200s					
Date created:	Code 26/09/2002_02:38:11	Interface				
Last modified:	07/02/2001 03:03:43	15/02/1996 04:5	1:12			
Comment:	"Main Program Sweep (Cycle)"		* *			
ОК			Cancel	Help		

- 34. With LAD, STL, FBD: Program blocks, you now have an editor which gives you the possibility to generate your STEP 7- Program. Here the organization block OB1 was already opened with the first network. In order to generate your first logical operation, you must highlight the first network. Now you can write your first STEP 7- Program. Several programs can usually be divided into networks. Open a new network by clicking on the network **H**).

symbol 💾 The STEP 7- Program to be tested can now be saved with

Ele       Edt       Inset       PLC       Debug       View       Options       Window       Help         D       E       E       S       E       S       E       S       E         Image: S       E       S       E       S       E       S       E       E         Image: S       E       Image: S       E       Image: S       E       Image: S       E <th>2 8</th> <th></th>	2 8	
OB1 - ET200S\CPU315_2DP\CPU 315-2 DP           OB1 : "Main Program Sweep (Cycle)"           Comment:           Metwork 1: Title:           Comment:           A           I           0.0           =           10.0		Image: New network         Image: FE blocks         Image: FE blocks
Press F1 to get Help.	9 offline	Abs Nw1 Ln 3

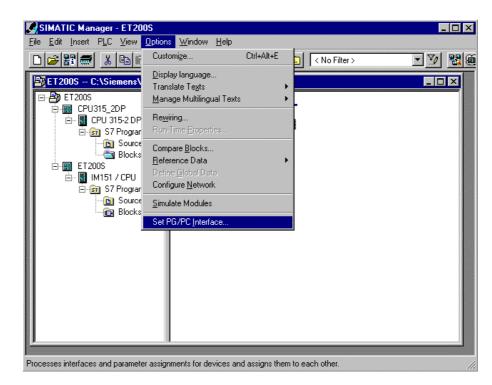
### Note

After the transferring of the hardware configuration, the master CPU315-2DP searches for your slave and also the slave ET200S awaits the master call. It is important to generate the organization blocks OB82 and OB86 in both CPUs.

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35. In **SIMATIC Manager**, the **Set PG/PC Interface** controls the download of the data into the CPU 315-2DP ( $\rightarrow$  Options  $\rightarrow$  Set PG/PC Interface).



36. Chose the **Properties** of the interface parameterization for the **PC Adapter(MPI)** (→ PC Adapter(MPI) → Properties).

Set PG/PC Interface	×
Access Path	20°
Access Point of the Application:	
S70NLINE (STEP 7)> PC Adapter	(MPI)
(Standard for STEP 7)	
Interface <u>P</u> arameter Assignment Used: PC Adapter(MPI)	P <u>r</u> operties
ISS <none> ISS PC Adapter(Auto) ISS PC Adapter(MPI) ISS PC Adapter(PROFIBUS)</none>	Copy Dejete
(Parameter assignment of your PC adapter for an MPI network)	
⊢ Interfaces	
Add/Remove:	Sele <u>c</u> t
	Cancel Help

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37. Choose the setting of the local connection.

Properti	es - PC Adapter(MPI)		×
MPI	Local Connection		
<u>_</u> 0	)M Port:		
<u>I</u> ra	nsmission Rate:	19200	3
L			
0	<u>D</u> efault	Cancel	Help

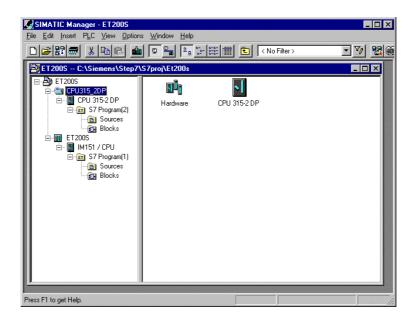
38. Choose the MPI setting and accept with  $\text{OK} \ ( \rightarrow \text{OK} \rightarrow \text{OK}$  ).

Pro	perties - PC Adapter(MPI)		×
M	PI Local Connection		
	Station Parameters		
	FG/PC is the only master on the bus		
	Address:	0	
	<u>T</u> imeout:	30 s	•
	Network Parameters		
	Transmission <u>R</u> ate:	187.5 Kbps	•
	Highest Node Address:	31	
	OK <u>D</u> efault	Cancel	Help

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39. In **SIMATIC Manager**, load the station **CPU315\_2DP** into the PLC The mode switch of the CPU must be on STOP and the PC-Adapter must be connected with the MPI-Interface of the CPU 315-2DP! ( $\rightarrow$  CPU315\_2DP  $\rightarrow$  ).



40. In **SIMATIC Manager**, the **Set PG/PC Interface** changes for the downloading of the data into the ET 200S/CPU on to the PROFIBUS (→ Options → Set PG/PC Interface).

Customize Cutl+Alt+E   Image Multilingual Texts   Im

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41. Choose the **Properties** of the interface parameterization for the **PC Adapter(PROFIBUS)** ( $\rightarrow$  PC Adapter(PROFIBUS)  $\rightarrow$  Properties).

Set PG/PC Interface		×
Access Path		<i>.</i> #
Access Point of the Application: S70NLINE (STEP 7)> PC Adapte (Standard for STEP 7)	er(PROFIBUS)	
Interface Parameter Assignment Used: PC Adapter(PROFIBUS)	P_rop	erties
ISS <none> ISS PC Adapter(Auto) ISS PC Adapter(MPI) ISS PC Adapter(PROFIBUS)</none>		IPY
(Parameter assignment of your PC adapter for a PROFIBUS network)		
_ Interfaces		
Add/Remove:	Sel	e <u>c</u> t
	Cancel	Help

42. Choose the setting of the local connection.

Properties - PC Adapter(PROFIBUS)		×
PROFIBUS Local Connection		
<u>C</u> OM Port:		
Iransmission Rate:	19200 💌	
OK <u>D</u> efault	Cancel	Help

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43. Choose the **PROFIBUS** setting and accept (  $\rightarrow$  OK  $\rightarrow$  OK ).

Properties - PC Adapter(PROFIBUS)	×
PROFIBUS Local Connection	
Station Parameters	
PG/PC is the only master on the bus	
Address:	0
<u>⊥</u> imeout:	30 s
Network Parameters	
Transmission <u>R</u> ate:	9.6 Kbps 💌
Highest Node Address:	126 💌
<u>P</u> rofile:	DP Standard Universal (DP/FMS) User-Defined
	<u>B</u> us Parameters
Network Configuration	
Master: 1 📑 Sia	yes: 0
OK <u>D</u> efault	Cancel Help

44. In **SIMATIC Manager**, download the station **CPU315\_2DP** into the PLC . The switch on the ET200S/CPU must be on STOP and the PC-Adapter must be connected with the PROFIBUS interface of the CPU 315-2DP! Also the CPU 315-2DP must be connected again over the

SIMATIC Manager - ET200S <u>File</u> Edit Insert PLC View Options			
ET2005 C:\Siemens\Step7\ ET2005 CPU315_2DP CPU315_2DP GPU315_2DP Blocks ET2005 CPU315_2DP GPU35_2DP GPU35_	Hardware	IM151 / CPU	
Press F1 to get Help.			1.

PROFIBUS with the ET 200S/CPU ( $\rightarrow$  ET200S  $\rightarrow$  ).

45. Now switch the ET200S/CPU to RUN. If it starts up, then the program can be started through the switching of the mode switch on the CPU 315-2DP to RUN.

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