Training Document for Comprehensive Automation Solutions Totally Integrated Automation (T I A)

MODULE E09 PROFINET with 2 x CPU 315F-2 PN/DP

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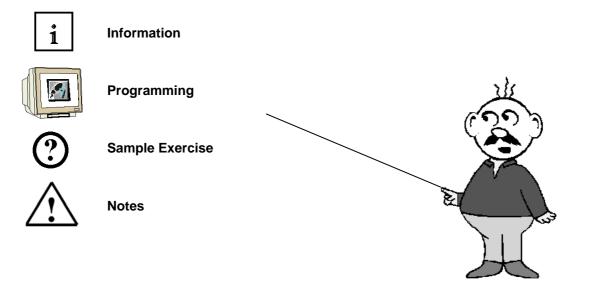
We would like to thank the following: Michael Dziallas Engineering, the teachers at vocational schools, and all others who helped to prepare this document.

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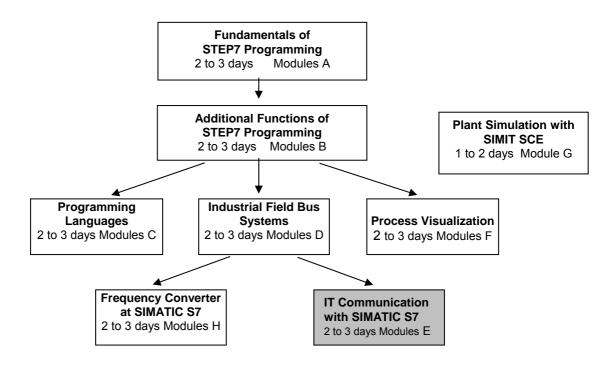
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The following symbols provide a guide through Module E09:



1. PREFACE

In terms of its contents, Module E09 is part of the teaching unit entitled '**IT Communication with SIMATIC S7**'.



Learning Objective:

In Module E09, the reader learns how two PLCs with the CPU 315F-2 PN/DP can communicate with each other via PROFINET. Module E09 shows the method for startup in principle, using a brief example.

Prerequisites:

To successfully work through Module E09, the following knowledge is assumed:

- Knowledge in handling Windows
- Fundamentals of PLC programming with STEP 7 (for example, Module A3 'Startup' PLC Programming with STEP 7)
- Fundamentals of network engineering (for example, Appendix V Basics of Network Engineering)

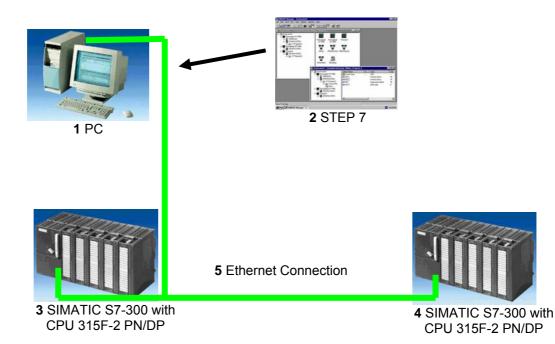
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Hardware and software required

- 1 PC, operating system Windows 2000 Professional starting with SP4/XP Professional starting with SP1/Server 2003 with 600MHz and 512RAM, free hard disk storage 650 to 900 MB, MS Internet Explorer 6.0 and network card
- 2 Software STEP7 V 5.4
- 3 PLC SIMATIC S7-300 with CPU 315F-2 PN/DP and at least one digital input and output module
 - Sample configuration:
 - Power supply: PS 307 2A
 - CPU: CPU 315F-2 PN/DP
 - Digital inputs: DI 16 x DC 24V
 - Digital outputs: DO 16 x DC 24V/0.5A
- PLC SIMATIC S7-300 with CPU 315F-2 PN/DP and at least one digital input and output 4 module:

Sample configuration:

- Power supply: PS 307 2A
- CPU: CPU 315F-2 PN/DP
- Digital inputs: DI 16 xDC 24V
- Digital outputs: DO 16 x DC 24V/0.5A
- 5 Ethernet connection between PC and CPUs 315F-2 PN/DP



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NOTES ON THE USE OF CPU 315F-2 PN/DP 2.

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The CPU 315F-2 PN/DP is a CPU that is shipped with 2 integrated interfaces. The first interface is a combined MPI/PROFIBUS-DP interface that can be used on the

PROFIBUS DP as master or slave for connecting distributed IO/field devices with very fast response timing.

In addition, the CPU can be programmed here by means of MPI or PROFIBUS DP.

- The second interface is an integrated PROFINET interface. It allows for using the CPU as a PROFINET IO controller for operating distributed IO on the PROFINET. Also, the CPU can be programmed by means of this interface!
- Fault tolerant IO devices can also be used on both interfaces. _

Notes:

- In Module E09, the CPU 315F-2 PN/DP is used on the PROFINET.
- To operate this CPU, a micro-memory card is required!
- The addresses of the input and output modules can be parameterized at this CPU.

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3. STARTUP OF THE PROFINET (2 X CPU 315F-2 PN/DP)



Below, the startup of a PROFINET network with 2 x CPU 315F-2 PN/DP is described. To test the configuration, a program is written in which an input byte (SET) can be specified at the PLC in Station 1. Via PROFINET, this byte is transmitted to the other PLC in Station2, and can be read out there at a display byte (DISPLAY).

Assignment List Station1:

l1.0	REQ	Activation of the send request (with positive edge)
11.1	R	Cancelling the send request (with positive edge)
IB 0	SET	Input byte
MB 40	Comm_A1	Output communication send buffer Byte1

Assignment List Station2:

I1.0	EN_R	Activation of Ready to receive (if EN_R == 1)
MB 50	Comm_E1	Input communication receive buffer Byte1
QB 4	DISPLAY	Display byte



1. The central tool in STEP 7 is the 'SIMATIC Manager'. It is called here with a double click. (\rightarrow SIMATIC Manager)



2. STEP7 programs are managed in projects. We are now setting up such a project. (\rightarrow File \rightarrow New)

SIMATIC Manager		
Datei Zielsystem Ansicht Extras Fenster Hilfe		
Neu	Ctrl+N	
Assistent 'Neues Projekt'		
Öffnen	Ctrl+O	
S7-Memory Card	•	
Memory Card-Datei	•	
Löschen		
Reorganisieren		
Verwalten		
Archivieren		
Dearchivieren		
Seite einrichten		
1 PROFIsafe02 (Projekt) F:\0_S7_Projekte\PROFIs_2		
2 Profi Umrichter (Projekt) F:\0_S7_Projekte\Profi_Um		
3 Erreichbare Teilnehmer PROFIBUS		
Beenden	Alt+F4	
rstellt ein neues Projekt oder eine neue Bibliothek.		

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3. The project is now assigned the 'Name' 'CPU315F_CPU315F' (\rightarrow CPU315F_CPU315F \rightarrow OK)

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	aw enningen	Typ: Projekt
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4. Highlight your project and insert an 'Industrial Ethernet Subnet' (\rightarrow CPU315F_CPU315F \rightarrow Insert \rightarrow Subnet \rightarrow Industrial Ethernet).

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- E CPU315F_CPU	Subnetz Programm	1 MPI 2 PROFIBUS	ne Typ		Größe Autor
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	Symboltabelle Textbibliothek Externe Quelle	*			
	WinCC flexible RT	+			
	Globale Deklaratione	n ▶			

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5. Then, a 'SIMATIC 300 Station' is inserted. (\rightarrow Insert \rightarrow Station \rightarrow SIMATIC 300 Station)

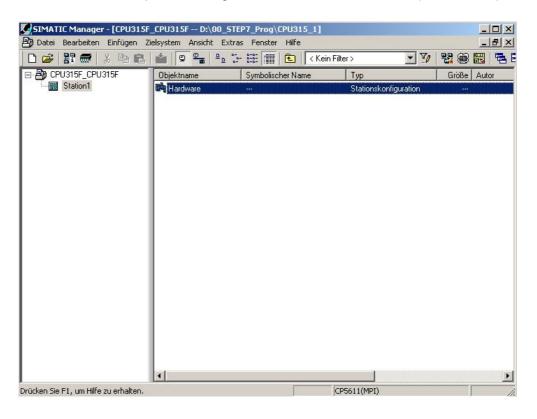
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ED CP	U315F_CPU	Subnetz		2 SIMATIC 300-Station 3 SIMATIC H-Station	Тур		Größe	Autor
		Programm	_	4 SIMATIC PC-Station	MPI		2984	
		S7-Software	•	5 SIMATIC HMI-Station	Industrial E	thernet	2328	
		S7-Baustein	2	6 Andere Station				
		M7-Software	-	7 SIMATIC S5	1			
		Symboltabelle		8 PG/PC				
		Textbibliothek	*	9 SIMATIC OP A SIMATIC 200 Station				
		Externe Quelle	- T	A SIMATIC 200 Station	1			
		WinCC flexible RT	- P.					
		Globale Deklaratione	n 🕨					

- Fugt SIMATIC 300-Station an der Cursorposition ein.
- 6. Change the name of the station to '**Station1**'. (\rightarrow Station1)

SIMATIC Manager - [CPU315F] Datei Bearbeiten Einfügen Z	and the second se			×
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⊞ - A CPU315F_CPU315F	Objektname	Symbolischer Name	Тур	Größe Autor
	MPI(1)		MPI	2984
	Ethernet(1)		Industrial Ethernet	2328
	Station1		SIMATIC 300-Station	
	•			
rücken Sie F1, um Hilfe zu erhalten.			CP5611(MPI)	

|--|

7. With a double click, open the configuration tool for the 'Hardware'. (\rightarrow Hardware)



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8. Open the hardware catalog by clicking on $\frac{1}{100}$, $(\rightarrow 100)$ There, arranged in the following directories: PROFIBUS DP, PROFIBUS PA, PROFINET IO, SIMATIC 300, SIMATIC 400, SIMATIC PC Based Control, and SIMATIC PC Station, all racks, modules and interface modules are provided for configuring your hardware. Insert 'Rail' with a double click. (\rightarrow SIMATIC 300 \rightarrow RACK 300 \rightarrow Rail)

🎝 Station Bearbeiten		· · · · · · · · · · · · · · · · · · ·						
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Note: After that, a configuration table is displayed automatically for configuring Rack 0.

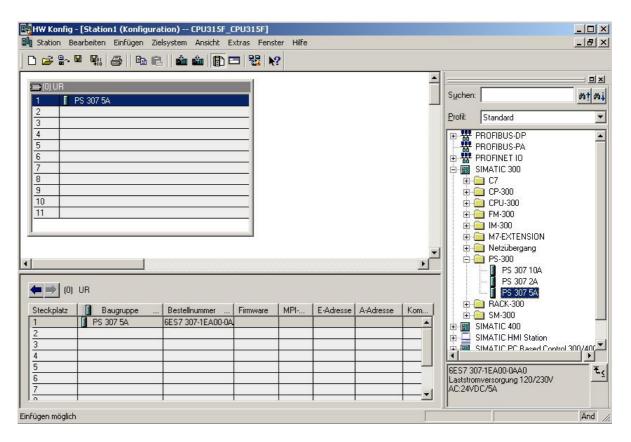
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9. From the hardware catalog, you can now select all modules that are also in your real rack, and insert them in the configuration table.

To this end, click on the name of the respective module, hold the mouse key and drag the module to a line in the configuration table.

We are starting with the power unit '**PS 307 2A**'. (\rightarrow SIMATIC 300 \rightarrow PS-300 \rightarrow PS 307 5A)





Note: If your hardware differs from the one displayed here, simply select the corresponding modules from the catalog and insert them in your rack. The order numbers of the individual modules -that are also indicated on the components- are displayed in the footer of the catalog.

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Next, we are dragging the 'CPU 315F-2 PN/DP' to the second slot.
The order number and the version of the CPU can be read off the front of the CPU.
(→ SIMATIC 300 → CPU-300 → CPU 315F-2 PN/DP → 6ES7 315-2FH10-0AB0 → V2.3)

HW Konfig - [Station1 (Konfiguration) CPU315F_CPU315F]	
	Suchen: nt ni Profil: Standard
4 5 6 7 8 9 10 11	CPU 313C CPU 313C CPU 313C-2 DP CPU 313C-2 PtP CPU 314 CPU 314 CPU 314 CPU 314-2 DP CPU 314C-2 DP CPU 315-2 DP CPU 315-2 DP CPU 315F-2 DP CPU 315F-2 DP CPU 315F-2 DP CPU 315F-2 PN/DP CPU 315F-2 PN
Image: Steckplatz Baugruppe Bestellnummer Firmware MPI E-Adresse A-Adresse Kom 1 1 1 1 6ES7 307-1EA00-0A <	
4 5 6 6 7 1 0 1 1 Drücken Sie F1, um Hilfe zu erhalten. Image: Comparison of the second	SES7 315-2FH10-0AB0 Arbeitsspeicher 192KB; 0.1ms/kAW/; PR0FINET Anschluss; S7- Kommunikation (ladbare FBs/FCs); ↓

11. When entering the CPU, the window below appears. In this window, do the following: Assign an '**IP Address**' to the CPU 315F-2 PN/DP, specify the '**Subnet Screen Form**', and select the '**Ethernet**' network that has already been generated.

Optional: a '**Router Address**' can also be selected for network-overreaching communication. Confirm your input with '**OK**' (\rightarrow IP Address: 192.168.0.1 \rightarrow Subnet Screen Form: 255.255.255.0 \rightarrow Ethernet(1) \rightarrow Don't use a router \rightarrow OK)

	Bei Anwahl eines Subnetzes werden die nächsten freien Adressen vorgeschlagen
IP-Adresse: 192.168.0.1 Subnetzmaske: 255.255.255.0	Netzübergang Keinen Router verwenden Router verwenden Adresse: 192.168.0.1
Subnetz:	
Ethernet(1)	Eigenschaften
	Löschen
ОК	Abbrechen Hilfe

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Notes on Networking on the Ethernet (additional information is provided in Appendix V of the training document):

MAC Address:

The MAC address consists of a permanent and a variable part. The permanent part ("Basis MAC Address") identifies the manufacturer (Siemens, 3COM, ...). The variable part of the MAC address differentiates the different Ethernet stations, and should be assigned uniquely world-wide. On each module, a MAC address specified by the factory is imprinted.

Value range for the IP address:

The IP address consists of 4 decimal numbers from the value range 0 to 255 which are separated by a period; for example 141.80.0.16

Value range for the subnet screen form:

This screen form is used in order to recognize whether a station or its IP address is part of the local subnet, or can be accessed only by means of a router.

The subnet screen form consists of 4 decimal numbers from the value range 0 to 255 which are separated by a period; for example, 255.255.0.0

In their binary representation, the 4 decimal numbers of the subnet screen form have to contain from the left a series of gapless values "1" and from the right a series of gapless values "0".

The values "1" determine the area of the IP address for the network number. The values "0" determine the area of the IP address for the station address.

Example:

Correct values:	255.255.0.0 decimal = 1111 1111.1111 1111.0000 0000.0000 0000 binary
	255.255.128.0 decimal = 1111 1111.1111 1111.1000 0000.0000 0000 binary
	255.254.0.0 decimal = 1111 1111.1111 1110.0000 0000.0000.00
Incorrect value:	255.255.1.0 decimal = 1111 1111.1111 1111.0000 000 <i>1</i> .0000 0000 binary

Value range for the address of the network transition (Router):

The address consists of 4 decimal numbers from the value range 0 to 255 which are separated by a period; for example, 141.80.0.1.

Relationship of IP addresses, router address, and subnet screen form:

The IP address and the address of the network transition may differ only in positions that have a "0" in the subnet screen form.

Example:

You entered: for the subnet screen form 255.255.255.0; for the IP address 141.30.0.5, and for the router address 141.30.128.1.

The IP address and the address for the network transition are to have a different value only in the 4th decimal number. In the example, however, the 3rd position already differs.

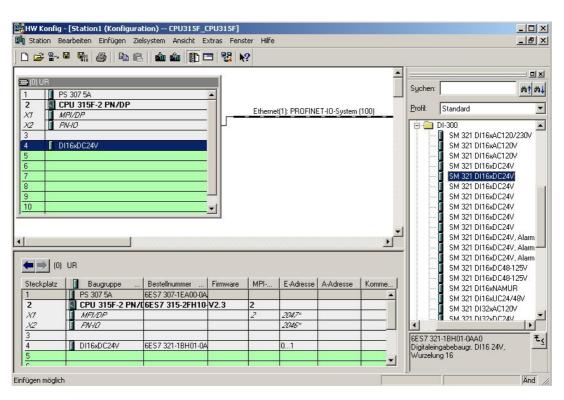
In the example, you have to change alternatively:

- the subnet screen form to: 255.255.0.0 or
- the IP address to: 141.30.128.5 or
- the address of the network transition to: 141.30.0.1

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12. Next, we are dragging the input submodule for 16 inputs to the 4th slot. The order number of the submodule can be read off the front. (\rightarrow SIMATIC 300 \rightarrow DI-300 \rightarrow SM 321 DI16xDC24V)





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

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 Now we are dragging the output submodule for 16 outputs to the 5th slot. The order number of the submodule can be read off the front. (→ SIMATIC-300 → DO-300 → SM 322 DO16xDC24V/0.5A)

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X1 MP/DP 2 2004/7* Start 22 D004/02/24//0 34	X7	MFI/DF			2	2047*					
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Note: The order number of the module is shown in the footer of the catalog.

14. By clicking on $\frac{1}{100}$, the configuration table is stored and compiled. (\rightarrow

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X2 FW/D 2046* 3	(0) Steckplatz	Baugruppe	6ES7 307-1EA00-0A			E-Adresse	A-Adresse			SM 322 D016x SM 322 D016x SM 322 D016x SM 322 D032x SM 322 D032x SM 322 D032x SM 322 D032x SM 322 D04xD SM 322 D04xD	Rel. AC120 Rel. AC120 UC24/48 AC120-230 AC120-/1A AC120 AC120 AC120 C15 V/20 C15 V/20 C15 V/20 C15 V/20 C15 V/20 C15 V/20 C15 V/20 C15 V/20 C15 V/20 C12 V/10 C12 C12 C12 C12 C12 C12 C12 C12 C12 C12
3 6ES7 321-18H01-0A 4 D116xDC24V 6ES7 321-18H01-0A 01 5 D016xDC24V/.05A 6ES7 322-18H01-0A 45	() Steckplatz	Baugruppe PS 307 5A CPU 315F-2 PN/I	6ES7 307-1EA00-0A		2		A-Adresse			SM 322 D016x SM 322 D016x SM 322 D016x SM 322 D032x SM 322 D032x SM 322 D032x SM 322 D032x SM 322 D04xD SM 322 D04xD SM 322 D064x	Rel. AC120 Rel. AC120 UC24/48 AC120-230 AC120-230 AC120//1A DC24V/0.5 C15V/20m ⁴ C24V/10m ⁴ DC24V/0.3
4 D116xDC24V 6ES7 321-1BH01-04 01 D637 322-1BH01-04-00 5 D016xDC24V/0.5A 6ES7 322-1BH01-04 45 D116xDC24V/0.5A, Wurzelung 8; auch als	() Steckplatz 1 2 X7	Baugruppe PS 307 5A CPU 315F-2 PN/I MRV/DF	6ES7 307-1EA00-0A		2	2047*	A-Adresse			SM 322 D016x SM 322 D016x SM 322 D016x SM 322 D032x SM 322 D032x SM 322 D032x SM 322 D032x SM 322 D04xD SM 322 D04xD SM 322 D064x	Rel. AC120 Rel. AC120 UC24/48 AC120-230 AC120-230 AC120//1A DC24V/0.5 C15V/20m ⁴ C24V/10m ⁴ DC24V/0.3
5 D016xDC24V/0.5A 6ES7 322-1BH01-0A 45 24V/0.5A, Wurzelung 8, auch als -	() Steckplatz 1 2 X7 X2	Baugruppe PS 307 5A CPU 315F-2 PN/I MRV/DF	6ES7 307-1EA00-0A		2	2047*	A-Adresse		•	SM 322 D016x SM 322 D016x SM 322 D016x SM 322 D032x SM 322 D032x SM 322 D032x SM 322 D032x SM 322 D04xD SM 322 D04xD SM 322 D064x SM 322 D064x SM 322 D064x	Rel. AC120 Rel. AC120 UC24/48 AC120-230 AC120-230 AC120//1A DC24V/0.5 C15V/20m ⁴ C24V/10m ⁴ DC24V/0.3
	(0) Steckplatz 1 2 X7 X2 3	Baugruppe PS 307 5A CPU 315F-2 PN/I M/F//D/P F/W/I/2	6ES7 307-1EA00-0A 6ES7 315-2FH10-		2	2047* 2046*	A-Adresse		• 6ES73	SM 322 D016x SM 322 D016x SM 322 D016x SM 322 D032x SM 322 D032x SM 322 D032x SM 322 D04xD SM 322 D04xD SM 322 D04xD SM 322 D064x SM 322 D064x SM 322 D064x SM 322 D064x	Rel. AC120X Rel. AC120X UC24/48V AC120-230X AC120V/1A DC24V/0.5/ C15V/20m4 C24V/10m4 DC24V/10m4 DC24V/10m4
Jan I I I I I I I I I I I I I I I I I I I	(0) Steckplatz 1 2 X7 X2 3 4	Baugruppe PS 307 5A CPU 315F-2 PN/L MFV/DF FW/L0 D116xDC24V	6ES7 307-1EA00-0A 6ES7 315-2FH10- 6ES7 321-1BH01-0A		2	2047* 2046*		Komme	6ES7 32 Digitalat	SM 322 D016x SM 322 D016x SM 322 D015x SM 322 D032x SM 322 D032x SM 322 D032x SM 322 D04xD SM 322 D04xD SM 322 D064x SM 322 D064x SM 322 D064x SM 322 D064x	Rel. AC120X Rel. AC120X UC24/48V AC120-230V AC120-230V AC120V/1A DC24V/0.5/ C15V/20m ⁴ C24V/10m ⁴ DC24V/0.3/ DC24V/0.3/

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HW Konfig - [Station1 (Konfig Station Bearbeiten Einfügen				110	r Hilfe				_ D ×
			<u> </u>	₩. \ ?					
		aden in B.	augruppe	ſ	Ethernet(1): PROFINET-IO-System (10)		Standard	====
X2 PM-IO 3							E E E E E E E E E E E E E E E E E E E	IDFIBUS-DP IDFIBUS-PA IDFINET ID MATIC 300 MATIC 400 MATIC HMI Station MATIC PC Based Cor MATIC PC Station	ntrol 300/400
(0) UR Steckplatz Baugrupp 1 PS 307 5A 2 CPU 315F-2 X7 MP/UP X2 FW-00 3 FW-00 3 FW-00 3 D016xDC24V/0	6ES7	3 2 2	A 247 247 246 .1 45	Komment	ntar			3-DP-Slaves der SIM/ d C7 (dezentraler Aufi	



Note: A precondition for this is that the PG/PC interface is set to TCP/IP and the network card for the PC is configured correctly; for example: IP address 192.168.0.99, Subnet 255.255.255.0 and router address -.-.- (refer to module E02!)



Note: Make sure that your programming device is connected to the CPU by means of the Ethernet!

	Preface	Notes	StartUp	
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16. The CPU 315F-2 PN/DP is confirmed as the destination module for loading the configuration. (\rightarrow OK)

augruppe	Träger	Steckplatz
'U 315F-2 PN/DP	0	2
lles markieren		

17. In the dialog box below, you can have the devices on the network displayed 'Display'. (\rightarrow display)

eilnehmeradress	e auswählen			×
Über welche Teilnel	hmeradresse ist das P	G mit der Baugruppe	CPU 315F-2 PN/[DP verbunden?
Baugruppenträger:				
Steckplatz:	2 🚍			
Zielstation:	C Lokal			
Anschluß an Zielst	C Über Netzüberg	ang zu erreichen		
IP-Adresse	MAC-Adresse	Baugruppenty	Stationsname	Baugruppenn
192.168.0.1			1	•
Erreichbare Teilnehr	mer:			
•				•
		Anzeigen		
				E
<u> </u>			Abbrechen	Hilfe

	Preface	Notes	StartUp	
TIA Training Document		Page 18 of 45		Module



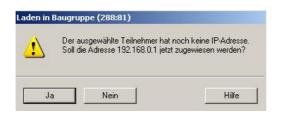
18. Then, the MAC address of the CPU on the Ethernet is selected. If you are connected to only one CPU, simply accept with '**OK**'. (\rightarrow OK)

Baugruppenträger:	0 🚍			
Steckplatz:	2 🚊			
Zielstation:	C Lokal			
	C Über Netzübergang	j zu erreichen		
Anschluß an Ziels	tation eingeben:			
IP-Adresse	MAC-Adresse	Baugruppentyp	Stationsname	Baugruppenr
4	08-00-06-6B-A2-F6	57-300		
Erreichbare Teilneh	mer:			<u>12</u>
	08-00-06-68-A2-F6	S7-300		
	08-00-06-68-A2-D8	S7-300		
•		a		<u>></u>
	ALI	tualisieren		



Note: If several IO controllers are on the network, the device can be identified with the MAC address imprinted on it.

19. Now, the correct IP address has to be assigned to the IO controller if it has not been set correctly previously. Confirm this in the following dialog with '**Yes**'. (→ Yes)



<< The selected station does not have an IP address. Do you want to assign the address 192.168.0.1. now?>>

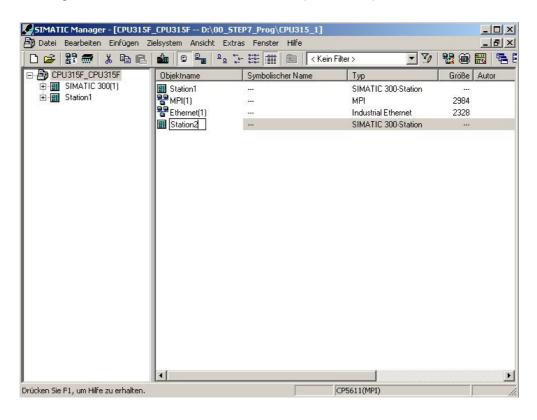
Preface	Notes	StartUp	



20. Then, a second 'SIMATIC 300 Station' is inserted. (\rightarrow Insert \rightarrow Station \rightarrow SIMATIC 300 Station)

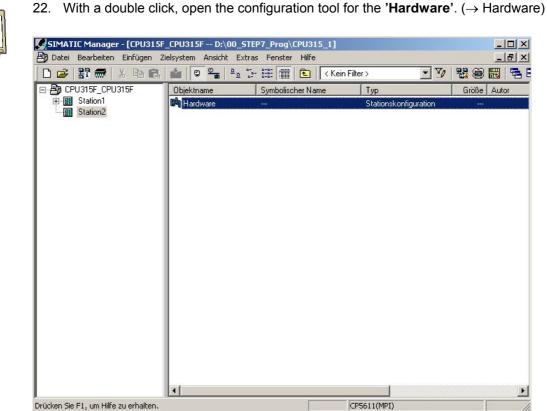
Station Subnetz Programm 57-Software 57-Baustein))))	2 SIMATIC 3 SIMATIC	2 400-Station 2 300-Station 2 H-Station	:Kein Filter> Typ	• 7/			4
Programm 57-Software	+	3 SIMATIC		Тур		0.00	10	
S7-Software	-		an beacon			Große	Autor	
		4 SIMATIC PC-Station 5 SIMATIC HMI-Station 6 Andere Station	4 SIMATIC PC-Station		300-Station			
J7-Daustein	2		I HMI-Station	MPI		2984 2328		
M7-Software			Industrial	Industrial Ethernet				
		7 SIMATIC S5		1				
Symboltabelle Textbibliotbek		8 PG/PC	1					
				1				
WinCC flexible RT	T			-				
Globale Deklaratione								
	Textbibliothek Externe Quelle WinCC flexible RT	Textbibliothek • Externe Quelle	Textbibliothek 9 SIMATIC Externe Quelle A SIMATIC WinCC flexible RT +	Textbibliothek 9 SIMATIC OP Externe Quelle A SIMATIC 200 Station WinCC flexible RT Image: Comparison of the state of the sta	Textbibliothek 9 SIMATIC OP Externe Quelle A SIMATIC 200 Station WinCC flexible RT >	Textbibliothek 9 SIMATIC OP Externe Quelle A SIMATIC 200 Station WinCC flexible RT >	Textbibliothek 9 SIMATIC OP Externe Quelle A SIMATIC 200 Station WinCC flexible RT >	Textbibliothek 9 SIMATIC OP Externe Quelle A SIMATIC 200 Station WinCC flexible RT •

21. Change the name of the station to '**Station2**'. (\rightarrow Station2)

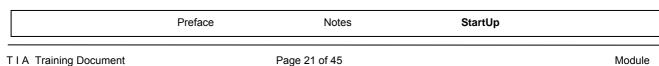


	Preface	Notes	StartUp	
_				





Drücken Sie F1, um Hilfe zu erhalten.





23. Open the hardware catalog by clicking on the symbol $(1)^{-1}$, $(1)^{-1}$ There, arranged in the following directories: PROFIBUS DP, PROFIBUS PA, PROFINET IO, SIMATIC 300, SIMATIC 400, SIMATIC PC Based Control, and SIMATIC PC Station, all racks, modules and interface modules are provided for configuring your hardware. Insert 'Rail' with a double click. (\rightarrow SIMATIC 300 \rightarrow RACK 300 \rightarrow Rail)

) CPU315F_CPU315F] em Ansicht Extras Fenster	Hilfe							_ 🗆 ×
	\$1 6 6 6	ân ân 🗊 🗖 🔀 🦎								
🚍 (0) UR							-		ř	
$\frac{1}{2}$								Suchen:	I	m‡ mi
3 4								<u>P</u> rofil:	Standard	<u>•</u>
5								甲羅	PROFIBUS-DP PROFIBUS-PA	
6 7								E	PROFINET IO	
8									SIMATIC 300	
10									CP-300 CPU-300	
11								÷.	🛅 FM-300	
2									📄 IM-300 📄 M7-EXTENSION	
							-		Netzübergang PS-300	
									RACK-300	
(0) UR								-		
Steckplatz	Baugruppe	Bestellnummer	Firmware	MPI-A	E	A	к	E -	SIMATIC 400	
1 2							-	± 🕅	SIMATIC HMI Station SIMATIC PC Based Contr	ol 300/400
3								÷-2:	SIMATIC PC Station	
4 5			-					1		
6									90-1???0-0AA0 hiedenen Längen lieferba	r [₹] ∢
7							- <u>-</u>			
ı Drücken Sie F1, um H	ilfe zu erhalten,							10.		Ănd //



Note: After that, a configuration table for configuring Rack 0 is displayed automatically.

	Preface	Notes	StartUp	
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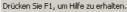


24. From the hardware catalog, you can now select all modules that are also in your real rack, and insert them in the configuration table.

To this end, click on the name of the respective module, hold the mouse key and drag the module to a line in the configuration table.

We are starting with the power unit 'PS 307 2A'. (\rightarrow SIMATIC 300 \rightarrow PS-300 \rightarrow PS 307 5A)

🙀 HW Konfig - [Station2 (Konfiguration) 💵 Station Bearbeiten Einfügen Zielsyste		Hilfe				×
□ ▷ ▷ □						Image: Subset of the standard Image: Standard Brofit: Standard Image: Standard Brofit: Standard Image: Standard Image: Standard Image: Standard
						E- PS-300 PS 307 10A → PS 307 2A
Steckplatz Baugruppe 1 PS 307 5A 2 3 4 5 6 7 0 Drücken Sie F1, um Hilfe zu erhalten.	Bestellnummer 6ES7 307-1EA00-0AA0	Firmware	MPI-A	E A	K	Bend State S





Note: If your hardware differs from the one displayed here, simply select the corresponding modules from the catalog and insert them in your rack. The order numbers of the individual modules -that are also indicated on the components- are displayed in the footer of the catalog.

	Preface	Notes	StartUp	
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version of (-> SIMAT (the CPU can be IC $300 \rightarrow CPU$ [Station2 (Konfigurate Parbeiten Einfügen Ziele	e 'CPU 315F-2 PN/E be read off the front of U-300 \rightarrow CPU 315F- ion) CPU315F_CPU315F] system Ansicht Extras Fenster im a fig \square \Re \Re \Re	of the CPU 2 PN/DP	J.				$80 \rightarrow V2.3)$	_ D × _ B ×
😑 (0) UR						<u>_</u>		v	
1 PS 2 3	6 307 5A						S <u>u</u> chen: Profil:	Standard	nt ni
5 6 7 8 9 10 11 11 (0)						×		CPU-300 CPU 312 CPU 312 CPU 312 CPU 313 CPU 313C CPU 313C CPU 313C CPU 313C CPU 313C CPU 314 CPU 314 CPU 314 CPU 314 CPU 314 CPU 314 CPU 314 CPU 314C CPU 314 CPU 314 CPU 314 CPU 315C CPU 315-2 DP CPU 315-2 DP CPU 315-2 DP CPU 315-2 DP	• -
Steckplatz	Baugruppe PS 307 54	Bestellnummer 6ES7 307-1EA00-0AA0	Firmware	MPI-A	E	A K	E 6ES7 31	CPU 315F-2 DP CPU 315F-2 PN/D ECS7 315-2FH	10-0AE
Drücken Sie F1, u	um Hilfe zu erhalten.					 _	0,1ms/kA	eicher 192KB; W; PROFINET s; S7-Kommunikation	→ Ănd

26. When entering the CPU, the window below appears. In this window, do the following: Assign an 'IP Address' to the CPU 315F-2 PN/DP, specify the 'Subnet Screen Form', and select the 'Ethernet' network that has already been generated.

Optional: a 'Router Address' can also be selected for network-overreaching communication. Confirm your input with 'OK' (\rightarrow IP- Address: 192.168.0.2 \rightarrow Subnet screen form: 255.255.255.0 \rightarrow Ethernet(1) \rightarrow Don't use a router \rightarrow OK)

enschaften - Ethernet Schnif Ilgemein Parameter	
	Bei Anwahl eines Subnetzes werden die nächsten freien Adressen vorgeschlagen
IP-Adresse: 192.168.0. Subnetzmaske: 255.255.25	E Keinen Router verwenden
Subnetz: nicht vernetzt Ethernet(1)	Neu
Emene(1)	Eigenschaften
	Löschen
ок	Abbrechen Hilfe

	Preface	Notes	StartUp	
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Notes on Networking on the Ethernet (additional information is provided in Appendix V of the training document):

MAC Address:

The MAC address consists of a permanent and a variable part. The permanent part ("Basis MAC Address") identifies the manufacturer (Siemens, 3COM, ...). The variable part of the MAC address differentiates the different Ethernet stations, and should be assigned uniquely world-wide. On each module, a MAC address specified by the factory is imprinted.

Value range for the IP address:

The IP address consists of 4 decimal numbers from the value range 0 to 255 which are separated by a period; for example 141.80.0.16

Value range for the subnet screen form:

This screen form is used in order to recognize whether a station or its IP address is part of the local subnet, or can be accessed only by means of a router.

The subnet screen form consists of 4 decimal numbers from the value range 0 to 255 which are separated by a period; for example, 255.255.0.0

In their binary representation, the 4 decimal numbers of the subnet screen form have to contain from the left a series of gapless values "1" and from the right a series of gapless values "0".

The values "1" determine the area of the IP address for the network number. The values "0" determine the area of the IP address for the station address.

Example:

Correct values:	255.255.0.0 decimal = 1111 1111.1111 1111.0000 0000.0000 0000 binary
	255.255.128.0 decimal = 1111 1111.1111 1111.1000 0000.0000 0000 binary
	255.254.0.0 decimal = 1111 1111.1111 1110.0000 0000.0000.00
Incorrect value:	255.255.1.0 decimal = 1111 1111.1111 1111.0000 000 <i>1</i> .0000 0000 binary

Value range for the address of the network transition (Router):

The address consists of 4 decimal numbers from the value range 0 to 255 which are separated by a period; for example, 141.80.0.1.

Relationship of IP addresses, router address, and subnet screen form:

The IP address and the address of the network transition may differ only in positions that have a "0" in the subnet screen form.

Example:

You entered: for the subnet screen form 255.255.255.0; for the IP address 141.30.0.5, and for the router address 141.30.128.1.

The IP address and the address for the network transition are to have a different value only in the 4th decimal number. In the example, however, the 3rd position already differs.

In the example, you have to change alternatively:

- the subnet screen form to: 255.255.0.0 or
- the IP address to: 141.30.128.5 or
- the address of the network transition to: 141.30.0.1

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27. Next, we drag the input submodule for 16 inputs to the 4th slot. The order number of the submodule can be read off the front. (→ SIMATIC 300 → DI-300 → SM 321 DI16xDC24V)

In Station Be		CPU315F_CPU315F] em Ansicht Extras Fenster	Hilfe							_ 0 × _ 8 ×
2 C X1 M X2 F 3	S 307 54 PU 315F-2 PN/DP #P/DP W-IO-7 I16xDC24V								Standard	AC120V AC120V DC24V DC24V DC24V DC24V DC24V
<u>دا</u>							• •		SM 321 DI16xl SM 321 DI16xl SM 321 DI16xl SM 321 DI16xl SM 321 DI16xl	DC24V DC24V, Alarm DC24V, Alarm
(0)	UR								📕 SM 321 DI16xI	
Steckplatz	Baugruppe	Bestellnummer	Firmware	MPI-A	E	A	K		SM 321 DI16x	
1	PS 307 5A	6ES7 307-1EA00-0AA0							SM 321 DI16xl	
2	CPU 315F-2 PN/DP	6ES7 315-2FH10-0AB0	V2.3	2					SM 321 DI18x	
X7	MFI/DF			2	2047				SM 321 DI32V	nr24V 🚬 🔟
<u>X2</u>	FN-10-1				2046			1		•
3 4 5 6	DI16xDC24V	6ES7 321-18H01-04A0			01		-		1-18H01-0AA0 ngabebaugr. DI16 2 ng 16	24V, <u>₹</u> <u>₹</u>
Einfügen möglich) 							J		Änd

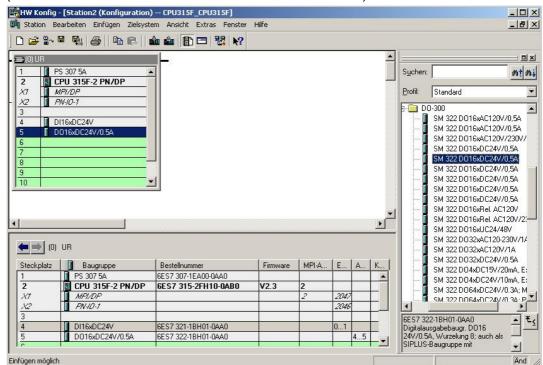


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Note Slot 3 is reserved for interface modules and remains empty for that reason. The order number of the module is shown in the footer of the catalog.

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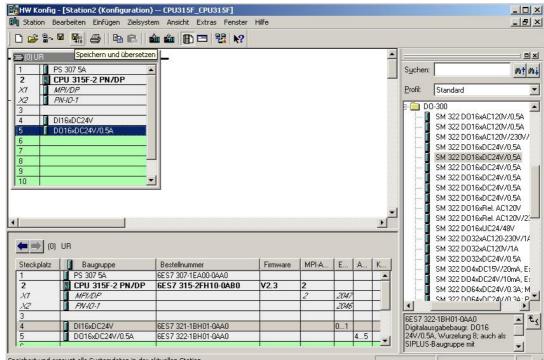
- 28. Next, we are dragging the output submodule for the 16 outputs to the 5th slot. The order number of the submodule can be read off the front.
 - $(\rightarrow \text{SIMATIC-}300 \rightarrow \text{DO-}300 \rightarrow \text{SM }322 \text{ DO1}6x\text{DC2}4\text{V}/0.5\text{A})$





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

29. By clicking on (\neg) , the configuration table is saved and compiled. (\rightarrow



Speichert und erzeugt alle Systemdaten in der aktuellen Station.

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30. By clicking on ', the configuration table can now be loaded to the PLC. The CPU's operating mode switch should be on Stop! (\rightarrow)

HW Konfig - [Station2 (Konfig Garbeiten Bearbeiten Einfügen						_ [] × _ 문 ×
D 🚅 🔐 🛢 🖏 🍯 Pb	R 🖄			⊐ ‱ №?		
■ (0) UR 1 PS 307 5A 2 S 2 CPU 315F-2 PN/DF X7 MPI/DP X2 PN-IO-1 3 0116xDC24V 5 01016xDC24V/0.5A 6 9 10 10		Laden i	in Baug	Ethernet(1): PROFINET-IO-System (100)	_	Suchen: Profil: Standard PROFIBUS-DP PROFIBUS-PA PROFINET IO SIMATIC 300 SIMATIC 400 SIMATIC 400 SIMATIC PC Based Control 300/400 SIMATIC PC Station
2 CPU 315F-2 f X1 MFI/DF X2 FN+ID-1 3	B Fi 6ES7 6ES7 6ES7 6ES7	3 2 2	E 2047 2046 01	A Kommentar		PROFIBUS-DP-Slaves der SIMATIC € S7, M7 und C7 (dezentraler Aufbau)



Note: A precondition for this is that the PG/PC interface is set to TCP/IP and the network card for the PC is configured correctly; for example: IP address 192.168.0.99, Subnet 255.255.255.0 and router address -.-.- (refer to module E02!)



Note: Make sure that your programming device is connected to the CPU by means of the Ethernet!

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31. The CPU 315F-2 PN/DP is confirmed as destination module for loading the configuration table. (\rightarrow OK)

augruppe	Träger	Steckplatz
'U 315F-2 PN/DP	0	2
lles markieren		

32. In the following table, you can have the devices displayed that are connected to the network **'Display'**. (\rightarrow Display)

Teilnehmeradress	e auswählen			×
Über welche Teilne	hmeradresse ist das F	PG mit der Baugru	ippe CPU 315F-2 PN/I	DP verbunden?
Baugruppenträger:	0 🚊			
Steckplatz:	2 =			
Zielstation:	 C Über Netzüber 	gang zu erreicher	1	
Anschluß an Ziels	tation eingeben:			
IP-Adresse	MAC-Adresse	Baugrupp	entyp Stationsname	Baugruppenn
192.168.0.2				Þ
Erreichbare Teilneh	mer:			
•				Þ
		Anzeigen]	
OK			Abbrechen	Hilfe

	Preface	Notes	StartUp	
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33. Then, the MAC address of the CPU on the Ethernet is selected. If you are connected to only one CPU, simply accept with 'OK'. $(\rightarrow OK)$

ilnehmeradress	e auswählen	and the second second		
lberwelche Teilneł	nmeradresse ist das PG m	nit der Baugruppe Cl	PU 315F-2 PN/D)P verbunden?
augruppenträger:	0 -			
iteckplatz:	2 =			
Zielstation:	🖸 Lokal			
	C Über Netzübergang	g zu erreichen		
Anschluß an Zielst	ation eingeben:			
IP-Adresse	MAC-Adresse	Baugruppentyp	Stationsname	Baugruppen
•	08-00-06-6B-A2-D8	57-300		•
rreichbare Teilnehr	mer:			
192.168.0.1	08-00-06-68-A2-F6 08-00-06-68-A2-D8	CPU 315F-2	Station1	CPU 315F-2
	08-00-06-66-42-08	57-300		
•				
	Akt	tualisieren		
14				



Note: If several IO controllers are on the network, the device can be identified with the MAC address imprinted on it.

34. Now, the correct IP address has to be assigned to the IO controller if it has not been set correctly previously. Confirm this in the following dialog with 'Yes'. (\rightarrow Yes)



<<The selected station does not have an IP address. Do you want to assign the address 192.168.0.2. now?>>

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35. So that the two CPUs on the PROFINET can exchange data by using an S7 connection, first, with a double click, the folder '**Connections**' in one of the two stations (here: '**Station1**') has to be opened in the '**SIMATIC Manager**'. (→ SIMATIC Manager → Connections)

be opened in th				nagoi / c	
SIMATIC Manager - [CPU315F	_CPU315F D:\00_5T	[EP7_Prog\CPU315_1]			_ 🗆 🗙
🎒 Datei Bearbeiten Einfügen Z	ielsystem Ansicht Extr	as Fenster Hilfe			_ 8 ×
🗅 😅 🎛 🛲 X 🖻 🛍		🗄 🏥 🏢 🔁 🔍 Kein	i Filter >	🖸 7/ 🔡 🛍) 🚟 🖷 🛙
⊡- 🎒 CPU315F_CPU315F	Objektname	Symbolischer Name	Тур	Größe	Autor
E Station1	S7-Programm(2)		S7-Programm		2
E CPU 315F-2 PN/DP	Verbindungen		Verbindungen		
Engramm(∠) Engramm(∠)					
					Þ

36. This opens the tool 'NetPro'. There, we get a good overview over the networking of the available components MPI, PROFIBUS and Industrial Ethernet. One of the CPUs is already selected. Now, the 'New Connection' is 'Insert'ed. (→ Insert → New Connection)

Ansicht Extras Fenster Hilfe Ctrl+yG Ctrl+y Ctrl+y The senster Hilfe The senst		×	
Station2			
2			1
2	Partner Schnittstr		1
2	indungsaufbau Partner Schnittst		
2	indungsaufbau Partner Schnittst		1
2	aindungsautbau Partner Schnttstr		
2	indungsautbau Partner Schnittstr		

|--|



37. Then, from the current project, the other station 'Station2' -with the CPU 'CPU 315F-2PN/DP' inserted there- is selected as connection partner. The type of connection is an 'S7 Connection'. (→ Station2 → CPU 315F-2PN/DP → S7 Connection →OK)

	partner	
	ktuellen Projekt CPU315F CPU315F	
	CPU 315F-2 PN/DP	
	(unspezifiziert)	
10 (S) (C)	Alle Broadcast-Teilnehmer	
10	Alle Multicast-Teilnehmer nbekanntem Projekt	
- By in ur	nbekanntem Frojekt	
		_ Ŧ,
Projekt:	CPU315F_CPU315F	- <u>₹</u>
Projekt: Station:	CPU315F_CPU315F Station2	- <u>₹</u>
Station:	-	- <u>t</u>
Station: Baugruppe:	Station2	- <u>₹</u>
	Station2	- <u>t</u>
Station: Baugruppe: Verbindung Typ:	Station2 CPU 315F-2 PN/DP	- <u>t</u>

38. Now, the '**ID**' of the two connection partners is read off the connection table. (Here, both are on '**1**'!). Then, the connection table is saved and compiled by clicking on '**I**'. (\rightarrow **I**'').

Netz Be	arbeiten Einfügen	(Netz) D:\00_STE Zielsystem Ansicht E	xtras Fenster Hilf	e				×
Etherne	et(1) al Ethernet	5 St	ation2	1				Suchen At Aj Auswahl der Netz BroFibi B PROFibi B PROFibi B PROFibi B Stationer B Subnetz
▲ [Partner ID		Тур	Aktiver Verbindungsaufbau	Partner Schnittstelle	L	•	
1		Partner Station2 / CPU 31 .		ja	PArtner Schnittstelle PN-IO-1	Lokale Adresse 192.168.0.1	<u> </u>	

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39. Now, select the compiling option 'Compile and check everything'. (\rightarrow Compile and check everything $\rightarrow OK$)

Ibersetzen
 Alles übersetzen und prüfen
🔿 Nur Änderungen übersetzen

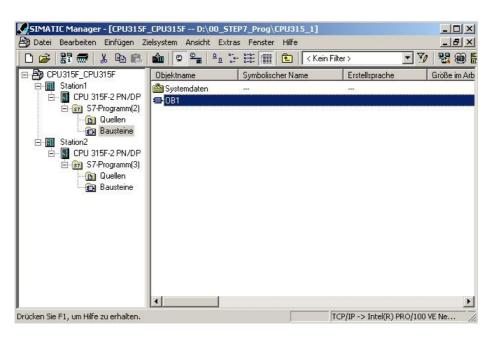
40. The subsequent window should display the message 'No errors'. Close the window by clicking on '**x**'. $(\rightarrow \mathbf{x})$

🛕 Ausgaben zur Konsistenzprüfung für D:\00_STEP7_Prog\CPU315_1\CPU315F_CPU315F						
Datei Bearbeiten						
Meldun Meldung Typ Projekt Projektpfad						
	Keine Fehler.					

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41. After the connection was set up and compiled, we can start generating the program. With a double click, open 'OB1' from the 'SIMATIC Manager'. (\rightarrow OB1)



42. Select the 'Programming Language STL' and accept with 'OK'. (\rightarrow STL \rightarrow OK)

Eigenschaften - Organisa	ationsbaustein		×
Allgemein - Teil 1 Allgem	ein - Teil 2 Aufrufe Attribute		
Name:	OB1		
Symbolischer Name:			
Symbolkommentar:			
Erstellsprache:	AWL		
Projektpfad:			
Speicherort des Projekts	D:\00_STEP7_Prog\CPU315_1		
Erstellt am:	Code 16.10.2007 21:04:02	Schnittstelle	
Zuletzt geändert am:	07.02.2001 15:03:43	15.02.1996 16:51:12	
Kommentar:	"'Main Program Sweep (Cycle)''		*
ОК		Abbrechen	Hilfe

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Through programmed SFB block calls, the user program activates the transfer of the data areas for S7 communication, and monitors its successful execution.

The SFB blocks required for communication are stored in the "Standard Library" under the item "Standard Function Blocks". To use these functions, they have to be incorporated in (copied to) your "own" project.

The SFB12 "BSEND" transfers data to the PROFINET for transmission over a configured S7 connection.

The specified data area can be a flag area or a data block area. Faultless execution is signaled.

The SFB12 "BSEND" sends data to a partner SFB of the type "BRCV" in the other CPU. During this data transfer, a larger data volume can be transported between the communication partners than is possible with all other communication SFBs for configured S7 connections. The following data volumes can be transmitted:

65534 bytes for the S7-400 and S7-300 over an integrated interface.

The data area to be sent is segmented. Each segment is sent individually to the partner. The last segment is acknowledged when it arrives, regardless of the associated call of the SFB "BRCV".

Sending is activated after the block is called and the edge is positive at control input REQ. The data from the user memory is sent asynchronously to user program processing.

The start address of the data to be sent is specified with SD 1. The length of the send data is specified request-related with LEN. Thus, LEN replaces the length share of SD 1.

The parameter R ID has to be identical for associated SFBs.

If the edge is positive at control input R, current sending is canceled.

If sending was successful, it is indicated with a 1 at the status parameter DONE.

After the previous send request is completed, a new send request can be processed only if the status parameters DONE or ERROR have the value 1.

Because data transmission is asynchronous, transmitting data can be started again only after the previous data was fetched by calling the partner SFB. Until the data is fetched, the status value 7 is read out when the SFB "BSEND" is called.

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When calling the SFB12 "BSEND", the following parameters have to be entered one after the other:

Parameter	Declaration	Туре	Memory Area	Description
REQ	INPUT	BOOL	I, O, F, D, L	Control parameter Request, activates the data exchange at rising edge
R	INPUT	BOOL	I, O, F, D, L, Const.	Control parameter Reset, activates the cancellation of a data exchange that is still running at rising edge
ID	INPUT	WORD	F, D, Const.	Addressing parameter ID
R_ID	INPUT	DWORD	I, O, F, D, L, Const.	Addressing parameter R_ID
DONE	OUTPUT	BOOL	I, O, F, D, L	Status parameter DONE: 0:Request not yet started or is still being executed 1:Request executed without fault
ERROR	OUTPUT	BOOL	I, O, F, D, L	Status parameter ERROR and STATUS
STATUS	OUTPUT	WORD	I, O, F, D, L	Error indication: ERROR=0 and STATUS has the value: 0000H: neither warning nor error <> 0000H: warning, STATUS provides detailed information ERROR=1 An error occurred. STATUS provides detailed information about the type of error
SD_1	IN_OUT	ANY	F, D	Pointer to send area. Only the following data types are permissible: BOOL (not permitted: bit field), BYTE, CHAR, WORD, INT, DWORD, DINT, REAL, DATE, TOD, TIME, S5TIME, DATE_AND_TIME, COUNTER, TIMER. Note: If the ANY pointer accesses a DB, the DB aways has to be specified; (for example: P# DB10.DBX5.0 Byte 10).
LEN	IN_OUT	WORD	I, O, F, D, L	Length of the data block to be sent in bytes

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SFB13 "BRCV" accepts the data transmitted by PROFINET over a configured S7 connection. The specified data area can be a flag area or a data block area. A faultless execution is signaled.

SFB13 "BRCV" receives the data from a partner SFB of the type "BSEND" in the other CPU. After each data segment is received, an acknowledgement is sent to the partner SFB, and the parameter LEN is updated.

After being called, the block is ready to receive with the value 1 at the control input EN R. With EN R=0, a running request can be canceled.

The start address and the maximum length of the receive area are specified with RD 1. The length of the received data block is indicated in LEN.

With each positive edge at EN_R, the parameters R_ID, ID and RD_1 are accepted. After the request is completed, new values can be assigned to the parameters R ID, ID and RD 1. To transmit segmented data, the block has to be called cyclically in the user program.

The data is received from the user memory asynchronously to the processing of the user program.

The parameter R ID has to be identical for the associated SFBs.

A faultless receipt of all data segments is indicated in the status parameter NDR with the value 1. The received data remains unchanged until SFB 13 is called again with EN_R=1.

If the block is called again during asynchronous receiving, a warning is read out in the status parameter STATUS; if the call is made with EN_R=0, receiving is canceled, and the SFB returns to its basic status.

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When callings SFB13 "BRCV", the following parameters have to be entered one after the other:

Parameter	Declaration	Туре	Memory Area	Description	
EN R	INPUT	BOOL	I, O, F, D, L, Const.	Control parameter Enabled to	
				receive; signals readiness to receive	
				if the input is set	
ID	INPUT	WORD	F, D, Const.	Addressing parameter ID	
R_ID	INPUT	DWORD	I, O, F, D, L, Const.	Addressing parameter R_ID	
NDR	OUTPUT	BOOL	I, O, F, D, L	Status parameter NDR: 0: Request not started or still running 1: Request was completed successfully	
ERROR	OUTPUT	BOOL	I, O, F, D, L	Status parameter ERROR and STATUS	
STATUS	OUTPUT	WORD	I, O, F, D, L	Error indication: ERROR=0 and STATUS has the value: 0000H: neither warning nor error <> 0000H: warning, STATUS provides detailed information ERROR=1 An error occurred. STATUS provides detailed information about the type of error	
RD_1	IN_OUT	ANY	M, D	Pointer to receive area. The length indication specifies the maximum length of the block to be received. Only the following data types are permissible: BOOL (not permitted: bit field), BYTE, CHAR, WORD, INT, DWORD, DINT, REAL, DATE, TOD, TIME, S5TIME, DATE_AND_TIME, COUNTER, TIMER. Note: If the ANY pointer accesses a DB, the DB always has to be specified (for example: P# DB10.DBX5.0 Byte 10).	
LEN	IN_OUT	WORD	I, O, F, D, L	Length in bytes of the data received so far	

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43. With 'LAD, STL, FBD - Program S7 Blocks', you now have an editor with which you can generate your STEP7 program accordingly. To this end, OB1 has already been opened with the first network. To generate your initial operations, highlight the first network. Now you can write your STEP7 program. In STEP7, individual programs are usually arranged in networks. A new

network is opened by clicking on the network symbol

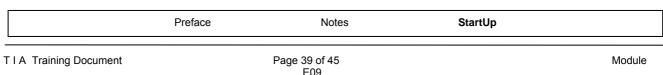
In OB1, the content of the flag byte MB40 is sent to "Station2" with the block SFB12 "BSEND". In the catalog, you can drag this block from the 'Library' 'Standard Library' to your network. (\rightarrow Libraries \rightarrow Standard Library \rightarrow System Function Blocks \rightarrow SFB12 BSEND)

ė 🔶 s	Standard Library
Ē.	System Function Blocks
	SFBO CTU IEC TC
	SFB1 CTD IEC_TC
	SFB2 CTUD IEC_TC
	SFB3 TP IEC_TC
	SFB4 TON IEC_TC
	SFBS TOF IEC_TC
	SFB8 USEND COM_FUNC
	SFB9 URCV COM_FUNC
	SFB12 BSEND COM_FUNC
	SFB13 BRCV COM_FUNC
	SFB14 GET COM_FUNC
	SFB15 PUT COM_FUNC
	SFB16 PRINT COM_FUNC
	SFB19 START COM_FUNC
	SFB20 STOP COM_FUNC
	SFB21 RESUME COM FUN
	¥
END / COM	1_FUNC

44. The instance DB (here: DB12) can be generated automatically if the query is confirmed with 'Yes'. (\rightarrow Call SFB12,DB12 \rightarrow Yes)



<<The instance data block DB12 does not exist. Do you want to generate it?>>





45. The complete program for sending the flag byte MB40 and for testing with the input byte IB0 looks like this:

erk Tibpeerry rengen	of send area
L W#16#1	//Load Value 1 in hexa-decimal code
T MW 10	//Transfer in flag word MW10
ork 2: Write inputs	co send buffer
L EB O	//Load input byte IB0
T MB 40	//Transfer in send buffer flag word MW40
	tation2/Cond buffor MD40
rk 3: Send data to S	Sationz/Send-Durrer MB40
rk 3: Send data to S CALL "BSEND", DB12	//Call Send block SFB12 (BSEND) with instance DB DB12
le le vi	
	//Call Send block SFB12 (BSEND) with instance DB DB12
CALL "BSEND", DB12 REQ :=E1.0	//Call Send block SFB12 (BSEND) with instance DB DB12 //Activate Send request (with positive edge)
CALL "BSEND", DB12 REQ :=E1.0 R :=E1.1	<pre>//Call Send block SFB12 (BSEND) with instance DB DB12 //Activate Send request (with positive edge) //Cancel Send request (with positive edge)</pre>

DONE :=M80.0	//Diagnostic info DONE indicates that request was executed without fault
ERROR :=M80.1	//Diagnostic information ERROR indicates that an error occurred
STATUS:=MW82	//Diagnostic info STATUS provides detail info about occurring errors
SD_1 :=P#M 40.0 BYTE 1	//Data area that is to be sent (here: MB40)
LEN :=MW10	//Length indication of the send area in bytes (only I,O,F,D,L; no constants
NOP O	



Note: More detailed information about SFB12 "BSEND" is provided in the descriptions in the preceding pages, or on Online Help

46. Save OB1 (\Box) and close the **'LAD, STL, FBD Editor**' by clicking on (\mathbf{x}) . ($\rightarrow \Box \rightarrow \mathbf{x}$)

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47. Now, the STEP 7 program has to be loaded to the PLC. In our case, we are doing this from the 'SIMATIC Manager'. In the SIMATIC Manager, highlight the folder 'Station1' and click on Load

. The CPU's key switch should be on STOP, and the programming device should be

connected to the CPU by means of the Ethernet! (\rightarrow SIMATIC Manager \rightarrow Station1 \rightarrow

CPU315F_CPU315F Laden_ame Symbolischer Name Typ Größe A Image: Station 1 Image: St	
i - III Station2 i - III CPU 315F-2 PN/DP · ST S7-Programm(3) · · · · · · · · · · · · · · · · · · ·	<u>ator</u>

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48. For 'Station2' also, open 'OB1' from the 'SIMATIC Manager' with a double click. (\rightarrow OB1)

SIMATIC Manager - [CPU315F] Datei Bearbeiten Einfügen Zie		MGR DOIN NOT THE R.		× 문 ×
D 🥔 🔡 🛲 👗 🖻 🖻		🟥 🏢 主 🛛 Kein Filter	r> 🔹 🏹	🐮 🎯 🛗 🗧 E
⊡ 🔁 CPU315F_CPU315F ⊡ 🛐 Station1	Objektname	Symbolischer Name	Erstellsprache	Größe im Arbeitsspei
CPU 315F-2 PN/DP S7-Programm(2) Quellen Bausteine Station2 CPU 315F-2 PN/DP STation2 CPU 315F-2 PN/DP S7-Programm(3) CPU 315F-2 PN/DP Bausteine Station2 CPU 315F-2 PN/DP Bausteine	Systemdaten			38
rücken Sie F1, um Hilfe zu erhalten.	<u> </u>		5611(MPI)	P

49. Optional: For documentation, enter the properties of OB1 and accept with 'OK'. (→OK)

Eigenschaften - Organisa	tionsbaustein		×
Allgemein - Teil 1 Allgeme	ein - Teil 2 Aufrufe Attribute		
Name:	081		
Symbolischer Name:			
Symbolkommentar:			8
Erstellsprache:	AWL		
Projektpfad:			
Speicherort des Projekts:	D:\00_STEP7_Prog\CPU315_1		
Erstellt am:	Code 16.10.2007 21:22:14	Schnittstelle	
Zuletzt geändert am:	07.02.2001 15:03:43	15.02.1996 16:51:12	
Kommentar:	"Main Program Sweep (Cycle)"	<u>*</u>	
		×	
OK		Abbrechen Hilfe	

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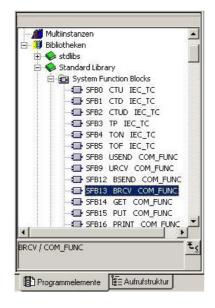
Issued: 02/2008



50. With 'LAD, STL, FBD - Program S7 Blocks', you now have an editor with which you can generate your STEP7 program accordingly. To this end, OB1 has already been opened with the first network. To generate your initial operations, highlight the first network. Now you can write your STEP7 program. In STEP7, individual programs are usually arranged in networks. A new

network is opened by clicking on the network symbol

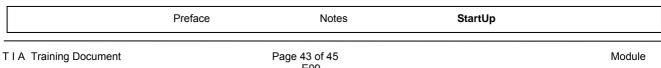
With the block SFB13 "BRCV", the data of Station1 is received in OB1 and written to the flag byte MB50. In the catalog, you can drag this block from the 'Library' 'Standard Library' to your network. (\rightarrow Libraries \rightarrow Standard Library \rightarrow System Function Blocks \rightarrow SFB13 BRCV)



51. The instance DB (here: DB13) can be generated automatically if the query is confirmed with 'Yes'. (\rightarrow Call SFB13,DB13 \rightarrow Yes)



<<The instance data block DB 13 does not exist. Do you want to generate it now?>>





52. The complete program for receiving the data, for writing it to the receive buffer MB50, and for indication at output byte QB4 looks like this:

OB1 : "Main Program Sweep (Cycle)" Metzwerk 1: Receiving data from CALL "BRCV", DB13 EN_R :=E1.0 ID :=W#16#1 R_ID :=DW#16#1 NDR :=M90.0 ERROR :=M90.1 STATUS:=MM92 RD_1 :=P#M 50.0 BYTE 1 LEN :=MM12 NOP 0	<pre>Stationl/Receive buffer MB50 //Call of receive block SFB13 (BRCV) with instance DB DB 13 //Activation of Ready to receive (for EN_R == 1) //ID of connection to the other station (from NetPro) //R_ID on receiver side has to match the R_ID on the sender side //Diagnostic info NDR indicates if request was completed successfully //Diagnostic information ERROR indicates that an error occurred //Diagnostic info STATUS provides detail info about occurring errors //Data area that is to receive (here: MB50) //Length of received data in bytes</pre>
Network 2: Read out receive b	uffer and indicate at outputs
L MB 50 T AB 4	//Load receive buffer flag byte MB50 //Transfer to output byte QB4



Note: More detailed information about the SFB13 "BRCV" is provided in the descriptions in the preceding pages, or on Online Help.



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54. Now, the STEP7 program has to be loaded to the PLC. In our case, this is done from the 'SIMATIC Manager'. In the SIMATIC Manager, highlight the folder 'Station2' and click on Load . The CPU's key switch should be on STOP and the programming device connected

to the CPU by means of the Ethernet! (\rightarrow SIMATIC Manager \rightarrow Station2 \rightarrow

SIMATIC Manager - [CPU315F_CPU315F D:\00_STEP7_Prog\CPU315_1]				
D 😅 🔡 🛲 👗 🛍 💼		🗄 📺 🔁 < Kein Filter	> • v	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
CPU315F_CPU315F Station1 CPU 315F-2 PN/DP Station2 Stat	CPU 315F-2 PN/DP	ymbolischer Name	Typ Stationskonfiguration CPU	Größe Autor
Lädt aktuelles Objekt in Zielsvstem.	4			<u>•</u>

55. The programs are started by switching the key switches on the CPUs to RUN. Test the programs according to the exercise described on Page 7.

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