

Application Note

Configuration of S7-300 with CPU315-2 DP

for PROFIBUS-DP Slave

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1 Introduction

This manual describes the configuration of an S7-300 PLC with CPU 315-2 DP as a PROFIBUS-DP Slave to connect to a Hilscher PROFIBUS-DP Master. The example describes the configuration for two bytes input and two bytes output.

2 Hints and Validity

- This manual describes the S7-300 as a PROFIBUS-DP Slave
- STEP7 Version 5.0 SP 3 under Windows 95 (already installed)
- This manual describes the configuration for a data exchange only. The PLC programer is responsible for the error handling. This is not part of this manual.

3 The PLC S7-300

3.1 Project

The first step is to create a project. To create a project selct menu **File > New**. Enter the name for the project, e.g. DPSlave.

DPSIave C:\SIEMENS\STE		
DPSlave	MPI(1)	

3.2 Stations

This manual describes the configuration for an S7-300 as a PROFIBUS-DP Slave and a Hilscher PROFIBUS-DP Master.

3.2.1 S7-300 Station 'DummyDPMaster for Config'

Insert a S7-300 station, select the menu **Insert > Station > SIMATIC 300 Station** and name it **DummyDPMaster for Config**. This station is only a 'dummy' station, but necessary inside the STEP7 configuration tool.

3.2.2 S7-300 Station 'DPSlave'

Insert another S7-300 station, select the menu **Insert > Station > SIMATIC 300 Station** and name it **DPSIave**. This station is the PROFIBUS-DP Slave.

DPSIave C:\SIEMENS\STEP7\	\$7proj\DPSlave	;	
DPSlave ⊕∰ DPSlave ⊕∰ DummyDPMaster for Config	MPI(1)	DummyDPMaster for Config	DPSlave

3.3 Hardware Configuration S7 300 Station (DummyDPMaster for Config)

Open the software for hardware configuration of the S7 station. Start with the 'DummyDPMaster for Config'.

DPSIave C:\SIEMENS\STEP7	_ 🗆 ×	
⊡-∰ DPSlave ⊡-∭ DPSlave	N ¹	
	Hardware	

Select the icon Hardware. Then select the menu **Edit > Open Object** or double click the Hardware icon to start the Hardware Configurator.

Select the menu View > Catalog.

📴 HW Config - DummyDPMaster for Config	
<u>Station Edit</u> Insert <u>PLC View Options</u> <u>W</u> indow <u>H</u> elp	
🖳 DummyDPMaster for Config (Configuration) DPSlave	Hardware catalog
	Profile Standard
	E INATIC 300
	E SIMATIC 400
	SIMATIC PC Based Control 300/400
(0) UR	
	CIMATIC S7 200, M7 200 and C7 modules (control cook)
	SIMATIC S7-500, M7-500 and C7 modules (Central rack)
Press F1 to get Help.	

Select now step by step the hardware components of the S7 300 station.







3.3.2 The Power Supply

3.3.3 The CPU (DummyDPMaster for Config)

Select for example CPU 315-2DP.

Hardware catalog	×
Profile Standard	-
📄 📄 CPU 315-2 DP	
6ES7 315-2AF00-0AB0	
🚺 6ES7 315-2AF01-0AB0	
6ES7 315-2AF02-0AB0	
📄 🕀 💼 CPU 316	
📙 🚊 💼 CPU 316-2 DP	•
6ES7 315-2AF01-0AB0	
48 KB work memory; 0.3 ms/1000 instructions; MPI + DI	Р
connections; for multi-tier configuration up to 32 modules	ŝ

Because this CPU type is usable for PROFIBUS-DP the following window appears.

Properties - PROFIBUS interface DP	' Master (R0/S2.1) 🛛 🔀
General Parameters	
Address: Highest address:126 Transmission rate:1.5 Mbit/s	If a subnet is selected, the next available address is suggested.
Subnet: not networked	New Properties Dejete
ОК	Abbrechen Hilfe

Press New.

Properties - New su	ubnetPROFIBUS	×
General Network Se	ettings	
<u>N</u> ame: <u>S</u> 7 subnet ID	PROFIBUS-DP 002e - 0007	
Project path:	DPSlave	-
Storage location of the project:	C:\SIEMENS\STEP7\S7proj\DPSlave	-
<u>A</u> uthor:		
Date created: Last modified:	06.01.2001 13:56:13 06.01.2001 13:56:13	
<u>C</u> omment:		
ОК	Abbrechen Hilfe	

Set the **Name**, e.g. PROFIBUS-DP, then select **Network Settings** to open the following window.

Properties - New subnetPROF	IBUS			×
General Network Settings				
Highest PROFIBUS Address:	126 💌	Change	<u>O</u> ption	ns
<u>T</u> ransmission Rate:	45.45 (31.25) kbit/s 93.75 kbit/s 187.5 kbit/s 500 kbit/s 1.5 Mbit/s 3 Mbit/s			
<u>P</u> rofile:	DP Standard Universal (DP/FMS) User-Defined		<u>B</u> us Para	meters
ОК		A	bbrechen	Hilfe

Select the Transmission Rate, e.g. 1.5 Mbit/s.

Select the **Profile**, e.g. the profile DP.

Close the window by pressing **OK**.

HW Config - [DummyDPMaster for Con	fig (Configuration) DPSlave]			8 ×
<u>Station Edit Insert PLC View Option</u>	is <u>W</u> indow <u>H</u> elp		_	lel ×
	🛍 🋍 🗖 🚯 😪 🔛			
			Hardware catalog	×
2 CPU 215	JFIBUS-DP: DP master system (1)		Profile Standard	-
$\lambda 2$ DP Maxte			PROFIBUS DP	
3			E SIMATIC 300	
			E ⊞ E7 □ □ □ □ CP.300	
			🕀 💼 CPU 312 IFM	
8			🕀 🧰 CPU 313	
9			E → CPU 314	
			📄 🧰 CPU 315-2 DP	
			6ES7 315-2AF00-0AB0	
			6ES7 315-2AF01-0AB0	
(0) UD				
(0) UR			6ES7 315-2AF02-0AB0	
(0) UR Slot 📑 Module Order number	MPI address I address Q a	address Comment		
(0) UR Slot I Module Order number 1 PS 307 2A 6ES7 307-18A00	MPI address II address Q a	address Comment		
(0) UR Slot Module Order number 1 PS 307 2A 6ES7 307-1BA00 2 CPU 315-2 DP 6ES7 315-2AF0 V2 CPU 315-2 DP 6ES7 315-2AF0	MPI address I address Q a H0AA0 01-0AB0 2 7/22*	address Comment		
(0) UR Slot Module Order number PS 307 2A 6ES7 307-1BA00 2 CPU 315-2 DP 6ES7 315-2AF X2 DF Maxter 3	MPI address I address Q a +QAA0 2	address Comment		
(0) UR Slot Module Order number PS 307 2A 6ES7 307-1BA00 2 CPU 315-2 DP 6ES7 315-2AFt X2 DF Maxter 3 4	MPI address I address Q a -QAA0 2 4 01-QAB0 2 4 - 7/223* 4 - 1/223* 4 - 1/23* 4 -	address Comment		
(0) UR Slot Module Order number PS 307 2A 6ES7 307-18A00 2 CPU 315-2 DP 6ES7 315-2AF0 X2 DP Maxter 3 4 5	MPI address I address Q a 10440 01-04B0 2 1/223** 1/23** 1/23** 1/23** 1/23** 1/23** 1/23** 1/23** 1/25* 1/	address Comment		•
(0) UR Slot Module Order number PS 307 2A 6ES7 307-18A00 2 SI CPU 315-2 DP 6ES7 315-2AF0 X2 DP Maxter 3 4 5 6 7	MPI address I address Q a H0AA0 2 1/223** - - - - - - - - - - - - -	address Comment		MPI
(0) UR Slot Module Order number Slot PS 307 2A EEST 307-18A00 CPU 315-2 DP 6EST 315-2AF X2 DP Master 3 4 5 6 7 7 8	MPI address I address Q a H0AA0 7 01-0AB0 2 7 7/237* 7 1 1 1 1 1 1 1 1 1 1 1 1 1	address Comment	GES7 315-24F02-0A80 GES7 315-24F03-0A80 GES7 315-24F03-0A80 GES7 315-24F83-0A80 GES7 315-24F83-0A80 GEO U 316 GEO U 316 GEO U 316-2 DP GEO U 318-2 GEO U 318-2 GEO U 44 GEO U M7 GES7 315-24F01-0A80 GES7 GES7 GES7 315-24F01 GES7 GES7	MPI
(0) UR Slot Module Order number 1 F PS 307 2A 6E S7 307-1BA00 2 I CPU 315-2 DP 6E S7 315-2AFI X2 I DPMaxter I 3	MPI address I address Q a +0AA0 01-0AB0 2 	address Comment		MPI
(0) UR Slot Module Order number 1 PS 307 2A 6ES7 307-18A00 2 CPU 315-2 DP 6ES7 315-2AFI X2 DP Master 3 4 5 6 7 8 9 10 0 0	MPI address I address Q a +QAA0 2 -10AB0 2 -1023** -1025** -1	address Comment		MPI o to
(0) UR Slot Module Order number 1 PS 307 2A 6ES7 307-1BA00 2 CPU 315-2 DP 6ES7 315-2AFI X2 DP Maxter 3 4	MPI address I address Q a I-QAAQ 2 1000 D1-QABQ 2 1000 I I I I I I I I I I I I I I I I I I I	address Comment		MPI o to

Press several times **OK** to reach the following window.

Save the current settings by selecting the menu **Station > Save**.

3.4 Hardware Configuration S7 300 Station (DPSlave)

Open the software for hardware configuration of the S7 station. Start with the 'DPSlave'.

DPSIave C:\SIEMENS\STEP7	S7proj\DPSlave	_ 🗆 ×
DPSlave	M ⁰ D	
⊡ 💮 DummyDPMaster for Config	Hardware	

Select the icon Hardware. Then select the menu **Edit > Open Object** or double click the Hardware icon to start the Hardware Configurator.

Select the menu View > Catalog.

🙀 HW Config - [DPSlave (Configuration) DPSlave]	_ @ ×
Billing Station Edit Insert PLC View Options Window Help	<u>_B×</u>
(0) UR	Hardware catalog Profile Standard PROFIBUS DP
	SIMATIC S7-300, M7-300 and C7 modules (central rack)
Press F1 to get Help.	

Select now step by step the hardware components of the S7 300 station.



3.4.1 The Rail





3.4.2 The Power Supply

3.4.3 The CPU (DPSlave)

Select for example CPU 315-2DP.

Hardware catalog	x
Profile Standard	Ŧ
E - W PROFIBUS DP	•
SIMATIC 300	
🛓 🚊 C7	
庄 💼 CP-300	
🖻 💼 CPU-300	
📋 💼 CPU 312 IFM	
😥 💼 💼 CPU 313	
庄 💼 CPU 314	
📄 💼 💼 CPU 314 IFM	
📄 💼 CPU 315	
📄 💼 CPU 315-2 DP	
6ES7 315-2AF00-0AB0	
🔂 6ES7 315-2AF01-0AB0	
📕 🔤 6ES7 315-2AF02-0AB0	
🗎 🕀 🧰 6ES7 315-2AF03-0AB0	
📕 📓 6ES7 315-2AF82-0AB0	
⊡ ⊡ 6ES7 315-2AF83-0AB0	
L 🛱 🦳 CPU 316	-
6ES7 315-2AF01-0AB0 48 KB work memory; 0.3 ms/1000 instructions; MI + DP connections; for multi-tier configuration up to 32 modules	PI >

Because this CPU type is usable for PROFIBUS-DP the following window appears.

Properties - PROFIBUS interface DP Master (R0/S2	2.1]	×
General Parameters		
Address: 3 T	subnet is selected, next available address is suggested	
Highest address:126		
Transmission rate:1.5 Mbit/s		
<u>S</u> ubnet:		
not networked PROFIDING DR 15 M5874	<u>N</u> ew	
	P <u>r</u> operties	
	Delete	
ОК	Abbrechen Hilfe	

Set the Station **Address**, e.g. 3. Select the **Subnet** PROFIBUS-DP that was created before.



Press several times **OK** to reach the following window.

Then select X2 DP Master and then select the menu Edit > Open Object or double click the icon X2 DP Master to open the following window.

Properties - DP Master	- (R0/S2.1)
General Addresses 0	perating Mode Configuration
Short Designation:	DP Master
Order No.:	
<u>N</u> ame:	DP Slave
Interface Type: PRO Address: 3 Networked: Yes	DFIBUS
<u>C</u> omment:	
ОК	Cancel Help

Set the Name to DP Slave.

Properties - DP Master - (R0/S2.1)	X
General Addresses Operating Mode Configuration	
O DP <u>M</u> aster	
DP <u>S</u> lave	
Programming and Monitor/Modify and other programming device (PG) functions by mean of PROFIBUS (extension of the bus cycle time) and communication connection for non-configured connections	ns an
Master: Station: Module: Rack (R) / Slot (S):	
OK Cancel	Help

Select **Operating Mode** to open the following window.

Set the operating mode to **DP Slave**.

Select Configuration.

Set as Module 1: Input 2 bytes (unit).

Set as Module 2: Output 2 bytes (unit).

	es - DF :	olave	- (NU/3	oz. I J			1				
enera	I Addres	ses (Operating	g Mode	Cont	iguratio	n				
	Mode		DPSlave	3	PF	ROFIBU	S-DP partn	er			
		1/0	Add	Diag	PR	1/0	Address	Pro	Length	Unit	Consiste
1	MS	I	0	1022				0	2	Byte	Unit
2	MS	Q	0	1022				0	2	Byte	Unit
3	MS										
•										-1	F
. ∎	Master-Sl	lave Co	onfigurati	ion—				[nsert	Row		▶ 2elete Row
-MS M St	Master-Sl aster: tation:	lave Co	onfigurat	ion				[nsert	Flow		▶ 2elete Row
-MS M SI Ci	Master-SI aster: tation: omment:	lave Co	onfigurat	ion				[nsert	Row	<u>]</u>	▶ 2elete Row

Press OK.

The adresses for the input and the output are related to the addresses inside the S7.

Note: The length of the process data module are limited to max. 32 bytes or 16 words per module. The number of modules and the number of the total process data depends on the used CPU type.

🔣 HW Config - [DPSlave (C	onfiguration) DPSlave]					_ 8 ×
<u>■</u> <u>■</u> <u>I</u> <u>station</u> <u>Edit</u> <u>Insert</u> <u>PLC</u>	⊻iew <u>O</u> ptions <u>W</u> indow <u>H</u> elp					_ 8 ×
		₩ №				
 ▲						
(0) UR						
Slot 🚺 Module	Order number	MPI address	l address	Q address	Comment	
1 PS 307 2A	6ES7 307-1BA00-0AA0					▲
2 CPU 315-2 DP	6ES7 315-2AF01-0AB0	2				
X2 DP Slave			1022*			
3						
4						
<u>5</u>						
		1		1	1	
Press F1 to get Help.					1.000	Chg

3.4.4 Download the Hardware Configuration

Select Destination Module			×
Destination Modules:			
Module	Racks	Slot	
CPU 315-2 DP	0	2	
Select <u>A</u> ll			
OK	Conor	. 1	Halo I
	Cance		neip

Select the menu PLC > Download to Module.

Select All and press OK.

Select Station Add	ress X
Over which station a	ddress is the programming device connected to the module CPU 315-2 DP?
<u>R</u> ack: <u>S</u> lot:	
Destination Station:	 Local Can be reached by means of gateway
Connection to de	stination station
Type Add	
1	
OK	Cancel Help

Press OK.

The Download Window shows Module currently beeing processed [0/2/0] CPU 315-2DP.

3.4.5 Save and Exit the Hardware Configurator

Select menu Station > Save and the select the menu Station > Exit.

The set the PLC into RUN mode.

4 The Hilscher DP Master

Before you start make sure that you have the <u>right</u> GSD file for the S7 300 CPU. You can download this file via the GSD library on <u>www.profibus.com</u>.

4.1 SyCon PROFIBUS Project

Start the System Configurator SyCon.

Then select **File > New** or **File > New > PROFIBUS**.

4.2 Insert the GSD file for the S7-300

Select the menu File > Copy GSD.

Copy GSD			? ×
Suchen in:	🔄 FromSiemens	- 🗈 (* 🔳
Siem802f.g	se		3
Datei <u>n</u> ame:	Siem802f.gse		Ö <u>f</u> fnen
Da <u>t</u> eityp:	GSE-file (*.gse) English	•	Abbrechen

4.3 Insert the DP Master

Select the menu **Insert > Master** and insert the master that you want to use, e.g. CIF 50-PB. Assign the **Station adress**, e.g. 1.

Insert Master		×
Available masters	Add >> CIF50-PB Add All >> CIF50-PB <<< Rgmove All	<u>Q</u> K <u>C</u> ancel
Vendor name Hilscher GmbH	Station address 1	
Ident number 0x1645	Description PC_Master	
GSD file name HIL_1645.GSD	· · · · ·	

4.4 Insert DP Slave

Select the menu **Insert > Slave** and insert the Siemens DP Slave, e.g. S7-315-2DP. Assign the **Station adress**, e.g. 3.

Insert Slave			×
Slave Filter Vendor SIEMENS Slave type All	•	Master CIF50-PB	▼ <u>D</u> K <u>C</u> ancel
Available slaves		Selected slaves	
ET 200M (IM153-2) ET 200S (IM151) S7-300 CP342-5 DP S7-315-2DP	<u>A</u> dd >> A <u>d</u> d All >> << R <u>e</u> move All << <u>R</u> emove	S7-315-2DP	
Vendor name SIEMENS		Station address 3	
Ident number 0x802F GSD file name SIEM802F.GSE GSD Revision V1.8		Description S7_Slave	

This results in the following bus layout.

🚰 SyCon - [Unnamed1]		_ 8 ×
Eile Edit View Insert Online Settings Tools	<u>M</u> indow <u>H</u> elp	<u>_ 8 ×</u>
📲 📲 🔀 PDD		
	PC Master	
CROC AL	Station address 1	
	FMS/DP Master CIF50-PB	
	S7 Slave	
	DP Slave S7-315-2DP	
For Help, press F1	PROFIBUS Config Mode	

Click the symbol of the Slave with the left mouse button and then choose the **Settings > Slave Configuration** menu.

or

Open the Slave configuration window by means of double clicking on the PROFIBUS-DP Slave device.

Select step by step the modules, e.g.

First select 'first ID in general '

Then select 'second ID in general '

Then select 'third ID in general '

Then select 'Master_O Slave_I 2 by unit' (2 Byte)

Finally select 'Master_I Slave_O 2 by unit' (2 Byte)

~				
51	200		_	ration
		NUH	11.1	rauur
			_	

- Allgi Geri	emein [.] ät	S7-315-2	DP				Statio	nsadre	esse [3		<u>0</u> K
Bes	chreib	ung S7_Slav	S7_Slave									Abbrechen
Gerät in der aktuellen Konfiguration aktivieren											Parameterdaten	
Max. Länge d. Ein-/AusgD. 244 Byt Max. Länge d. Eingangsdaten 122 But				Byte Byte	yte Längeld, Ein-/AusgD. 4 Byte			DPV1 Parameter				
Max. I Max. /	Länge Anzahl	d. Ausgangsda I der Module	aten 122 35	Byte	Lä An	nge d. A Izahl der	usgang Moduli	gsdate: e	n 2 5	Byte	Static	fordneter Master onsadresse 1 faster
Modu	ıl			Ein	gäng.	Ausgär	.g Ein	/Aus	Kennun	a 🔻	170	JE50-PB
firs	first ID in general 0x00											
second ID in general 0x00							eller Slave					
third ID in general 0x00							Stationsadresse 3 S7 Slave					
Master_I Slave_0 1 by unit 1 Byte 0x10												
Master_I Slave_0 2 by unit 2 Byte 0x11							270	7 215 20 P				
Mast	er_I	Slave_O	2 by ttl	2 B	yte				0x91	-	1373	57-515-2DP
									_			
Slot	Idx.	Modul	Symbol	Тур	E Ad	lr. E-	Ln.	Тур	A Adr	. A-Lr	<u>. </u>	Modul anhängen
1	1	first ID	Modulel									
2	1	second ID	Module2									Modul en <u>t</u> fernen
3	1	third ID	Module3									Modul einfügen
4	1	Master_O	Module4					QB	0	2		modureinitugen
5	1	Master_I	Module5	IB	0	2						Predefined <u>M</u> odules
											-	<u>Symbolische Namen</u>

The adresses for input (I Addr) and output (O Addr) are allocated in the process data memory in the Master.

X

4.5 Set the Bus Parameters

Click on the Icon for the master and then select the menu **Settings > Busparameters** and set the baudrate, e.g. 1.5 Mbaud.

4.6 Download the Configurtion

Click on the Icon for the master and then select the menu Online > Download.

4.7 Save the Configuration

Select the menu **File > Save** to save your configuration.