MODBUS/TCP Communication over Integrated PROFINET Interface of S7-300 and S7-400 CPU

Modbus/TCP PN CPU

FAQ · June 2013



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Caution

The functions and solutions described in this article confine themselves predominantly to the realization of the automation task. Furthermore, please take into account that corresponding protective measures have to be taken in the context of Industrial Security when connecting your equipment to other parts of the plant, the enterprise network or the internet. Further information can be found in Entry ID 50203404.

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Question

How do you use the blocks for MODBUS/TCP communication over the integrated PROFINET interface of S7-300 and S7-400 CPU in STEP 7 Professional V11/V12 (TIA Portal)?

Answer

The instructions and notes listed in this document provide a detailed answer to this question.

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 MODBUS/TCP communication over integrated PROFINET interface of S7-300 and S7-400 CPU

1 Introduction

The Modbus/TCP blocks for the S7-300 and S7-400 CPUs with integrated PROFINET interface are available for downloading in the form of a library: "Modbus_PN_CPU".

http://www.siemens.com/s7modbus

You can only install the "Modbus_PN_CPU" library on computers on which STEP 7 V5.4 or V5.5 is already installed. In order to use the blocks of the "Modbus_PN_CPU" library in STEP 7 Professional V11/V12 (TIA Portal) you must migrate the blocks in the TIA Portal.

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Migrate "MODBUS_PN_CPU" Library in STEP 7 V11/12 (TIA Portal)

The instructions below describe how to migrate the blocks of the "MODBUS_PN_CPU" library to STEP 7 Professional V11/V12 (TIA Portal) to be able to use them there.

Table 2-1

No.	Procedure		
1.	You can only install the "Modbus_PN_CPU" library on a computer on which STEP 7 V5.4 or V5.5 is already installed.		
2.	Create a new project in STEP 7 V5.4 or STEP 7 V5.5. Configure the hardware according to your hardware setup.		
3.	Open the "Modbus_PN_CPU" library with the "File > Open" menu. In the "Open Project" dialog you select the "Libraries" tab. Select the "Modbus_PN_CPU" library. If the "Modbus_PN_CPU" library is not displayed in the "Libraries" tab of the "Open Project" dialog, click the "Browse" button. Select the "Modbus_PN_CPU" library in the "\SIEMENS\Step7\S7LIBS" directory.		
	Open Project User projects Libraries Sample projects Multiprojects		
	Name Storage path		
	GRAPH7 C:\Program Files (x86)\Stemens\Step7\S7Libs\grammatriangles Modbus_PN_CPU C:\Program Files (x86)\Stemens\Step7\S7LiBs\ft Redundant IO CGP V40 C:\Program Files (x86)\Stemens\Step7\S7Libs\rec Bedundant IO CGP V52 C \Program Files (x86)\Stemens\Step7\S7Libs\rec Redundant IO CGP V52 C \Program Files (x86)\Stemens\Step7\S7Libs\rec Redundant IO MGP V32 C:\Program Files (x86)\Stemens\Step7\S7Libs\rec SIMATIC NET CP C:\Program Files (x86)\Stemens\Step7\S7Libs\std Standard Library C:\Program Files (x86)\Stemens\Step7\S7Libs\std stdlibs (V2) C:\Program Files (x86)\Stemens\Step7\S7Libs\std		
	۲ III ۲		
	L'alastad		
	Scieded		
	User projects: I Libraries: I Sample projects: Browse		
	OK Carroel Help		

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No.	Procedure
4.	Copy the blocks from the "Modbus_PN_CPU" and add them to the new project.
	SIMATIC Manager - [Modbus_PN_CPU C:\Program Files (x86)\SIEMENS
	Sile Edit Insert PLC View Options Window Help
	🗋 🗁 🚟 🛲 👗 🛍 💼 🍲 😨 🏪 🏝 🏗 🏥 🗰 🔂 < No Filter >
	Modbus_PN_CPU Object name Symbolic name
	READ-IMPORTANT!
	Blocks FB104 MOD_CLI
	UB3 License DB
5.	Open the "Modbus_PN_CPU" library with the "File > Open" menu. In the "Open Project" dialog you switch to the "Libraries" tab and select the "Standard Library"
	library.
	Open Project
	User projects Libraries Sample projects Multiprojects
	Name Storage path
	GPAPH7 C:\Program Files (x86)\Stemens\Step7\S7Libs\grameter wodbus PN_CPU C:\Program Files (x86)\StEMENS\Step7\S7LiBS\f
	Redundant IO CGP V40 - C:\Program Files (x86)\Siemens\Step7\S7libs\rec
	Redundant IO KGP V32 C\Program Files (x00)\Siemens\Step7\S7libs\rec
	SIMATIC NET CP C:\Program Files (x86)\Siemens\Step 7\S7libs\sim Standard Library C:\Program Files (x86)\Siemens\Step 7\S7libs\ste
	stdlibs (V2) C:\Program Files (x86)\Siemens\Step7\S7libs\std
	✓ ►
	Selected
	User projects:
	Libraries:
	Sample projects: Multiprojects:
	OK Cancel Help

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No.	Proc	edure	
6.	Copy the following blocks from the librar Blocks > Blocks" and add them to the ne FB63 "TSEND" FB64 "TRECV" FB65 "TCON" FB66 "TDISCON"	y "Standard Libra w project.	ary > Communication
	🍠 SIMATIC Manager - [Standard Libra	ry C:\Program	Files (x86)\Sieme
	Sile Edit Insert PLC View Op	tions Window	Help
	🗋 🖻 🎥 🛲 🌡 🛍 💼 💼 🗐 🗣	<u><u><u></u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u></u>	No Filter >
	Standard Library Standard Lib	>	Symbolic name USEND URCV BSEND BRCV GET PUT GETIO SETIO GETIO_PART SETIO_PART USEND_E URCV_E GET_E PUT_E TSEND TRCV TCON TDISCON TUSEND TURCV
7.	Copy the FC10 "EQ_STRNG" block from library and add it to the new project. SIMATIC Manager - [Standard Library File Edit Insert PLC View Option File Edit Insert PLC View Option E File Edit Insert PLC View Option File Edit Insert	n the "IEC Functi C:\Program Files s Window Help bigget nar FC1 FC2 FC3 FC3 FC4 FC5 FC4 FC5 FC6 FC6 FC7 FC7 FC8 FC9 FC10 FC12	ion Blocks > Blocks" (x86)\Siemens\Step7\S7libs <no filter=""> ▼ ♥ me Symbolic name AD_DT_TM CONCAT D_TOD_DT DELETE DI_STRNG DT_DATE DT_DATE DT_DATE DT_DAY EQ_DT EQ_DT FIND GE DT</no>

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No.		Procedure	e	
8.	If you change the numbers of the function blocks, use the "Rewire" function. It is no longer possible to rewire after migration. Right-click the block folder in the S7 program of the CPU. In the pop-up menu you select the "Rewire" function.		wire" function. It is ne pop-up menu dbus_T]	
	File Edit Insert PLC	View Options	Window Help)
	D 🛩 🎛 🛲 X 🖻 💼	🚵 😨 💁 🕒	b- b- 0-0- b- 0-0- Ⅲ Ⅰ €	< No Filter >
	BB Modbus_TCP_CPU B	Object	name Syn tem data — 3 TSE 4 TR0	nbolic name END CV
	Blochard	Cut		Ctrl+X
		Сору		Ctrl+C
		Paste		Ctrl+V
		Delete		Del
		Insert New Obje	ect	Þ
		PLC		Þ
		Rewire		
		Compare Block	S	
9.	Create the Parameter DB us Wizard is available for dowr <u>MODBUS TCP Wizard</u> Note The Modbus TCP Wizard is create the parameter DB be TIA Portal.	sing the Modbus T loading at this linl not available for T fore migration, yo	TCP Wizard. The k: TIA Portal projec u have to create	e Modbus TCP tts. If you do not it manually in the
10.	Start STEP 7 Professional \	'11 / V12 (TIA Po	rtal).	

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No.	Procedure	
12.	In the "Migrate project" dialog you select the project to be migrated. Don't select the "Include hardware configuration" option. Specify the project name and target path of the TIA Portal project. Click the "Migrate" button to execute the migration.	
	Migrate project X Select project to be migrated.	
	Project name: Modbus_T	
	Source path: D:ProjektelModbus_TIModbus_T.s7p	
	Target	
	Project name: Modbus_T	
	Target path: D:\Projekte\Modbus_T_V12_1	
	Author: rr_rkiv_3	
	Comment:	
	Migrate Cancel	
13.	Close the "Migrate project" dialog and open the migration log.	
	You are informed that the associated SCL sources of the blocks FB102, FB103, FB104 and FB105 are missing. You can ignore this message.	
14.	In addition you get the message "All PLCs have been replaced by unspecified CPUs".	
	To clear this message you switch to the Network view and there you right-click the CPU. Select "Change device" in the pop-up menu. The "Change device" dialog opens.	
	Network Connections HMI_Verbindung	
	CPU 315-2 Unspecific C	
	Migrate to 57-1500	
	X Cut Ctrl+X I □ Copy Ctrl+C I □ Paste Ctrl+V	

NO.	Procedure				
15.	In the "Change device" dia hardware setup, CPU 315	alog you select the correct C -2 PN/DP, for example. Cor	CPU according to your firm the settings with "OK".		
	Change device – Unspecified CPU 30	0	*		
	Current device:	New device: Image: CPU 315-2 PNIDP CPU 315-2 PNIDP Order no.: 6E57 315-2EH14-0A80 Version: V3.2 Description: Work memory 384KB; 0.05ms/1000 instructions; PROFINET interface; 57 communication (Doadble FBs/FCs); PROFINETIO controller; supports RIIBR; 2; ports; PROFINET Controller; Supports RIIBR; 2; ports; PROFINET CAR PROFINET (CAR Proxy, TCPIP transport protocol; combined MPIDP interface (MPI or DP master or DP slave); multivier configuration up to 32 modules; constant bus cycle time; routing; firmware V3.2	Controllers SimATIC \$7-300 CPU SimATIC \$7-300 CPU CPU 312 CPU 312 CPU 313C CPU 313C CPU 313C-2 PP CPU 313C-2 PP CPU 314C-2 PNIDP CPU 314C-2 PNIDP CPU 315-2 PNIDP CP		
	Compatibility information Information 'MPIDP interface' will be created! 'PROFINET interface' will be created! 'Prort' will be created! 'Port' will be created! The input address range for CPU 315-2	2 PNIDP will be changed from 32766 to 2047 byte	is. v		
16.	In the Device view you ma	rk the PROFINET interface	of the CPU 315-2 PN/DP.		
	In the inspector window yo enter the IP address and s General > Ethernet addres	bu assign a subnet to the Ph subnet mask of CPU 315-2 sses".	ROFINET interface and PN/DP in "Properties >		
	PROFINET-Schnittstelle_1 [PN-IO]				
	General IO tags Texts]			
	General	themet addresses			
	Time synchronization Operating mode	Interface networked with			
	Advanced options Diagnostics addresses	Subnet: PN/IE_1	dd new subnet		
		IP protocol			
		IP protocol Set Set Ro Set Set Set Set Set Set Set Se	P address in the project IP address: 192.168.0.1 Jubnet mask: 255.255.255.0 outer Juter address: 0.0.0.0 IP address using a different method		
		IP protocol Set Solution Set PROFINET	P address in the project IP address: 192.168.0.1 ubnet mask: 255.255.255.0 outer uter address: 0.0.0.0 P address using a different method		
		IP protocol Set PROFINET Set Profinet Set Profinet Set Profinet Profin	P address in the project IP address: 192.168.0.1 Jubnet mask: 255.255.255.0 outer Juter address: 0.0.0.0 IP address using a different method ROFINET device name using a different m		

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No.	Procedure			
17.	In the project navigation you open the folder str Here you open the "Program blocks" folder.	ucture for the CPU 315-2 PN/DP.		
	Project tree			
	Devices			
	e			
	de la Modbus_T	~		
	2 Add new device			
	CPU 315-2 PN/DP [CPU 315-2 PN/DP]			
	Device configuration U Online & diagnostics			
	Online & diagnostics Program blocks			
	Add new block			
	MOD_CLI [FB104]			
	MODEUSPN [FB102]			
	License DB [DB3]	_		
	System blocks			
	Technology objects			
	External source files			
18.	In the "Add new block" dialog you click the "Org Select the following Startup OB: OB100. Click the your project.	anization block (OB)" button. he "OK" button to add OB100 to		
	COMPLETE RESTART			
	Time interrupts	Language: FBD 💌		
	OB	Select OB: 100		
	Organization	Description:		
	Function block	Organization blocks (OBs) control program execution. With OBs, you can respond to cyclic, time- based or interrupt-driven events during program execution.		
	FC Function			
	Data block	more		
	> Additional information			
	Add new and open	OK Cancel		

No.	Procedure			
19.	Double-click the opens. Click the "Orgar OB: OB121. Cliv Add new block	e "Add new block" command a nization block (OB)" button. Se ck the "OK" button to add OB1	gain. The "Add lect the followi 21 to your proj	I new block" dialog ing Fault interrupt ject.
	PROG_ERR	. Pl time internets		[700]
	Function block	 Hardware interrupts Hardware interrupts Startup Fault interrupts CYCL_FLT [OB 80] HO_FLT1 [OB 82] HO_FLT2 [OB 83] OBNL_FLT [OB 85] RACK_FLT [OB 86] COMM_FLT [OB 87] PROG_ERR [OB 121] MOD_ERR [OB 122] 	Select OB: Description: Organization blo execution. With OBs, you ca based or interru program execut	121 121 acks (OBs) control program an respond to cyclic, time- pt-driven events during ion.
			more	
	> Additional info	rmation		
	Add new and open	1		OK Cancel

Note In STEP 7 V11 / 12 (TIA Portal) it is not permitted to add migrated know-how-protected blocks to a library. If you do this and add the library blocks to a project, this might damage the project.

It is not recommended to copy the blocks into another project, because this can lead to problems.

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