

FAQ • 05/2014

S7 Communication between SIMATIC S7-1200 and SIMATIC S7-300

STEP 7 V13 (TIA Portal) / STEP 7 V5.5 SP3

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1 Introduction

This document shows you how to exchange data between an S7-1200 and an S7-300 using S7 Communication.

For this the SIMATIC S7-300 is configured and programmed in STEP 7 V5.5 SP3. It sets up the S7 connection actively.

The SIMATIC S7-1200 is configured and programmed in STEP 7 V13 (TIA Portal).

2 Configuration and Programming of the SIMATIC S7-1200 in STEP 7 V13 (TIA Portal)

You configure and program the SIMATIC S7-1200 in STEP 7 V13 (TIA Portal).

Then you create the user program and define which data is to be exchanged with the S7-300 via the S7 connection.

2.1 Creating a Project

In Windows, select the menu "Start > All Programs > Siemens Automation > TIA Portal V13" to start the TIA Portal.

In the Portal View, select the "Create new project" action.

Enter the project name in the appropriate field.

Figure 2-1			
VA Siemens			
Start			Create new project
Devices & networks	م ر الر	Open existing project	Project name: 57communication Path: D:\Projekte
PLC programming	٠	Create new project	Author: User Comment:
Motion & technology		Close project	
Visualization			
Online & Diagnostics	10		
		Welcome Tour	

Click the "Create" button to create a new project. Figure 2-2

Create new p	roject	
	Project name:	S7communication
	Path:	D:\Projekte
	Author:	User
	Comment:	<u>^</u>
		×
		Create

Figure 2-3 Siemens - S7communication First steps Project: "\$7communication" was opened successfully. Please select the next step Devices & networks **م**ا en existing project Migrate project Motion & technology $q^{({\boldsymbol{q}})}$ Configure a device 1 ۲ Write PLC program Configure technology objects . Welcome Tour P Configure an HMI screen Installed software Help Open the project view 🚱 User interface language Project view Opened project: D:\Projekte\S7communication\S7communication

Use the "Project View" link to switch to the Project View.

2.2 Configuring the Hardware

Add a SIMATIC S7-1200

In the project tree, double-click the "Add new device" item. The "Add new device" dialog opens.

Figure 2-4	
Project tree	
Devices	
🖻 O O	
 S7communication 	
🏙 Add new device	
🛗 Devices & networks	
🕨 🥁 Common data	
Documentation settings	
🕨 🐻 Languages & resources	
🕨 🔚 Online access	
Emiliar Card Reader/USB memory	

In the working area, click the "Controllers" button. Go to "Controllers > SIMATIC S7-1200 > CPU" and select the required controller. Click the "OK" button to add the selected S7-1200 CPU to your project.



Define IP address and assign subnet

In the project tree, double-click the "Devices & networks" item. The Devices and Networks editor opens.

Figure 2-6	
Project tree	
Devices	
	₫
 S7communication 	
Add new device	
n Devices & networks	
PLC_1 [CPU 1211C DC/DC/DC]	
🕨 🙀 Common data	
Documentation settings	
🕨 词 Languages & resources	
Online access	
Emp Card Reader/USB memory	

In the Network View or Device View of the Devices and Networks editor you mark the S7-1200 CPU.

In the inspector window you switch to the "Properties" tab. Go to the "General" tab and in the area navigation you select the "PROFINET interface" item. In this example you enter the IP address 172.16.43.20 and the subnet mask 255.255.0.0 for the PROFINET interface of the S7-1200 CPU.

Then assign a subnet to the PROFINET interface. Click the "Add new subnet" button to insert a new subnet.

Figure 2-7



<	
PLC_1 [CPU 1211C DC/DC/DC]	Sector Properties
General IO tags Syste	em constants Texts
 Conoral 	Ethernet addresses
PROFINET interface DI6/DO4	Interface networked with
► AI2	Subnet: Not networked
 High speed counters (HSC) 	
Pulse generators (PTO/PWM)	Add new subnet
Startup	
Cycle	IP protocol
Communication load	
System and clock memory	 Set IP address in the project
Webserver	IP address: 172 . 16 . 43 . 20
Time of day	Subnet mask: 255 255 0 0
User interface languages	
Protection	
Connection resources	Router address: 0 . 0 . 0 . 0
Overview of addresses	IP address is set directly at the device

After entering the IP address and the subnet mask and assigning the subnet, in the navigation area of the "General" tab you select the "Protection" item. Enable the "Permit Access with PUT/GET communication from remote partner

(PLC, HMI, OPC ...)" function.

Figure 2-8

		R.C.)	
	▼		
	101	1	
Rack_0		SIEMENS	2010/7C 21-100
	103		
		 11	CPU tang
		—	
		<u> </u>	

<			
Ρl	_C_1 [CPU 1211C DC/DC/DC	9	Properties 1
Γ	General IO tags Sy	tem constants Texts	
•	General		
Þ	PROFINET interface		
۲	DI6/DO4	Connection mechanisms	
•	AI2		
•	High speed counters (HSC)	Permit access with PUT/GET communication from remote par	rtner (PLC, HMI, OPC,)
۲	Pulse generators (PTO/PWM)		
	Startup		
	Cycle		
	Communication load		
	System and clock memory		
۲	Web server		
	Time of day		
_	User interface languages		
	Protection		
	Connection resources		
	Overview of addresses		

The connection between the subnet, PN/IE_1, for example, and the S7-1200 is now displayed in the Network View of the Devices and Networks editor.

2.3 Creating a User Program

In the user program of the S7-1200 CPU you add the data blocks for saving the Send and Receive data.

Add data block for saving the Send data

In the project tree you mark the device folder of the S7-1200 CPU. The device folder contains structured objects and actions that belong to the device.

In the device folder you navigate to the "Program blocks" subfolder and doubleclick the "Add new block" action. The "Add new block" dialog opens.

Figure 2-9	
Project tree	
Devices	
1 O O	1
 S7communication 	
💕 Add new device	
品 Devices & networks	
PLC_1 [CPU 1211C DC/DC/DC]	
Transformation	
🛂 Online & diagnostics	
💌 🔜 Program blocks	
💕 Add new block	
🏪 Main [OB1]	
🕨 🙀 Technology objects	
External source files	
🕨 🚂 PLC tags	
PLC data types	
Watch and force tables	
Traces	
📴 Program info	

Click the "Data block (DB)" button. Enter the name of the data block and enable the "Automatic" option to assign the number of the data block automatically. If you enable the "Manual" option, you can assign the number of the data block manually.

Apply the settings with "OK".

The data block DB1 "SEND_DATA" is created in this example for saving the Send data.

Figure 2-10					
Add new block					×
Name:					
SEND_DATA					
	T				
	lype:	Giobal DB			
-OB	Language:	DB	T		
Organization	Number:	1			
		🔘 Manual			
		 Automatic 			
EB	Description:				
Eunction block	Data blocks (DBs)	save program data.			
-rc					
Function					
■DB					
Data block					
	More				
Additional inform	ation				
Add new and open				ок	Cancel

In the Properties of the data block, under "Attributes" you disable the "Optimized block access" function.

Data blocks with standard access have a fixed structure. The data elements in the declaration include both symbolic names and a fixed address in the block. The address is displayed in the "Offset" column. You can address the variables in this block both symbolically and absolutely.

General Information Time stamps Compilation Protection Attributes	Attributes Only store in load memory Data block write-protected in the device	

In DB1 "SEND_DATA" you define the static variable "SEND_DATA" of the data type Array[0..99] of Byte.

Figure 2-12

Project tree		S7	con	nm	uni	cation 🔸 PLC_1 [CPl	J 1211C DC/DC/DC] → P	rogram
Devices								
🖄 🖸 🖸		ý	; ₹	6 1	•	5 R 5 6 6	E 🔢 📽	
			SE	ND	_D	ATA		
 S7communication 				Na	me		Data type	Offset
🌁 Add new device		1		-	Sta	atic		
🛗 Devices & networks		2	-		Ŧ	SEND_DATA	Array[099] of Byte 🔳 💌	0.0
PLC_1 [CPU 1211C DC/DC/DC]		з			•	SEND_DATA[0]	Byte	0.0
Device configuration		4			•	SEND_DATA[1]	Byte	1.0
🛂 Online & diagnostics		5			•	SEND_DATA[2]	Byte	2.0
🗢 🔚 Program blocks		6			•	SEND_DATA[3]	Byte	3.0
💕 Add new block		7			•	SEND_DATA[4]	Byte	4.0
Main [OR1]		8			•	SEND_DATA[5]	Byte	5.0
SEND_DATA [DB1]		9			•	SEND_DATA[6]	Byte	6.0
Technology objects		10			•	SEND_DATA[7]	Byte	7.0
External source files		11			•	SEND_DATA[8]	Byte	8.0
🕨 🎑 PLC tags		12			•	SEND_DATA[9]	Byte	9.0
PLC data types		13			•	SEND_DATA[10]	Byte	10.0
Watch and force tables		14			•	SEND_DATA[11]	Byte	11.0
🗠 Traces		15			•	SEND_DATA[12]	Byte	12.0

Add data block for saving the Receive data

Add another data block for saving the Receive data.

In the "Add new block" dialog you click the "Data block (DB)" button. Enter the name of the data block and enable the "Automatic" option to assign the number of the data block automatically. If you enable the "Manual" option, you can assign the number of the data block manually.

Apply the settings with "OK".

The data block DB2 "RECV_DATA" is created in this example for saving the Receive data.

Figure 2-13					
Add new block					×
Name: RECV_DATA					
OB Organization block	Type: Language: Number:	Global DB	▼ ▼ 4		
FB Function block	Description: Data blocks (DBs) se	Manual Automatic			
FC					
Data block	More				
> Additional information	ation				
Add new and open				ОК	Cancel

In the Properties of the data block, under "Attributes" you disable the "Optimized block access" function.

Data blocks with standard access have a fixed structure. The data elements in the declaration include both symbolic names and a fixed address in the block. The address is displayed in the "Offset" column. You can address the variables in this block both symbolically and absolutely.

Figure 2-14

V_DATA [DB2] General	
General Information Time stamps Compilation Protection Attributes	Attributes Only store in load memory Data block write-protected in the device
Download without reinitializ	
	< <u> </u>
	OK Cancel

In DB2 "RECV_DATA" you define the static variable "RECV_DATA" of the data type Array[0..99] of Byte. Figure 2-15

Project tree		\$7	comn	nun	ication → PLC_1 [CPL	J 1211C DC/DC/DC] → I	Progran
Devices							
B O O		Ĩ	è 🖄			E 🔢 🛸	
			RECV	_D	ATA		
 S7communication 		-	N	ame	•	Data type	Offset
💕 Add new device		1	<u>-</u>	St	tatic		
🛗 Devices & networks		2	•	•	RECV_DATA	Array[099] of Byte	0.0
PLC_1 [CPU 1211C DC/DC/DC]		З	-		RECV_DATA[0]	Byte	0.0
Device configuration		4			RECV_DATA[1]	Byte	1.0
😼 Online & diagnostics		5			RECV_DATA[2]	Byte	2.0
🕶 🚘 Program blocks		6			RECV_DATA[3]	Byte	3.0
📑 Add new block		7			RECV_DATA[4]	Byte	4.0
Hain [OB1]		8			RECV_DATA[5]	Byte 🔳	5.0
📒 RECV_DATA [DB2]		9	-00		RECV_DATA[6]	Byte	6.0
SEND_DATA [DB1]		10			RECV_DATA[7]	Byte	7.0
🕨 🏣 Technology objects		11	-		RECV_DATA[8]	Byte	8.0
External source files		12	-00		RECV_DATA[9]	Byte	9.0
🕨 🏣 PLC tags		13			RECV_DATA[10]	Byte	10.0
PLC data types		14			RECV_DATA[11]	Byte	11.0

2.4 Downloading the Hardware Configuration and User Program

Requirements

You have already assigned the configured IP address 172.16.43.20 and subnet mask 255.255.0.0 to the S7-1200 CPU.

Instructions

Follow the instructions below to download the configuration and user program into the S7-1200 CPU.



No.			Acti	on			
3.	The "Extended do the PG/PC to the • Type of the P • PG/PC interfa • Connection to From the "Compa click the "Load" bu	wnload to devi S7-1200 CPU PG/PC interface ace: network ca subnet: subne tible devices in utton.	ce" dialog open has to be set. e: PN/IE ard of the PG/P(et to which the S target subnet:"	s aut C 67-12 list y	tomatically 200 CPU is /ou select t	only if the a connected he required	access path from S7-1200 CPU and
	Extended download to	device		_			×
		Configured access n	odes of "PLC_1"				
		Device PLC_1	Device type Provide type Provid	Slot 1 X1	Type PN/IE	Address 172.16.43.20	Subnet PN/IE_1
		Co	Type of the PG/PC inter PG/PC inter nnection to interface/sub 1st gate	face: face: onet: way:	PN/IE Intel(R) 8257 PN/IE_1	'4L Gigabit Networ	rk Connection V () V () V ()
		Compatible devices	in target subnet:			🛃 Sho	ow all compatible devices
		Device	Device type	Type	Ac	ldress	Target device
	mar mar	PLC_1	CPU 1211C DC/D	PN/IE	17	72.16.43.20	PLC_1
	P Ser	-		PN/IE PN/IE	Ac	cess address	
	Flash LED						
	Online status information						<u>S</u> tart search
	Scan and informatio	n retrieval completed.					^
	Display only problem	reports					*
							Load <u>C</u> ancel

No.				Action	
4.	In the "	Load	l preview" dialog y	you click the "Load" button to start the loadi	ng procedure.
	Load pre	eview			×
	C 🕄 C	heck be	efore loading		
	Status	1	Target	Message	Action
	+II	0	 PLC_1 	Ready for loading.	
		0	Stop modules	The modules are stopped for downloading to device.	Stop all
		0	 Device configurati 	Delete and replace system data in target	Download to device
		0	 Software 	Download software to device	Consistent download
		0	Text libraries	Download all alarm texts and text list texts	Consistent download
	<			10	
				Finish	Refresh Load Cancel
5.	In the " termina	Load ate th	l results" dialog yo e loading procedu	ou enable the "Start all" action and click the ure.	"Finish" button to
	Load res	tatus ar	nd actions after downloadir	ng to device	×
	Status	1	Target	Message	Action
	1	%	▼ PLC_1	Downloading to device completed without error.	
		4	Start modules	Start modules after downloading to device.	🖌 Start all
	<			1	>
				Finish	Load Cancel

3 Configuration and Programming of the SIMATIC S7-300

You configure and program the SIMATIC S7--300 in STEP 7 V5.5 SP3.

Then you create the user program and define which data is to be exchanged with the S7-300 via the S7 connection.

3.1 Creating a Project

In Windows, select the menu "Start > All Programs > SIMATIC > SIMATIC Manager" to start the SIMATIC Manager in STEP 7 V5.5 SP3.

In the SIMATIC Manager, you create a new project with the menu "File > New". In the SIMATIC Manager, you add a SIMATIC PC station with the menu "Insert > Station > SIMATIC S7-300 Station".



3.2 Configuring the Hardware

Create the hardware configuration of the S7-300 station by drag-and-dropping the relevant modules like Power Supply, CPU etc. from the hardware catalog into the S7-300 profile channel.

Define IP address and assign subnet

Double-click the PROFINET interface of the S7-300 CPU. The Properties dialog of the PROFINET interface opens.

igure 3-2	
🙀 HW Config - [SIMATIC 300(1) (Configuration) PUT_GET_zu_S71200]	
💵 Station Edit Insert PLC View Options Window Help	
D 🍃 🖫 📱 🖏 🚭 🛍 💼 🏙 🎰 🖺 🗔 🎇 🕅	
🚍 (0) UR	
1 PS 307 10A 2 CPU 315-2 PN/DP	-
X2 PN-10-1	
X2 P1 R Port 1 X2 P2 R Port 2 3	ш
4 DI8/DO8xDC24V/0,5A	
<u>6</u> 7	
/ 2	Ŧ

Click the "Properties" button to change the IP address and subnet mask and assign the subnet.

Figure 3-3

Properties - PN-IO-1 (R0/S2.2)			×
Media Redund General	Jancy Addresses	Time-of-Day Synch PROFINET	nronization I-Device	Options Synchronization
Short description:	PN-IO			
Device name:	PN-IO-1			
Use different met	thod to obtain devi	ce name		
Support device r	eplacement withou	ut exchangeable mediun	n	
_ Interface				
Type:	Ethernet			
Device number:	0			
Address:	172.16.43.21			
Networked:	Yes	Properties		
Comment:				
				*
				-
ОК			Ca	incel Help

S7 communication between SIMATIC S7-1200 and SIMATIC S7-300 Entry ID: ID number, V1.0, 05/2014

In this example you enter the IP address 172.16.43.21 and the subnet mask 255.255.0.0. Click the "New" button to insert a new subnet. Select the new subnet or another existing subnet. Click the "OK" button to apply the IP address and subnet mask and assign the selected subnet to the PROFINET interface of the S7-300 CPU.

Figure 3-4			
Properties - Ethernet interface PN-IO (R0/S2.2)	(item		x
General Parameters			
IP address: 172.16.43.21 Subnet mask: 255.255.0.0	Gateway © Do not use router © Use router Address:		
		New	ר ו
Ethemet(2)		Properties Delete	
ОК	С	ancel He	lp

Clock memory

Double-click the S7-300 CPU. The Properties dialog of the S7-300 CPU opens. Figure 3-5

🖳 HW Config	g - [SIMATIC 300(1) (Configuration) PUT_GET_zu_S71200]
Station	Edit Insert PLC View Options Window Help
] 🗅 😅 🔓	🛢 🛼 🎒 🖹 🖻 🗈 🛛 🏜 🛍 📳 🗖 🖼 🗞
🚘 (0) UR	
1	PS 307 10A
2	I CPU 315-2 PN/DP
X1	MPI/DP
X2	PN-IO-1
X2 P1 R	Port 1
X2 P2 R	Port 2
3	
4	D18/D08xDC24V/0,5A
5	
6	
7	
2	· · · · · · · · · · · · · · · · · · ·

Switch to the "Cycle/Clock Memory" tab and enable, for example, the memory byte 0 as clock marker.

Apply the settings with "OK".

Diagnostics/Clock	c Protecti	ion	Communication	Web
General	Startup		Synchronous Cycle	Interrupts
Cycle/Clock Memory	Retentive Memory	Interrupts	Time-of-Day Interrupts	Cyclic Interrupt
Cycle				
🔽 Update OB1 pro	cess image cyclically			
Scan cycle monitori	ng time [ms]:	150		
Minimum scan cycle	e time [ms]:	0		
Scan cycle load from	m communication [%]:	20		
Prioritized OCM	communication			
Size of the process-	image input area:	128		
Size of the process-	image output area:	128		
OB85 - call up at I/0) access error:	No OB85 ci	all up	•
		,		
-Clock Memory]	
Memory byte:		0		
]-		

Click the "Save and Compile" button to save and compile the configuration of the SIMATIC S7-300.

Figure 3-7

🖳 HW Config	g - [SIMATIC 300(1) (Configuration) PUT_GET_zu_S71200]
Station	Edit Insert PLC View Options Window Help
) 🗅 😅 🔓	¤ 🛼 ⊜ te te 🔬 🎪 [t]: ≕ 😤 k?
🚎(0) UR	
1	PS 307 10A
2	CPU 315-2 PN/DP
X1	MPI/DP
X2	PN-10-1
X2 P1 R	₽ort 1 Ξ
X2 P2 R	Port 2
3	
4	D18/D08xDC24V/0,5A
5	
6	
7	
Q	▼ ▼

3.3 Configuring the S7 Connection

In the SIMATIC Manager you open the "NetPro" tool via the menu "Options > Configure Network". In "NetPro" you configure the S7 connection for the S7-300 CPU.

Figure 3-8



Mark the CPU in the SIMATIC S7-300 station. Open the "Insert New Connection" dialog via the menu "Insert > New Connection". In this example you insert an unspecified S7 connection.



Select the entry "(Unspecified)" under Connection Partner. Select "S7 connection" as the connection type. Click "Apply". The Properties dialog of the S7 connection opens. Figure 3-10

Insert New Conr Connection P	artner e current project PIT GET zu S71200 All broadcast stations All multicast stations known project
Project:	ŧ
Station:	(Unspecified)
Module:	
Connection -	
Туре:	S7 connection
Display pr	operties before inserting
ОК	Apply Cancel Help

The S7-300 CPU sets up the S7 connection actively.

Enter the IP address of the communication partner. In this example you enter the IP address of the S7-1200 station.

You specify the local ID of the connection in the user program at the input parameter ID of the function blocks FB15 "PUT" and F14 "GET".

Click the "Address Details..." button. The "Address Details" dialog opens. Figure 3-11

General Status	Information	Block Parameters Local ID (Hex): 1 Default
Connection Pa	th	Pattor
	Loodi	raulei
End Point:	SIMATIC 300(1)/ CPU 315-2 PN/DP	
End Point: Interface:	SIMATIC 300(1)/ CPU 315-2 PN/DP CPU 315-2 PN/DP, PN-IO-1(R0/S2)	Unknown Unknown
End Point: Interface: Subnet:	SIMATIC 300(1)/ CPU 315-2 PN/DP CPU 315-2 PN/DP, PN-IO-1(R0/S2) Ethemet(2) [Industrial Ethemet]	Unknown Unknown Industrial Ethemet]
End Point: Interface: Subnet: Address:	SIMATIC 300(1)/ CPU 315-2 PN/DP CPU 315-2 PN/DP, PN-IO-1(R0/S2) Ethemet(2) [Industrial Ethemet] 172.16.43.21	Unknown Unknown Industrial Ethemet] I72.16.43.20

Enter the Rack/Slot of the communication partner. The S7-1200 CPU uses Rack 0 and Slot 1. For the Connection Source (hex) you select 03, because the S7 connection is configured unilaterally only in the S7-300 CPU. With these settings the TSAP 03.01 is used for the S7 connection in the communication partner. Apply the settings with "OK".

Figure 3-12		
Address Details		×
End Point: Rack/Slot: Connection Resource (hex):	Local SIMATIC 300(1)/ CPU 315-2 PN/DP 0 2 10	Pattner Unknown 0 1 03 V
TSAP: S7 Subnet ID:	10.02 00CA - 0007	03.01
ОК		Cancel Help

In NetPro, mark the CPU in the SIMATIC S7-300 station. The connection table shows all the connections configured for the CPU.

Figure 3-13								
RetPro - [PUT_GET_zu_S71200 (Network)	躍 NetPro - (PUT_GET_zu_S71200 (Network) D:\Projekte\PUT_GET_S.5_V12\PUT_GET_]							
Network Edit Insert PLC View	Options Window Help)						
😂 🖩 🗞 🎒 🗈 🛍 🏜 🔏	🛷 🖉 🚯 🛓 ।	*?						
		1						
SIMATIC	300(1)							
	P (PN-)							
315-2 PN/DP	10-1							
2								
Ethernet(2)								
Industrial Ethernet								
Local ID Partner ID Partner Type	Active connection partner	Send operating mode messages	Subnet	Local interface	Partner interface	Local address	Partner address	
1 Unknown S7 connection	Yes	No	Ethernet(2) [IE]	PN-IO-1		172.16.43.21	172.16.43.20	

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In NetPro you mark the S7-300 station. In the toolbar you click the "Save and Compile" button to save and compile the connection configuration.



3.4 Creating a User Program

In the user program of the S7-300 CPU you call the function blocks FB15 "PUT" and FB14 "GET.

The function blocks FB15 "PUT" and FB14 "GET" are located in the Standard Library under "Communication Blocks > Blocks". Copy the function blocks from the Standard Library and insert them in your STEP 7 project.

The figure below shows the block calls in the S7-300 and S7-1200 CPUs.





3.4.1 FB15 "PUT"

You use FB15 "PUT" to write data to the S7-1200 CPU.

Figure 3-16



FB15 "PUT" has the following input parameters.

Input parameters	Data type	Description			
REQ	BOOLEAN	Request control parameter, enables data transfer on a rising edge In this example the job to write the data is enabled via the clock memory M0.5 "ClockMemory".			
ID	WORD	Reference to the local connection description (preset by the connection configuration in STEP 7) In this example the ID = w#16#1 is preset by the configuration connection (see <u>Figure 3-1</u>).			
ADDR_1	ANY	Pointer to the area to be written to in the partner CPU (Receive data area in the partner CPU, here S7-1200 CPU). More information about the Receive data area in the S7-1200 CPU is available in section <u>3.4.3</u> .			
SD_1	ANY	Pointer to the area in your own CPU which contains the data to be sent (Send data area in your own CPU, here S7-300 CPU). More information about the Send data area in the S7-300 CPU is available in section <u>3.4.2</u> .			

Table 3-2					
Output parameters	Data type	Description			
DONE	BOOLEAN	State parameter DONE: 0 = Job not yet started or is still being executed 1 = Job executed error-free			
ERROR	BOOLEAN	State parameters ERROR and STATUS:			
STATUS	WORD	 ERROR = 0: STATUS = 0000(hex): neither warning nor error STATUS <> 0000(hex): warning, STATUS provides detailed information ERROR = 1: A fault has occurred. STATUS provides detailed information about the type of error. 			

FB15 "PUT" has the following output parameters.

3.4.2 Send data area in the S7-300 CPU

In the S7-300 CPU the Send data written to the S7-1200 CPU is stored in data block DB11 "SEND_DATA".

In this example 10 bytes of data starting at address 0 are written from DB11 "SEND_DATA" to the S7-1200 CPU.

3.4.3 Receive data area in the S7-1200 CPU

In the S7-1200 CPU the received data is stored in data block DB2 "RECV_DATA". In this example 10 bytes of data are stored in DB2 "RECV_DATA" starting at address 0.

3.4.4 Error evaluation of the Write job

If the Write job does not terminate successfully, in other words ERROR =1, the value of the output parameter STATUS is stored in MW112 "PUT_STATUS_SAVE".

Figure 3-17

Network 2 : Title:



3.4.5 FB14 "GET"

You use FB14 "GET" to read data from the S7-1200 CPU. Figure 3-18





Table 3-3

Input parameters	Data type	Description
REQ	BOOLEAN	Request control parameter, enables data transfer on a rising edge
		In this example the job to read the data is enabled via the clock memory M0.5 "ClockMemory".
ID	WORD	Reference to the local connection description (preset by the connection configuration in STEP 7)
		In this example the ID = w#16#1 is preset by the configuration connection (see Figure 3-1).
ADDR_1	ANY	Pointer to the area to be read in the partner CPU (Send data area in the partner CPU, here S7-1200 CPU).
		More information about the Send data area in the S7-1200 CPU is available in the section $3.4.7$.
RD_1	ANY	Pointer to the area in your own CPU in which the read data is stored (Receive data area in your own CPU, here S7-300 CPU).
		More information about the Receive data area in the S7-300 CPU is available in the section $3.4.6$.

Output parameters	Data type	Description
NDR	BOOLEAN	State parameter NDR: 0 = Job not yet started or is still being executed 1 = Job executed error-free
ERROR	BOOLEAN	State parameters ERROR and STATUS:
STATUS	WORD	 ERROR = 0: STATUS = 0000(hex): neither warning nor error STATUS <> 0000(hex): warning, STATUS provides detailed information ERROR = 1: A fault has occurred. STATUS provides detailed information about the type of error.

FB14 "GET" has the following output parameters.

Table 3-4

3.4.6 Receive data area in the S7-300 CPU

In the S7-300 CPU the Receive data read from the S7-1200 CPU is stored in data block DB12 "RECV_DATA".

In this example 10 bytes of data are stored in DB12 "RECV_DATA" starting at address 0.

3.4.7 Send data area in the S7-1200 CPU

In the S7-1200 CPU the data read from the S7-300 CPU is stored in data block DB1 "SEND_DATA".

In this example 10 bytes of data starting at address 0 are read from DB1 "SEND_DATA" of the S7-1200 CPU.

3.4.8 Error evaluation of the Read job

If the Read job does not terminate successfully, in other words ERROR =1, the value of the output parameter STATUS is stored in MW122 "GET_STATUS_SAVE".

Figure 3-19



3.5 Downloading the Hardware Configuration, Connection Configuration and User Program

Requirements

You have already assigned the configured IP address 172.16.43.21 and subnet mask 255.255.0.0 to the S7-300 CPU.

Instructions

Follow the instructions below to download the configuration, the connection configuration and the user program into the S7-300 CPU.

Table 3-5

No.	Description
No. 1.	Description In the SIMATIC Manager, you select the menu "Options > Set PG/PC Interface". The "Set PG/PC Interface" dialog opens. SIMATIC Manager - [PUT_GET_zu_S71200 D:\Projekte\PUT_GET_5.5_V12\PUT_GET_] Pile Edit Insert PLC View Options Window Help PUT_GET_zu_S71200 Customize Ctrl+Alt+E Access Protection H III SIMATIC 3001 Change Log Text Libraries Language for Display Devices Manage Multilingual Texts Rewire Run-Time Properties Compare Blocks Reference Data Define Global Data Configure Network Simulate Modules
	Configure Process Diagnostics
	Rick Privacy
	S7-Web2PLC
	Set PG/PC Interface

No.	Description					
2.	As access point for the application you set the network card with TCP/IP protocol via which the SIMATIC Field PG is connected to the S7-300 CPU and via which you access the S7300 CPU. Apply the settings with "OK".					
	Set PG/PC Interface					
	Access Path LLDP / DCP PNIO Adapter Info Access Point of the Application:					
	S7ONLINE (STEP 7)> Intel(R) 82574L Gigabit Network Connec (Standard for STEP 7)					
	Interface Parameter Assignment Used: Intel(R) 82574L Gigabit Network Connection Properties					
	Image: CP5611.PPI.1 Diagnostics Image: CP5611.PROFIBUS.1 <active> Copy Image: CP5611.PROFI</active></active></active></active></active></active></active></active></active></active></active></active></active></active></active></active></active></active></active></active></active>					
	(Parameter assignment of your NDIS-CP with TCP/IP protocol (RFC-1006))					
	Add/Remove: Select					
	OK Cancel Help					
3.	In the SIMATIC Manager you mark the SIMATIC S7-300 station. In the toolbar you click the "Load" button. This loads the configuration, the connection configuration and the user program into the S7-300 CPU.					
	SIMATIC Manager - [PUT_GET_zu_S71200 D:\Projekte\PUT_GET_5.5_V1					
	□ □ □ □ ↓ □ ↓ □ ↓ □					

4 Operation and Monitoring

Operation and monitoring is done via a variable table in STEP 7 V5.5 SP3 and in STEP 7 V13 (TIA Portal).

4.1 Writing Data to the S7-1200 CPU

Monitor variables

In STEP 7 V5.5 SP3 you can monitor and modify the Send and Receive data of the S7-300 CPU in the variable table.

In the toolbar of the variable table you click the "Monitor Variable" button. The "Status value" column displays the current values in the Send data area (DB11) and Receive data area (DB12).

Figure 4-1

	Var - VAT_1									
Table Edit Insert PLC Variable View Options Window Help										
	-[23) 🚅 日	e) <u>X B</u> B • • • X	9 . 8 N	2	9) & M	64 47 <i>110</i> 7	
ĺ	VAT_1 @PUT_GET_zu_S71200\SIMATIC 300(1)\CPU 315-2 PN/DP\S7-Programm(2) ONLINE									
		1	Address		Symbol	Display format	Status value	Modify value		
	1		// 11							
	2		DB11.DBB	0	"SEND_DATA".SEND_DATA[0]	HEX	B#16#89	B#16#89		
	3		DB11.DBB	1	"SEND_DATA".SEND_DATA[1]	HEX	B#16#38	B#16#38		
	4		DB11.DBB	2	"SEND_DATA".SEND_DATA[2]	HEX	B#16#02	B#16#02		
	5		DB11.DBB	3	"SEND_DATA".SEND_DATA[3]	HEX	B#16#03	B#16#03		
	6		DB11.DBB	4	"SEND_DATA".SEND_DATA[4]	HEX	B#16#04	B#16#04		
	7		DB11.DBB	5	"SEND_DATA".SEND_DATA[5]	HEX	B#16#00			
	8		DB11.DBB	6	"SEND_DATA".SEND_DATA[6]	HEX	B#16#00			
	9		DB11.DBB	7	"SEND_DATA".SEND_DATA[7]	HEX	B#16#00			
	10		DB11.DBB	8	"SEND_DATA".SEND_DATA[8]	HEX	B#16#00			
	11		DB11.DBB	9	"SEND_DATA".SEND_DATA[9]	HEX	B#16#00			
	12		MW 112		"PUT_STATUS_SAVE"	HEX	W#16#0000			
	13									
	14		DB12.DBB	0	"RECV_DATA".RECV_DATA[0]	HEX	B#16#32			
	15		DB12.DBB	1	"RECV_DATA".RECV_DATA[1]	HEX	B#16#89			
	16		DB12.DBB	2	"RECV_DATA".RECV_DATA[2]	HEX	B#16#65			
	17		DB12.DBB	3	"RECV_DATA".RECV_DATA[3]	HEX	B#16#00			
	18		DB12.DBB	4	"RECV_DATA".RECV_DATA[4]	HEX	B#16#00			
	19		DB12.DBB	5	"RECV_DATA".RECV_DATA[5]	HEX	B#16#00			
	20		DB12.DBB	6	"RECV_DATA".RECV_DATA[6]	HEX	B#16#00			
	21		DB12.DBB	7	"RECV_DATA".RECV_DATA[7]	HEX	B#16#00			
	22		DB12.DBB	8	"RECV_DATA".RECV_DATA[8]	HEX	B#16#00			
	23		DB12.DBB	9	"RECV_DATA".RECV_DATA[9]	HEX	B#16#00			
	24		MW 122		"GET_STATUS_SAVE"	HEX	W#16#0000			
	25									

Write data

In the "Modify value" column you enter the values for the Send data area (DB11) which are to be written to the Receive data area of the S7-1200 CPU. In the toolbar you click the "Modify variable" button to transfer the modify values to the Send data area of the S7-300 CPU and write them to the S7-1200 CPU.

Figure	4-2
--------	-----

	i v	ar - VAT_1								
	Table	e Edit Insert	PLC Variable View Optic	ons Window	Help					
ľ										
war_var_u @PUT_0ET_20_5/1200\5IMATIC 300(1)\CPU 315-2 PN/0P\5/-Programm(2) ONLINE										
l		Address	Symbol	Display format	Status value	Modify value				
l	1	// 11								
l	2	DB11.DBB (SEND_DATA".SEND_DATA[0]	HEX	B#16#89	B#16#89				
l	3	DB11.DBB 1	1 "SEND_DATA".SEND_DATA[1]	HEX	B#16#38	B#16#38				
l	4	DB11.DBB 2	2 "SEND_DATA".SEND_DATA[2]	HEX	B#16#02	B#16#02				
l	5	DB11.DBB 3	3 "SEND_DATA".SEND_DATA[3]	HEX	B#16#03	B#16#03				
l	6	DB11.DBB 4	ISEND_DATA".SEND_DATA[4]	HEX	B#16#04	B#16#04				
l	7	DB11.DBB 5	5 "SEND_DATA".SEND_DATA[5]	HEX	B#16#00					
l	8	DB11.DBB 6	S "SEND_DATA".SEND_DATA[6]	HEX	B#16#00					
l	9	DB11.DBB 7	7 "SEND_DATA".SEND_DATA[7]	HEX	B#16#00					
l	10	DB11.DBB 8	SEND_DATA".SEND_DATA[8]	HEX	B#16#00					
l	11	DB11.DBB 9	SEND_DATA".SEND_DATA[9]	HEX	B#16#00					
l	12	MW 112	"PUT_STATUS_SAVE"	HEX	W#16#0000					
l	13									
l	14	DB12.DBB 0	RECV_DATA".RECV_DATA[0]	HEX	B#16#32					
l	15	DB12.DBB 1	1 "RECV_DATA".RECV_DATA[1]	HEX	B#16#89					
l	16	DB12.DBB 2	2 "RECV_DATA".RECV_DATA[2]	HEX	B#16#65					
l	17	DB12.DBB 3	3 "RECV_DATA".RECV_DATA[3]	HEX	B#16#00					
l	18	DB12.DBB 4	4 "RECV DATA".RECV DATA[4]	HEX	B#16#00					
l	19	DB12.DBB	5 "RECV DATA".RECV DATA[5]	HEX	B#16#00					
l	20	DB12.DBB 6	S "RECV DATA".RECV DATA[6]	HEX	B#16#00					
	21	DB12.DBB 7	7 "RECV DATA".RECV DATA[7]	HEX	B#16#00					
	22	DB12.DBB 8	3 "RECV DATA".RECV DATA[8]	HEX	B#16#00					
	23	DB12.DBB	RECV DATA" RECV DATA[9]	HEX	B#16#00					
	24	MW 122	"GET STATUS SAVE"	HEX	W#16#0000					
	25									
			-							

In STEP 7 V13 (TIA Portal) you can monitor and modify the Send and Receive data of the S7-1200 CPU in the variable table.

In the toolbar of the variable table you click the "Monitor All" button. The "Monitor value" column displays the current values in the Send data area (DB1) and Receive data area (DB2). This permits you to check whether the data written from the S7-300 CPU has arrived in the Receive data area (DB2) of the S7-1200 CPU.

Figure 4-3									
S7-1200V42 V12 V13 → PLC 1 [CPU 1211C DC/DC/DC] → Watch and force tables → Beobachtungstabelle 1									
	i	Name	Address	Display format	Monitor value	Modify value			
1		"RECV_DATA".RECV_DATA[0]	%DB2.DBB0	Hex	16#89				
2		"RECV_DATA".RECV_DATA[1]	%DB2.DBB1	Hex	16#38				
3		"RECV_DATA".RECV_DATA[2]	%DB2.DBB2	Hex	16#02				
4		"RECV_DATA".RECV_DATA[3]	%DB2.DBB3	Hex	16#03				
5		"RECV_DATA".RECV_DATA[4]	%DB2.DBB4	Hex	16#04				
6		"RECV_DATA".RECV_DATA[5]	%DB2.DBB5	Hex	16#00				
7		"RECV_DATA".RECV_DATA[6]	%DB2.DBB6	Hex	16#00				
8		"RECV_DATA".RECV_DATA[7]	%DB2.DBB7	Hex	16#00				
9		"RECV_DATA".RECV_DATA[8]	%DB2.DBB8	Hex	16#00				
10		"RECV_DATA".RECV_DATA[9]	%DB2.DBB9	Hex	16#00				
11		"SEND_DATA".SEND_DATA[0]	%DB1.DBB0	Hex	16#32	16#32			
12		"SEND_DATA".SEND_DATA[1]	%DB1.DBB1	Hex	16#89	16#89			
13		"SEND_DATA".SEND_DATA[2]	%DB1.DBB2	Hex	16#65	16#65			
14		"SEND_DATA".SEND_DATA[3]	%DB1.DBB3	Hex	16#00				
15		"SEND_DATA".SEND_DATA[4]	%DB1.DBB4	Hex	16#00				
16		"SEND_DATA".SEND_DATA[5]	%DB1.DBB5	Hex	16#00				
17		"SEND_DATA".SEND_DATA[6]	%DB1.DBB6	Hex	16#00				
18		"SEND_DATA".SEND_DATA[7]	%DB1.DBB7	Hex	16#00				
19		"SEND_DATA".SEND_DATA[8]	%DB1.DBB8	Hex	16#00				
20		"SEND_DATA".SEND_DATA[9]	%DB1.DBB9	Hex	16#00				
21			<add new=""></add>						

4.2 Reading Data from the S7-1200 CPU

Monitor variables

In STEP 7 V13 (TIA Portal) you can monitor and modify the Send and Receive data of the S7-1200 CPU in the variable table.

In the toolbar of the variable table you click the "Monitor All" button. The "Monitor value" column displays the current values in the Send data area (DB1) and Receive data area (DB2).

Fig	ure 4-4							
S7-1200V42_V12_V13 → PLC_1 [CPU 121 <u>1C DC(DC</u> /DC] → Watch and force tables → Beobachtungstabelle_1								
-		Address	Disalaufaa		Maniferentia	La diferente a		
	Name	Address	Display for	mat	Monitor value	Modify value		
1	"RECV_DATA".RECV_DATA[0]	SDB2.DBB0	Hex	•	16#89			
2	"RECV_DATA".RECV_DATA[1]	%DB2.DBB1	Hex		16#38			
3	"RECV_DATA".RECV_DATA[2]	%DB2.DBB2	Hex		16#02			
4	"RECV_DATA".RECV_DATA[3]	%DB2.DBB3	Hex		16#03			
5	"RECV_DATA".RECV_DATA[4]	%DB2.DBB4	Hex		16#04			
6	"RECV_DATA".RECV_DATA[5]	%DB2.DBB5	Hex		16#00			
7	"RECV_DATA".RECV_DATA[6]	%DB2.DBB6	Hex		16#00			
8	"RECV_DATA".RECV_DATA[7]	%DB2.DBB7	Hex		16#00			
9	"RECV_DATA".RECV_DATA[8]	%DB2.DBB8	Hex		16#00			
10	"RECV_DATA".RECV_DATA[9]	%DB2.DBB9	Hex		16#00			
11	"SEND_DATA".SEND_DATA[0]	%DB1.DBB0	Hex		16#32	16#32		
12	"SEND_DATA".SEND_DATA[1]	%DB1.DBB1	Hex		16#89	16#89		
13	"SEND_DATA".SEND_DATA[2]	%DB1.DBB2	Hex		16#65	16#65		
14	"SEND_DATA".SEND_DATA[3]	%DB1.DBB3	Hex		16#00			
15	"SEND_DATA".SEND_DATA[4]	%DB1.DBB4	Hex		16#00			
16	"SEND_DATA".SEND_DATA[5]	%DB1.DBB5	Hex		16#00			
17	"SEND_DATA".SEND_DATA[6]	%DB1.DBB6	Hex		16#00			
18	"SEND_DATA".SEND_DATA[7]	%DB1.DBB7	Hex		16#00			
19	"SEND_DATA".SEND_DATA[8]	%DB1.DBB8	Hex		16#00			
20	"SEND_DATA".SEND_DATA[9]	%DB1.DBB9	Hex		16#00			
21		<add new=""></add>				-		

Read data

In the "Modify value" column you enter the values for the Send data area which are read from the S7-300 CPU and stored in the Receive data area of the S7-300 CPU. In the toolbar you click the "Modify all enabled values once and immediately" button to transfer the modify values to the Send data area of the S7-1200 CPU.

Figure 4-5

\$7-12	00V42_V12_V13 ▶ PLC_1 [CPU 121	So offline (/DC) V	Vatch and force tab	les 🕨 Beobach	tungstabelle_'		
416							
i	Name	Address	Display format	Monitor value	Modify value		
	"RECV_DATA".RECV_DATA[0]	%DB2.DBB0	Hex	16#89			
	"RECV_DATA".RECV_DATA[1]	%DB2.DBB1	Hex	16#38			
	"RECV_DATA".RECV_DATA[2]	%DB2.DBB2	Hex	16#02			
	"RECV_DATA".RECV_DATA[3]	%DB2.DBB3	Hex	16#03			
	"RECV_DATA".RECV_DATA[4]	%DB2.DBB4	Hex	16#04			
	"RECV_DATA".RECV_DATA[5]	%DB2.DBB5	Hex	16#00			
	"RECV_DATA".RECV_DATA[6]	%DB2.DBB6	Hex	16#00			
	"RECV_DATA".RECV_DATA[7]	%DB2.DBB7	Hex	16#00			
	"RECV_DATA".RECV_DATA[8]	%DB2.DBB8	Hex	16#00			
0	"RECV_DATA".RECV_DATA[9]	%DB2.DBB9	Hex	16#00			
1	"SEND_DATA".SEND_DATA[0]	%DB1.DBB0	Hex	16#32	16#32		
2	"SEND_DATA".SEND_DATA[1]	%DB1.DBB1	Hex	16#89	16#89		
3	"SEND_DATA".SEND_DATA[2]	%DB1.DBB2	Hex	16#65	16#65		
4	"SEND_DATA".SEND_DATA[3]	%DB1.DBB3	Hex	16#00			
5	"SEND_DATA".SEND_DATA[4]	%DB1.DBB4	Hex	16#00			
6	"SEND_DATA".SEND_DATA[5]	%DB1.DBB5	Hex	16#00			
7	"SEND_DATA".SEND_DATA[6]	%DB1.DBB6	Hex	16#00			
8	"SEND_DATA".SEND_DATA[7]	%DB1.DBB7	Hex	16#00			
9	"SEND_DATA".SEND_DATA[8]	%DB1.DBB8	Hex	16#00			
0	"SEND_DATA".SEND_DATA[9]	%DB1.DBB9	Hex	16#00			
1		<add new=""></add>					

In STEP 7 V5.5 SP3 you can monitor and modify the Send and Receive data of the S7-300 CPU in the variable table.

In the toolbar of the variable table you click the "Monitor Variable" button. The "Status value" column displays the current values in the Send data area (DB11) and Receive data area (DB12). This permits you to check whether the data read from the S7-1200 CPU has arrived in the Receive data area (DB12) of the S7-300 CPU.

Figure 4-6

8	Var - VAT_1							
Table Edit Insert PLC Variable View Options Window Help								
-ja				P. 8 N	2	©∦ 667 4⊅	60°i ≌n ////	
1	.VAT_1 @PUT_GET_zu_S71200\SIMATIC 300(1)\CPU 315-2 PN/DP\S7-Programm(2) ONLINE							
	Addres	s	Symbol	Display format	Status value	Modify value		
1	// 11		1					
2	DB11.DE	3B 0	"SEND_DATA".SEND_DATA[0]	HEX	B#16#89	B#16#89		
3	DB11.DE	3B 1	"SEND_DATA".SEND_DATA[1]	HEX	B#16#38	B#16#38		
4	DB11.DE	3B 2	"SEND_DATA".SEND_DATA[2]	HEX	B#16#02	B#16#02		
5	DB11.DE	3B 3	"SEND_DATA".SEND_DATA[3]	HEX	B#16#03	B#16#03		
6	DB11.DE	3B 4	"SEND_DATA".SEND_DATA[4]	HEX	B#16#04	B#16#04		
7	DB11.DE	3B 5	"SEND_DATA".SEND_DATA[5]	HEX	B#16#00			
8	DB11.DE	3B 6	"SEND_DATA".SEND_DATA[6]	HEX	B#16#00			
9	DB11.DE	3B 7	"SEND_DATA".SEND_DATA[7]	HEX	B#16#00			
10	DB11.DE	3B 8	"SEND_DATA".SEND_DATA[8]	HEX	B#16#00			
11	DB11.DE	3B 9	"SEND_DATA".SEND_DATA[9]	HEX	B#16#00			
12	MW 11	2	"PUT_STATUS_SAVE"	HEX	W#16#0000			
13								
14	DB12.DE	3B 0	"RECV_DATA".RECV_DATA[0]	HEX	B#16#32			
15	DB12.DE	3B 1	"RECV_DATA".RECV_DATA[1]	HEX	B#16#89			
16	DB12.DE	3B 2	"RECV_DATA".RECV_DATA[2]	HEX	B#16#65			
17	DB12.DE	3B 3	"RECV_DATA".RECV_DATA[3]	HEX	B#16#00			
18	DB12.DE	BB 4	"RECV_DATA".RECV_DATA[4]	HEX	B#16#00			
19	DB12.DB	3B 5	"RECV_DATA".RECV_DATA[5]	HEX	B#16#00			
20	DB12.DB	3B 6	"RECV_DATA".RECV_DATA[6]	HEX	B#16#00			
21	DB12.DB	3B 7	"RECV_DATA".RECV_DATA[7]	HEX	B#16#00			
22	DB12.DB	3B 8	"RECV_DATA".RECV_DATA[8]	HEX	B#16#00			
23	DB12.DB	3B 9	"RECV_DATA".RECV_DATA[9]	HEX	B#16#00			
24	MW 12	2	"GET_STATUS_SAVE"	HEX	W#16#0000			
25								