# **FAQ about communication via IE**

# Service & SUPPORT

### fault-tolerant S7 communication via IE



FAQ



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http://support.automation.siemens.com/WW/view/en/16667714

# Question

How do I configure a fault-tolerant S7 connection via Industrial Ethernet to a SIMATIC S7 with a user application?

## Answer

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

#### 1 Assignment of tasks

In this example, a CP1613 will be used. The CP1613 allows the S7 communication for a user application to a S7-400 H System on Ethernet. An existing configuration of S7-400 H system with network connection is required to proceed as described below.

# **NOTICE** Fault-tolerant S7 connections are only available with a CP1613 and a CP1623. The use of a normal network adapter is not possible.

#### 1.1 Conditions

You need an engineering station with STEP 7 for the commissioning of the PC station. You compulsory need STEP 7 to configure a fault-tolerant S7 connection between PC station and S7400-H System.

Furthermore you need the license for the SIMATIC NET PC software S7-REDCONNECT on the PC station, which communicates with the S7400-H system over fault-tolerant S7 connections.

## 2 Configuration of the PC station

After successful installation of the hardware and software of the SIMATIC NET CD and also of the configuration tool comprehending a restarting of your computer, start NCM PC or STEP 7 with "Start  $\rightarrow$  (in Windows XP: All Programs $\rightarrow$ ) SIMATIC  $\rightarrow$  SIMATIC Manager or SIMATIC NCM PC Manager".

Open the STEP 7 project of the SIMATIC S7400-H controller with "File $\rightarrow$ Open".

Open Project			
User projects Li	braries   Sample (	projects   Multiprojec	ts
Name	Storage	path	
FAQprojekt_I	E_S7H C:\Prog	ram Files\Siemens\S	tep7\S7Proj\FAQpr
PC_Station		ram Files\Siemens\S	tep7\S7Proj\PC_SI
1200			
	Selected		
User Projects: Libraries: Sample Projects:			
Multiprojects:			Browse
OK		Cancel	Help

Figure 2-1 Opening the project

Confirm the selection of the project (in the example: "FAQproject\_IE\_S7H") with OK. The project will open.



Figure 2-2 Inserting the PC station
SIMATIC Manager - [FAQprojekt_IE_S7H C:\Program Files\Siemens\Step7\S7Proj\F 🗐 🗖 🔀
By Elle Edit Insert PLC View Options Window Help
□ 📽 📰 😹 🛍 🔍 📽 🏝 🏤 🎬 🏥 👘 < No Filter> 💽    🍡
FAQprojekt_IE_S7H SIMATIC H-Station(1) PROFIBUS(2) PROFIBUS(2) SIMATIC PC Station(1)
Press F1 to get Help.

With the command "Insert  $\rightarrow$  Station  $\rightarrow$  SIMATIC PC Station", insert the PC station.

**Hinweis** Standard STEP 7 always creates a MPI network. Because the SIMATIC S7400-H CPU has a PROFIBUS interface, you have in the STEP 7 project additional two PROFIBUS networks.



	<mark>jekt_IE_S7H C:\Program Files\S</mark> Options <u>W</u> indow <u>H</u> elp	iemens\Step7\S7Proj\F	🔳 🗖 🚺
The File Edit Incent DLC View	Options Window Help		
Ene Enic Tuserc HEC New			_ 8 >
D 🛩 📰 📶 🗴 🖻 🖻	🚵 🗣 💁 🏊 🗄 📰 💼	< No Filter >	· 7/ 22
	SIMATIC H-Station(1)	PC Station	
Press F1 to get Help.	]		

Figure 2-3 Adapting the Name of the PC Station

Assign the PC station you have just inserted the name of your computer (in the example: "PC Station").

Now open the hardware configuration of the PC station by selecting the PC station. Select the PC station, then press the right mouse button and select "Open Project" (STEP 7: "Open Object").



igure 2 4 maraware oo	ingulation of the r	0 0.00			
SIMATIC NCM PC Config - [PC_SU	tation (Configuration) PC_9	Station]			_O×
In Station Edit Insert PLC View	Options Window Help				_ 8 ×
	8  1111 111 111 111	N?			
			-		미치
💻 (0) PC				E.A.	
1				Eind:	ntni
2					
4					
5					
6				ROFINET ID	
				É	
1			<u>ب</u>		
(0) PC					
Index Module	Order number	Firm	м   с		
Index Module	Urder number	Firm	M C		
2 3 4 5 6 7					
4					
3					
7					
8				PROFIBUS-DP slaves for SIMAT (distributed rack)	TIC S7, M7, and C7 E
9 10				(distributed rack)	
1.0	1				
Press F1 to get Help.					11.

#### Figure 2-4 Hardware Configuration of the PC Station

An empty Rack is now displayed. If the hardware catalog is missing click on the button marked in red.

Figure 2-5 Selecting the Mod	ules from the Hardware Catalog
------------------------------	--------------------------------

👪 HW Config - [PC Station (Configuration) FAQprojekt_IE_S7H]	
📫 Station Edit Insert PLC Yiew Options Window Help	- 8
	Eind: At A Profile: Current Modules Version 08.200 PROFIBUS DP PROFIBUS-PA PROFIBUS-PA PROFINET IO
7 8 V 8 V 10) PC	
Index         Module         Drder num         Fi         M         Comment           1         -	
8 9 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	CP 1616 GK1 161-3AA00 SIMATIC NET CP 1613 Industrial Ethernet, ISO, TCP/IP, S7 connections, PG communication, TCP connections, PG



Now place your PC modules in this rack (for example by dragging them from the catalog).

The following dialog box appears automatically after you insert the module in the PC station:

Figure 2-6 Address Assignment Dialog Box

Properties - Ethe	ernet interface CP 1	613 (R0/S9)	×
General Param	eters		
🔽 Set MAC add	ress / use IS <u>0</u> protocol		
MAC address:	08-00-06-01-00-01	If a subnet is selected, the next available address is suggested.	
IP protocol is	being used		
IP address:	192.168.0.1	Gateway	
Su <u>b</u> net mask:	255.255.255.0	C Use router	
Subnet:		Address: 192.168.0.1	
not network Ethernet(1)	ed	<u>N</u> ew	
		Properties	
		Dejete	
ОК		Cancel Help	

Deselect the "IP Protocol is being used" check box and select "MAC address". Please enter the MAC address of the CP1613 and choose under subnet the already existing Ethernet network.

The CP1613 is now configured and networked. Confirm the configuration with "OK".



Elauro 27	The CD	1612 nlace	ed in the PC	Station
Figure $2^{-1}$	THE OF	1013 place		Jalalion

🖳 HW Config - [PC-Station (Cor	figuration) FAOn	rajact IF	\$7H1			
D Station Edit Insert PLC View	and the second	and the second	2011]			
			41			
	e 🛍 🋍 🚯	3 🔡 N	?			
🖳 (0) PC					~	Eind: nt ni
1	<u>^</u>					Profile: Standard
2 3 4						SIMATIC PC Based Control 300/4     SIMATIC PC Station
5						Controller     Or Industrial Ethernet
6 7						- SW V6.0 SP4
8						
9 CP 1613	►					
<					>	
<u> </u>					<u> </u>	CP 1612
(0) PC						⊡- 🔁 CP 1613
	1.0.1		[	10		
Index 🚺 Module	Order number	Firmware	MPI address	Comment		IE General
3					^	SIMATIC HMI IE
4					Ξ	CP PROFIBUS
5					_	HMI
6						WinCC flexible RT
7						<
8						6GK1 161-3AA00 SIMATIC NET CP 1613 Industrial
9 CP 1613	6GK1 161-3AA00	V6.0.5				Ethernet, ISO, TCP/IP, S7
10					~	connections, H communication, TCP 👽
Incortion naccible						, Cha

The module is now plugged in a PC Station slot.

Figure 2-8 Edit the Application Project

HW Config - [PC-Station (Cont		IE_S7H]					
🛍 Station Edit Insert BLC Yiew Options Window Help 🗕 🗗 🗙							
	1 🛍 🏙 🚯 🗖 🐮	▶?					
				<ul> <li>×</li> </ul>		Standard ROFIBUS DP ROFIBUS-PA MATIC 300 MATIC HMI Station MATIC PC Based Cor MATIC PC Station I CP Industrial Etherno I CP PROFIBUS I HMI	
(0) PC	0.1			(a	-	User Application	
Index Module	Order number	Firmware	MPI address	Comment	÷	OPC Server	
2 Application				<u> </u>			
3				E			
4							
5							
<u>8</u> 7							
8					Application	1	₹
	6GK1 161-3AA00	V6.0.5			User progr	ams for configuring	-7
10				<b>v</b>	connection	ns	
Insertion possible					1		Chg



From the hardware cataloge choose "user application" and move the "application" with "drag & drop" into the slot.

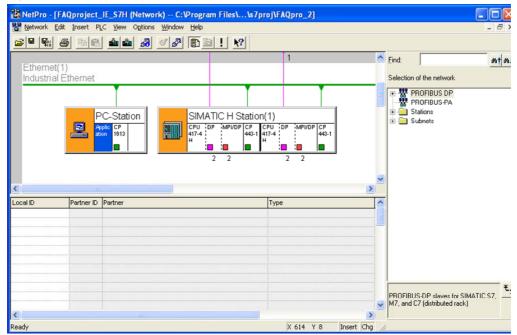
In the next step the fault-tolerant S7 connection between the S7400-H system and the application will be created.

Figure 2-9 NetPro Symbol



Open the program NetPro. Use the symbol which is marked in red in the Toolbar (see Figure 2-9 NetPro Symbol).

Figure 2-10 STEP 7 NetPro



To insert a connection choose the application. With "Insert  $\rightarrow$  New Connection" create a connection.



nsert New	Connection 🛛 🛛 🔀
	Partner the current project FAQproject_IE_S7H SIMATIC H Station(1) CPU 417-4 H/CPU 417-4 H(1) (Unspecified) All broadcast stations All multicast stations unknown project
Project:	FAQproject_IE_S7H
<u>S</u> tation: <u>M</u> odule:	SIMATIC H Station(1) CPU 417-4 H/CPU 417-4 H(1)
Connection	
<u>T</u> ype:	S7 connection fault-tolerant
☐ <u>D</u> isplay	properties before inserting
OK	Apply Cancel Help

Figure 2-11 Insert a new connection in NetPro with STEP 7

Choose as partner the existing S7400-H CPU and use as connection type "S7-connection fault-tolerant" connection.

Deactivate the box "Display properties before inserting".

By confirming the settings with "OK" the connection will be created in the station. A redundant connection to each S7 CPU of the SIMATIC S7400-H system will be created automatically.



Figure	2-12	Created	connection	in	NetPro
Iguie	2-12	Ciealeu	COLLIGCTION		

	AQproject_IE_S7H (N			s7proj\FAQpro_2	J				
Network Edi	it Insert PLC View C	ptions <u>W</u> indow	Help						_ 8 ×
	<u>3 66 16</u>	<u>88</u> S 89	🗈 ! 🕅						
Ethernet(1				1		^	<u>F</u> ind:		nț ni
Industrial E	Ethernet						Selection of	the network	
					Ľ,		- R PR	ofibus dp ofibus-pa	
	Applic CP ation 1613		SIMATIC H Sta	tion(1) P CPU DP MPI/DI H DP MPI/DI 2 2	P CP 443-1		ini - Catal ini -		
<	iii/				0	>			
Local ID	Partner ID Partner			Туре		^			
§7 connection_1	1 SIMATIC H	Station(1) / CPU 41	7-4 H / CPU 417-4 H(1	) S7 connection	fault-tolerant				
						~		DP slaves for SIMAT (distributed rack)	IC \$7, £ <u></u>
<							1		
Ready				X 588 Y 112	Insert	1			

If you mark the application in the SIMATIC PC station the connection you have created will be shown in the connection table.

After the fault-tolerant S7 connection has been created the configuration is done. Save and compile the project ("Network  $\rightarrow$  Save and Compile"). Proceeding that way the information in the project will be updated.

Save and Compile	×
Compile Compile and check everything Compile changes only	
OK Cancel Help	

Figure 2-13 Save and Compile



**NOTE** Warning indications can be displayed while proceeding with the "Save and Compile" of a project. Warnings serve as piece of information and have no functional effect. In case error warnings occur, search for possible divergences in the previous steps of the instructions.

After the configuration is finished successful you have two possibilities the download the configuration on the PC station.

#### 2.1 Configuration and download from STEP7 or NCM PC

With this function it is possible to perform a configuration completely from a remote computer, if a network connection (standard Ethernet) to the target PC station is available. It is assumed that the PC station can be reached via network connection. The project engineering can be downloaded after that.

#### 2.2 Configuration and Download via "Import Station"

With this function it is possible to download the configuration and project engineering at once also without a connection to the target PC station. Depending on the application, other configurations can be loaded.

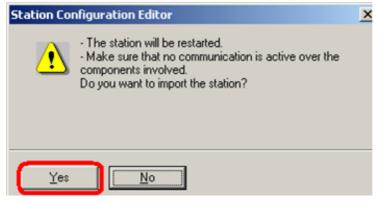
Open the "Station Configuration Editor". You will find its icon on your desktop and also in the system tray.



	1	Configuration Info					
tation:	PC_Station		Mode:	RUN	_P		
Index	Name	Туре	Ring	Status	Run/Stop	Conn	
1							
2							
3							
4	-						
5							
6							
7							
8							
9				_			
10			-	-	_		
11				_			
12				_			
13				-		-	
14			_				
15 16				-			
15							•
ew dia	gnostic entry arriv	edi					_
on ala	groote ening and						
	<u>A</u> dd	Edit		Delete		Ring <u>O</u> N	
200	tion Name	Import Station	-		D.	able Station	

Click on the button "Import station ..." marked in red.

Figure 2-15 Import station



Click on the button "Yes" marked in red.



Figure	2-16	Searching	for	XDR
Figure	2-10	Searching	101	VDD

Import XI	DB file			<u>? ×</u>
Look jn:	🗀 XDBs	•	( <del>-</del>	<b>🕂 💷 -</b>
pcst_:	Desktop			
	🛗 My Documents 😼 My Computer			
	لا 🕹 3½ Floppy (A:)			
	I SYSTEM (C:)			
	🚞 Program Files			
	C SIEMENS			
	🛅 Step7			
J	🛅 s7proj			
File <u>n</u> ame	EAQproje			<u>O</u> pen
Files of ty	🥪 Win2K (E:)		•	Cancel
		l		

In the dropdown choose the directory which contains the \*.xdb file. The XDB file is generated by STEP 7. You have to copy it from the engineering station to the PC station.

The XDB file is always set in the project directory ".../SIEMENS/STEP 7/S7PROJ" (see Figure 2-1 Opening the project).

ndex	Name	Тур	Status	Fehler	1
1					
2	Application	Applikation			
3	_				
4					
5					
6					
7					-
8					
9	IF CP 1613	CP 1613			
10					
11					
12					
13					
14					
15					17
16					
<b>?</b>	entnehmen.			Konfiguration ist der Liste oben zi	
Im O	ffline Modus arbeite	n (Ein Download	auf diese S	tation ist dann nicht möglich)	

Figure 2-17 Information from the XDB file



Information about the concerning components and application in the XDB will be shown. Confirm this dialog box with "OK".

ation:	PC_Station		Betriebsa	rt: RUN	LP		
Index	Name	Тур	Klingeln	Status	Run/Stop	Verb	^
1							
2	Application	Applikation		R	0	(¢)	
3							
4							
5							
6							
7							
8							-
9	TF CP 1613	CP 1613		No.	0		
10							
11							
12							
13							
14							
15							
16							~
17							
	er Diagnoseeintrag ist	t <b>eingegangen !</b> Bearbeiten	1	schen	1	lingeln El 1	12
Hir	iguiugen	<u>p</u> earpeken	10	sonen		angein <u>E</u> ll	1
<u>S</u> tal	tionsname S	tation importieren			St	ation sperr	en

Figure 2-18 PC station is configured

The import is now completed and the configuration is loaded. The connection column shows that the connection is also loaded.

**NOTE** After loading the PC station, the S7 system must be loaded.

Without the loaded connection information from NetPro the S7400-H station will not accept the connection establishment from the PC station. Therefore the connection can not be established.

For a user application there are two different application types:

- Configuration with WinCC as user application
- Configuration with a SAPI S7 application or a third party application

### 3 Example: Using WinCC as user application

**NOTE** In this example WinCC is used stand-alone as user application.

#### Conditions:

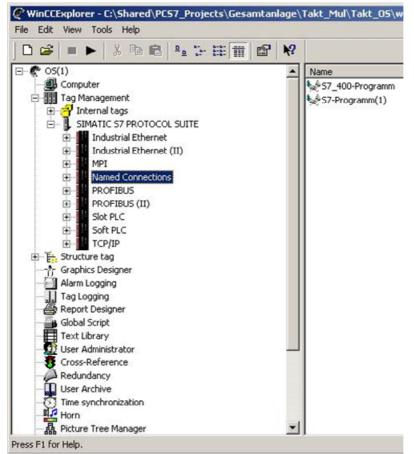
- The configuration of the PC station is created and downloaded to the PC (see chapter 2 "Configuration of the PC station") where WinCC is used as user application for communication to the S7 station.
- The WinCC project is created on the PC where WinCC is used as user application for communication to the S7 station. That means the engineering station is also operation station.

Start the WinCC "Start  $\rightarrow$  SIMATIC  $\rightarrow$  WinCC  $\rightarrow$  Windows Control Center". Open the WinCC project.

Follow the path of the treenode in the explorer of the WinCC project "Tag Management  $\rightarrow$  SIMATIC S7 PROTOCOLL SUITE" till to "Named Connections" to configure the connection of the H System.



Figure 3-1 select "Named Connections"
---------------------------------------



Click on "Named Connection" with the right button of the mouse. Select "New Connection" to create a new connection in WinCC. Enter a name for the connection and then select "properties".



neccion	properties		
eneral			
Name:	NewConnection		Properties
Unit	Named Connect	tions	
Server Li	at		
PC_Sta	tion		
			N /
			~~
			×
			Å
	make certain that t		ot include any
	make certain that t special characters		ot include any
			ot include any
			ot include any

Figure 3-2 set the connection name

Choose in the dialog box the configured S7 Data. In the text field "application name" type the name you have chosen in Figure 2-8 Edit the Application Project. At the dropdown box "connection name" choose the connection name you have used in NetPro (see Figure 2-12 Created connection in NetPro). Information concerning the task is automatically given. A manual entry is not needed.



Figure 3-3 select "S7	Connection Parameter"	

nnection Parameter	- Named Connections	
Connection		
S7 Network Address		
Application name:	Application	•
Connection name:	1	•
	S7-connection_1	
Plazas onter the name	of a connection which is configu	red in STEP7
For example: CPU3_B		aled in STEP7.
ОК	Abbrechen	Hilfe

Close the dialog box with "OK". The configuration is completed.

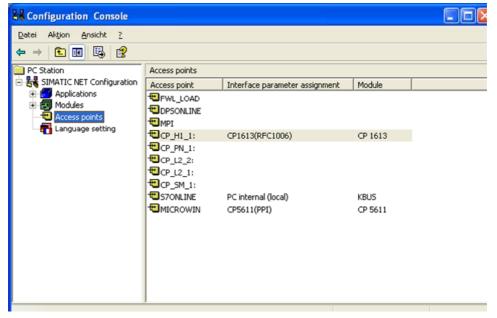
4

entry ID: 16667714

# Example: Using a SAPI S7 application or a third party application

Start the Program "Setting the PG-PC Interface" with "Start  $\rightarrow$  (WinXP: Start  $\rightarrow$  All Programs $\rightarrow$ ) SIMATIC  $\rightarrow$  SIMATIC NET  $\rightarrow$  Configuration Console".

Figure 4-1 choose the Access Points



Switch to the tree node Access Points. Choose the Access Point with a double click.

Figure 4-2 set the Access Point

CP_H1_1: Properties	? ×
Ccess point	
Access point: CP_H1_1:	
Associated interface parameter assignment:	
CP1613(ISO)	•
CP5611(PROFIBUS) CP5611(Auto) CP5611(PPI) CP5611(FWL)	
CP5611(PROFIBUS - DP Slave) CP1613(RFC1006)	
CP1613(ISO) points that point to the old interface parameter assignment will be remapped to the new interface parameter assignment.	
OK <u>Apply</u> Cancel He	lp )



Choose under "Associated interface parameter assignment" the entry "CP 1613(ISO)".

**NOTE** A fault-tolerant S7 connection can be used only via ISO. The chosen access point must respond to the user application.

# 5 History

Version	Date	Changes
V 1.0	04.12.2007	First Issue