

Learn-/Training Document

Siemens Automation Cooperates with Education (SCE) | From Version V14 SP1

TIA Portal Module 011-101 Specified Hardware Configuration with SIMATIC S7-1200

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- SIMATIC S7-1200 AC/DC/RELAY (set of 6) "TIA Portal" Order no.: 6ES7214-1BE30-4AB3
- SIMATIC S7-1200 DC/DC/DC (set of 6) "TIA Portal" Order no.: 6ES7214-1AE30-4AB3
- Upgrade SIMATIC STEP 7 BASIC V14 SP1 (for S7-1200) (set of 6) "TIA Portal" Order no.: 6ES7822-0AA04-4YE5

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We wish to thank the TU Dresden, particularly Prof. Dr.-Ing. Leon Urbas and the Michael Dziallas Engineering Corporation and all other involved persons for their support during the preparation of this Learn-/Training Document.

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Specified Hardware Configuration – SIMATIC S7-1200

1 Goal

In this chapter, you will first learn how to *create a project*. You are then shown how the *hardware is configured*.

The SIMATIC S7 controllers listed in Chapter 3 can be used.

2 Prerequisite

You do not need any previous knowledge from other chapters to successfully complete this chapter. You only need an S7-1200 controller and a PC with the STEP 7 Basic V14 (TIA Portal V14) software.

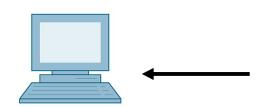
3 Required hardware and software

- 1 Engineering station: Requirements include hardware and operating system (for additional information, see Readme on the TIA Portal Installation DVDs)
- 2 SIMATIC STEP 7 Basic software in TIA Portal as of V14 SP1
- **3** SIMATIC S7-1200 controller, e.g. CPU 1214C DC/DC/DC with ANALOG OUTPUT SB1232 signal board, 1 AO Firmware as of V4.2.1

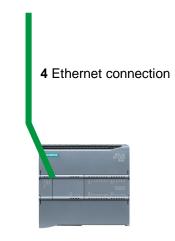
2 SIMATIC STEP 7

Basic (TIA Portal) as of V14 SP1

4 Ethernet connection between engineering station and controller



1 Engineering Station



3 SIMATIC S7-1200 controller



4 Theory

4.1 SIMATIC S7-1200 automation system

The SIMATIC S7-1200 automation system is a modular microcontroller system for the lower performance range.

A comprehensive range of modules is available to optimally adapt the system to the automation task. The S7 controller consists of a power supply and a CPU with integrated inputs and outputs or additional input and output modules for digital and analog signals.

If necessary, communication processors and function modules are also used for special tasks such as stepper motor control.

The programmable logic controller (PLC) uses the S7 program to monitor and control a machine or process. In doing so, the IO modules are scanned in the S7 program using input addresses (%I) and addressed using output addresses (%Q).

The system is programmed with the TIA Portal Basic or Professional software.

4.1.1 Range of modules

The SIMATIC S7-1200 is a modular automation system and offers the following range of modules:

Central processing units (CPUs) with different performance, integrated inputs/outputs, and PROFINET interface (e.g. CPU 1214C)



Power supply module (PM) with input 120/230 V AC, 50 Hz / 60 Hz, 1.2 A / 0.7 A and output 24 V DC / 2.5 A



Signal boards (SBs) for adding analog or digital inputs/outputs, in which case the size of the CPU remains unchanged. (Signal boards can be used with CPUs 1211C / 1212C and 1214C.)



Signal modules (SMs) for digital and analog inputs and outputs (a maximum of 2 SMs can be used for CPU 1212C and a maximum of 8 SMs for CPU 1214C.)



Communication modules (CMs) for serial communication RS232 / RS 485 (Up to 3 CMs can be used for CPUs 1211C / 1212C and 1214C.)



Compact switch module (CSM) with 4x RJ45 sockets 10/100 Mbps



SIMATIC memory cards from 2 MB to 32 MB for storing program data and for easy exchange of CPUs during maintenance.



Note: Only a single CPU (any type) with integrated digital inputs and digital outputs is needed for this module.

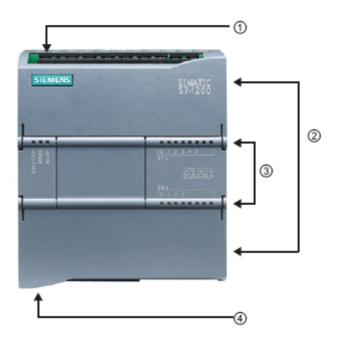
4.2 Operator control and display elements of the CPU 1214C DC/DC/DC

4.2.1 Front view of the CPU 1214C DC/DC/DC

With integrated power supply (24 V connection) and integrated inputs and outputs, the CPU 1214C DC/DC/DC is immediately ready for use without any other components.

The CPU has an integrated TCP/IP connection for communication with a programming device.

The CPU can thus communicate with HMI devices or other CPUs via an Ethernet network.



- 24 V connection
- , Plug-in terminal block for user wiring (behind the cover flaps)
- *f* Status LEDs for the integrated IO and the operating state of the CPU
- ", TCP/IP connection (on the underside of the CPU)

4.2.2 SIMATIC memory card (MC)

The optional **SIMATIC memory card (MC)** stores a program as well as data, system data, files and projects. It can be used for:

- Transferring a program to multiple CPUs
- Firmware update of CPUs, signal modules (SMs) and communication modules (CMs)
- Easy replacement of the CPU



4.2.3 Operating states of the CPU

The CPU can have the following three operating states:

- In the STOP operating state, the CPU is not executing the program and you can download a project.
- In the **STARTUP** operating state, the CPU is starting up.
- In the **RUN** operating state, the program is cyclically executed.

The CPU does not have a physical switch for changing the operating state.

You use the button on the operator panel of the STEP 7 Basic software to change the operating state (**STOP** or **RUN**). The operator panel also contains an **MRES** button for performing a memory reset and displays the status LEDs of the CPU.

RUN / STO	P RUN
ERROR	STOP
MAINT	MRES

4.2.4 Status and error displays

The **RUN/STOP status LED** on the front side of the CPU indicates the current operating state of the CPU by the color of the display.



- Yellow light indicates STOP operating state. – Green light indicates RUN operating state. flashing light indicates _ А STARTUP operating state.

There are two additional LEDs here: **ERROR** LED for indicating errors and **MAINT** LED for indicating that maintenance is required.

4.3 STEP 7 Basic V14 (TIA Portal V14) programming software

The STEP 7 Basic V14 (TIA Portal V14) software is the programming tool for the following automation systems:

- SIMATIC S7-1200
- Basic Panels

STEP 7 Basic V14 provides the following functions for automation of a system:

- Configuration and parameter assignment of the hardware
- Specification of the communication
- Programming
- Testing, commissioning and servicing with operational/diagnostic functions
- Documentation
- Creation of visualizations for SIMATIC Basic Panels using the integrated WinCC Basic software

Support is provided for all functions through detailed online help.

4.3.1 Project

To implement a solution for an automation and visualization task, you create a project in the TIA Portal. A project in the TIA Portal contains the configuration data for the configuration and internetworking of devices as well as the programs and the configuration of the visualization.

4.3.2 Hardware configuration

The *hardware configuration* includes the configuration of the devices, consisting of the hardware of the automation system, the field devices on the PROFINET bus system and the hardware for visualization. The configuration of the networks specifies the communication between the various hardware components. Individual hardware components are *inserted in the hardware configuration* from catalogs.

The hardware of SIMATIC S7-1200 automation systems comprises the controller (CPU), the signal modules for input and output signals (SMs), the communication modules (CMs) and other special-purpose modules.

The signal modules and the field devices connect the input and output data of the process to be automated and visualized to the automation system.

The hardware configuration enables the downloading of automation and visualization solutions to the automation system and access to the connected signal modules by the controller.

4.3.3 Planning the hardware

Before you can configure the hardware, you must plan it (hardware planning). In general, you begin by selecting which controllers are needed and how many. You then select the communication modules and signal modules. The selection of signal modules is based on the number and type of inputs and outputs needed. As the final step, a power supply that ensures the necessary power supply must be selected for each controller or field device.

The functionality required and the ambient conditions are of vital importance for planning the hardware configuration. For example, the temperature range in the application area sometimes limits which devices are available for selection. Fail-safe operation might be another requirement.

The <u>TIA Selection Tool</u> (Select automation technology ® TIA Selection Tool and follow the instructions) provides you support. Note: The TIA Selection Tool requires Java.

Note for online research: If more than one manual is available, you should look for the description "Device Manual", "Product Manual" or simply "Manual" (as opposed to "Function Manual", "List Manual", "System Manual", etc.) in order to find the device specifications.

4.3.4 TIA Portal – Project view and portal view

The TIA Portal has two important views. When started, the TIA Portal displays the portal view by default. This view makes getting started easier, especially for beginning users.

The portal view provides a task-oriented view of the tools for working on the project. Here, you can quickly decide what you want to do and open the tool for the task at hand. If necessary, a change to the project view takes place automatically for the selected task.

Figure 1 shows the portal view. At the bottom left, there is an option to switch between this view and the project view.

Ma Siemens - C:\Users\mde\Documents\	Automatisierung\011-101_CPU1214C\011-101	CPU1214C	Tot	_ □ × ally Integrated Automation PORTAL
Start Instruction	 Open existing project Create new project 	First steps Project: "011-101_CPU1214C" was opened su	iccessfully. Please select the next ste	,
PLC programming Motion & technology	Migrate project Close project	Start		
Drive parameterization	Welcome Tour	Devices & The second se	Configure a device Write PLC program	
Online & Jagnostics	First steps	Motion & 🚓 technology 🔅 Drive parameterization	Configure technology objects Parameterize drive	
	 Installed software Help 	Visualization	Configure an HMI screen	
	🚯 User interface language	Project view	Open the project view	
Project view	Opened project: C:\Users\mde\Doc	uments\Automatisierung\011-101_CPU1214C\0	11-101_CPU1214C	

Figure 1: Portal view

The project view, as shown in Figure 2, is used for hardware configuration, programming, creation of the visualization and many other tasks.

By default, the project view displays the menu bar with the toolbars at the top, the project tree with all components of a project on the left and the so-called "task cards" with instructions and libraries, for example, on the right.

If an element (for example, the device configuration) is selected in the project tree, it is displayed in the center and can be worked on there.

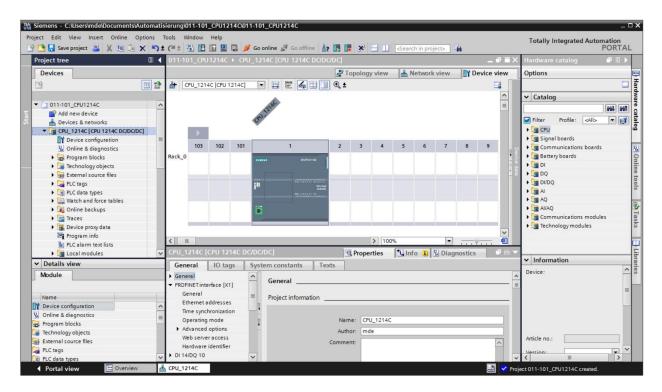


Figure 2: Project view

4.3.5 Basic settings for the TIA Portal

- Users can specify their own default settings for certain settings in the TIA Portal. A few
 important settings are shown here.
- ® In the project view, select the ® "Options" menu and then ® "Settings".

Ma Siemens				_ D ×
	Options Tools Window Help	e 🖉 Go offline 🔐 🖪 🖛 🗶	т — П. Р	Fotally Integrated Automation PORTAL
Project tree	Support packages			
Devices	Manage general station description files (GSD) Start Automation License Manager			Tasks
<u>B</u>	Show reference text			a sks
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Y Display/hide interfaces	General Cross-references	Compile Energy Suite		
	Show all messages			
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	<	III		1212017 4.23.511W >
Portal view Overvie			🔚 😴 The devic	

- ® One basic setting is the selection of the user interface language and the language for the program display. In the curriculums to follow, "English" will be used for both settings.
- ® Under "General" in "Settings", select ® "User interface language ® English" and "Mnemonic
 ® International".

W	🕌 Siemens 📃 🗆 X				
		Online Options Tools Window Help	🕼 🖉 Go online 🖉 Go offline 🛔 🖪 🖪 🗶 🛨 🚺 🕨	Totally Integrated Automation PORTAL	
•	Settings General Hardware configuration	General			
Start	 PLC programming STEP 7 Safety Simulation Online & diagnostics 	General settings		Libraries	
	PLC alarms Visualization Keyboard shortcuts Password providers	User name: User interface language: Mnemonic:			
	Multiuser CAx		8 • elements Load last opened project during startup		
			 Show truncated texts completely Show tooltips (context-sensitive help is available) Open cascade automatically in tooltips 		
		Banner:	Show banners minimized		

Note: These settings can always be changed.

4.3.6 Set the IP address on the programming device

To program the SIMATIC S7-1200 controller from the PC, the programming device or a laptop, you need a TCP/IP connection or an optional PROFIBUS connection.

For the PC and SIMATIC S7-1200 to communicate with each other via TCP/IP, it is important that the IP addresses of both devices match.

First, we show you how to set the IP address of a PC with Windows 7 operating system.

B Locate the network icon in the taskbar at the bottom and click
 B "Open Network and Sharing Center".

貯	VMware Network Adapter VMnet1 No Internet				
Wi-Fi					
Network settings					
(la		⇔			
Wi-Fi		Airplane mode			

® In the open Network and Sharing Center window, click ® "Change adapter settings".

Settings

ŝ	Home	Ethernet
	nd a setting	VMware Network Adapter VMnet8 No Internet
Ð	Status	VMware Network Adapter VMnet1 No Internet
(h.	Wi-Fi	Unidentified network No Internet
臣	Ethernet	Related settings
ແ	Dial-up	Change adapter options
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	VPN	Change advanced sharing options
ŝ	Airplane mode	Network and Sharing Center
((j))	Mobile hotspot	HomeGroup
Ċ	Data usage	Windows Firewall
$\oplus$	Proxy	

Select the desired 
 Tocal Area Connection
 that you want to use to connect to the controller and click
 "Properties".

Network Connections			
Organize   Disable this network device	Diagnose this connection Rename this connection		
Bluetooth Network Connection         Not connected         Bluetooth Device (Personal Area         Wi-Fi         Not connected         Intel(R) Dual Band Wireless-AC 82	Ethernet Uniden Intel(R Status Diagnose Bridge Connections Create Shortcut Delete Rename Properties		

® Next, select ® "Properties" for ® "Internet Protocol Version 4 (TCP/IP)".

Networking Sharing	3				
Connect using:					
Intel(R) Ether	met Connection (4) 1219	)-LM			
		Con	figure		
This connection use	es the following items:				
VMware B		Laurenteer et a	^		
	inter Sharing for Microso	oft Networks			
QoS Pack	0.0				
	otocol Version 4 (TCP/I	and the second se			
the second s	Microsoft Network Adapter Multiplexor Protocol PROFINET IO protocol (DCP/LLDP)				
	LDP Protocol Driver		~		
<			>		
Install	Uninstall	Prop	perties		
Description	20 - 147				
	stral Protocol /Internet P				
Transmission Cor			ion		
Transmission Cor wide area netwo	k protocol that provides terconnected networks				

Pou can use the following address, for example 
 IP address: 192.168.0.99
 Subnet mask 255.255.255.0 and accept the settings (
 "OK")

ternet Protocol Version 4 (TC	P/IPv4) Properties		
General			
	ed automatically if your network supports need to ask your network administrator		
Obtain an IP address automatically			
• Use the following IP addr	ess:		
IP address:	192 . 168 . 0 . 99		
Subnet mask:	255.255.255.0		
Default gateway:			
Obtain DNS server addre	ss automatically		
Use the following DNS ser	and any property of a set of a		
Preferred DNS server:			
Alternate DNS server:			
Validate settings upon e	xit Advanced		
	OK Cancel		
	Concer		

#### 4.3.7 Set the IP address in the CPU

The IP address of SIMATIC S7-1200 is set as follows.

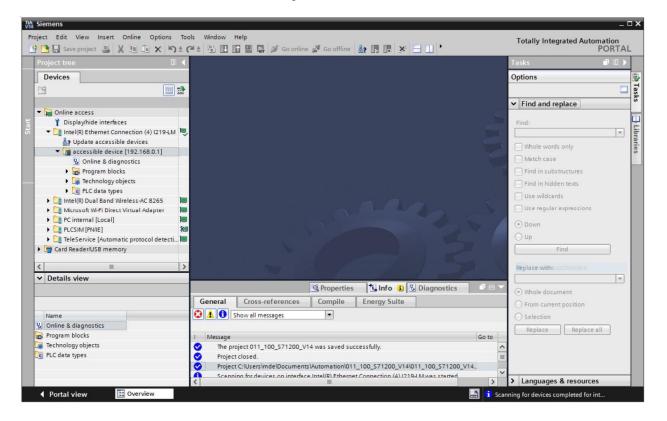
 Select the Totally Integrated Automation Portal for this, which is opened here with a double-click (
 TIA Portal V14)



 $\circledast$  Select  $\circledast$  "Online&Diagnostics", and open the  $\circledast$  "project view".

TIA Siemens		_ ¤ X
		Totally Integrated Automation PORTAL
Start 🦓		
Devices &	Show all devices	
	Online status	
Motion & technology		
	Accessible devices	
Online & Jiagnostics		Fenster ausschneiden
	Help	
Project view		

In the project tree under 
 "Online access", select the network adapter that was set previously. If you click 
 "Update accessible devices" here, you see the IP address (if previously set) or the MAC address (if IP address not yet assigned) of the connected SIMATIC S7-1200. Select 
 "Online&Diagnostics" here.



® Under ® "Functions", you now find the ® "Assign IP address" item. Enter the following IP address here (example): ® IP address: 192.168.0.1 ® Subnet mask 255.255.255.0. Click ® "Assign IP address" and this new address will be assigned to your SIMATIC S7-1200.

MA Siemens			-	. <b>- x</b>
Project Edit View Insert Online Options To			Totally Integrated Automation	
📑 📑 🖬 Save project 📕 🐰 🏥 🗎 🗙 🏷 ± 1	🛎 🗄 🔃 🖬 🖳 🗛 💋 Goonline 🖉 Goo	ffine 🎎 🖪 🖪 🗶 🖃 🛄 🔭	PORTA	AL.
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Devices				2
Online access     Display/hide interfaces     Display/hide interfaces     Display/hide interfaces     Untel(R) Ethermet Connection (4) 1219-LM     Dynamic accessible device (192.168.0.1]     Update accessible device (192.168.0.1]     Online & diagnostics     Online	General Diagnostic status	http://www.siemens.com/industrialsecurity MAC address: 28 -63 -36 -88 -FF -DA IP address: 192 . 168 . 0 . 1 Subnet mask: 255 . 255 . 0 Use router Router address: 0 . 0 . 0 . 0 Assign IP address	o the internet must be appropriately ewalls and network segmentation.	Online tools
Name		Roperties	🗓 Info 🛛 📱 Diagnostics 👘 🗖 🖃 🦄	
	General Cross-references Comp	ile Energy Suite		
	A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A	Go to	? Date Time 7/2/2017 4:23:51 PM	~
	<	m	>	Ĭ
Portal view     Overview	Inline & dia	📑 🚺 sc	canning for devices completed for int	

If the IP address was not successfully assigned, you will receive a message in the ® "Info" window under ® "General".

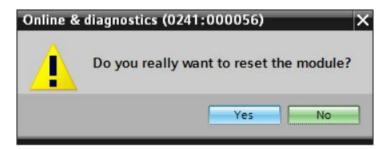
				<b>Q</b> Properties		i, Info	🛛 🛛 Diagr	iostics	78	-
General	Cross-references	Compile	Energy Suite							
🕄 🚹 🔂 Sł	how all messages	•								
! Message				(	So to	?	Date	Time		
😢 🔻 The IP a	ddress could not be assig	ned.				?	7/2/2017	4:27:32 PM		~
C The IP a	set command could not b	e executed.					7/2/2017	4:27:32 PM		
										= >
										~
<			Ш						>	

#### 4.3.8 Restore the factory settings of the CPU

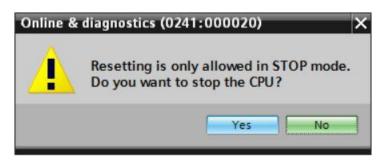
If the IP address could not be assigned, the program data on the CPU must be deleted. This is done by resetting the CPU. To reset the controller, select the 
 "Reset to factory settings" function and click 
 "Reset".

TA Siemens								_ 0
Project Edit View Insert Online Options		the second s			То	tally Integ	rated Automa	tion
📑 🔁 🗔 Save project 进 💥 🗈 🗊 🗙 🕷	-							ORTAL
Project tree [		Intel(R) Ethernet Connectio		.168.0.1] ▶ acces			8.0.1] _	
Devices								
		Diagnostics     General     Diagnostic status     Diagnostic stuffer     Cycle time     Memory     PROFINET interface [X1]     Functions     Assign IP address     Set time     Firmware update     Assign PROFINET device na     Reset to factory settings     Format memory card	Reset to factory settings IP address: PROFINET device name:	192.168.0         accessible device         Retain IP address         Delete IP address         Reset	1			
<	>	< III >						
✓ Details view				<b>Properties</b>	i, Info	🛽 🛛 Diagn	ostics	
	_	General Cross-reference	s Compile Energy Suite					
Name		Show all messages						
		1 Message		Go to	7	Date	Time	
		<ul> <li>Wessage</li> <li>The IP address could not be</li> </ul>	assigned.	Gut	?	7/2/2017	4:27:32 PM	^
		The set command could	not be executed.			7/2/2017	4:27:32 PM	
		4	W					>
Portal view     Overview		Online & dia			-		not be executed	

® Confirm the prompt asking if you really want to reset the module with ® "Yes".



® If necessary, stop the CPU. (® "Yes")



## 5 Task

Create a project und configure the compact CPU of your hardware, which corresponds to one part of the **SIMATIC S7-1200 with CPU 1214C** DC/DC/DC Trainer Package.

 SIMATIC S7-1200, CPU 1214C DC/DC/DC (Order number: 6ES7 214-1AG40-0XB0)

## 6 Planning

Because this is a new system, a new project must be created.

The hardware for this project is already specified with the SIMATIC S7-1200, CPU 1214C DC/DC/DC Trainer Package, Therefore, a selection does not have to be made. Instead, the listed CPU of the Trainer Package only has to be inserted in the project. To ensure that the correct module is inserted, the order number from the Task should be checked again directly on the installed device (see Table 1).

The Ethernet interface must be set for the configuration of the CPU. For the digital and analog inputs and outputs, the address areas corresponding to Table 1 will be set.

Module	Order number	Slot	Address area
CPU 1214C DC/DC/DC	6ES7 214-1AG40-0XB0	1	DI 0.0 -1.5
			DQ 0.0 - 1.1
			AI 64 / 66

Table 1: Overview of the planned configuration

As the final step, the hardware configuration must be compiled and downloaded. Any errors present can be detected during compiling and incorrect modules can be detected when the controller is started *(only possible when hardware is present and installed identically)*.

The tested project must be saved and archived.

## 7 Structured step-by-step instructions

You can find instructions on how to carry out planning below. If you already have the relevant previous knowledge, it will be sufficient to focus on the numbered steps. Otherwise, simply follow the detailed steps in the instructions.

#### 7.1 Create a new project

® Select the Totally Integrated Automation Portal for this, which is opened here with a doubleclick (® TIA Portal V14)



® In the portal view under the "Start" menu, select the command ® "Create new project".

Via Si	emens		
s	tart		
			Open existing project
			🥚 Create new project
			Migrate project
		-	Close project
			Welcome Tour
			First steps
	Online & Diagnostics	1	

® Modify Project name, Path, Author and Comment as appropriate and click ® "Create".

Create new project		
Project name:	011-101_CPU1214C	
Path:	C:\Users\mde\Documents\Automatisierung	
Version:	V14 SP1	•
Author:	mde	
Comment:		^
		~
		Create

 The project will be created and opened and the "Start" menu, "First steps" will open automatically.

#### 7.2 Insert the CPU 1214C DC/DC/DC

In the 
 "Start" portal, select 
 "First steps"
 "Devices & Networks"
 "Configure a device".
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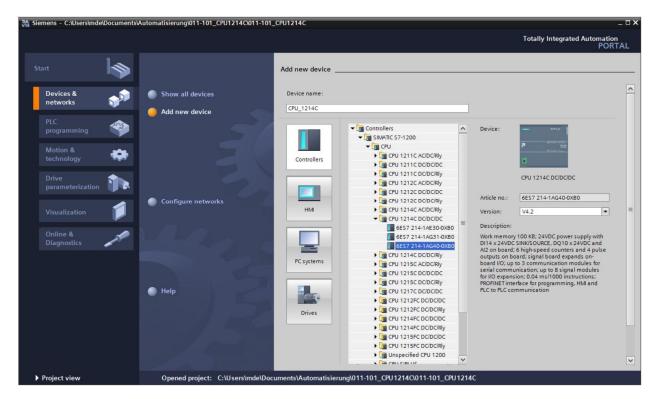
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VIA Siem	ens - C:\Users\mde\Documents\	Automatisierung\011-101_CPU1214C\011-101_	_CPU1214C				_ ¤ ×
						То	tally Integrated Automation PORTAL
Star	ι 崎		First steps _				
	Devices &	Open existing project	Project: "011	101_CPU1214C" was	opened su	ccessfully. Please select the next st	ep:
	PLC programming	<ul> <li>Create new project</li> <li>Migrate project</li> </ul>	Start				
	Motion & 🚓	Close project					
	Drive parameterization		→		ų ų	Configure a device	
	Visualization	<ul> <li>Welcome Tour</li> <li>First steps</li> </ul>	$\rightarrow$		Ŷ	Write PLC program	
	Online & J		→		100	Configure technology objects	
		Installed software	⊢			Parameterize drive	
		Itelp	→		Ø	Configure an HMI screen	
		🚯 User interface language					
						Open the project view	
► Pi	roject view	Opened project: C:\Users\mde\Doc	uments\Automa	tisierung\011-101_CP	U1214C\0	11-101_CPU1214C	

- ® The "Show all devices" menu opens in the "Devices & Networks" portal.
- ® Switch to the "Add new device" menu.

V14 Sie	emens - C:\Users\mde	Documents	Automatisierung/011-101_CPU1214C/011	01_CPU1214C	_ ¤ ×
					Totally Integrated Automation PORTAL
SI				Add new device	
	Devices & networks	<b>*</b>	Show all devices Add new device	Device name:	<u>^</u>
		ا		Controllers	Device:
		*		Controllers	
			Configure networks	SIMATIC ET 200 CPU	Article no.:
		1	comigure networks	HM	Version:
	Online & Diagnostics	-10		PC systems	
			Alp		
				Drives	
					×
	Project view		Opened project: C:\Users\mde	Documents\Automatisierung\011-101_CPU1214C\011-101_C	PU1214C

- ® The specified model of the CPU will now be added as a new device.
- ® (Controllers ® SIMATIC S7-1200 ® CPU ® CPU 1214C DC/DC/DC® 6ES7214-1AG40-0XB0 ® V4.2)



R Assign a device name (Device name ® "CPU_1214C").

Add new device	
Device name:	
CPU_1214C	

® Select "Open device view".

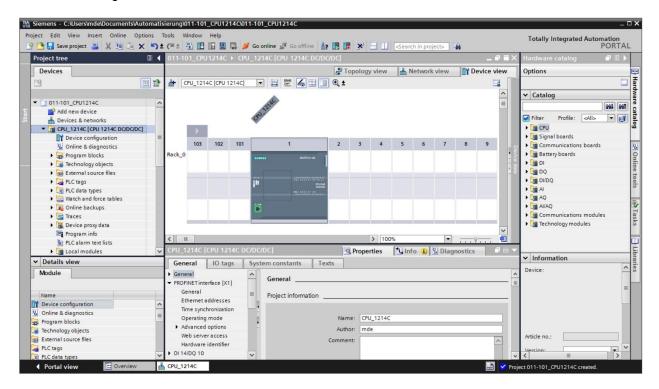


® Click "Add".

TA Siemens - C:\Users\mde\Documents\	Automatisierung\011-101_CPU1214C\011-101	_CPU1214C			_ ¤ ×
					Totally Integrated Automation PORTAL
Start I		Add new device			
Devices & final sector of the	Show all devices Add new device		Controllers     SIMATIC 57-1200     CPU	Device:	
PLC programming		Controllers	CPU 1211C AC/DC/Rly      Garce CPU 1211C DC/DC/DC      Garce CPU 1211C DC/DC/Rly      Garce CPU 1211C DC/DC/Rly		CPU 1214C DC/DC/DC
Motion & 🗱			[CPU 1212C ACIDC/RIy     [CPU 1212C DC/DC/DC     [CPU 1212C DC/DC/RIy	Article no.:	6E57 214-1AG40-0XB0
Drive parameterization	Configure networks	HM	CPU 1214C AC/DC/Rly      CPU 1214C DC/DC/DC      GES7 214-1AE30-0XB0      GES7 214-1AG31-0XB0	Version: Description:	v4.2 v 100 KB; 24VDC power supply with
Visualization	Comigure networks	PC systems		DI14 x 24VDC Al2 on board; outputs on bo board I/O; up	SINK/SOURCE, DQ10 x 24VDC and 6 high-speed counters and 4 pulse pard; signal board expands on- to 3 communication modules for
Online & Diagnostics	1 1 1 1 1		[]] CPU 1215C DC/DC/DC      []] CPU 1215C DC/DC/Rly      []] CPU 1215C DC/DC/Rly      []] CPU 1217C DC/DC/DC	for I/O expans PROFINET inte	unication; up to 8 signal modules sion; 0.04 ms/1000 instructions; Frâce for programming, HMI and mmunication
	Help	Drives	(jiii) CPU 1212FC DC/DC/DC     (jiii) CPU 1212FC DC/DC/RJy     (jiii) CPU 1212FC DC/DC/RJy     (jiii) CPU 1214FC DC/DC/DC     (jiii) CPU 1214FC DC/DC/RJy		
			↓ □ CPU 1215FC DCIDC/DC       ↓ □ CPU 1215FC DCIDC/DC       ↓ □ CPU 1215FC DCIDC/Rly       ↓ □ Unspecified CPU 1200       ↓ □ CPU 1215FC DCIDC/Rly		
		Open device view			Add
Project view	Opened project: C:\Users\mde\Doc	uments\Automatisieru	ing\011-101_CPU1214C\011-101_CPU1214	4C	

**Note:** The desired CPU may have multiple versions that differ in functionality (work memory, integrated memory, technology functions, etc.). In this case, you should ensure that the selected CPU meets the requirements placed on it.

The TIA Portal now switches automatically to the project view and displays the selected CPU in the device configuration on slot 1 of a rail.



**Note:** You can now configure the CPU according to your specifications there. Possible settings include the PROFINET interface, startup characteristics, cycle, password protection, communication load and many more.

### 7.3 Configure the Ethernet interface of the CPU 1214C DC/DC/DC

- ® Select the CPU with a double-click
- When the second select the second select the select the select the select addresses select.
   We select the sel

CPU_1214C [CPU 1214C DC/DC/DC]				Properties	i Info	Diagnostics	
General	IO tags	System constants	Texts				
→ General → PROFINET in	terface [X1]	Ethernet addres	sses				
General	addresses	Interface net	tworked with				
200000000000000000000000000000000000000	chronization		Subr	et: Not netwo	rked		-
Operatin			5001				
<ul> <li>Advance</li> </ul>	-			Add	new subne	et	
	ver access						
Hardwar	e identifier	IP protocol					
DI 14/DQ 10	)			O Catll a	ddress in th	a avaiast	
► AI 2				Set ir a	duress in th	ie project	
High speed	counters (HSC)	C		1	Paddress:	192.168.0.1	
Pulse gener	rators (PTO/PWN	0 •		Sub	onet mask:	255 . 255 . 255 . 0	
Startup				Use rou	iter		
Cycle		•		Doute	u addenes.	0.0.0.0	-
Communica	ation load					Lane	
System and	clock memory				ess is set di	rectly at the device	
Web server							
Multilingual	support	PROFINET					
Time of day				_			
Protection 8	& Security			PROFIN	ET device na	ame is set directly at the	device
Configuratio	on control			🛃 Genera	te PROFINET	Tdevice name automatic	ally
Connection	resources	PROFI	INET device nan	ne: cpu_1214	c		
Overview o	faddresses	Thomas and the second s					
			Converted nan	ne: cpuxb121	4c//d5		
			Device numb	er: 0			1

- ® Under "Interface networked with", only the "Not networked" entry is available.
- ® Add an Ethernet subnet with the ® "Add new subnet" button.

Ethernet addresses		
Interface networked with		
Subnet:	Not networked Add new subnet	•

® Keep the preassigned "IP address" and "Subnet mask".

General       IO tags       System constants       Texts         > General	
<ul> <li>PROFINET interface [X1]         General         Ethernet addresses         Time synchronization         Operating mode         Advanced options         Web server access         Hardware identifier         DI 14/DQ 10         Al 2         High speed counters (HSC)         Pulse generators (PTO/PWM)         Startup         Cycle         Communication load         Here addresses         Communication load         Here addresses         If protocol         Router addresses         If protocol         Pulse generators (PTO/PWM)         Startup         Cycle         Communication load         If protocol         Paddress:         O O O O         Paddress:         O O O O         Paddress:         O O O O         Paddress:         O O O         Paddress:         O O O         Paddress:         O O O         Paddress:         Paddress:         O         Paddress:         Paddress:</li></ul>	
Ethernet addresses         Time synchronization         Operating mode         Advanced options         Web server access         Hardware identifier         DI 14/DQ 10         Al 2         High speed counters (HSC)         Pulse generators (PTO/PWM)         Startup         Cycle         Communication load	•
Operating mode       Add new subnet         Advanced options       Web server access         Web server access       IP protocol         Hardware identifier       IP protocol         DI 14/DQ 10       Set IP address in the project         Al 2       IP address:       192.168.0.1         Pulse generators (PTO/PWM)       Subnet mask:       255.255.0         Startup       Use router       Use router         Cycle       Router address:       0.0.0         Communication load       IP address is cat directives the dwice	
<ul> <li>Advanced options         Web server access         Hardware identifier         DI 14/DQ 10         Al 2         High speed counters (HSC)         Pulse generators (PTO/PWM)         Startup         Cycle         Communication load         IP address: 0 0 0 0         Paddress: 0 0 0         Paddress: 0 0 0         Paddress: 0         Paddress         Paddress: 0         Paddress         Paddress</li></ul>	
Web server access       IP protocol         Hardware identifier       IP protocol         DI 14/DQ 10       Set IP address in the project         AI 2       IP address:       192.168.0.1         High speed counters (HSC)       Subnet mask:       255.255.0         Startup       Use router         Cycle       Router address:       0.0.0         Communication load       IP address:       0.0.0	
Hardware identifier         DI 14/DQ 10         AI 2         High speed counters (HSC)         Pulse generators (PTO/PWM)         Startup         Cycle         Communication load	
<ul> <li>Al 2</li> <li>High speed counters (HSC)</li> <li>Pulse generators (PTO/PWM)</li> <li>Startup</li> <li>Cycle</li> <li>Communication load</li> <li>IP address: 0.0.0</li> </ul>	
<ul> <li>AI 2</li> <li>High speed counters (HSC)</li> <li>Pulse generators (PTO/PWM)</li> <li>Startup</li> <li>Use router</li> <li>Cycle</li> <li>Communication load</li> <li>IP address: 0.0.0.0</li> </ul>	
High speed counters (HSC)     Subnet mask:     255.255.0       Pulse generators (PTO/PWM)     Use router       Cycle     Router address:     0.0.0       Communication load     IP address is set directives the device	
Startup Cycle Communication load Use router Cycle Router address: 0.0.0.0	
Cycle Router address: 0 . 0 . 0 . 0 . 0 . 0 . 0 . 0 . 0 . 0	
Communication load	
Communication load	
System and clock memory IP address is set directly at the device	
System and clock memory	
Web server	
Multilingual support PROFINET	
Time of day	
Protection & Security PROFINET device name is set directly at the device	
Configuration control	
Connection resources PROFINET device name: cpu_1214c	_
Overview of addresses	
Converted name: cpuxb1214c77d5	
Device number: 0	

#### 7.4 Configure the address areas

® The next step is to check the address areas of the inputs and outputs and adapt them if necessary. DI/DO should have an address area of 0...1 and AI should have an address area of 64...67. (® Device overview ® DI 14/DQ 10_1 ® I address: 0..1® Q address: 0...1 ® AI 2_1 ® I address: 64...67)

												Topology view	Network view	Device	view
CPI	U_1214C	[CPU 12	14C]		₩ 🖌 🖽 '		evice	overview							
							**	Module	Slot	I address	Q address	Туре	Article no.	Firmware	Co
				22120					103						
				CPU-274C					102						
1	-			~					101						
								<ul> <li>CPU_1214C</li> </ul>	1			CPU 1214C DC/DC/DC	6ES7 214-1AG40-0XB0	V4.2	
1	103	102	101	1	1			DI 14/DQ 10_1	11	01	01	DI 14/DQ 10			
								AI 2_1	12	6467		AI 2			
ack_0					284275 2-128				13						
								HSC_1	1 16	10001003		HSC			
								HSC_2	1 17	10041007		HSC			
				10	CPU devic OCOCCCC			HSC_3	1 18	10081011		HSC			
					Mail 2222.27 Mr	•		HSC_4	1 19	10121015		HSC			
				F		-		HSC_5	1 20	10161019		HSC			
						•		HSC_6	1 21	10201023		HSC			
	_	_	-					Pulse_1	1 32		10001001	Pulse generator (PTO/P			
								Pulse_2	1 33		10021003	Pulse generator (PTO/P			
								Pulse_3	1 34		10041005	Pulse generator (PTO/P			
								Pulse_4	1 35		10061007	Pulse generator (PTO/P			
								PROFINET interface_1	1 X1			PROFINET interface			
									2						
									3						
									4						
									5						
									6						
									7						
		100%				✓			8						

**Note:** To show and hide the Device overview, you need to click the small arrow next to "Device data" on the right side of the hardware configuration.

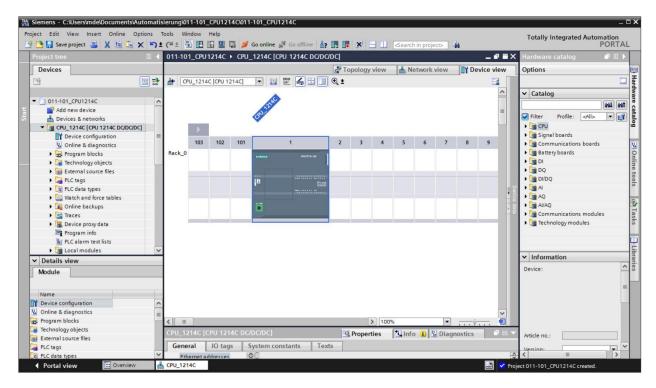
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#### 7.5 Save and compile the hardware configuration

Before you compile the configuration, you should save your project by clicking the ®

 Save project
 button. To compile your CPU with the device configuration, first select the ®

 "CPU_1214C [CPU1214C DC/DC/DC]" folder and click the ®
 "Compile" icon.



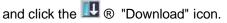
**Note:** "Save project" should be used again and again when working on a project since this does not happen automatically. A prompt to save the project only occurs when the TIA Portal is closed.

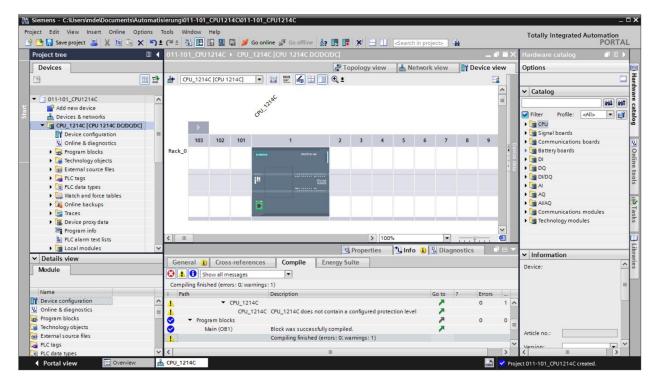
® If the project was compiled without errors, you see the following screen.

		🔍 Properties 🚺 Info 🕄	🕽 🔽 Dia	gnostics			•
G	eneral 🚺 Cross-referen	ces Compile Energy Suite					
Ο	🔒 📵 Show all messages	•					
Co	mpiling finished (errors: 0; warn	ings: 1)					
!	Path	Description	Go to	?	Errors		
1	CPU_1214	c	~		0	1	^
1	CPU_12	14C CPU_1214C does not contain a configured protection level	~				
9	<ul> <li>Program blocks</li> </ul>		~		0	0	=
0	Main (OB1)	Block was successfully compiled.	~				-
1		Compiling finished (errors: 0; warnings: 1)					~
<		HI.				>	~

#### Download the hardware configuration to the device 7.6

® To download your complete CPU, select the ® "CPU_1214C [CPU1214C DC/DC/DC]" folder





The manager for configuring the connection properties (extended download) opens. R

	Device	Device type	Slot	Туре	Address	Subnet
	CPU_1214C	CPU 1214C DC/D	1 X1	PN/IE	192.168.0.1	PN/IE_1
		Type of the PG/PC inte PG/PC inte Connection to interface/su	rface:	Please select		• • •
		1st gat	eway:			•
	Select target devi	ce: Device type	Interfa	ace type	Show devices with t Address	he same address Target device
Flash LED			Interfa	ace type		

- ® First, the interface must be correctly selected. This happens in three steps.
- ® Type of the PG/PC interface ® PN/IE

Configured acces	s nodes of "CPU_1200"				
Device	Device type	Slot	Туре	Address	Subnet
CPU_1200	CPU 1214C DC/D	1 X1	PN/IE	192.168.0.1	PN/IE_1
	Type of the PG/PC inte	erface:	Please select.		
	PG/PC inte		Please select.		•
	Connection to interface/s		PN/IE	e	•
	1st gat	tewayo			()

® PG/PC interface ® here: Intel(R) Ethernet Connection (4) I219-LM

Configured acces	ss nodes of "CPU_1200"					
Device	Device type	Slot	Туре	Address	Subn	et
CPU_1200	CPU 1214C DC/D	1 X1	PN/IE	192.168.0.1	PN/IE	_1
	Type of the PG/PC inte	rface:	PN/IE			•
	Type of the PG/PC inte PG/PC inte		PN/IE Please select.	n		<u> </u>
	**	rface:	Please select. Please select.			

® Connection to interface/subnet ® "PN/IE_1"

 Configured acces	s nodes of "CPU_1200"				
Device	Device type	Slot	Туре	Address	Subnet
CPU_1200	CPU 1214C DC/D	1 X1	PN/IE	192.168.0.1	PN/IE_1
	states and a second second second	A CONTRACTOR OF	-		
	Type of the PG/PC inte	rface:	PN/IE		•
	Type of the PG/PC inte PG/PC inte			hernet Connection (4) I21	
				hernet Connection (4) I21	9-LM

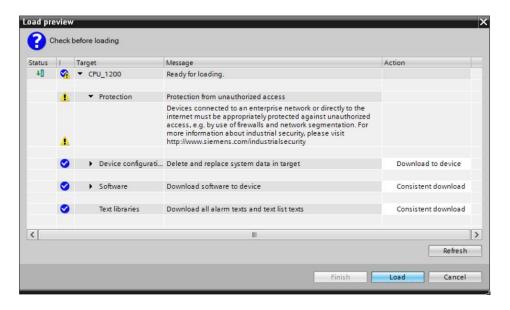
The ® "Show all compatible devices" check box must be selected. The search for devices in the network is started by clicking the ® <u>Start search</u> button.

	Device	Device type	Slot	Туре	Address	Subnet	
	CPU_1200	CPU 1214C DC/D	1 X1	PN/IE	192.168.0.1	PN/IE_1	
		Type of the PG/PC inter	freed	. mult			
		PG/PC inter		PN/IE	Ethernet Connection (4) I2	19-LM 🔻	0
	Conr	nection to interface/su		Direct at s		19-LIM +	
	Com	1st gate		Directars		v	-
		ist yau	svady.				
	Select target device:				Show all compatible	e devices	
	Device	Device type		ce type	Address	Target devic	e
и. —            	-	-	PN/IE		Access address	-	
Flash LED							
						<u>Start</u> s	earc
					Display only error	messages	▶ s
ine status information:							

If your CPU is shown in the "Compatible devices in target subnet" list, you must select it. The download can then be started (
 CPU 1214C DC/DC/DC 
 ILoad").

	Device	Device type	Slot	Туре	Address	Subnet	
	CPU_1200	CPU 1214C DC/D	1 X1	PN/IE	192.168.0.1	PN/IE_1	
		Type of the PG/PC inte	rface:	PN/IE			]
		PG/PC inte	rface:	Intel(R)	Ethernet Connection (4)	1219-LM	] 🐨 [
	c	Connection to interface/su	bnet:	Direct at	slot '1 X1'		) 🕐
		1st gate	eway:	[			
	Desite 1		100000	10.0 a Marco	A 4 4 4 4 4 4 4		200
_	Device	Device type		ace type	Address	Target devi	
no. ————————————————————————————————————	CPUcommon 	Device type CPU 1214C DC/D 		ace type	Address 192.168.0.1 Access address	Target devi CPUcomm —	
Flash LED		CPU 1214C DC/D	. PN/IE	ace type	192.168.0.1		
ie status informat	CPUcommon -	CPU 1214C DC/D -	. PN/IE	ace type	192.168.0.1	CPUcomm  Start	
ne status informat Connection estab	CPUcommon 	CPU 1214C DC/D -	. PN/IE PN/IE	ace type	192.168.0.1 Access address	CPUcomm  Start	on search
	CPUcommon 	CPU 1214C DC/D -	. PN/IE PN/IE	sce type	192.168.0.1 Access address	CPUcomm  Start	on search

 $\circledast$  You first obtain a preview. Confirm the prompt  $\circledast$  "Overwrite all" and continue with  $\circledast$  "Load".



**Note:** The Symbol should be visible in every line of the "Load preview". You can find additional information in the "Message" column.

The [®] "Start all" option will be selected next before the download operation can be completed with [®] "Finish".

	•	Target	Message	Action	
1	×1.	CPU_1200	Downloading to device completed without error.		
	Δ	Start modules	Start modules after downloading to device.	Start all	
r	_				1

roject tree															I ■ X	Hardware catalog	
Devices							a To	pology	view	A N	etwork	view	De	vice vi	ew	Options	
4		de CPU	1214C [CPU	1214Cl	-		• ±							E			Ē
_		aaa   [					-							-			-
011-101_CPU1214C	^				NC.										<u>^</u>	✓ Catalog	
Add new device	-				CPU 1214C										-		ili inii
Devices & networks					Car.											Filter Profile: <all></all>	- 📦
▼ CPU_1214C [CPU 1214C DC/DC]	DC1															► TT CPU	_
Device configuration	=			_					_					_		Signal boards	
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Online backups					Ē											Al/AQ	
Traces						_	L		_					_		Communications modules	
Device proxy data																Technology modules	
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Device configuration	^	1 Messi		ing configu	ration was	loaded successfully					Go to	1		2017	1 A		
Online & diagnostics		8		1214C sta		ionaca successions								2017			
Program blocks	-	ŏ		-	successfully	/								2017			
Technology objects						r. nterface Intel(R) Eth	ernet Co	nnection	(4) 1219	-LM. Fou	n			2017	=		_
External source files			pading comp											2017		Article no.:	
PLC tags				(4.1.4											~	Version:	
PLC data types	~	<					III								>	<	>

# 7.7 Download the hardware configuration to the PLCSIM simulation (optional)

- If no hardware is present, the hardware configuration can **alternatively** be downloaded to a PLC simulation (S7-PLCSIM).
- ® To do so, you must first start the simulation by selecting the ® "CPU_1214C [CPU1214C DC/DC]" folder and clicking the ® "Start simulation" icon.

TIA Siemens - C:\Users\mde\Documents\Automati	sierung\011-1	101_CPU1214C\011-101_	CPU1214C									_ 🗆 X
Project Edit View Insert Online Options											Totally Integrated Auto	mation
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🕨 🔄 Traces			_								Communications modu	iles as
Device proxy data						_					Technology modules	ŝ
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E PLC alarm text lists	<					100%		•		_		
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Name	I Messag	e					Got	to 7	Date	T		
Device configuration	6	Routing configuration	was loaded succe	essfully.					7/3/2017			
😵 Online & diagnostics	l 🖉	CPU_1214C started.							7/3/2017			
Rogram blocks	ø	'Main' was loaded succe	ssfully.						7/3/2017			
🙀 Technology objects	1 Sca	inning for devices complete	d for interface Inte	I(R) Ethernet Co	nnection (4)	1219-LM	Foun		7/3/2017	· 🖻	Article no.:	
External source files	🕑 Loa	ding completed (errors: 0; )	varnings: 0).						7/3/2017		Aracie no.:	
PLC tags	<			m						>	Version:	~ ~
🔄 PLC data types 🗸 🗸		_			_	_	_					
Portal view     Derview	CPU_1214C									🗄 💙 Loa	ding completed (errors: 0; warni	ng

® The prompt that all other online interfaces will be disabled is confirmed with ® "OK".

Recreate	the cross-reference information (0626 $ imes$
	Starting simulation will disable all other online interfaces.
	Do not show this message again.
	OK Cancel

® The "S7 PLCSIM" software is started in a separate window in the compact view.



® The manager for configuring the connection properties (extended download) opens shortly thereafter.

	Device	Device type	Slot	Туре	Address	Subnet
	CPU_1214C	CPU 1214C DC/D		PN/IE	192.168.0.1	PN/IE_1
<b></b>	_					_
		Type of the PG/PC interfac	e: 🖳	PN/IE		•
		PG/PC interfac	e: Ple	ase select		
	Con	nection to interface/subne	t: Pre	PN/IE		•••••
		1st gatewa	Y:			-
					1	
	Select target devi				Show devices with t	<i></i>
	Select target devi Device	ce: Device type	Interfa	ce type	Show devices with t Address	the same address Target device
	-		Interfa	ce type	L	<i></i>
140	-		Interfa	ce type	L	<i></i>
	-		Interfa	ce type	L	<i></i>
Flash LED	-		Interfa	ce type	L	<i></i>
Flash LED	-		Interfa	ce type	L	Target device
Flash LED	-		Interfa	ce type	L	<i></i>
Flash LED	Device		Interfa	ce type	L	Target device
	Device		Interfa	ce type	Address	Target device
	Device		Interfa	ce type	Address	Target device

First, the interface must be correctly selected. This happens in three steps.

® Type of the PG/PC interface ® PN/IE

Extended download	to device			_		×
	Configured acces	s nodes of "CPU_1214C"				
	Device	Device type	Slot	Туре	Address	Subnet
	CPU_1214C	CPU 1214C DC/D	1 X1	PN/IE	192.168.0.1	PN/IE_1
		Type of the PG/PC interfac	e: 🖳	_PN/IE		•
		PG/PC interfac	:e: Pl	ease select		1
	Con	inection to interface/subn	et:	PN/IE		®
		1st gatewa	ву:			-

® PG/PC interface ® PLCSIM

Configured access	s nodes of "CPU_1214C"				
Device	Device type	Slot	Туре	Address	Subnet
CPU_1214C	CPU 1214C DC/D	1 X1	PN/IE	192.168.0.1	PN/IE_1
	Type of the PG/PC interfac		_PN/IE		•
	PG/PC interfac		PLCSIM		- 0
Con	nection to interface/subn	CL.	ease select PLCSIM		

® Connection to interface/subnet ® "PN/IE_1"

Configured access	s nodes of "CPU_1214C"				
Device	Device type	Slot	Туре	Address	Subnet
CPU_1214C	CPU 1214C DC/D	1 X1	PN/IE	192.168.0.1	PN/IE_1
Type of the PG/PC interface: PG/PC interface:					
			PN/IE PLCSIM		- - - @ U

The 
 The

	Device	Device type	Slot Type	Address	Subnet
=	CPU_1214C	CPU 1214C DC/D	1 X1 PN/IE	192.168.0.1	PN/IE_1
		Type of the PG/PC interfac	e: LPN/IE		<b>.</b>
		PG/PC interfac	e: 💹 PLCSIM		- (
	Co	onnection to interface/subn	et: PN/IE_1		- 6
		1st gatewa	iY:		-
	Select target de			Show devices with	the same addre
				A REAL PROPERTY AND A REAL	the state of the s
_	Device	Device type	Interface type PN/IE	Address Access address	Target devi
ED	Device 	Device type —			

If the simulation is shown in the "Compatible devices in target subnet" list, it must be selected before the download can be started (
 "CPU-1200 Simulation" 
 "Load")

	Device	Device type	Slot Type	Address	Subnet
	CPU_1214C	CPU 1214C DC/D	1 X1 PN/IE	192.168.0.1	PN/IE_1
		Type of the PG/PC interface			•
		PG/PC interface			• •
	Con	nection to interface/subne	t: PN/IE_1		• •
		1st gateway	y:		- 🔍
	Select target devic		Interface type	Show devices with Address	the same address Target device
	-	Device type	Interface type		the same address Target device CPUcommon
nor —	Device	Device type		Address	Target device
Flash LED	Device	Device type	. PN/IE	Address 192.168.0.1	Target device CPUcommon
Flash LED	Device CPUcommon	Device type	. PN/IE	Address 192.168.0.1	Target device CPUcommon 
ine status informati	Device CPUcommon	Device type	PN/IE PN/IE	Address 192.168.0.1 Access address	Target device CPUcommon 
ine status informati Scan completed. 1 Retrieving device ii	Device CPUcommon 	Device type CPU-1200 Simula — f1 accessible devices four	PN/IE PN/IE	Address 192.168.0.1 Access address	Target device CPUcommon 

® You first obtain a preview. Continue with ® "Load".

tatus	1	Target	Message	Action
+1	0	▼ CPU_1214C	Ready for loading.	
	0	Simulated module	The download will be performed to a simulated PLC.	
	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
:			III	

**Note:** The Symbol should be visible in every line of the "Load preview". You can find additional information in the "Message" column.

The 
 "Start all" option will be selected next before the download operation can be completed with 
 "Finish".

tatus	1	Target	Message	Action	
1	9	▼ CPU_1214C	Downloading to device completed without error.		
	4	Start modules	Start modules after downloading to device.	Start all	
٢)					T

 After a successful download, the project view will open again automatically. A loading report appears in the information field under "General". This can be helpful when troubleshooting an unsuccessful download.

CHL12144 (EVU 1214C (E	Siemens - C:\Users\mde\Documents	s Automatis	ierung\011-10	1_CPU121	4C\011-101_0	CPU1214C												-	. <b></b> X
SICMENS SICMEN																Totally In	tegrated Auto	omation	
Image: State of the	CPU_1214C [CPU 1214C DCDCDC]	X ∋÷	C# ± 🛅 🗓		🔐 🖉 Go onl	ine 🖉 Go offlin	• 🐴 🖪 !	×		Searc	h in proje	ct>	iii 👘					PORTA	۹L.
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Name       Consection configuration       Consection configuration was loaded successfully.       7/3/2017       Pair Consection configuration was loaded successfully.         Name       Message       Connection configuration was loaded successfully.       7/3/2017       Pair Consection configuration was loaded successfully.         Name       Message       Connection configuration was loaded successfully.       7/3/2017       Article no:         Vectary       Connection configuration was loaded successfully.       7/3/2017       Article no:         Vectary       Connection configuration was loaded successfully.       7/3/2017       Article no:         Vectary       Connection configuration was loaded successfully.       7/3/2017       Article no:         Vectary       Connection configuration was loaded successfully.       7/3/2017       Article no:         Vectary       Connection configuration was loaded successfully.       7/3/2017       Article no:         Valir       Valir       Valir       Valir       Valir         Valir       Valir       Valir       Valir       Valir       Valir         Valir       Valir       Valir       Valir       Valir       Valir       Valir         Valir       Valir       Valir       Valir       Valir       Valir       Valir       Valir<					in the														slo
Communications modules     Communications     Communica																			-
Program info     PrC alar mext lists     Commetion configuration was loaded successfully.     Program blocks     Connection configuration was loaded successfully.     Program blocks     Connection configuration was loaded successfully.     Program blocks     Connection configuration was loaded successfully.     Trainology objects     Technology objects     Technology objects     Technology objects     Completed (errors: 0; warnings: 0).     Connection configuration     Connection configuration     Connection configuration     Connection configuration was loaded successfully.     Trainology objects     Contraction configuration was loaded successfully.     Trainology objects     Contraction configuration was loaded successfully.     Contraction configuration was load					-														1
Program info     PrC alar mext lists     Commetion configuration was loaded successfully.     Program blocks     Connection configuration was loaded successfully.     Program blocks     Connection configuration was loaded successfully.     Program blocks     Connection configuration was loaded successfully.     Trainology objects     Technology objects     Technology objects     Technology objects     Completed (errors: 0; warnings: 0).     Connection configuration     Connection configuration     Connection configuration     Connection configuration was loaded successfully.     Trainology objects     Contraction configuration was loaded successfully.     Trainology objects     Contraction configuration was loaded successfully.     Contraction configuration was load																	inications mod	ules	Ta
Program info     PrC alar mext lists     Commetion configuration was loaded successfully.     Program blocks     Connection configuration was loaded successfully.     Program blocks     Connection configuration was loaded successfully.     Program blocks     Connection configuration was loaded successfully.     Trainology objects     Technology objects     Technology objects     Technology objects     Completed (errors: 0; warnings: 0).     Connection configuration     Connection configuration     Connection configuration     Connection configuration was loaded successfully.     Trainology objects     Contraction configuration was loaded successfully.     Trainology objects     Contraction configuration was loaded successfully.     Contraction configuration was load					_									13					sks
PLC alarm text lists     PLC alarm text l															~	-			
Notice       Show all messages         Name       I Message         Device configuration       O Connection configuration was loaded successfully.         Device configuration       O Connection configuration was loaded successfully.         Program blocks       O Routing configuration.         Program blocks       O'Listernal source files         PLC tags       V Loading completed (errors: 0; warnings: 0).         PLC tags       V Learning: O'Listernal source files			<						> 100	1%		•			•				
Notice       Show all messages         Name       I Message         Device configuration       O Connection configuration was loaded successfully.         Device configuration       O Connection configuration was loaded successfully.         Program blocks       O Routing configuration.         Program blocks       O'Listernal source files         PLC tags       V Loading completed (errors: 0; warnings: 0).         PLC tags       V Learning: O'Listernal source files	Local modules	~					1	O Prop	ortios	ti In	fo V	Diagr	ostice			1			
Notice       Show all messages         Name       I Message         Device configuration       O Connection configuration was loaded successfully.         Device configuration       O Connection configuration was loaded successfully.         Program blocks       O Routing configuration.         Program blocks       O'Listernal source files         PLC tags       V Loading completed (errors: 0; warnings: 0).         PLC tags       V Learning: O'Listernal source files	✓ Details view					1			erues	1.54.00		Diagi	1051105	-		✓ Informat	ion		rar
Name       I       Messages         Name       I       Message         IV       Device configuration       Image: Configuration was downloaded successfully.       7/3/2017         IV       Device configuration       Image: Configuration was loaded successfully.       7/3/2017         IV       Online & diagnostics       Image: Configuration was loaded successfully.       7/3/2017         IV       Online & diagnostics       Image: Configuration was loaded successfully.       7/3/2017         IV       Online & diagnostics       Image: Configuration was loaded successfully.       7/3/2017         IV       Device configuration was loaded successfully.       7/3/2017       Image: Configuration was loaded successfully.         Image: Configuration was loaded successfully.       7/3/2017       Image: Configuration was loaded successfully.       7/3/2017         Image: Configuration was loaded successfully.       Image: Configuration was loaded successfully.       7/3/2017       Image: Configuration was loaded successfully.         Image: Configuration was loaded successfully.       Image: Configuration was loaded successfully.       Image: Configuration was loaded successfully.         Image: Configuration was loaded successfully.       Image: Configuration was loaded successfully.       Image: Configuration was loaded successfully.         Image: Configuration was loaded successfully. <td< td=""><td></td><td></td><td></td><td>Cross-</td><td>references</td><td></td><td>Energy S</td><td>uite</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>Device:</td><td></td><td>1</td><td>&lt; les</td></td<>				Cross-	references		Energy S	uite								Device:		1	< les
Message     Onnection configuration was downloaded successfully.     Online & diagnostics	Module		🕄 🔔 🚹 [	Show all me	essages	-													
Message     Onnection configuration was downloaded successfully.     Online & diagnostics																		1	
V     Online & diagnostics     Image: Configuration was boaded successing.     Organization       V     Online & diagnostics     Image: Configuration was boaded successing.     Organization       V     Online & diagnostics     Image: Configuration was boaded successing.     Organization       V     Online & diagnostics     Image: Configuration was boaded successing.     Organization       V     Online & diagnostics     Image: Configuration was boaded successing.     Organization       V     Configuration was boaded successing.     Organization     Organization       V     Loading completed (errors: 0; warnings: 0).     Organization     Organization       V     Configuration     V     Vertion     Vertion			! Message								Go to	?	Date	1	T				
Program blocks     CPU_1214C started.     7/3/2017     Arricle no.:     Arricle no.:     CPU_1214C started.		^	0	Conne	ction configurat	tion was downloa	ded successf	ully.					7/3/	2017	^				
Technology objects     Main was loaded successfully.     7/3/2017     Image: Article no.:       Technology objects     Main was loaded successfully.     7/3/2017     Image: Article no.:       Technology objects     Image: Article no.:     Image: Article no.:     Image: Article no.:       PLC tags     Image: Article no.:     Image: Article no.:     Image: Article no.:       Image: Article no.:     Image: Article no.:     Image: Article no.:     Image: Article no.:       Image: Article no.:     Image: Article no.:     Image: Article no.:     Image: Article no.:       Image: Article no.:     Image: Article no.:     Image: Article no.:     Image: Article no.:       Image: Article no.:     Image: Article no.:     Image: Article no.:     Image: Article no.:       Image: Article no.:     Image: Article no.:     Image: Article no.:     Image: Article no.:       Image: Article no.:     Image: Article no.:     Image: Article no.:     Image: Article no.:       Image: Article no.:     Image: Article no.:     Image: Article no.:     Image: Article no.:       Image: Article no.:     Image: Article no.:     Image: Article no.:     Image: Article no.:       Image: Article no.:     Image: Article no.:     Image: Article no.:     Image: Article no.:       Image: Article no.:     Image: Article no.:     Image: Article no.:     Image: Article no.:		=				was loaded succ	essfully.						7/3/	2017					
B External source files     Cags     PLC tags     C PLC data types     C C C data types     C C C C C C C C C C C C C C C C C		-											7/3/	2017					
ap Ectags      Loading completed (errors: 0; warnings: 0).     7/3/2017        ap Ectags           ap Ectags													7/3/	2017	=	Article no :			
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			•	-															9

® The PLCSIM simulation has the following appearance in the project view. You can switch to

 Siemes
 □ ×

 Project Edit Execute Options Tools Window Help
 Totally Integrated Automation S7-PLCSIM V14

 Project tree
 ■

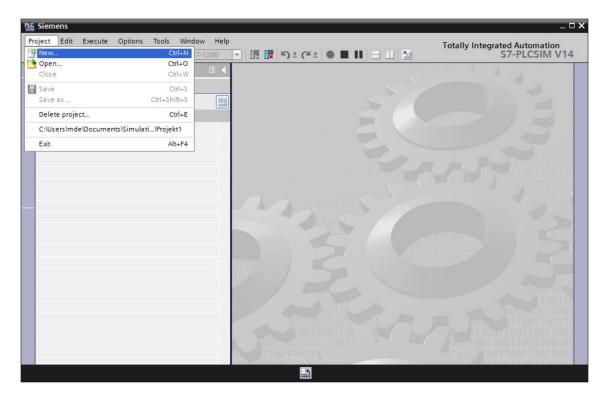
 Image: Several option in the sever

the compact view of the simulation by clicking the  $\ensuremath{\mathbb{R}}$  icon in the menu bar.

® The compact view of the PLCSIM simulation has the following appearance. You can switch



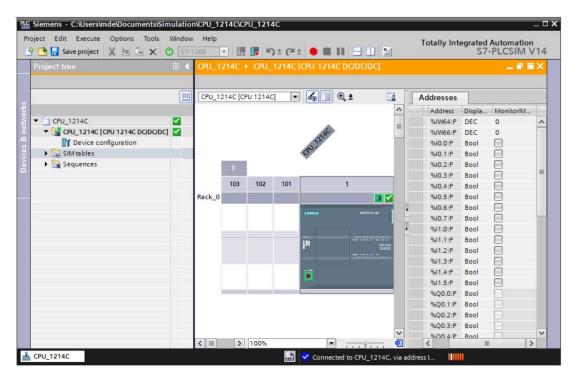
back to the project view by clicking the ® 🗾 icon.



R Assign a "Project name" R "CPU_1214C" and select a R "Path" where you want to create your project. Then click R "Create".

Create a new project		×
Project name:	CPU_1214C	
Path:	C:\Users\mde\Documents\Simulation	
Version:	V14 SP1	-
Author:	mde	
Comment:		^
		~
	Create Cance	4

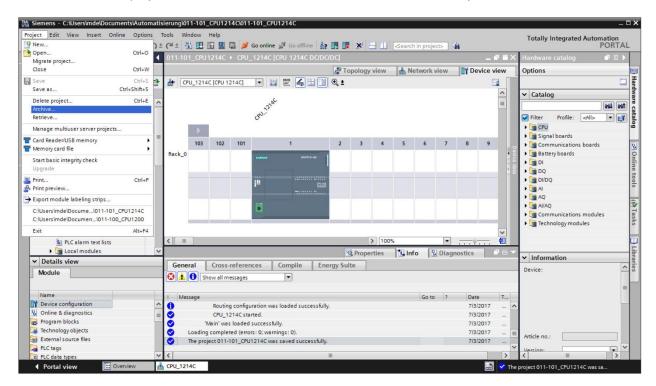
Pou can see the downloaded configuration with the status of all inputs and outputs in the project view by double-clicking 
 "Device configuration". Here you can also create your own
 Isometables, "Sim tables," with selected input and output signals. You can modify the input signals used in your program to test the program in the PLCSIM simulation.



**Note:** Because this is a simulation, you cannot detect errors in the hardware configuration in this case.

#### 7.8 Archive the project

® To archive the project, select the ® "Archive ..." command in the ® "Project" menu.



® Confirm the prompt to save the project with ® "Yes".

Archive	project (0104:000006)	×
4	Save project? The last saved project is archived. Do you want to save the project before	
	archiving to create a backup copy of the current changes?	

® Select a folder where you want to archive your project and save it as file type "TIA Portal project archive" (® "TIA Portal project archive" ® "SCE_EN_011-101_Hardware configuration_S7-1214C..." ® "Save").

### 7.9 Checklist

No.	Description	Completed
1	Project was created	
2	Slot 1: CPU with correct order number	
3	Slot 1: CPU with correct firmware version	
4	Address area of the digital inputs correct	
5	Address area of the digital outputs correct	
6	Address area of the analog inputs correct	
7	Hardware configuration was compiled without error message	
8	Hardware configuration was downloaded without error message	
9	Project was successfully archived	

## 8 Exercise

#### 8.1 Task – Exercise

The hardware configuration of the SIMATIC CPU 1214C DC/DC/DC Trainer Package is not quite complete. Insert the following missing signal board. Use the address area starting from 64 for the analog output.

1X SIMATIC S7-1200, signal board ANALOG OUTPUT SB1232, 1 AO (Order number: 6ES7 232-4HA30-0XB0)

#### 8.2 Planning

Plan the implementation of the task on your own.

## 8.3 Checklist – Exercise

No.	Description	Completed
1	Signal board with correct order number	
2	Signal board with correct firmware version	
3	Signal board address area of analog output correct	
4	Hardware configuration was compiled without error message	
5	Hardware configuration was downloaded without error message	
6	Project was successfully archived	

## 9 Additional information

More information for further practice and consolidation is available as orientation, for example: Getting Started, videos, tutorials, apps, manuals, programming guidelines and trial software / firmware, under the following link:

www.siemens.com/sce/s7-1200

#### Preview "Additional information"

- Getting Started, Videos, Tutorials, Apps, Manuals, Trial-SW/Firmware
  - ↗ TIA Portal Videos
  - TIA Portal Tutorial Center
  - > Getting Started
  - ↗ Programming Guideline
  - Easy Entry in SIMATIC S7-1200
  - > Download Trial Software/Firmware
  - ↗ Technical Documentation SIMATIC Controller
  - ↗ Industry Online Support App
  - TIA Portal, SIMATIC S7-1200/1500 Overview
  - ↗ TIA Portal Website
  - ↗ SIMATIC S7-1200 Website
  - ↗ SIMATIC S7-1500 Website

#### **Further Information**

Siemens Automation Cooperates with Education siemens.com/sce

SCE Learn-/Training Documents siemens.com/sce/documents

SCE Trainer Packages siemens.com/sce/tp

SCE Contact Partners siemens.com/sce/contact

Digital Enterprise siemens.com/digital-enterprise

Industrie 4.0 siemens.com/future-of-manufacturing

Totally Integrated Automation (TIA) siemens.com/tia

TIA Portal siemens.com/tia-portal

SIMATIC Controller siemens.com/controller

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