



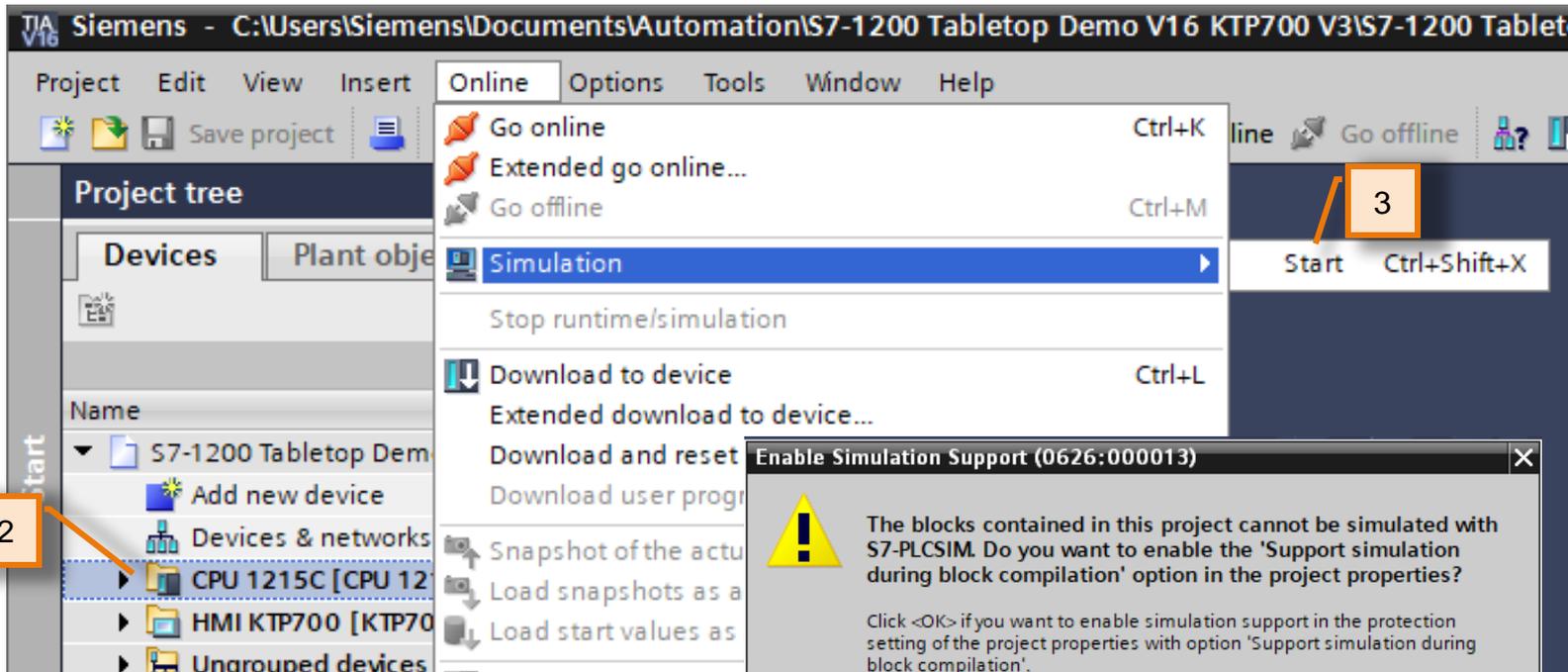
S7-1200: Basic Controller with Advanced Functions

Virtual Commissioning Functions

Starting PLC Simulation with 'PLCSIM'

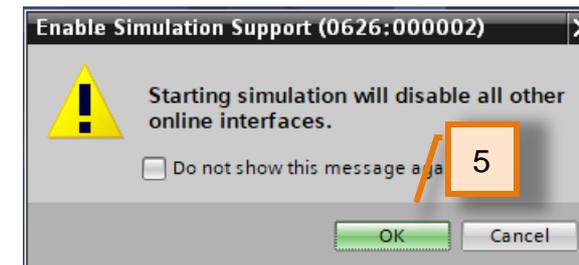
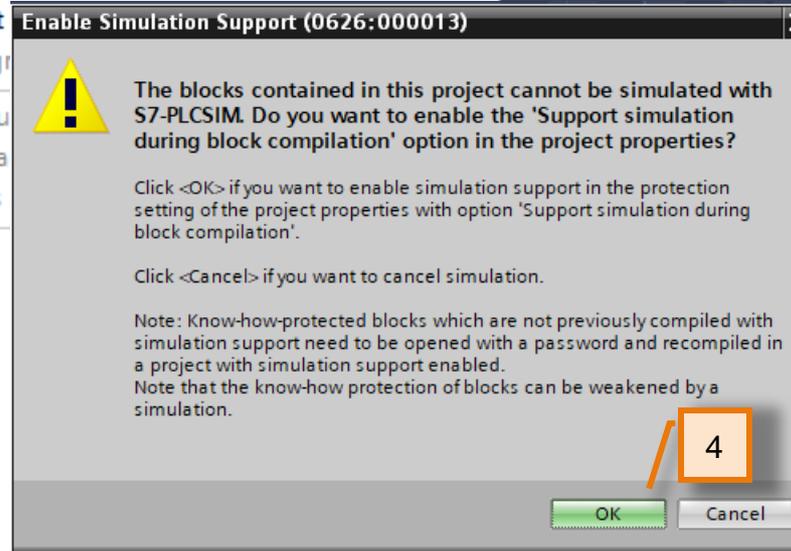
Virtual Commissioning Functions

Loading PLC Simulation



1. Select the CPU in the project Tree
 2. Select "Simulation/Start" in the "Online" menu
- Note: If the 'Start Simulation' is grayed out and you are currently online with the CPU, you will need to go offline with the physical before starting simulation.**
3. If this project has not been simulated before then select "OK" to enable simulation.
 4. Select "OK" to disable all online interfaces.

Result: after short moment, the 'PLCSIM' application will startup and the "Extended download to device" dialog will appear.



Virtual Commissioning Functions

Download project

Extended download to device

Configured access nodes of *CPU 1215C*

Device	Device type	Slot	Interface type	Address	Subnet
CPU 1215C	CPU 1215C DC/D...	1 X1	PN/IE	192.168.0.10	PN/IE_2
CP 1243-1	CP 1243-1	101 X1	PN/IE	192.168.1.1	PN/IE_1
CPU 1215C	CP 1243-1	101	TeleService	200165	

Type of the PG/PC interface: PN/IE

PG/PC interface: PLCSIM

Connection to interface/subnet: Direct at slot '1 X1'

1st gateway:

Select target device: Show devices with the same addresses

Device	Device type	Interface type	Address	Target device
CPUcommon	CPU-1200 Simula...	PN/IE	192.168.0.10	CPUcommon
--	--	PN/IE	Access address	--

Flash LED

Online status information:

- Scan completed. 1 compatible devices of 1 accessible devices found.
- Retrieving device information...
- Scan and information retrieval completed.

Load results

Status and actions after downloading to device

Status	Target	Message
✓	CPU 1215C	Downloading to device completed without error.
✓	Start modules	Start modules after downloading to device.

TIA Portal is configured to automatically download the project to the "Virtual PLC" once the PLCSIM software has started. You may be prompted with the 'Extended download to device' dialog. If you are not, proceed to step 3.

! Notice the PG/PC Interface is automatically selected as "PLCSIM"

1. Select "Direct at Slot '1 X1'" from the dropdown menu
2. Click "Start search"

! Notice: the 'device type' column shows "CPU-1200 Simulation" indicating the connection to the virtual PLC via the PLCSIM instance.

3. Click "Load" and continue through the download prompts to complete the download (See module 4 for help).
4. Select "Start module" to put the simulated PLC in Run mode.
5. Select "Finish"



Virtual Commissioning Functions Going Online

The virtual PLC within PLCSIM should now be in RUN mode with the configured project downloaded.

No changes to the project hardware configuration were required to use PLC simulation. It is possible to now go online with the PLC and test a project without any additional steps.

1. Open "Main [OB1]" under Program blocks/Demo in the Project tree.
2. Click the "Monitoring On/Off" icon on the toolbar to go online and view the logic execution.
3. Note that the timers are running (Network 2).



Virtual Commissioning Functions

Modifying values

The screenshot shows the SIMATIC Manager interface. The top bar indicates the project path: ...Demo V16 KTP700 V3 > CPU 1215C [CPU 1215C DC/DC/DC] > Program blocks > Demo > Main [OB1]. The main window displays a ladder logic network for Network 9: HMI Paddle Switch and Prox Status. The network contains a contact labeled "GlobalData".Production.EnableProduction. A context menu is open over this contact, showing options: Modify (selected), Monitor, Display format, Define tag..., Rename tag..., Rewire tag..., Cut, Copy, Paste, Delete, Go to, Cross-references, Cross-reference information, Insert network, Insert STL network, and Insert SCL network. The 'Modify' sub-menu is open, showing 'Modify to 0' (Ctrl+F3), 'Modify to 1' (Ctrl+F2), and 'Modify operand...' (Ctrl+Shift+2). A red box with the number '2' highlights the 'Modify to 1' option. A red box with the number '1' is on the left side of the screenshot.

1. Scroll down to network 9.
2. Right mouse on "GlobalData".Production.EnableProduction contact. Select Modify/Modify to 1 to change the state of this contact. This can also be done via the hotkeys to quickly toggle the mode (Ctrl+F3 to turn off the bit and Ctrl+F2 to turn on the bit).
3. Use the hotkey Ctrl+F3 to turn the bit back off.



Starting HMI Simulation

Virtual Commissioning Functions

Starting the HMI simulation

The screenshot displays the Siemens WinCC software interface. On the left, the 'Project tree' is visible, showing a hierarchy of objects. A red box labeled '1' highlights the 'HMI KTP700 [KTP700 Basic PN]' object. Below the project tree, a 'PLC SIM' window shows the 'SIEMENS' logo and a 'RUN' button. In the center, the 'RT Simulator' window shows a network diagram with a red box labeled '2' pointing to a 'Start Simulation' icon on the toolbar. On the right, the HMI simulation window is shown, featuring a conveyor belt interface. A red box labeled '3' highlights the 'Start Simulation' icon on the toolbar. The HMI simulation window displays various data points and controls, including 'State Idle', 'Lot Number 10000', and 'Operator'. The interface includes a 'Conveyor' section with an 'Enable' button, 'Production' and 'Current Position' displays, and 'Heating Setpoint' and 'Fan Speed' controls. The bottom of the HMI simulation window shows a row of function keys labeled F1 through F8.

1. Select the HMI KTP700 in the project tree.
2. Select the "Start Simulation" icon on the toolbar.
Note: The same button can be used for different devices in the project based on which device is in focus/selected.
3. The HMI RT Simulation should start via a separate window (if it doesn't appear after compiling, you may have to click on the WinCC RT icon in the Windows taskbar).



Virtual Commissioning Functions

HMI and CPU Connection

The screenshot displays the Siemens SIMATIC Manager interface. On the left, the 'Project tree' shows the project structure, including 'HMI KTP700 [KTP700 Basic PN]'. The main window shows 'Network 8: HMI Paddle Switch and Prox Status'. The network diagram includes logic for 'Paddle_Prox_1' and 'Paddle_Prox_2' using TOF timers and status databases. On the right, the HMI simulation screen shows the 'Wiper Mode' screen with a 'Reset Count' button and a green arrow button. A 'Green arrow' button is highlighted with a blue starburst icon. A 'Green arrow' button is also highlighted with a blue starburst icon. A 'Green arrow' button is also highlighted with a blue starburst icon.

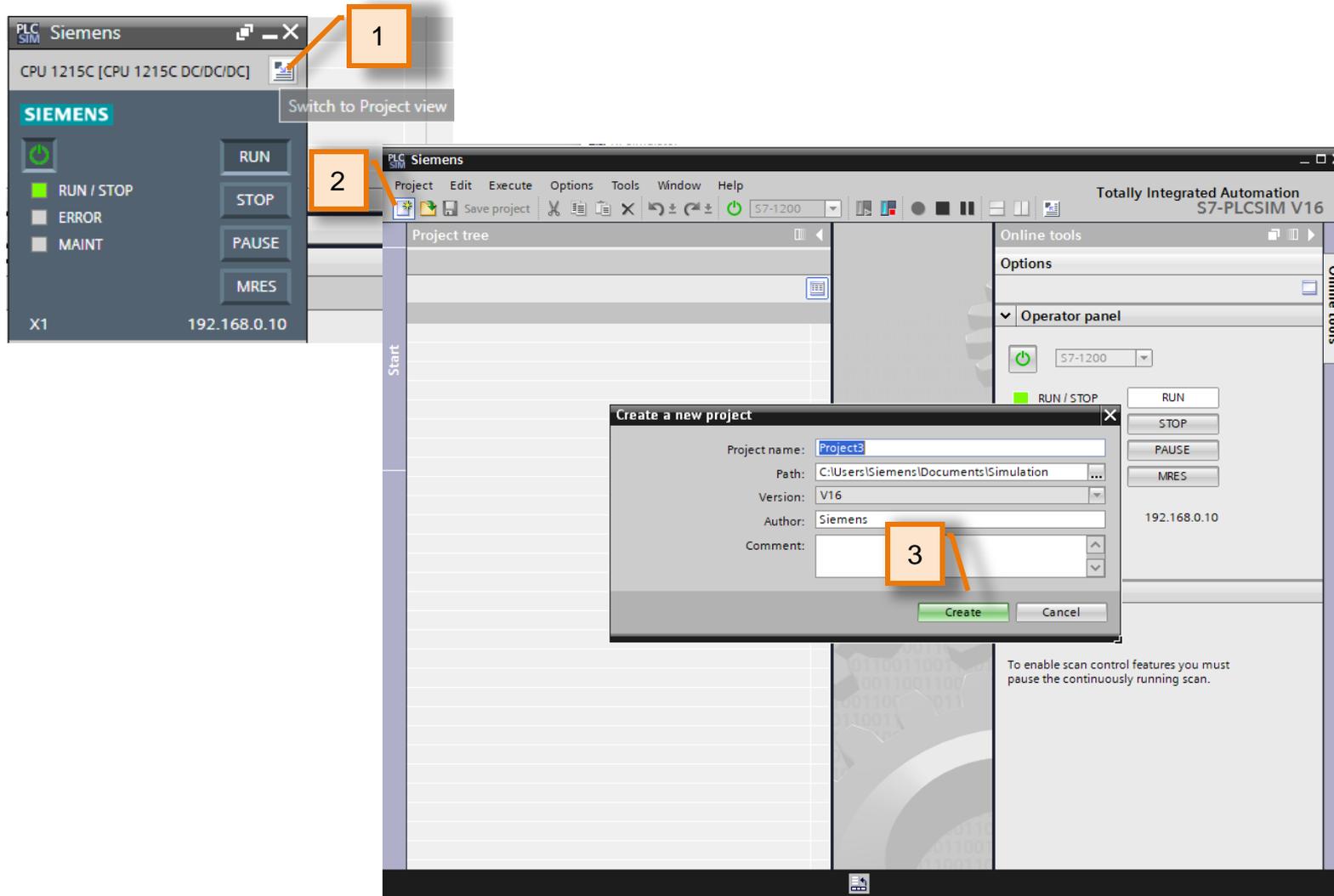
1. Position the HMI simulation on the screen so that you can see the code in Network 9.
 2. Select the Wiper screen on the HMI.
 3. Click the "Green arrow" button on the HMI.
- Note that the "Paddle_Motor" %Q0.3 turns on. This shows that the HMI and PLC simulations are connected. It is also possible to use the HMI Simulation with a real S7-1200 CPU (Dual monitors are very helpful when simulating multiple devices).



Virtual Commissioning Functions

Expanding the PLC Simulation functions

SIEMENS
Ingenuity for life



PLCSIM offers more functions when expanded and a simulation project is created.

1. Select the “Switch to Project view” button on the PLC simulation. 
2. Select the “New Project” button on the toolbar. 
3. Select “Create” to create a new simulation project.

 This simulation project can get its tag values and hardware configuration from the TIA Portal project but is saved separately. It could be used with different TIA Portal projects.



Virtual Commissioning Functions Using PLC Simulation functions

SIEMENS
Ingenuity for Life

Name	Address	Displ...	Monitor/Modify val...
Switch:P	%I0.0:P	Bool	<input type="checkbox"/>
----	%I0.1:P	Bool	<input type="checkbox"/>
Conveyor_Encoder:P	%I0.2:P	Bool	<input type="checkbox"/>
----	%I0.3:P	Bool	<input type="checkbox"/>
Conveyor_Lo_Switch:P	%I0.4:P	Bool	<input type="checkbox"/>
----	%I0.5:P	Bool	<input type="checkbox"/>
Conveyor_Home_Sw:P	%I0.6:P	Bool	<input type="checkbox"/>
Conveyor_Hi_Switch:P	%I0.7:P	Bool	<input type="checkbox"/>
----	%I1.0:P	Bool	<input type="checkbox"/>
----	%I1.1:P	Bool	<input type="checkbox"/>
Paddle_Start_2:P	%I1.2:P	Bool	<input type="checkbox"/>
Paddle_Count_Reset:P	%I1.3:P	Bool	<input type="checkbox"/>
----	%I1.4:P	Bool	<input type="checkbox"/>
----	%I1.5:P	Bool	<input type="checkbox"/>
Conveyor_Pulse:P	%Q0.0:P	Bool	<input type="checkbox"/>
Conveyor_Direction:P	%Q0.1:P	Bool	<input type="checkbox"/>
Fan_Speed_PWM:P	%Q0.2:P	Bool	<input type="checkbox"/>
Paddle_Motor:P	%Q0.3:P	Bool	<input checked="" type="checkbox"/>
----	%Q0.4:P	Bool	<input type="checkbox"/>
----	%Q0.5:P	Bool	<input type="checkbox"/>
----	%Q0.6:P	Bool	<input type="checkbox"/>
----	%Q0.7:P	Bool	<input type="checkbox"/>
----	%Q1.0:P	Bool	<input type="checkbox"/>
----	%Q1.1:P	Bool	<input type="checkbox"/>
Analog Pot1:P	%IW64:P	DEC	0
Analog Pot2:P	%IW66:P	DEC	0
----	%QW64:P	DEC	0
----	%QW66:P	DEC	0

1. Double-click on 'Device configuration' in the project tree.
 2. Click on the CPU.
- Notice the tag names and addresses are automatically available since the tags are stored in the CPU on the download.
3. From the HMI toggle the Paddle_Motor off and on using the Green arrow / Red square button.

SIEMENS SIMATIC HMI

S7-1200: Compact Controller with Advanced Capabilities

State: Idle Lot Number: 10000 Operator: [Green Arrow]

Setpoint: 6 Actual: 0

Wiper Mode Reset Count

Wiper [Green Arrow]

Demo PID Motion Wiper Security Recipe Web Server

F1 F2 F3 F4 F5 F6 F7 F8



Virtual Commissioning Functions Using PLC Simulation functions

SIEMENS
Ingenuity for life

The image displays the Siemens TIA Portal software interface for virtual commissioning. On the left, the 'Devices & networks' tree shows a rack configuration with a CPU 1215C and an SM 1223 D/DQ module in Slot 2. An arrow labeled '1' points to the SM 1223 module, and another arrow labeled '2' points to the 'Monitor/Modify' checkbox for the 'Paddle_Prox_1' input. A third arrow labeled '3' points to the 'Monitor/Modify' column header. Below this, a ladder logic diagram shows a network with a normally open contact labeled 'Paddle_Prox_1' (address %I8.0) connected to a TOF timer (T#750MS). A blue exclamation mark icon is placed over the contact. On the right, the HMI visualization for the 'S7-1200: Compact Controller with Adv...' shows a 'Wiper Mode' screen. The 'Setpoint' is 6 and the 'Actual' is 7. A blue exclamation mark icon is placed over a green indicator light. Below the HMI, a list of function keys (F1-F8) is visible.

Name	Address	Displ...	Monitor/Mod
"Paddle_Prox_1":P	%I8.0:P	B...	<input checked="" type="checkbox"/>
"Paddle_Prox_2":P	%I8.1:P	Bool	<input type="checkbox"/>
"Paddle_Prox_3":P	%I8.2:P	Bool	<input type="checkbox"/>
....	%I8.3:P	Bool	<input type="checkbox"/>
"Conveyor_Prox_Min":P	%I8.4:P	Bool	<input type="checkbox"/>
"Conveyor_Prox_Hom..."	%I8.5:P	Bool	<input type="checkbox"/>
"Conveyor_Prox_Max..."	%I8.6:P	Bool	<input type="checkbox"/>
....	%I8.7:P	Bool	<input type="checkbox"/>
"Paddle_Direction":P	%Q8.0:P	Bool	<input type="checkbox"/>
....	%Q8.1:P	Bool	<input type="checkbox"/>
....	%Q8.2:P	Bool	<input type="checkbox"/>
....	%Q8.3:P	Bool	<input type="checkbox"/>
"Fan Isolation":P	%Q8.4:P	Bool	<input checked="" type="checkbox"/>
....	%Q8.5:P	Bool	<input type="checkbox"/>
....	%Q8.6:P	Bool	<input type="checkbox"/>
....	%Q8.7:P	Bool	<input type="checkbox"/>

1. Click on the SM 1223 D/DQ module in Slot 2.
2. Click the checkbox under 'Monitor/Modify value' for Paddle_Prox_1
- ! Notice the paddle appears on the HMI and the contact comes on in network 9.
3. Uncheck the box for Paddle_Prox_1



PLCSIM - Sequence Tables

Virtual Commissioning Functions

Build a Sequence Table

SIEMENS
Ingenuity for life

The screenshot displays the Siemens SIMATIC Manager interface. On the left, the 'PLC programming' window shows a ladder logic diagram for a 'Main (OB1)' program. The central 'Addresses' table lists various digital outputs and their monitoring status. On the right, the 'RT Simulator' window shows a virtual HMI control panel for an 'S7-1200: Compact Controller with Advanced'.

Name	Address	Displ...	Monitor/Modify val
"Paddle_Prox_1":P	%I8.0:P	B...	<input checked="" type="checkbox"/>
"Paddle_Prox_2":P	%I8.1:P	Bool	<input type="checkbox"/>
"Paddle_Prox_3":P	%I8.2:P	Bool	<input type="checkbox"/>
----	%I8.3:P	Bool	<input type="checkbox"/>
"Conveyor_Prox_Min":P	%I8.4:P	Bool	<input type="checkbox"/>
"Conveyor_Prox_Hom...	%I8.5:P	Bool	<input type="checkbox"/>
"Conveyor_Prox_Max"	%I8.6:P	Bool	<input type="checkbox"/>
----	%I8.7:P	Bool	<input type="checkbox"/>
"Paddle_Direction":P	%Q8.0:P	Bool	<input type="checkbox"/>
----	%Q8.1:P	Bool	<input type="checkbox"/>
----	%Q8.2:P	Bool	<input type="checkbox"/>
----	%Q8.3:P	Bool	<input type="checkbox"/>
"Fan Isolation":P	%Q8.4:P	Bool	<input checked="" type="checkbox"/>
----	%Q8.5:P	Bool	<input type="checkbox"/>
----	%Q8.6:P	Bool	<input type="checkbox"/>
----	%Q8.7:P	Bool	<input type="checkbox"/>

Numbered callouts in the image indicate: 1. 'Start recording' button on the toolbar; 2. 'Monitor/Modify value' checkbox in the addresses table; 3. 'Stop recording' button on the toolbar.

A Sequence table will step through changing the value of inputs. It can be created several ways in the PLCSIM project. The start and stop buttons for the sequence table are next to each other on the PLCSIM project toolbar.

1. Click the "Start Recording" button from the PLCSIM project toolbar. 

You will know it is recording when the "Stop recording" button appears in the toolbar. 

You will also see an indicator at the bottom right of the PLCSIM project showing recording status 

2. Click the Monitor/Modify box for

- Paddle_Prox_1 On and then Off
- Paddle_Prox_2 On and then Off
- Paddle_Prox_3 On and then Off

3. Click the "Stop Recording" button on the toolbar. 



Virtual Commissioning Functions

Use a Sequence Table

The screenshot shows the SIMATIC Manager interface with a sequence table. Annotations 1 through 4 point to specific elements: 1 points to the 'Start sequence' button on the toolbar; 2 points to the 'Repeat sequence' button; 3 points to the 'Stop sequence' button; and 4 points to the 'Sequences' folder in the project tree. The sequence table contains the following data:

Time	Name	Address	Display format	Action	Action parameter
00:00:00.000				Start immediately	
00:00:01.685	*Paddle_Prox_1*:P	%I8.0:P	DEC	Set to value	1
00:00:02.425	*Paddle_Prox_1*:P	%I8.0:P	DEC	Set to value	0
00:00:04.330	*Paddle_Prox_2*:P	%I8.1:P	DEC	Set to value	1
00:00:05.710	*Paddle_Prox_2*:P	%I8.1:P	DEC	Set to value	0
00:00:07.135	*Paddle_Prox_3*:P	%I8.2:P	DEC	Set to value	1
00:00:08.560	*Paddle_Prox_3*:P	%I8.2:P	DEC	Set to value	0
00:00:08.610				Set to value	0
00:00:08.615				Stop sequence	

When the recording stops the Sequence table automatically opens.

1. Click the “Start sequence” button on the toolbar. 
 Watch the paddle change position on the HMI
2. After the sequence completes, click the “Repeat sequence” button  and then start the sequence again. Watch it loop through the sequence.
3. Click the “Stop sequence” button
4. Adjust any times if needed

The screenshot shows the HMI interface for an S7-1200 Compact Controller. The title is "S7-1200: Compact Controller with Advanced Capabilities". The interface includes a status bar with "State Idle", "Lot Number 10000", and "Operator". Below this is a large graphic of a wiper with a blue warning icon. At the bottom, there are fields for "Setpoint" (value 6) and "Actual" (value 38), along with "Wiper Mode" and "Reset Count" labels. A blue circular arrow button and a red square button are also visible.



Virtual Commissioning Functions

Modify a Sequence Table

The screenshot shows the SIMATIC Manager interface. The 'Sequence' table is visible with the following data:

Time	Name	Address	Display form	Action	Action parameter	Comment
00:00:00.000				Trigger condition		
00:00:01.685	"Paddle_Prox_1":P	%I8.0:P	DEC	Set to value		
00:00:02.425	"Paddle_Prox_1":P	%I8.0:P	DEC	Set to value		
00:00:04.330	"Paddle_Prox_2":P	%I8.1:P	DEC	Set to value		
00:00:05.710	"Paddle_Prox_2":P	%I8.1:P	DEC	Set to value		
00:00:07.135	"Paddle_Prox_3":P	%I8.2:P	DEC	Set to value		
00:00:08.560	"Paddle_Prox_3":P	%I8.2:P	DEC	Set to value		
00:00:08.610	"Paddle_Prox_3":P	%I8.2:P	DEC	Set to value		
00:00:08.615				Stop sequence		

The configuration window for the first action is open, showing:

- Trigger tag: "Paddle_Motor"
- Event: = TRUE
- Value: 1

Annotations: A box labeled '4' points to the 'Sequence' header. A box labeled '1' points to the 'Trigger condition' dropdown. A box labeled '2' points to the 'Trigger tag' field.

1. Change the first action from "Start Immediately" to "Trigger condition".
2. Enter "Paddle_Motor" as the Action parameter with a Event type of "=True" and Value of 1.
3. Click the red Stop button on the HMI
4. Click the "Start sequence". The sequence starts but waits for the motor to turn on.
5. Click the green arrow on the HMI to turn on the paddle motor and watch the sequence.
6. Leave the sequence running.

The HMI interface for the S7-1200 controller is shown. It displays the following information:

- State: Idle
- Lot Number: 10000
- Operator: [Name]
- Setpoint: 6
- Actual: 38
- Wiper Mode
- Reset Count

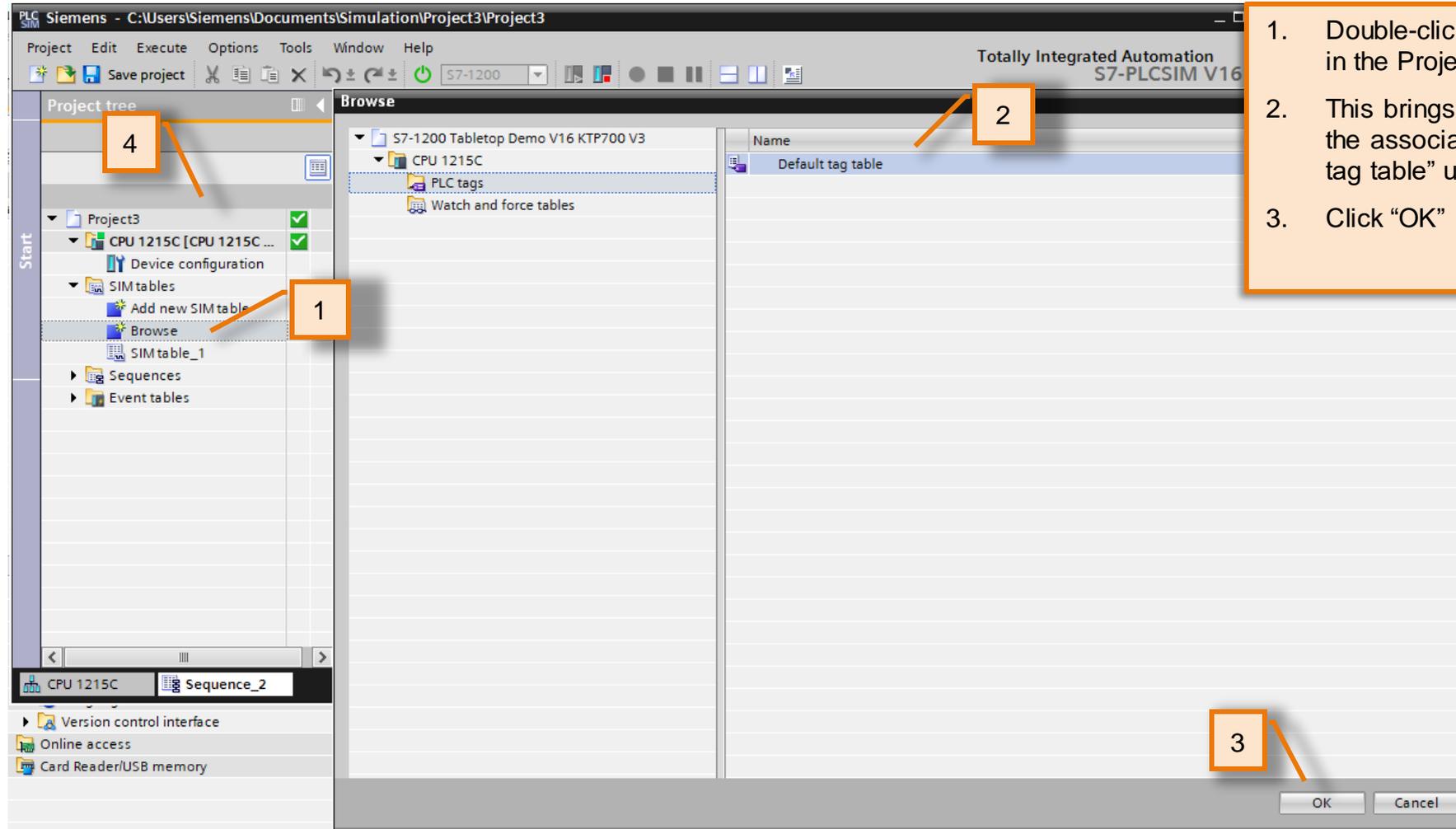
Annotations: A box labeled '3' points to the red stop button.



PLCSIM - SIM Tables

Virtual Commissioning Functions

Build a SIM Table



1. Double-click the “Browse” option under the SIM tables in the Project tree.
2. This brings up the tag tables and watch tables from the associated TIA Portal project. Select the “Default tag table” under the PLC tags.
3. Click “OK”



Virtual Commissioning Functions

Build a SIM Table

PLC SIM Siemens - C:\Users\Siemens\Documents\Simulation\Project3\Project3

Project Edit Execute Options Tools Window Help

Totally Integrated Automation S7-PLCSIM V16

Project tree

Default tag table

Name	Address	Display format	Monitor/Modify value	Bits	Consistent m...
*Conveyor_En...	%ID100...	DEC	0		0
*Fan_Speed_HSC...	%ID100...	DEC	0		0
Analog Pot1:P	%IW64:P	DEC	0		0
Paddle_Prox_1:P	%I8.0:P	DEC	0		<input type="checkbox"/>
Paddle_Prox_2:P	%I8.1:P	DEC	1		<input checked="" type="checkbox"/>
Paddle_Prox_3:P	%I8.2:P	DEC	0		<input type="checkbox"/>
*Paddle_Count_R...	%I1.3:P	DEC	0		<input type="checkbox"/>
Paddle_Start_2:P	%I1.2:P	DEC	0		<input type="checkbox"/>
*Conveyor_Prox_...	%I8.4:P	DEC	0		<input type="checkbox"/>
*Conveyor_Prox_...	%I8.5:P	DEC	0		<input type="checkbox"/>
*Conveyor_Prox_...	%I8.6:P	DEC	0		<input type="checkbox"/>
*Conveyor_Enco...	%IO.2:P	DEC	0		<input type="checkbox"/>
*Conveyor_Enco...	%IO.3:P	DEC	0		<input type="checkbox"/>
*Conveyor_Hom...	%IO.6:P	DEC	0		<input type="checkbox"/>

1

1. Double-click the “Default tag table” in the Project tree.



If you left the Sequence running then you can see the values for the Paddle_Prox tags changing.

The SIM table allows you to change tag values like the watch table in TIA Portal. You can also browse and import a watch table directly from the TIA Portal project.

Sequence and SIM tables can be imported or export to Excel files.



PLCSIM - Event Tables

Virtual Commissioning Functions

Build an Event Table

PLC SIM Siemens - C:\Users\Siemens\Documents\Simulation\Project3\Project3

Project Edit Execute Options Tools Window Help

Save project S7-1200

Project tree Event table_1

Start

Project3

CPU 1215C [CPU 1215C ...]

Device configuration

SIM tables

Add new SIM table

Browse

SIM table_1

Default tag table

Sequences

Event tables

Add new event table

Event table_1

Event

Parameter

Comment

Pull or plug of modules

Rack or station failure

Hardware interrupt

Diagnostic error interrupt

CPU 1215C Sequence_2 Default tag t... Event table_1

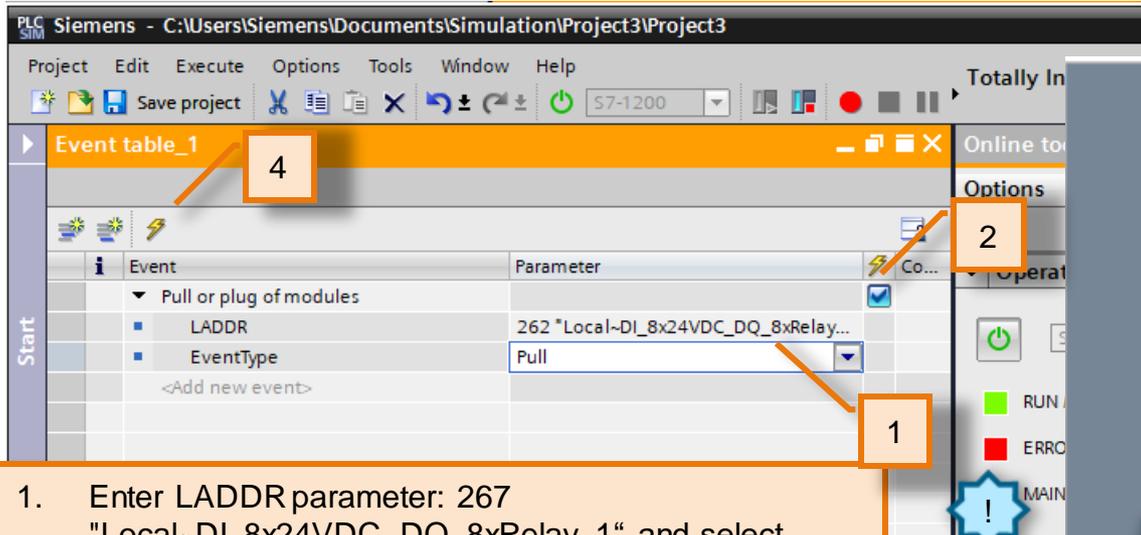
Connected to CPU 1215C, via address I... PLAYING

1. Double-click “Event table_1” option under the Event tables in the Project tree.
2. Event tables can be used to test error handling, diagnostic, and interrupt logic in the CPU and HMI. Select “Pull or plug of modules” for the first event



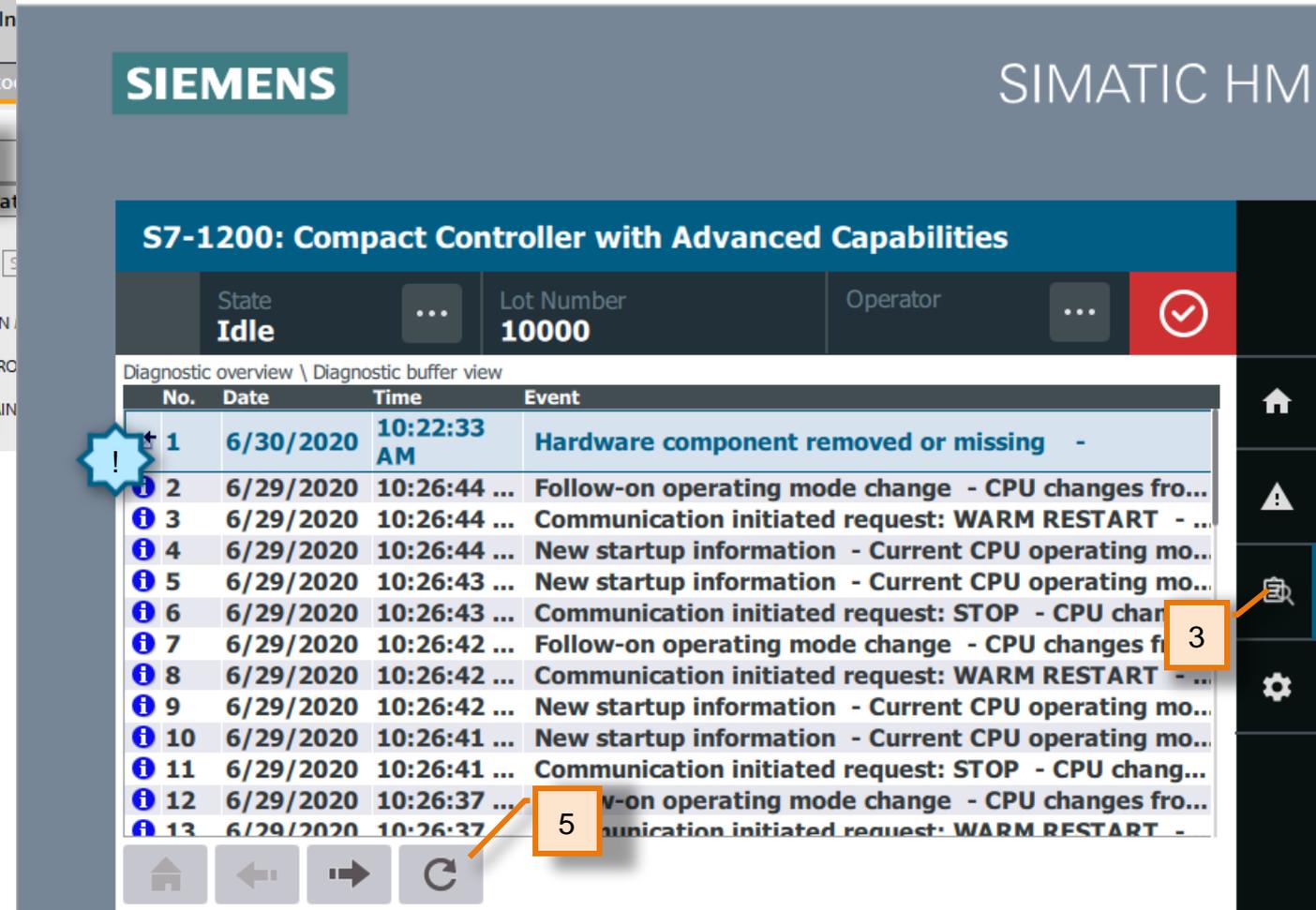
Virtual Commissioning Functions

Trigger an Event



1. Enter LADDR parameter: 267 "Local~DI_8x24VDC_DQ_8xRelay_1" and select "Pull" as the EventType.
2. Check the box to trigger the diagnostic event.
3. Select the HMI Diagnostic screen on the right toolbar.
4. Select the "Trigger selected events" icon to activate all selected events.
5. Click the refresh button on the diagnostics screen on the HMI until the new event appears.

Notice the CPU error LED starts flashing and see the "Hardware component removed or missing" message on the HMI.



Virtual Commissioning Functions

Read the Error

S7-1200: Compact Controller with Advanced Capabilities

State **Idle** Lot Number **10000** Operator

Diagnostic overview \ Diagnostic buffer view \ Detail view

1 6/30/2020 10:22:33 AM

Error: Hardware component removed or missing

CPU 1215C / DI8 x 24VDC / DO8 x relay_1

**A hardware component has been removed or cannot be addressed.
Check the power supply especially for stations with a self-assembling backplane bus and power segments.**

Resolution:

Connect/plug the hardware component.

Check the power supply.

Check the presence of an interfering IO controller or supervisor.

Navigation buttons: Home, Back, Forward, Refresh

1. Double-click the “Hardware component removed or missing” message on the HMI to expand the message. See that it indicates the relay module is missing.
2. Select the arrow to return to the Diagnostic overview.



Virtual Commissioning Functions

Clear the Error

SIEMENS
Ingenuity for life

The screenshot shows the 'Event table_1' configuration window. The 'Event' column contains a tree view with 'Pull or plug of modules' expanded, showing 'LADDR' (parameter: 262 *Local-HSC_4*) and 'EventType' (set to 'Plug'). An orange box labeled '1' points to the 'Plug' dropdown menu. Another orange box labeled '2' points to the 'Trigger selected events' icon (a lightning bolt) in the top right of the event table.

1. Change the EventType to "Plug".
2. Select the "Trigger selected events" icon.
3. Notice the event message on the HMI shows that the message has left.

The screenshot shows the HMI diagnostic buffer view for an S7-1200 controller. The controller state is 'Idle' and the lot number is '10000'. The diagnostic buffer contains a list of events. An orange box labeled '3' points to the first event in the list, which is 'Hardware component removed or missing'.

No.	Date	Time	Event
1	6/30/2020	11:36:59 AM	Hardware component removed or missing -
2	6/30/2020	11:36:49 ...	Hardware component removed or missing -
3	6/30/2020	10:22:33 ...	Hardware component removed or missing -
4	6/29/2020	10:26:44 ...	Follow-on operating mode change - CPU changes fro...
5	6/29/2020	10:26:44 ...	Communication initiated request: WARM RESTART - ...
6	6/29/2020	10:26:44 ...	New startup information - Current CPU operating mo...
7	6/29/2020	10:26:43 ...	New startup information - Current CPU operating mo...
8	6/29/2020	10:26:43 ...	Communication initiated request: STOP - CPU chang...
9	6/29/2020	10:26:42 ...	Follow-on operating mode change - CPU changes fro...
10	6/29/2020	10:26:42 ...	Communication initiated request: WARM RESTART - ...
11	6/29/2020	10:26:41 ...	New startup information - Current CPU operating mo...
12	6/29/2020	10:26:41 ...	New startup information - Current CPU operating mo...
13	6/29/2020	10:26:41 ...	Communication initiated request: STOP - CPU chang...



Virtual Commissioning Functions

Trigger an Event

1 Start

2 LADDR

3 Error

4 Error type

5 Trigger selected events

6 Trigger selected events icon

Event	Parameter	Co...
▼ Pull or plug of modules		
LADDR	262 *Local-DI_8x24VDC_DQ_8xRelay...	
EventType	Plug	
▼ Diagnostic error interrupt		<input checked="" type="checkbox"/>
LADDR	262 *Local-DI_8x24VDC_DQ_8xRelay...	
▼ Module state	Error	
Error	<input checked="" type="checkbox"/>	
Maintenance demanded	<input type="checkbox"/>	
Maintenance required	<input type="checkbox"/>	
▼ Channels	0	
▼ Channel number	0	
Error type	16#0001	
Extended error type	16#0000	
Severity	Failure	
Direction	Incoming	
Channel number	<Add new channel>	

1. Add a new “Diagnostic error interrupt” event to the PLCSim Event table.
2. Enter LADDR parameter: 267
"Local~DI_8x24VDC_DQ_8xRelay_1"
3. Check the box for Error under Module state
4. Enter the Error Type of 16#0001 under the Channels
5. Check the box for the Trigger.
6. Select the “Trigger selected events” icon.



Notice the CPU error LED starts flashing and see the “Short-circuit” message on the HMI.

S7-1200: Compact Controller with Advanced Capabilities

State	...	Lot Number	Operator	...	
Idle		10000			

Diagnostic overview \ Diagnostic buffer view

No.	Date	Time	Event	
1	6/30/2020	1:13:34 PM	Short-circuit	



Virtual Commissioning Functions

Viewing the Event

SIEMENS
Ingenuity for life

Siemens - C:\Users\Siemens\Documents\Automation\S7-1200 Tabletop Demo V16 KTP700 V3\S7-1200 Tabletop Demo V16 KTP700 V3

Project Edit View Insert Online Options Tools Window Help

Project tree

Devices Plant objects

PLC programming

S7-1200 Tabletop Demo V16 KTP700 V3

Devices & networks

Devices configuration

Online & diagnostics

Program blocks

Diagnostic error interrupt [OB82]

Custom User Webpage

Data Logging & Recipes

Demo

Main [OB1]

Startup [OB100]

Analog Pot Control [FC4]

Cap Placement [FC11]

Paddle Control FB [FB6]

Production_FB [FB9]

Windshield Wiper FB [FB7]

CurrentTime DB [DB9]

GlobalData [DB18]

HMI [DB30]

HSC Fan [DB6]

Paddle Control_FB_IDB [DB3]

Production_FB_IDB [DB45]

Windshield Wiper_FB_IDB [DB42]

Motion

PID

Security

Details view

Name Address

Diagnostic error interrupt

Name	Data type	Default value	Comment
1 Input			
2 IO_State	Word		IO state of the HW object
3 LADDR	HW_ANY		Hardware identifier
4 Channel	UInt		Channel number

Block title: ...

Comment

Network 1: ...

Comment

Network 2: ...

Comment

Inspector window

Diagnosics

Device information

Connection information

Alarm display

Monitor value

1 Device with problems

Online...	Opera...	Devicemodule	Connection establis...	Mess...	Details	Help
Online...	Oper...	Devicemodule	Connection establis...	Mess...	Details	Help
Error	RUN	CPU 1215C	Direct	Error	For more detailed information, refer to devi...	?

1. Switch to the view of TIA Portal OB82. Notice that the code is now green since this OB was called when the error event occurred.
2. See the LADDR address matches the "262" that was entered in PLCsim.
3. In the Inspector Window below, Click the Diagnostics tab
4. Click 'Device Information Tab
5. Click "For more detailed information, refer to the device" field in the Diagnostic/Device Information area to open the diagnostic buffer.

S7-1200 Tabletop Demo V16 KTP700 V3

Online access

Diagnosics

General

Diagnostic status

Diagnosics buffer

Cycle time

Memory

PROFINET interface (X1)

Functions

Diagnosics buffer

Events

Display CPU Time Stamps in PG/PC local time

No.	Date and time	Event
1	6/30/2020 2:13:34.143 PM	Short-circuit
2	6/30/2020 1:47:52.503 PM	Follow-on operating mode change - CPU changes from STARTUP to RUN mode
3	6/30/2020 1:47:52.491 PM	Communication initiated request: WARM RESTART - CPU changes from STOP to STARTUP...
4	6/30/2020 1:47:52.490 PM	New startup information - Current CPU operating mode: STOP
5	6/30/2020 1:47:50.181 PM	New startup information - Current CPU operating mode: STOP
6	6/30/2020 1:47:50.080 PM	Follow-on operating mode change - CPU changes from STOP to STOP mode
7	6/30/2020 1:47:50.078 PM	Hardware component removed or missing - Potential inhibit/break reason for next startup
8	6/30/2020 1:47:49.649 PM	New startup information - Current CPU operating mode: STOP
9	6/30/2020 1:47:49.481 PM	New startup information - Current CPU operating mode: STOP

Freeze display

Details on event:

Details on event: 1 of 50 Event ID: 16# 06:0040

Module: CPU 1215C / DI 8x24VDC/DQ 8xRelay_1

Rack/slot: Rack 0 / Slot 2

Description: Error: Short-circuit on Input/Output channel 0 CPU 1215C / DI 8x24VDC/DQ 8xRelay_1.

Help on event: Possible causes: A short-circuit in the encoder power supply or at the output cable. The encoder is defective. An incorrect encoder type was set in the parameters. An output is overloaded. Solution: Check the possible causes and remedy the fault.



Virtual Commissioning Functions

Change the Module state

Event table_1

Event	Parameter	Co...
▼ Pull or plug of modules		
■ LADDR	262 *Local-DI_8x24VDC_DQ_8xRelay...	
■ EventType	Plug	
▼ Diagnostic error interrupt		<input checked="" type="checkbox"/>
■ LADDR	262 *Local-DI_8x24VDC_DQ_8xRelay...	
▼ Module state	Maintenance demanded	
■ Error	<input type="checkbox"/>	
■ Maintenance demanded	<input checked="" type="checkbox"/>	
■ Maintenance required	<input type="checkbox"/>	
▼ Channels	0	
■ Channel number	0	
■ Error type	16#0001	
■ Extended error type	16#0000	
■ Severity	Failure	
■ Direction	Incoming	

Options

Operator panel

RUN / STOP

ERROR

MAINT

X1

1. Deselect "Error" and Select "Maintenance demanded" on the PLCSim Event table.
2. Select the "Trigger selected events" icon.



Notice the CPU error LED goes out and the orange MAINT LED comes On. See the "Short-circuit" message on the HMI.



**Maintenance demanded: Diagnostics available and is being processed
CPU 1215C / DI8 x 24VDC / DO8 x relay_1.**

S7-1200 Tabletop Demo V16 KTP700 V3 - CPU 1215C [CPU 1215C DC/DCDC]

Online access

▼ Diagnostics

General

Diagnostic status

Diagnostics buffer

Cycle time

Memory

► PROFINET interface [X1]

► Functions

Diagnostics buffer

Display CPU Time Stamps in PG/PC local time

No.	Date and time	Event
1	6/30/2020 2:35:06.219 PM	Diagnostics available and is being processed
2	6/30/2020 2:35:06.219 PM	Short-circuit
3	6/30/2020 2:13:34.143 PM	Short-circuit
4	6/30/2020 1:47:52.503 PM	Follow-on operating mode change - CPU changes from STARTUP to RU...
5	6/30/2020 1:47:52.491 PM	Communication initiated request: WARM RESTART - CPU changes from...
6	6/30/2020 1:47:52.490 PM	New startup information - Current CPU operating mode: STOP
7	6/30/2020 1:47:50.181 PM	New startup information - Current CPU operating mode: STOP
8	6/30/2020 1:47:50.080 PM	Follow-on operating mode change - CPU changes from STOP to STOP ...

Freeze display

Details on event:

Details on event: 1 of 50 Event ID: 16# 08:0022

Module: CPU 1215C / DI 8x24VDC/DQ 8xRelay_1

Rack/slot: Rack 0 / Slot 2

Description: Maintenance demanded: Diagnostics available and is being processed
CPU 1215C / DI 8x24VDC/DQ 8xRelay_1.



Finish

Virtual Commissioning Functions

Shut down

1. Go Offline with the CPU in the TIA Portal project.
2. Close the HMI simulation
3. Close the PLC simulation. You have the option to save the simulation project to use later.



End of 'Virtual Commissioning Functions



THE INFORMATION PROVIDED HEREIN IS PROVIDED AS A GENERAL REFERENCE REGARDING THE USE OF APPLICABLE PRODUCTS IN GENERIC APPLICATIONS. THIS INFORMATION IS PROVIDED WITHOUT WARRANTY. IT IS YOUR RESPONSIBILITY TO ENSURE THAT YOU ARE USING ALL MENTIONED PRODUCTS PROPERLY IN YOUR SPECIFIC APPLICATION. IF YOU USE THE INFORMATION PROVIDED HEREIN IN YOUR SPECIFIC APPLICATION, PLEASE DOUBLE CHECK ITS APPLICABILITY AND BE ADVISED THAT YOU ARE USING THIS INFORMATION AT YOUR OWN RISK. THE PURCHASER OF THE PRODUCT MUST CONFIRM THE SUITABILITY OF THE PRODUCT FOR THE INTENDED USE, AND ASSUME ALL RISK AND LIABILITY IN CONNECTION WITH THE USE.

THIS GUIDE SHOULD NOT BE USED AS A SUBSTITUTE FOR OR IN LIEU OF A THOROUGH REVIEW AND UNDERSTANDING OF ALL WRITTEN INSTRUCTION AND OPERATION MANUALS AND GUIDELINES.

THE CONTENTS OF THIS GUIDE SHALL NOT BECOME PART OF OR MODIFY ANY PRIOR OR EXISTING AGREEMENT, COMMITMENT OR RELATIONSHIP. THE SALES CONTRACT CONTAINS THE ENTIRE OBLIGATION OF SIEMENS.

MODIFICATION AND OR DISTRIBUTION OF THIS CONTENT IS STRICTLY PROHIBITED.

