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Siemens
Simulate with S7-PLCSIM and HMI Simulator

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Agenda

- Brief Overview of S7-PLCSIM and HMI Simulator
- S7-PLCSIM SIM Tables
- S7-PLCSIM Sequences
- HMI Simulation with S7-PLCSIM
- S7-PLCSIM vs. S7-PLCSIM Advanced
- Live Demos

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S7-PLCSIM Overview

- Enables you to test your PLC code without actual hardware
- Configure PLC hardware and program your PLC with STEP 7
- Download PLC program from STEP 7 to PLCSIM
- Run program
- Monitor
- Adjust input values in PLC to test logic
- Analyze results
- Connect Simulated HMI to PLCSIM to test HMI with PLC
- No hardware Required

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S7-PLCSIM Hardware Support and Licensing

- STEP 7 License determines PLCs you can simulate
- STEP 7 Basic and S7-PLCSIM
  - S7-1200 firmware 4.0 or higher
  - S7-1200F firmware 4.1 or higher
- STEP 7 Professional and S7-PLCSIM adds
  - S7-1500, S7-1500C and S7-1500F any firmware
  - ET 200SP and ET200SPF any firmware

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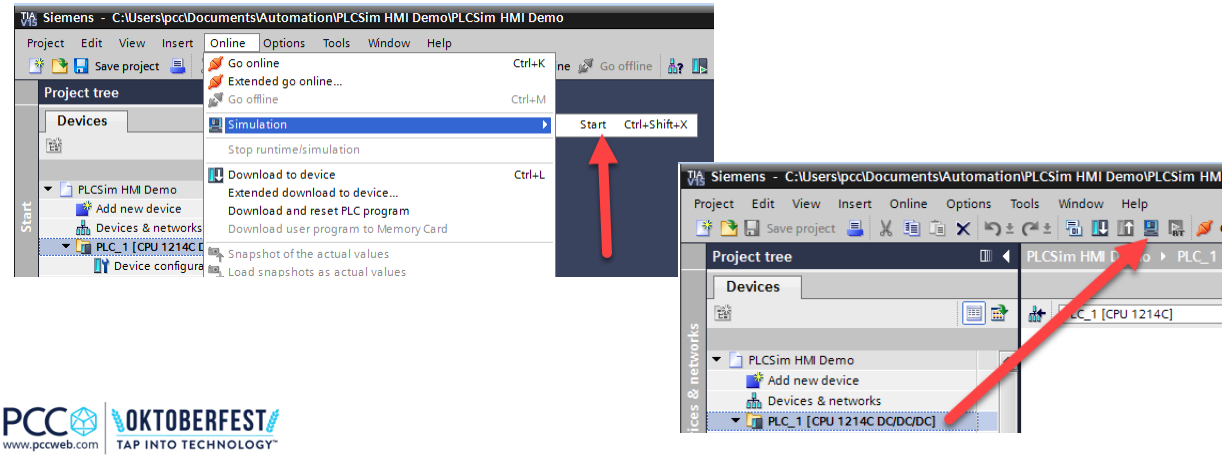
Starting S7-PLCSIM

- Online Menu, Toolbar, Desktop shortcut …
- Select PLC – If Start or icon grayed out (Simulation not available)



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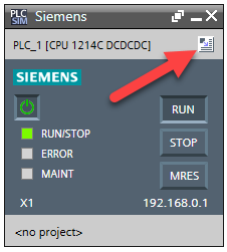
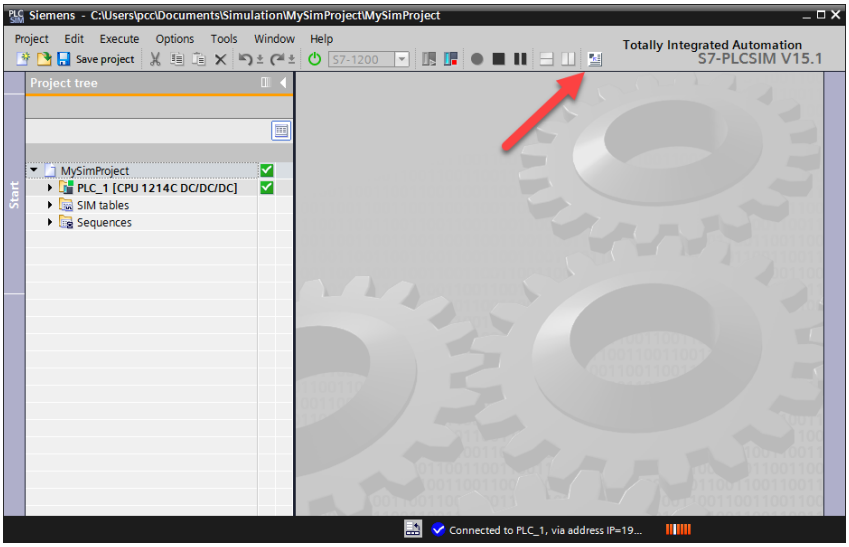
S7-PLCSIM Compact and Project Views

- Toggle the views





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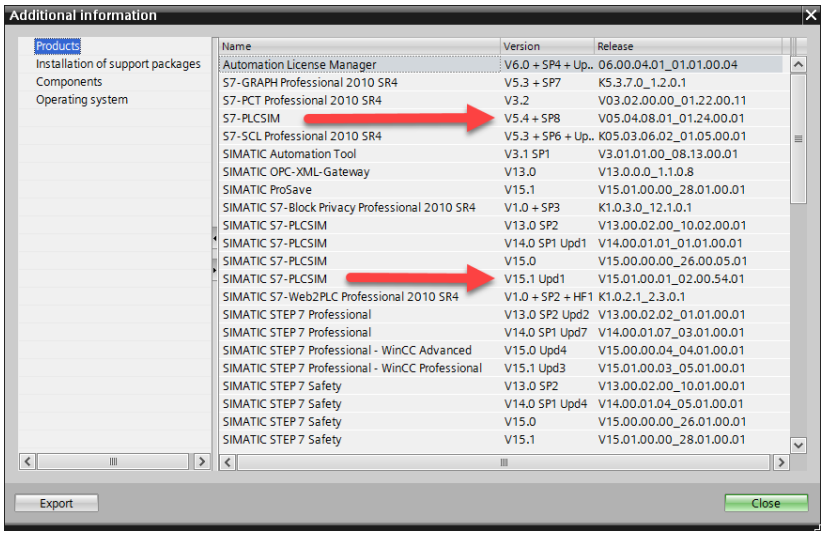
S7-PLCSIM for Classic STEP 7 and TIA Portal STEP 7

- Installed Software
- V5.x for Classic
- V1x for TIA Portal
- Separate Install



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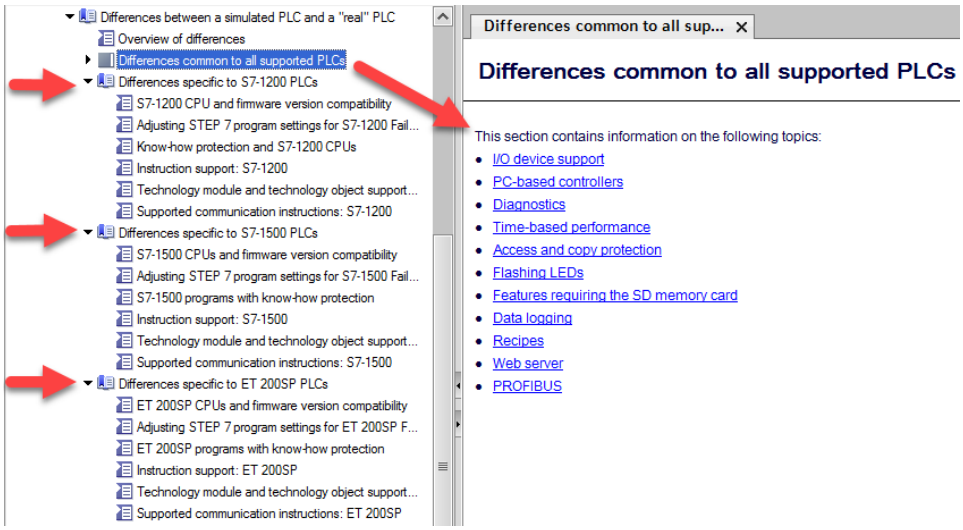
Differences between a simulated PLC and a “real” PLC

- Help



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S7-PLCSIM Simulating Safety PLC's

- Help

Adjusting STEP 7 program settings for S7-1200 Fail-Safe CPUs

In order to simulate an S7-1200F PLC, you must adjust the F-parameter F-monitoring time in your STEP 7 project before you perform a download to S7-PLCSIM. This is due to the difference in timing between a software-based simulation and actual physical hardware.

Procedure to adjust the F-monitoring time in STEP 7

To adjust the F-monitoring time, follow these steps:

1. In the STEP 7 Project tree, right-click your F-CPU and select "Properties".
2. In the Properties dialog, go to "Fail-Safe > F-parameter > Default F-monitoring time for central F-IO".
3. Adjust the F-monitoring time from the default of 150 ms to a higher value.
4. Click OK.

You might need to repeat this procedure until you find an F-monitoring value that allows your F-CPU simulation to run without errors.

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S7-PLCSIM What's new in S7-PLCSIM V15

- Help

New features in S7-PLCSIM V15

S7-PLCSIM V15 contains many useful new features and functions, including the following:

Feature	Topic
S7-PLCSIM V15 and S7-PLCSIM Advanced can be installed on the same computer	Differences between S7-PLCSIM products
The S7-PLCSIMSIM table editor has a slider control for adjusting analog values	The Control view slider for analog values
The S7-PLCSIMSIM table editor has a push button control for adjusting Boolean values	The Control view push button for Boolean values
Simulation of know-how protected blocks for S7 1500 and ET 200SP projects	Know-how protection and startup
Clicking "start simulation" in TIA Portal prompts you to enable simulation for your S7 1500 and ET 200SP project	Enabling simulation support
S7-PLCSIM supports breakpoints for S7 1500 and ET 200SP CPUs in your STEP 7 program	Breakpoint functionality

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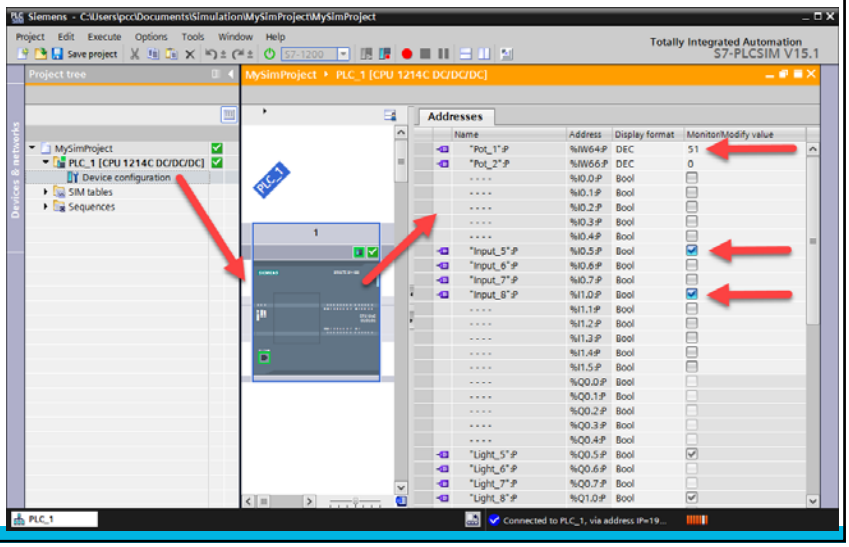
S7-PLCSIM Device configuration - SIM Table

- Modify in Device configuration
  - Digital inputs
  - Analog inputs
- Quick Access
- Auto generated



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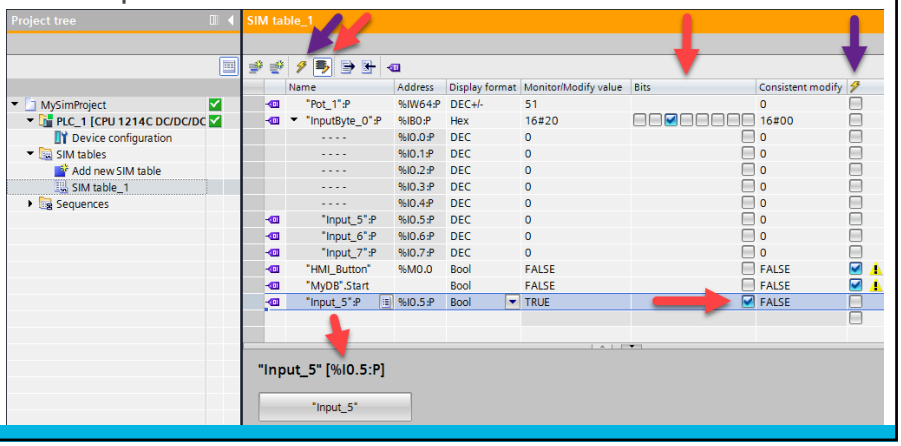
S7-PLCSIM SIM Tables

- Default setting allows modification
  - Digital inputs
  - Analog inputs
- Enable modify of non-inputs
  - Digital outputs
  - M addresses
  - DB addresses
- Modify
  - Selected values
- Custom tables



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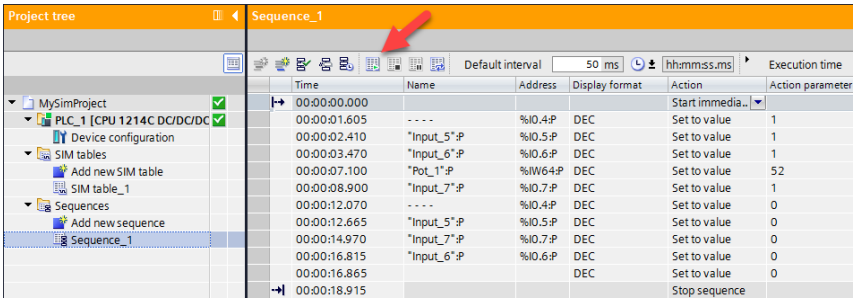
S7-PLCSIM Sequences

- Open SIM Table
- Press Record
- Adjust values
- Stop Recording
- New Sequence
- Replay changes
  - Enable Step
  - Disable Step
  - Insert and edit Steps
  - Play, Stop, Pause and Repeat



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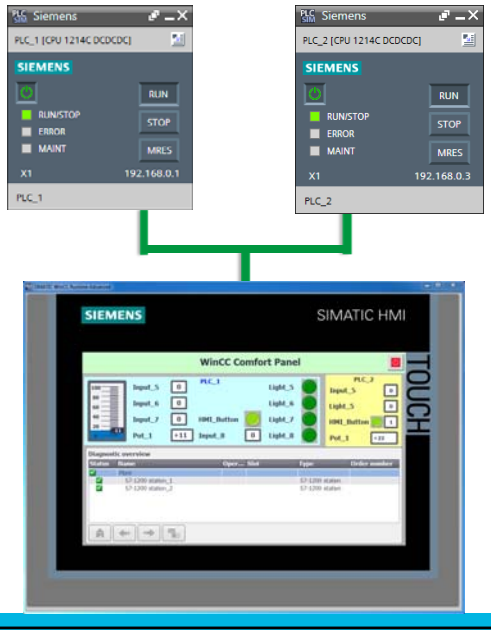
S7-PLCSIM V15 – Run two instances at same time

- PLC Comms between instances
  - See help for valid combinations
- HMI Comms to two instances



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S7-PLCSIM versions vs. S7-PLCSIMAdvanced 2.0

- Technically three Versions:
  - Free Versions
  - Advanced Version (Licensed)
  - Classic version

Note:

Advanced version does not have SIM tables or Sequences.

Function	PLCSIM Advanced V2.0	PLCSIM V15	PLCSIM V5.x
Runtime	Independent	Programming with STEP 7	Programming with STEP 7
User interface	Control Panel	Look&Feel of TIA Portal	Look&Feel of STEP 7 V5.x
Communication	Softbus, TCP/IP	Softbus only	Softbus only
Supported CPU families	S7-1500 (C, T, F), ET 200SP, ET 200SP F	S7-1200 (F), S7-1500 (C, T, F), ET 200SP, ET 200SP F	S7-300, S7-300F S7-400, S7-400F
API for co-simulation[1]	✓	-	-
Web server	✓	-	-
OPC UA	✓	-	-
Process diagnostics	✓	✓	-
S7 communication	✓	Softbus	Softbus
Open user communication	✓, UDP only via TCP/IP	Softbus	-
Traces[2]	✓	(✓)	-
Motion[3]	✓	(✓)	-
Protected blocks (KHP)	✓	✓, for S7-1500 CPUs only	-
Multiple instances	Up to 16	Up to 2	-
Support of distributed in-stances	✓	-	-
Virtual time	✓	-	-
Connection of real CPUs/HMIs	✓	-	-
DNS usage	✓	-	-
Virtual memory card	✓	-	-
Communication between the instances	-	PLCSIM as of V12 and PLCSIM V5.x can be installed and operated on the same PC or the same virtual machine.	
	-	Instances of PLCSIM as of V12 can communicate via Soft-bus with PLCSIM V5.x.	
	PLCSIM Advanced 2.0 and PLCSIM V15 and higher can be installed and operated on the same PC or the same virtual machine. The communication between the two applications **cannot** be simulated.		-
	PLCSIM V5.4 SP8 is automatically installed with PLCSIM Advanced. The communication between the two applications can be simulated. Instances of PLCSIM Advanced can communicate via Softbus with PLCSIM V5.4 SP8.		

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Live Demos

- PLCSIM SIM Table
- PLCSIM Sequence
- PLCSIM with HMI
- Saving PLCSIM Project

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