

Application example for using an RCCA-A without HMI

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Preconditions

To understand this example, the following components are required: RCCA with current firmware (V1.0.30 or newer) GSMDL file for the TST RCCA, Siemens S7-1200(F) PLC (for RCCA-B/C and -D variants, a fail-safe PLC is mandatory), Siemens TIA Portal development environment not older than version V15.

TST FUF2/FU3F with activated RCCA functionality and activated parameter P.804 = 1.

To simplify the interaction between PG, PLC and RCCA, the use of an Ethernet switch is recommended. The address range of the adapter used in the PG must be set to 192.168.0.xxx/24.

Connect an input device - any passive buttons/switches will do for demonstration purposes - to sockets X10 (input 1&2), X11 (input 3/4) and X12 (input 5/6).

Hardware configuration

Create a new project and add your control unit to the project. A Siemens S7-1211C DC/DC/DC is used in the example. ProfiNet® support is a prerequisite for communication via an RCCA-A.

If you have already integrated the GSDML into your project, select the hardware variant "TST-RCCA-A" from the hardware catalogue under "Other field devices" -> "PROFINET IO" -> "I/O" -> "FEIG ELECTRONIC GmbH" -> "Door control" and add it to your project.

Establish the ProfiNet connection between the control unit and RCCA under "Network view".

iPar-CRC for fail-safe variants

If you are using one of the RCCA variants -B, -C or -D, the security parameters must be configured before communication is established.

To do this, switch to the device view of the corresponding RCCA hardware and open the "Feig-iPar-CRC" tool by right-clicking on the hardware and selecting "Start device

tool". The default values are not changed in this demonstration. Confirm the parameter settings by ticking the "accepted" column and then generate the checksum by clicking on "Calculate CRC". Accept the value under hexadecimal and enter it in the "F-iPar_CRC" field in the PROFIsafe module settings.

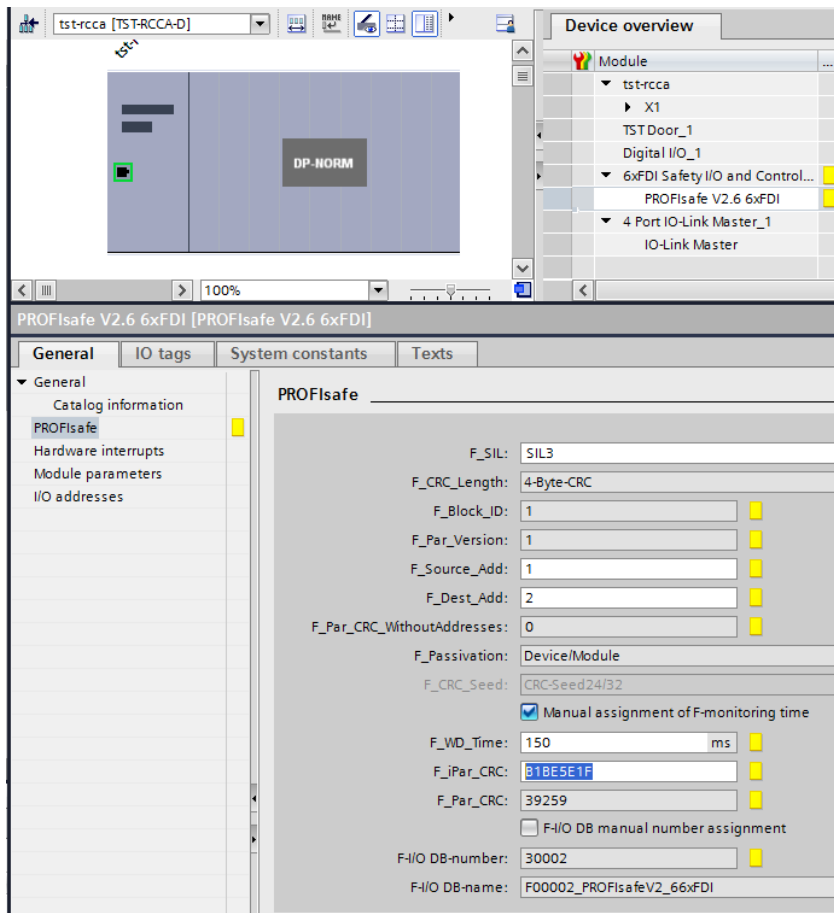


Figure 1: iPar CRC

Debounce time of the digital inputs

The debounce time of the digital inputs can be set in the range from 0ms (debounce off) to 255ms.

This setting can be found in the hardware view of the RCCA in the "Digital I/O_1" submodule.

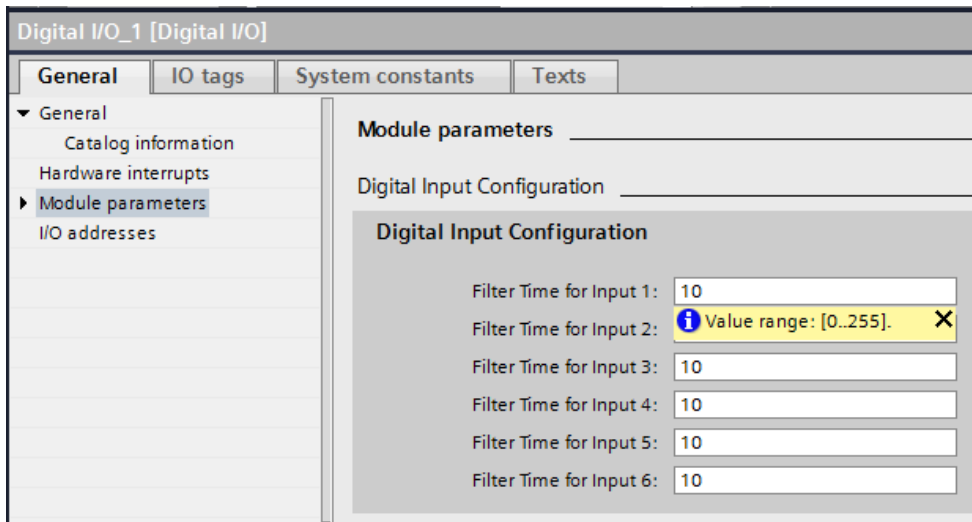


Figure 2: Debouncing

Program blocks

Tags

To simplify the subsequent wiring, create a variable table with the variables shown in Fig. 2 and Fig. 3.

Default tag table				
		Name	Data type	Address
1		Q_DigIn_1	Bool	%Q0.3
2		Q_DigIn_2	Bool	%Q0.4
3		Q_DigIn_3	Bool	%Q0.5
4		m_Enable	Bool	%M1000.0

Figure 3: Variables for program control

Digital inputs				
		Name	Data type	Address
1		Digital_Input_1	Bool	%I1.0
2		Digital_Input_2	Bool	%I1.1
3		Digital_Input_3	Bool	%I1.2
4		Digital_Input_4	Bool	%I1.3
5		Digital_Input_5	Bool	%I1.4
6		Digital_Input_6	Bool	%I1.5

Figure 4: Variables of the input bits

The addresses of the digital inputs can be found under the hardware configuration of the RCCA module.

Device overview							
Module	...	Rack	Slot	I address	Q address	Type	
▼ tst-rcca-a		0	0			TST-RCCA-A	
▶ X1		0	0 X1			tst-rcca	
TST Door and Control_1		0	1	68...91	64...74	TST Door and Control	
Digital I/O_1		0	2	1		Digital I/O	
		0	3				

Figure 5: Address of digital inputs EB1

The "Safety" variable table is only necessary when using RCCA variants B, C and D.

Safety			
	Name	Data type	Address
1	ACK	Bool	%M200.0
2	Q_E-Stop	Bool	%Q3.0
3	Trigger_E-Stop	Bool	%M200.1

Figure 6: Safety variable table

The address of the safe output Q_E-Stop can be found in the "Module list" document. It is byte1/bit0 of the output register in the "PROFIsafe V2.6..." module of the hardware configuration.

Security program

To ensure an error-free sequence, the safety program must also be set up when using RCCA variants B - D. To do this, open the automatically created module "Main_Safety_RTG1" and add the standard modules "ACK_GL" and "ESTOP1" to the safety programme. As the movement function is not to be evaluated in this example, we will dispense with the necessary programme section at this point and only create the modules to ensure error-free start-up. These modules are identical for all fail-safe variants.

Supply the inputs of the modules with the variables previously created in the "Safety" table.

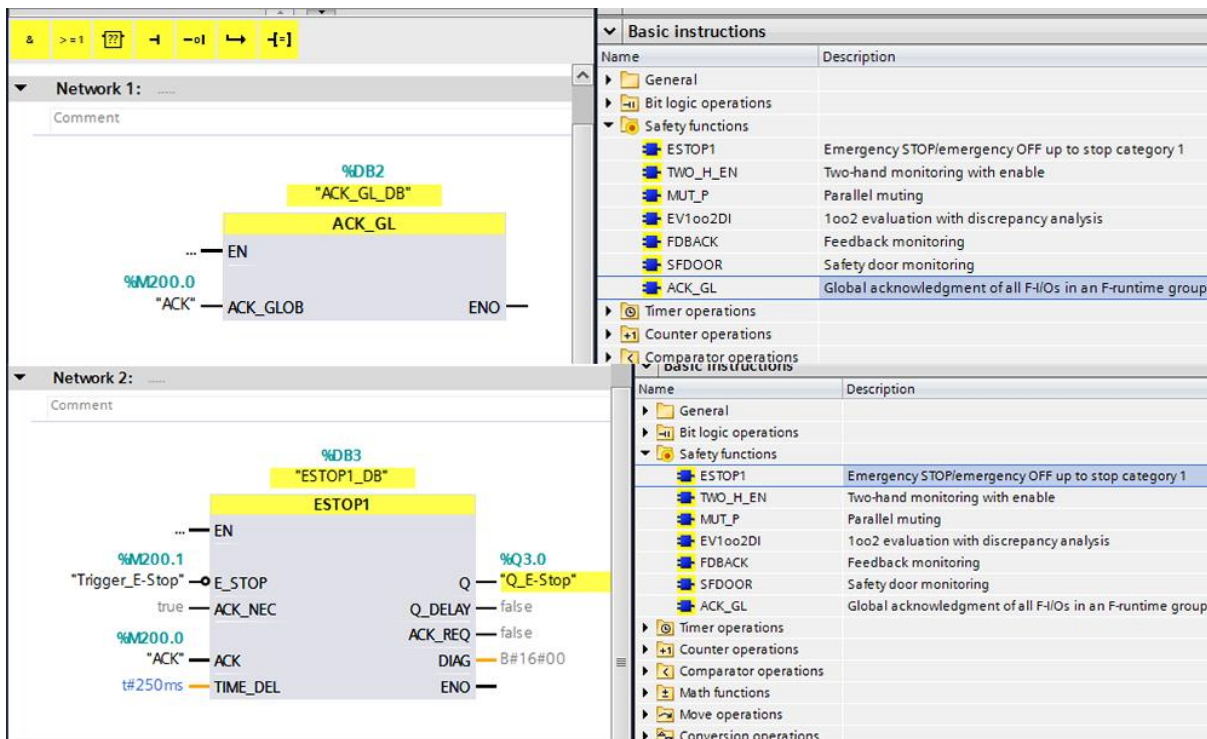


Figure 7: Security program

Example library

Open "Feig RCCA V1.1" under "Global libraries" and copy "Module" and "PLC data types" from the templates to the appropriate place in your project.

Program sequence

The program is processed cyclically in OB1 of the control program.

Data from the digital inputs can be used directly for programme control.

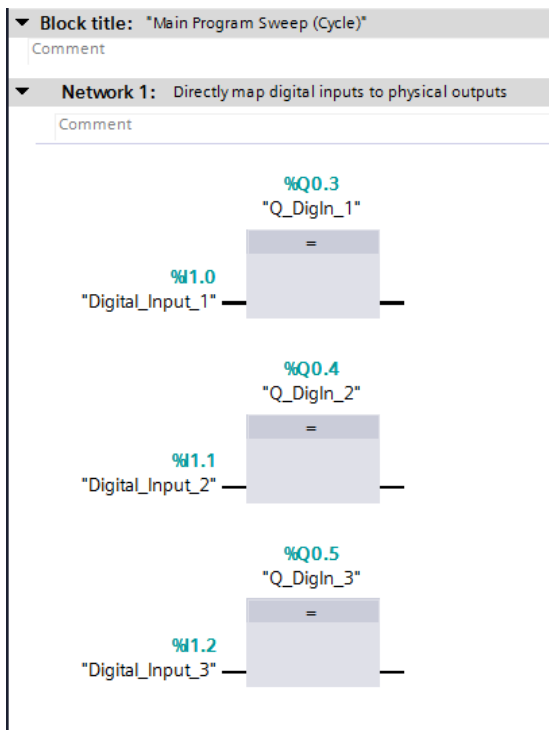


Figure 8: Direct control of outputs

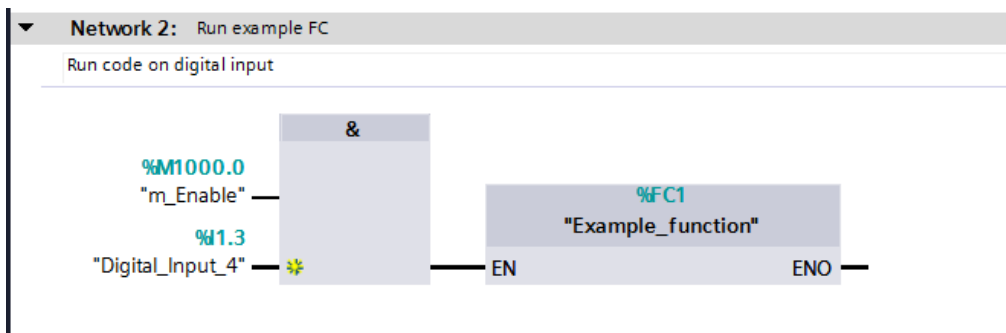


Figure 9: Digital input controls program sequence

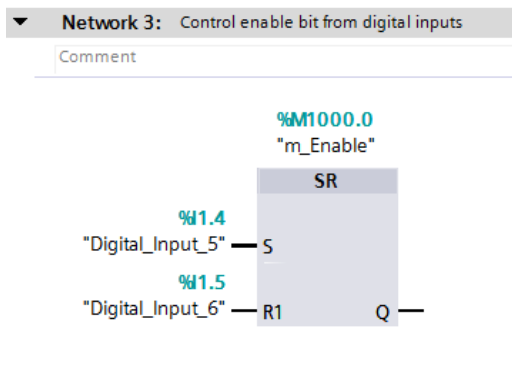
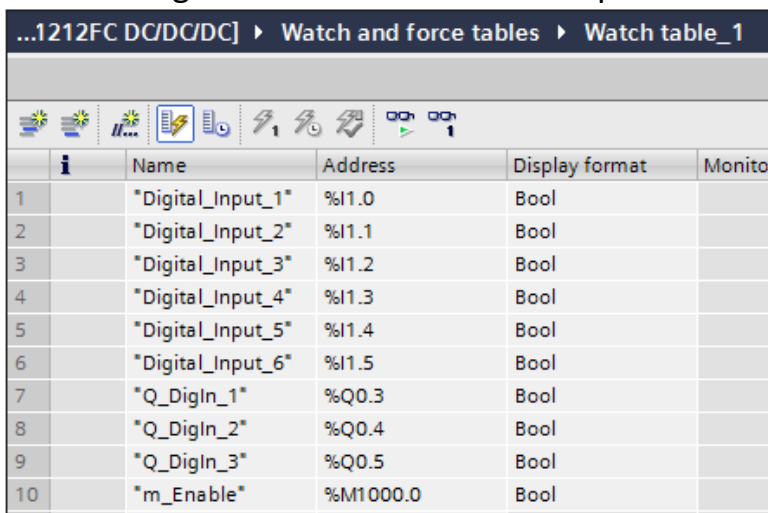


Figure 10: Digital inputs control enable

Watch and control

Now translate and transfer the hardware configuration and control programme. The processing of the digital inputs can now be read directly from the output indicators of the control unit. As the physical outputs 4 - 6 of the PLC are directly linked to the digital inputs 1 - 3, the output directly represents the status of the input.

To monitor all functions and input states, create a new monitoring table under "Monitoring and force tables" and complete it as shown in Figure 11.



	i	Name	Address	Display format	Monito
1		*Digital_Input_1*	%I1.0	Bool	
2		*Digital_Input_2*	%I1.1	Bool	
3		*Digital_Input_3*	%I1.2	Bool	
4		*Digital_Input_4*	%I1.3	Bool	
5		*Digital_Input_5*	%I1.4	Bool	
6		*Digital_Input_6*	%I1.5	Bool	
7		*Q_DigIn_1*	%Q0.3	Bool	
8		*Q_DigIn_2*	%Q0.4	Bool	
9		*Q_DigIn_3*	%Q0.5	Bool	
10		*m_Enable*	%M1000.0	Bool	

Figure 11: Control and Watch