



SoMachine application to communicate with SoSafe controller XPSMCM

Using Modbus TCP, Ethernet
IP and CANopen





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Introduction

Overview

This chapter gives the introduction.

Contents of this chapter

This chapter contains the following topics:

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Before You Begin

General

The products specified in this document have been tested under actual service conditions. Of course, your specific application requirements may be different from those assumed for this and any related examples described herein. In that case, you will have to adapt the information provided in this and other related documents to your particular needs. To do so, you will need to consult the specific product documentation of the hardware and/or software components that you may add or substitute for any examples specified in this documentation. Pay particular attention and conform to any safety information, different electrical requirements and normative standards that would apply to your adaptation.

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WARNING

REGULATORY INCOMPATIBILITY

Be sure that all equipment applied and systems designed comply with all applicable local, regional and national regulations and standards

Failure to follow these instructions can result in death, serious injury, or equipment damage.

Please Note

Electrical equipment should be installed, operated, serviced, and maintained only by qualified personnel. No responsibility is assumed by Schneider Electric for any consequences arising out of the use of this material. A qualified person is one who has skills and knowledge related to the construction and operation of electrical equipment and its installation, and has received safety training to recognize and avoid the hazards involved. Failure to observe this information can result in injury or equipment damage.



The use and application of the information contained herein require expertise in the design and programming of automated control systems. Only the user or integrator can be aware of all the conditions and factors present during installation and setup, operation, and maintenance of the machine or process, and can therefore determine the automation and associated equipment and the related safeties and interlocks which can be effectively and properly used. When selecting automation and control equipment, and any other related equipment or software, for a particular application, the user or integrator must also consider any applicable local, regional or national standards and/or regulations.

Some of the major software functions and/or hardware components used in the proposed architectures and examples described in this document cannot be substituted without significantly compromising the performance of your application. Further, any such substitutions or alterations may completely invalidate any proposed architectures, descriptions, examples, instructions, wiring diagrams and/or compatibilities between the various hardware components and software functions specified herein and in related documentation. You must be aware of the consequences of any modifications, additions or substitutions.

A residual risk, as defined by EN/ISO 12100-1, Article 5, will remain if

- it is necessary to modify the recommended logic and if the added or modified components are not properly integrated in the control circuit.
- you do not follow the required standards applicable to the operation of the machine, or if the adjustments to and the maintenance of the machine are not properly made (it is essential to strictly follow the prescribed machine maintenance schedule).
- the devices connected to any safety outputs do not have mechanically-linked contacts.

CAUTION

EQUIPMENT INCOMPATIBILITY

Read and thoroughly understand all device and software documentation before attempting any component substitutions or other changes related to the application examples provided in the document

Failure to follow these instructions can result in injury, or equipment damage.



Start-Up and Test

Before using electrical control and automation equipment after design and installation, the application and associated functional safety system must be subjected to a start-up test by qualified personnel to verify correct operation of the equipment. It is important that arrangements for such testing be made and that enough time is allowed to perform complete and satisfactory testing.

CAUTION

EQUIPMENT OPERATION HAZARD

- Verify that all installation and set up procedures have been completed.
- Before operational tests are performed, remove all blocks or other temporary holding means used for shipment from all component devices
- Remove tools, meters, and debris from equipment.

Failure to follow these instructions can result in injury, or equipment damage.

Verify that the completed system, including the functional safety system, is free from all short circuits and grounds, except those grounds installed according to local regulations. If high-potential voltage testing is necessary, follow the recommendations in equipment documentation to help prevent injury or equipment damage.



Operations and Adjustments

General

Regardless of the care exercised in the design and manufacture of equipment or in the selection and ratings of components, there are hazards that can be encountered if such equipment is improperly installed and operated.

In some applications, such as packaging machinery, additional operator protection such as point-of-operation guarding must be provided. This is necessary if the hands and other parts of the body are free to enter the pinch points or other hazardous areas where serious injury can occur. Software products alone cannot protect an operator from injury. For this reason, the software cannot be substituted for or take the place of point-of-operation protection.

WARNING

UNGUARDED MACHINERY CAN CAUSE SERIOUS INJURY

- Do not use this software and related automation equipment on equipment which does not have point-of-operation protection.
- Do not reach into machinery during operation.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

Ensure that appropriate safeties and mechanical/electrical interlocks related to point-of-operation protection have been installed and are operational before placing the equipment into service. All interlocks and safeties related to point-of-operation protection must be coordinated with the related automation equipment and software programming.

NOTE: Coordination of safeties and mechanical/electrical interlocks for point-of-operation protection is outside the scope of the examples and implementations suggested herein. It is sometimes possible to adjust the equipment incorrectly and this produce unsatisfactory or unsafe operation. Always use the manufacturer instructions as a guide to functional adjustments. Personnel who have access to these adjustments must be familiar with the equipment manufacturer instructions and the machinery used with the electrical equipment. Only those operational adjustments actually required by the machine operator should be accessible to the operator. Access to other controls should be restricted to help prevent unauthorized changes in operating characteristics.



XPSMCM Communication module's

Supported modules and related firmware

EtherNet/IP	XPSMCMCO0000EI•	V1.8
Modbus TCP/IP	XPSMCMCO0000EM•	V1.8
CANopen	XPSMCMCO0000CO•	V1.8

The CANopen device is not integrated in SoMachine so use



XPSMCM_CanOpen_V5_1_20160615_1550.eds

Use SoMachine V4.1 SP2 or newer.

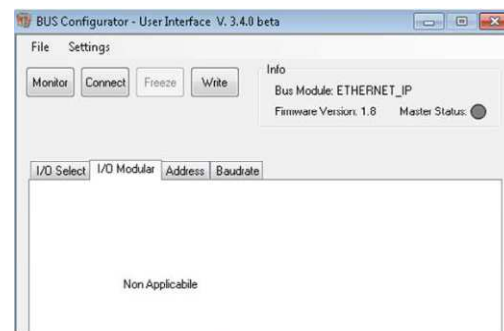
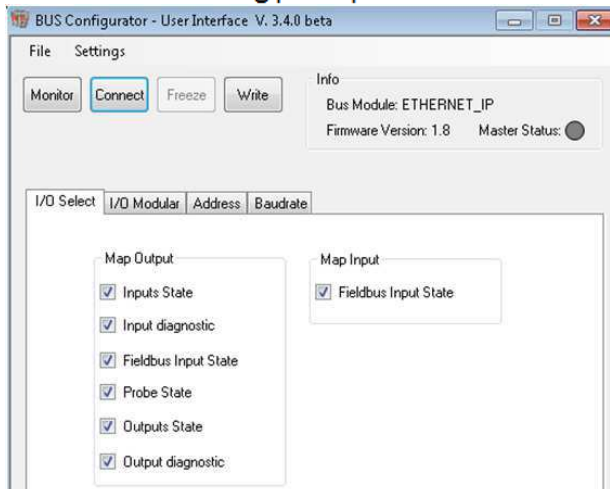


Communication Data

With default configuration of Bus Configurator, addressing of data is basing to a static process image.
The hardware setup in Safety Designer does not affect the address size.
Only unselecting features in Bus Configurator affects to length of the process image.
In pictures 5 and 6 presented the default configuration for FW V1.8 and in table 4 addressing.

	Size[b]	Modbus traditional	Modbus IEC 61131-3	Ethernet/IP
Fieldbus input	1	40001lb	%MW0 lb	96 _h /1 _h
System status	1	30001lb	%MW256 lb	64 _h /1 _h
Inputs status*	16	30001hb...30009lb	%MW256hb...%MW264lb	64 _h /2 _h ...64 _h /17 _h
Fieldbus inputs*	1	30009hb	%MW264hb	64 _h /18 _h
Fieldbus probe*	2	30010lb...30010hb	%MW265lb...%MW265hb	64 _h /19 _h ...64 _h /20 _h
OSSD & RO status*	2	30011lb...30011hb	%MW266lb...%MW266hb	64 _h /21 _h ...64 _h /22 _h
Diagnostic index and code*/**	2	30012lb...30012hb	%MW267lb...%MW267hb	64 _h /23 _h ...64 _h /24 _h
* Must not be unselected in I/O select tab to reserve bytes				
** Must not be unselected both "Input diagnostic" and "output diagnostic" in I/O select tab to reserve bytes				

Table 4. Addressing principle of default setting with FW V1.8



Picture 5. Default selection of the setup list in I/O select tab for FW V1.8

Picture 6. Default view to the frame size tab for FW V1.8



The union data type XPSMCM_CM allow a common access to the XPSMCM values independent from the communication protocol created.



- MODBUS-TCP with WRITE_READ_VAR function blocks
- MODBUS-TCP with IO Scanner
- ETHERNET-IP Scanner
- CANopen device

The screenshot illustrates the configuration of a Modbus TCP Slave in the SIMATIC Manager. The project tree on the left shows the hierarchy starting from 'MyContr_CAN (TM2S8LF4ZDT)'. The main workspace is divided into several tabs, with 'Modbus TCP Slave Configuration' being the active one. This tab contains a table defining the mapping between application variables, communication channels, and memory addresses.

Variable	Mapping	Channel	Address	Type
Inputs				
+ Application.StatusMTC.slMTCP[0]		XPSMCHTCP	W#96	WORD
+ Application.StatusMTC.slMTCP[1]		XPSMCHTCP	W#98	WORD
+ Application.StatusMTC.slMTCP[2]		XPSMCHTCP	W#100	WORD
+ Application.StatusMTC.slMTCP[3]		XPSMCHTCP	W#102	WORD
+ Application.StatusMTC.slMTCP[4]		XPSMCHTCP	W#104	WORD
+ Application.StatusMTC.slMTCP[5]		XPSMCHTCP	W#106	WORD
+ Application.StatusMTC.slMTCP[6]		XPSMCHTCP	W#108	WORD
+ Application.StatusMTC.slMTCP[7]		XPSMCHTCP	W#110	WORD
+ Application.StatusMTC.slMTCP[8]		XPSMCHTCP	W#112	WORD
+ Application.StatusMTC.slMTCP[9]		XPSMCHTCP	W#114	WORD
+ Application.StatusMTC.slMTCP[10]		XPSMCHTCP	W#116	WORD
+ Application.StatusMTC.slMTCP[11]		XPSMCHTCP	W#118	WORD
Outputs				
+ Application.FieldbusInputMTC		XPSMCHTCP	W#96	WORD

To the right of this table is the 'Watch I' section, which lists the monitored expressions. A red box highlights the entry for 'MyContr_MB.Application.GVL_MB_SCANNER.StatusMTC', which is mapped to the 'XPSMCHM_CAN' channel at address 'W#96'. The value column shows the current state as '10 K'.