



iO-GRID X Series

GX-CL140

ModbusTCP coupler

with CoDeSys



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1. Solution

1.1 Install “CoDeSys V3”

Download “CoDeSys V3.5 Patch 4” demo version, available on:

http://www.3s-software.com/index.shtml?en_download

Start “setup.exe” and follow installation instructions.

Take care that both products “IDE” and “SoftPLC” will be installed.

1.2 Create a new project

Select “Menu -> File -> New Project...” or press [Ctrl] + N.

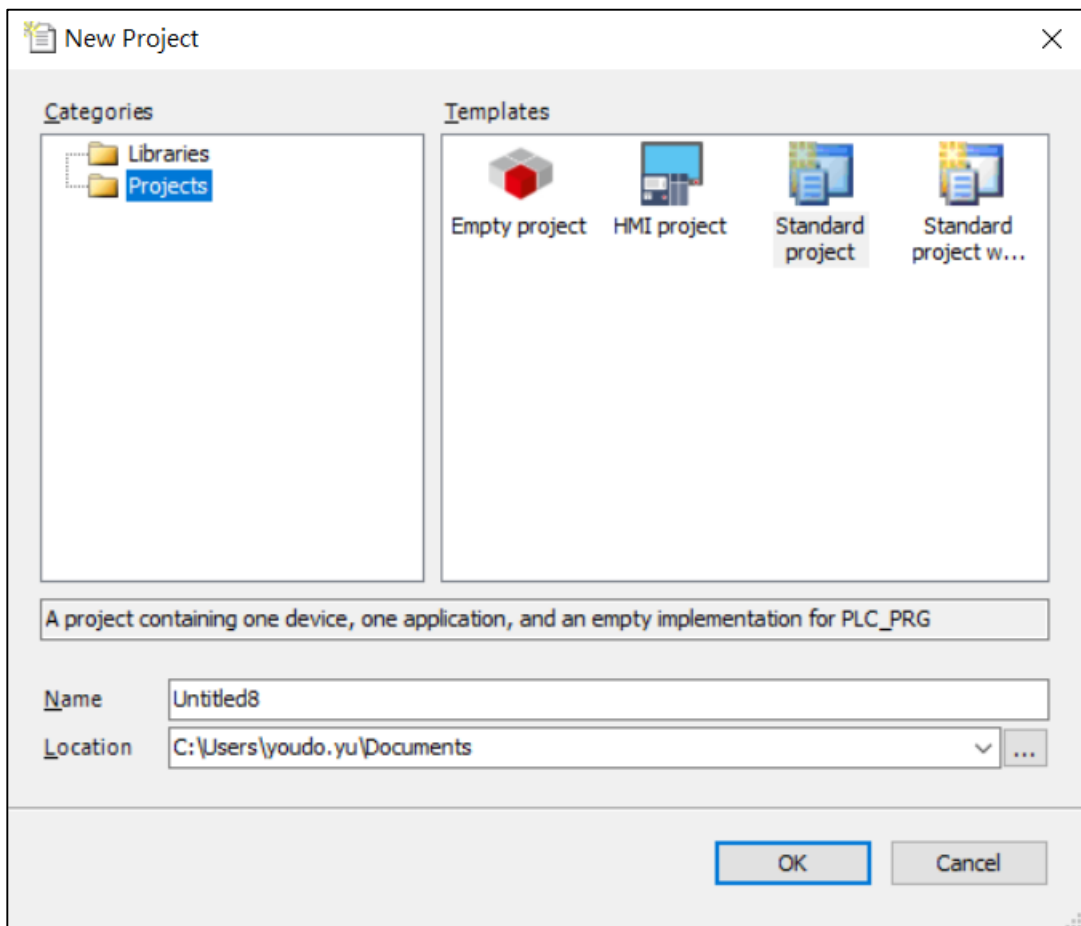


Fig1.1 Create a new project

Select “Standard project” and assign name and storage folder.

Afterwards press button “OK”

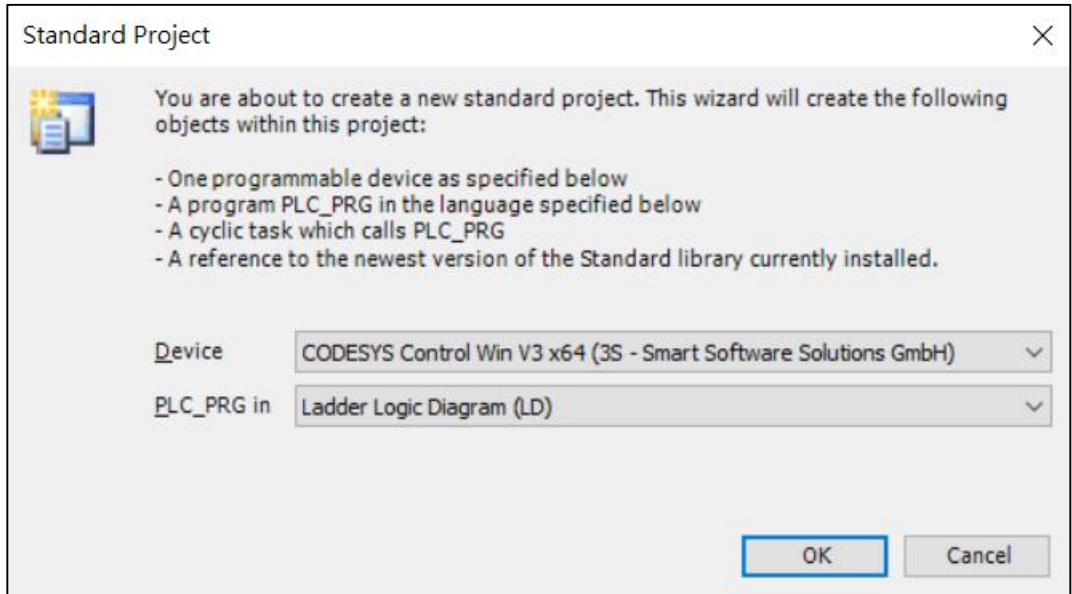


Fig1.2 Create a new project

Select “CoDeSys Control Win V3 x64” as target device and programming language for PLC_PRG. Afterwards press button “OK”.

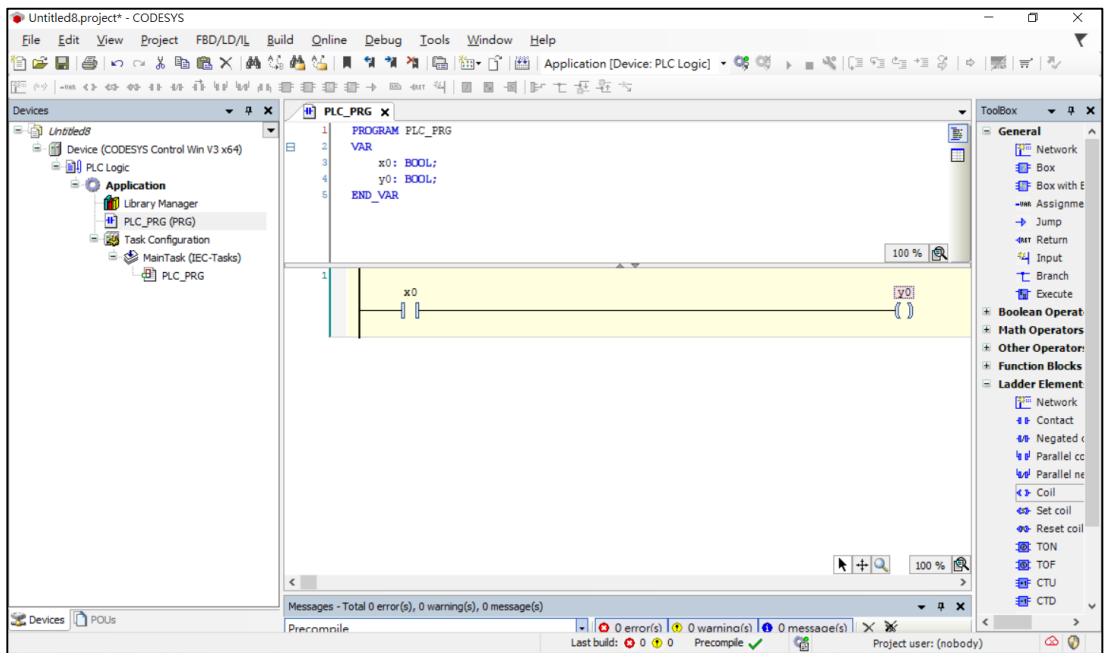


Fig1.3 Create a new project

1.3 Add ModbusTCP device

Open background menu with a right mouse button click on “Device(CoDeSys Control Win V3 x64)”

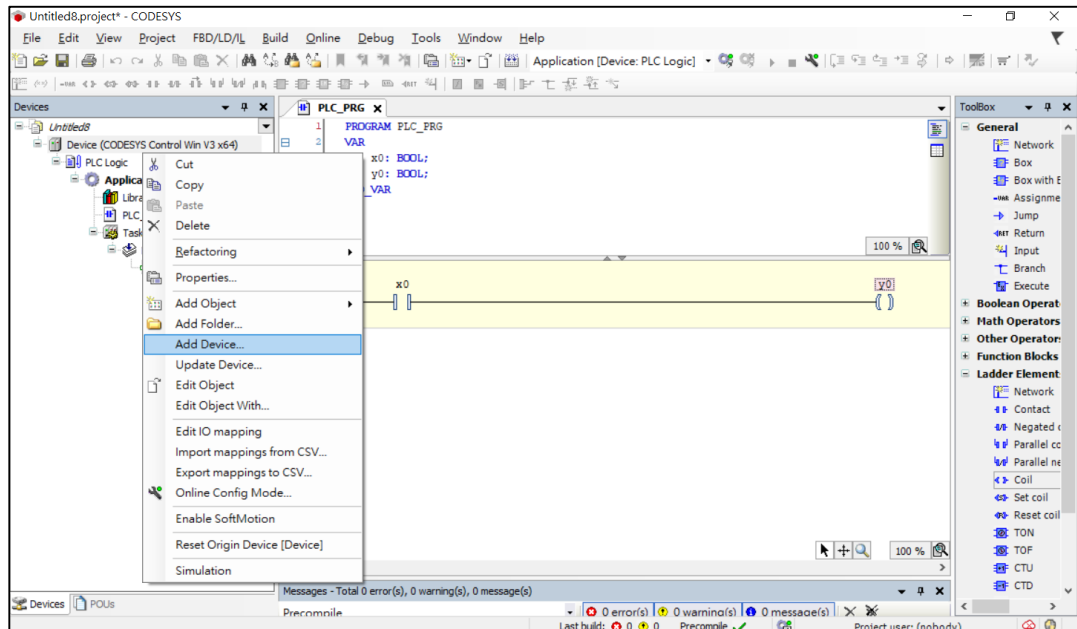


Fig1.4 Add ModbusTCP device

Select “Add Device ...”.

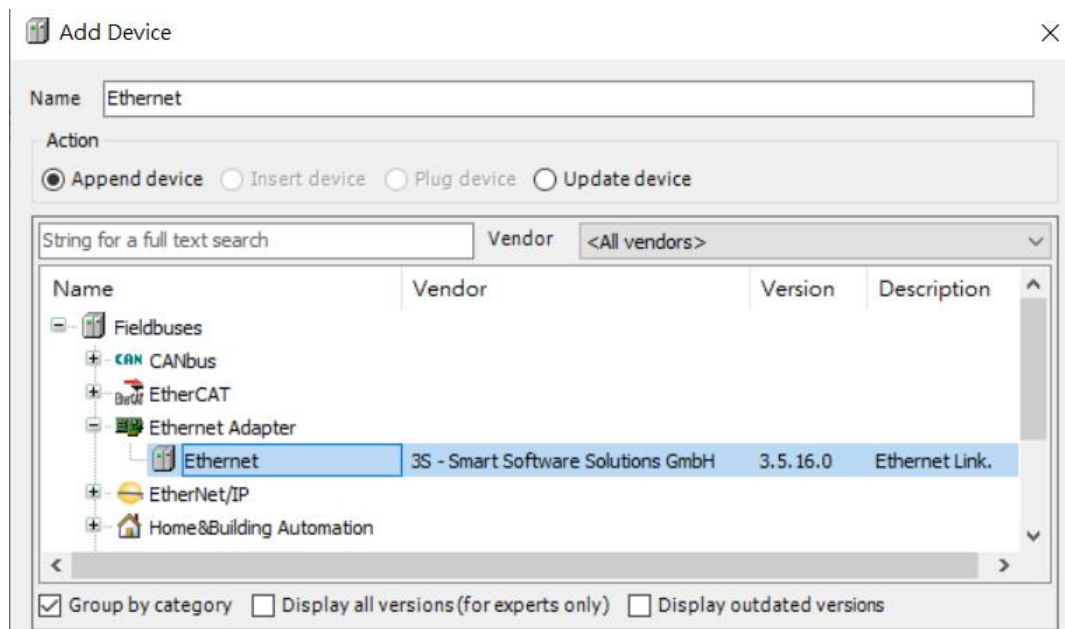


Fig1.5 Add ModbusTCP device

Select “Ethernet” and press button “Add Device”. Afterwards leave dialog with a click on button “Close”.

The wizard adds the ModbusTCP device to control it.

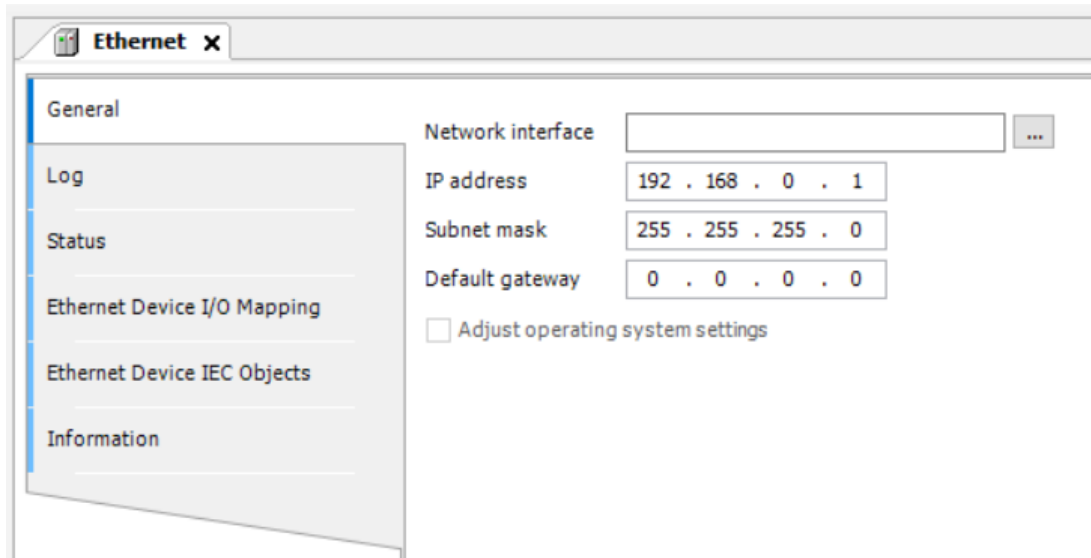


Fig1.6 Add ModbusTCP device

Press browse to select the network adapter. Make sure the gateway is active and the path to the soft plc is activated.

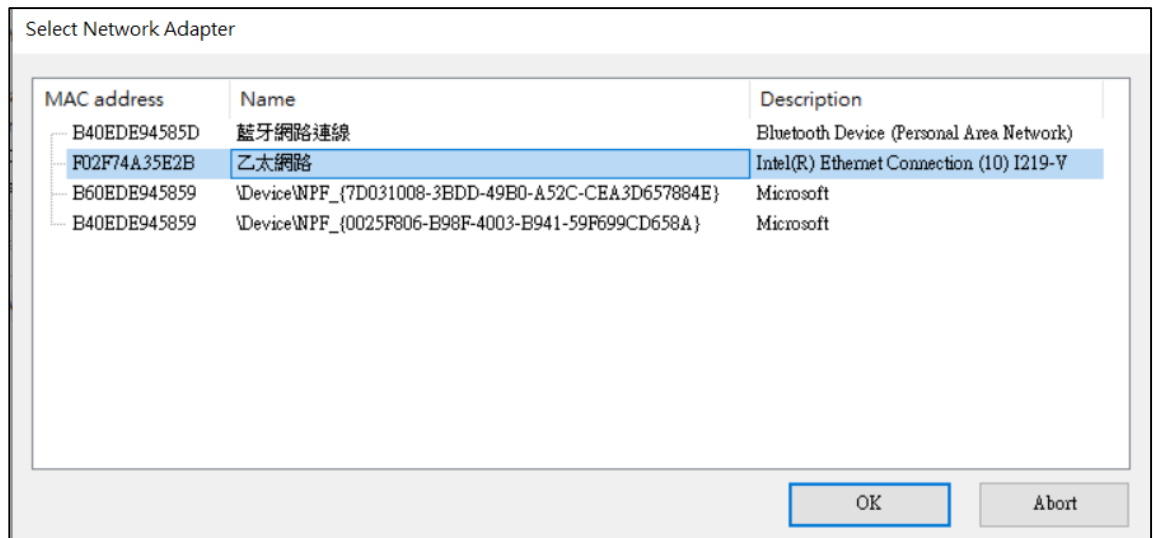


Fig1.7 Select Network Adapter

Open background menu with a right mouse button click on
 “Ethernet(Ethernet)”

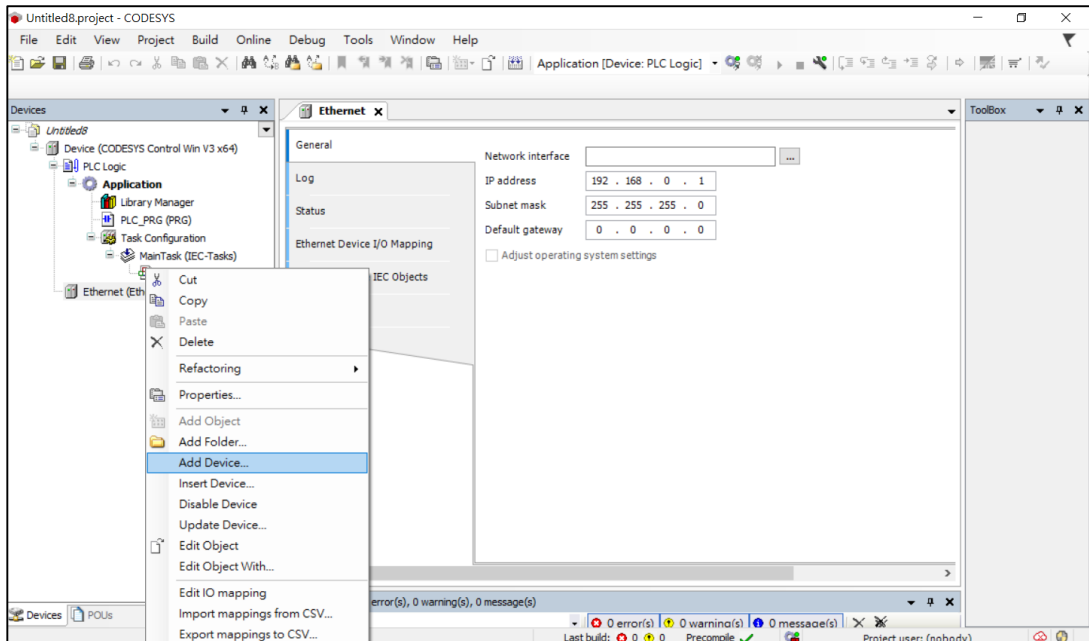


Fig1.8 Add ModbusTCP device

Select “Add Device ...”

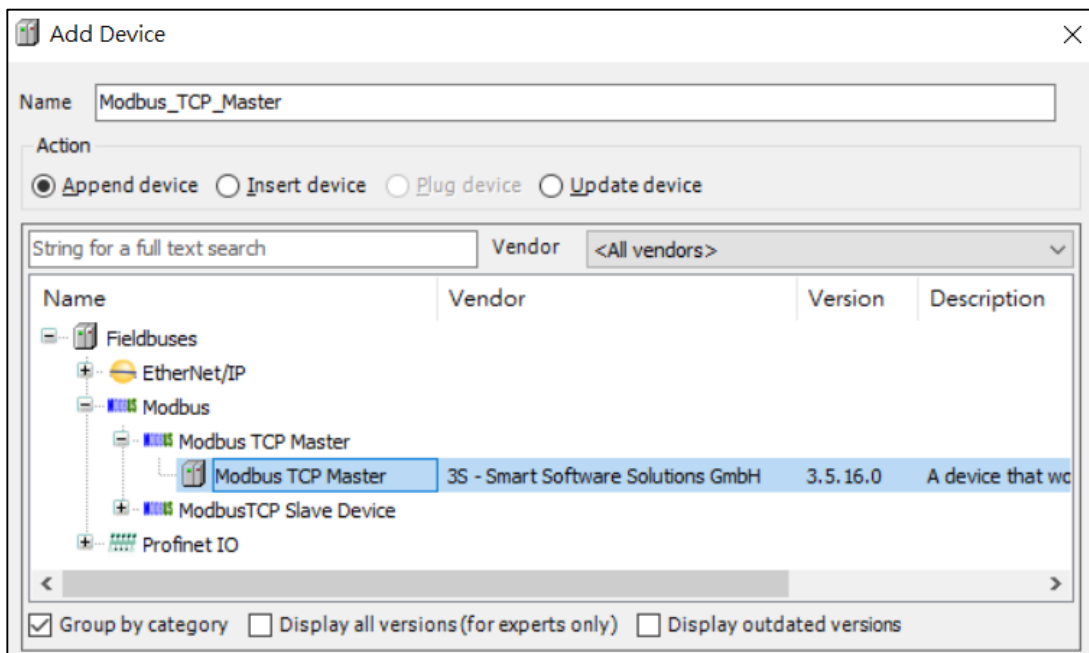


Fig1.9 Add ModbusTCP device

Select “Modbus TCP Master” and press button “Add Device”.

Afterwards leave dialog with a click on button “Close”.

1.4 Add ModbusTCP-Slave device

Open background menu with a right mouse button click on

“Modbus_TCP_Master (Modbus_TCP_Master)”

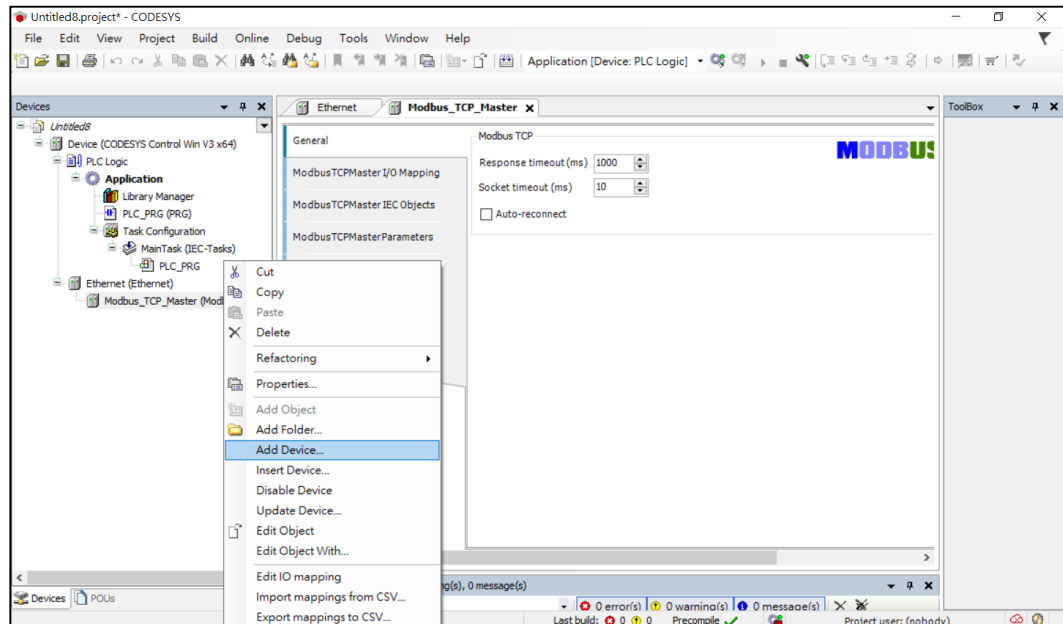


Fig1.10 Add ModbusTCP-Slave device

Select “Add Device ...”

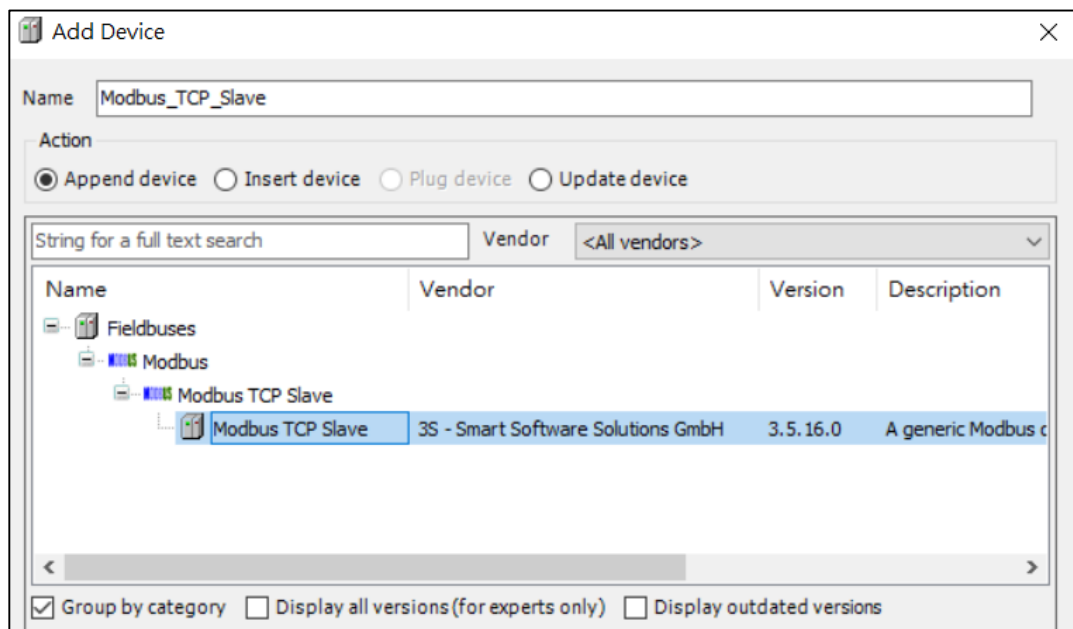


Fig1.11 Add ModbusTCP-Slave device

Select “Modbus TPC Slave” and press button “Add Device”.

Afterwards leave dialog with a click on button “Close”.

1.5 Assign variables

Choose the Modbus_TCP_Slave. Add ModbusTCP Slave Channel

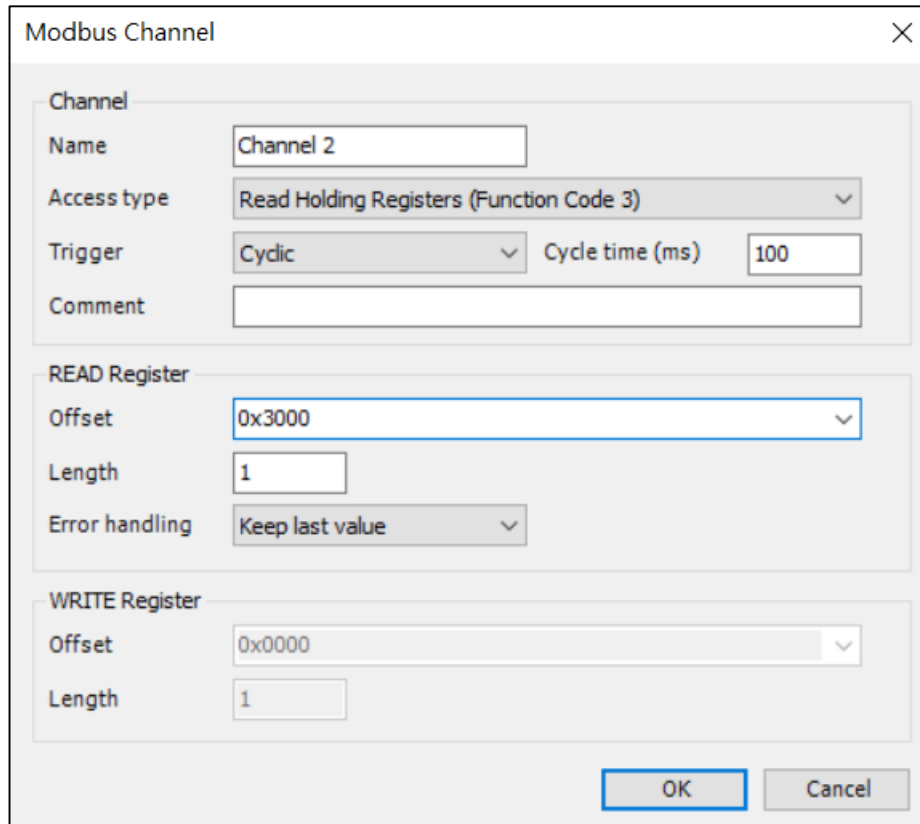


Fig1.12 Add ModbusTCP Slave Channel

Assign variables to the ModbusTCP Slave Channel

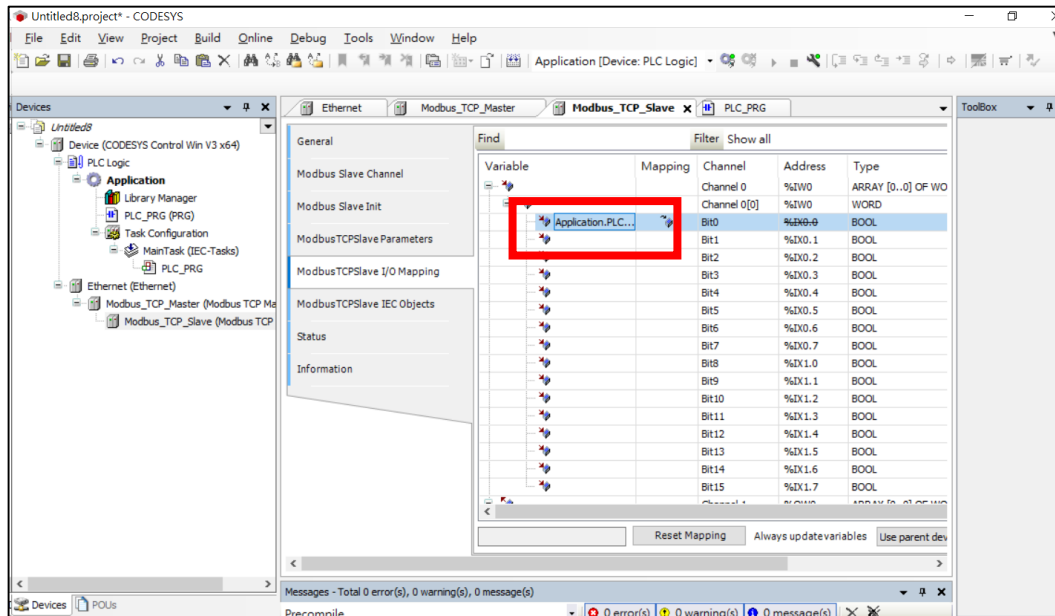


Fig1.16 Assign variables

2. Modbus rules

2.1 Modbus Function Code Information

Function Code	Details	Unit
0x01	Read Coils	byte
0x02	Read Discrete Inputs	byte
0x03	Read Holding Registers	Word
0x04	Read Input Registers	Word
0x05	Write Single Coil	byte
0x06	Write Single Register	Word
0x0F	Write Multiple Coils	byte
0x10	Write Multiple registers	Word

2.2 Modbus Starting Address Allocation, Sizes and Corresponding FC

IO modules assigned by the coupler are sorted based on the module order. Digital and analog module's locations are assigned separately based on the module order with the station numbers assigned at the rail. Digital inputs and outputs have the initial value of 0x0000 and can read 8192bit of data. Analog input modules have the initial value of 0x3000 and can read 512Words of data while analog output modules have the initial value of 0x4000 and can read 512Words of data. Error codes' initial value is 0xE000 and can read 6Words of data.

Register	ADDR	Funtion Code(FC)	Size
1x_Discrete Input	0x0000	02	8192Bits
	0x1000	03 、 04	512Words
0x_Coil	0x0000	01 、 05 、 0F	8192Bits
	0x2000	03 、 10	512Words
3x_Input Register	0x3000	03 、 04	512Words
4x_Holding Register	0x4000	03 、 06 、 10	512Words
System Diagnosis	0xE000	03 、 04	6 Words

Register Address and the List of Supported Control Modules:

Register	ADDR	Corresponding Control Modules
1x_Discrete Input	0x0000	DIxxN 、 DIxxP 、 CM111 (SubM_read_xxBit、SubMS_Status_xxDev、SubS_read_xxByte)
	0x1000	
0x_Coil	0x0000	DQxxN 、 DQxxP 、 CM111 (SubM_write_xxBit、SubM_Control_Output_xxDev、SubS_write_xxByte)
	0x2000	
3x_Input Register	0x3000	AIxxV 、 AIxxC 、 RT200 、 TC200 、 HC100 、 CM111 (SubM_Read_xxWords、SubMS_ErrorInfo_xxDev、SubM_Polling_Time(ms)、SubS_Read_xxWords)
4x_Holding Register	0x4000	AQxxV 、 AQxxC 、 HC100 、 CM111 (SubM_Write_xxWords、SubS_Write_xxWords)

Illustration: If the coupler scans and finds 9 modules on the rail as below:

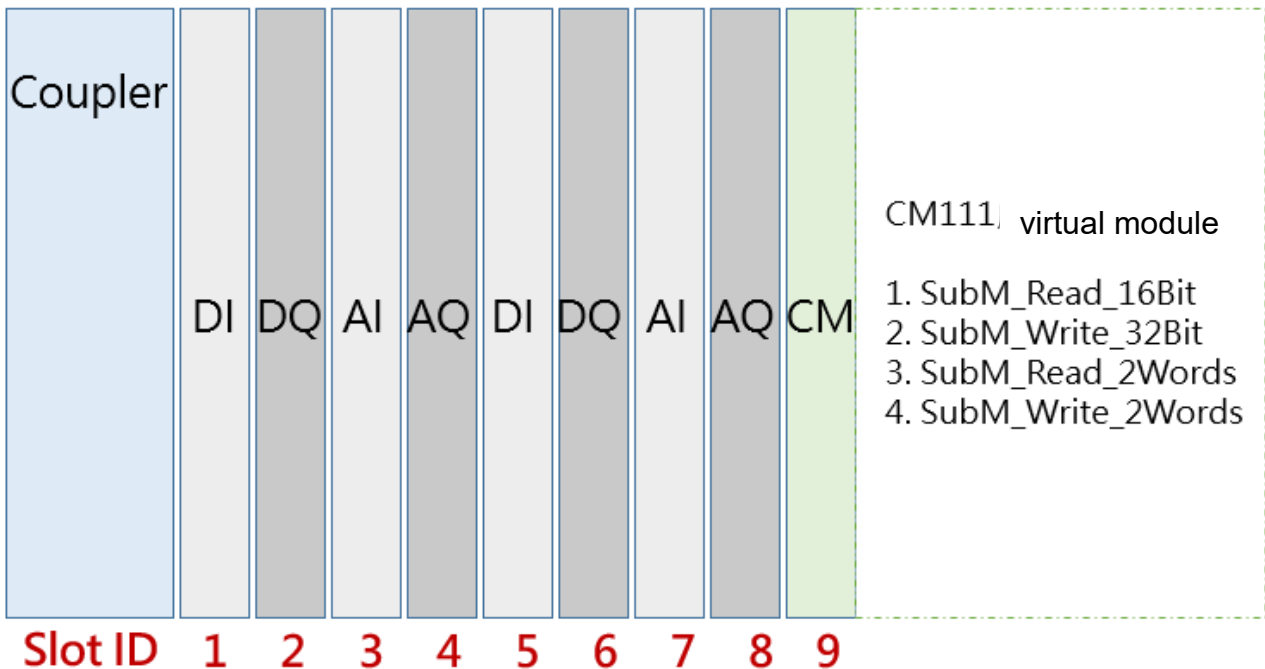


Fig 6. 6 Emulated Module Layout



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Modules assignments are listed below based on different types of sorting:

Slot ID	Module	Data Length	Bit ADDR 排序		Bit ADDR Sorting Word ADDR Sorting	
			Input Address	Output Address	Input Address	Output Address
1	DI	1	0x0000~ 0x000F	--	0x1000	--
2	DQ	1	--	0x0000~ 0x000F	--	0x2000
3	AI	4	--	--	(CH1) 0x3000 (CH2) 0x3001 (CH3) 0x3002 (CH4) 0x3003	--
4	AQ	4	--	--	--	(CH1) 0x4000 (CH2) 0x4001 (CH3) 0x4002 (CH4) 0x4003
5	DI	1	0x0010~ 0x001F	--	0x1001	--
6	DQ	1	--	0x0010~ 0x001F	--	0x2001
7	AI	4	--	--	(CH1) 0x3004 (CH2) 0x3005 (CH3) 0x3006 (CH4) 0x3007	--
8	AQ	4	--	--	--	(CH1) 0x4004 (CH2) 0x4005 (CH3) 0x4006 (CH4) 0x4007
9	CM	1	0x0020~ 0x002F	--	0x1002	--
	CM	2	--	0x0020~ 0x003F	--	0x2002 0x2003
	CM	2	--	--	0x3008 0x3009	--
	CM	2	--	--	--	0x4008 0x4009