CODESYS Quick-Start Guide

cMT-X Series and iR Modules

and using them with CODESYS

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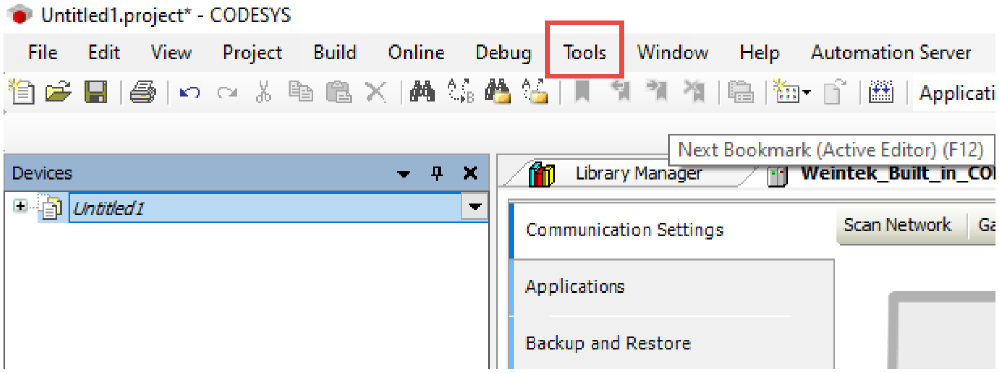
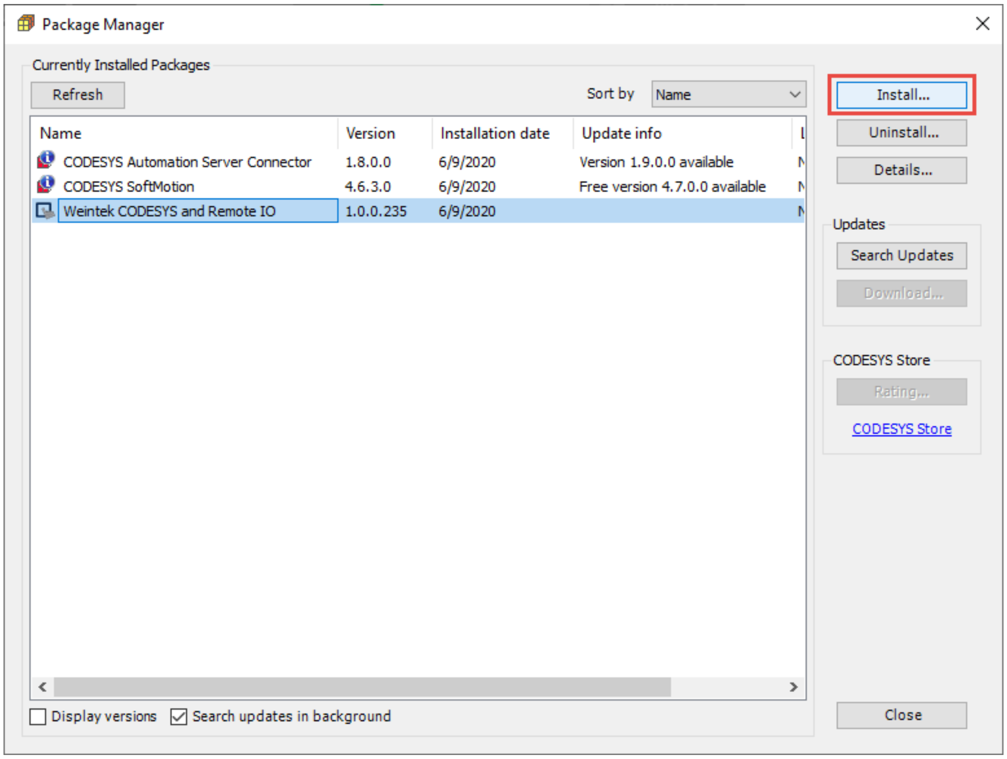
Set up CODESYS and Device

Note that if you are using the cMT-CTRL01, please refer to the cMT-CTRL01 User Manual for instructions on getting started with CODESYS specific to that model.

1. Create a CODESYS account and download CODESYS v3.5.10.
    a. If in the USA, Canada, or Mexico, use this link: https://us.store.codesys.com/customer/account/login/. Otherwise, use https://store.codesys.com/.
2. Download the Weintek package file and install the package in CODESYS.
    a. Select Tools -> Package Manager:



    b. Click Install and select the Weintek package file:



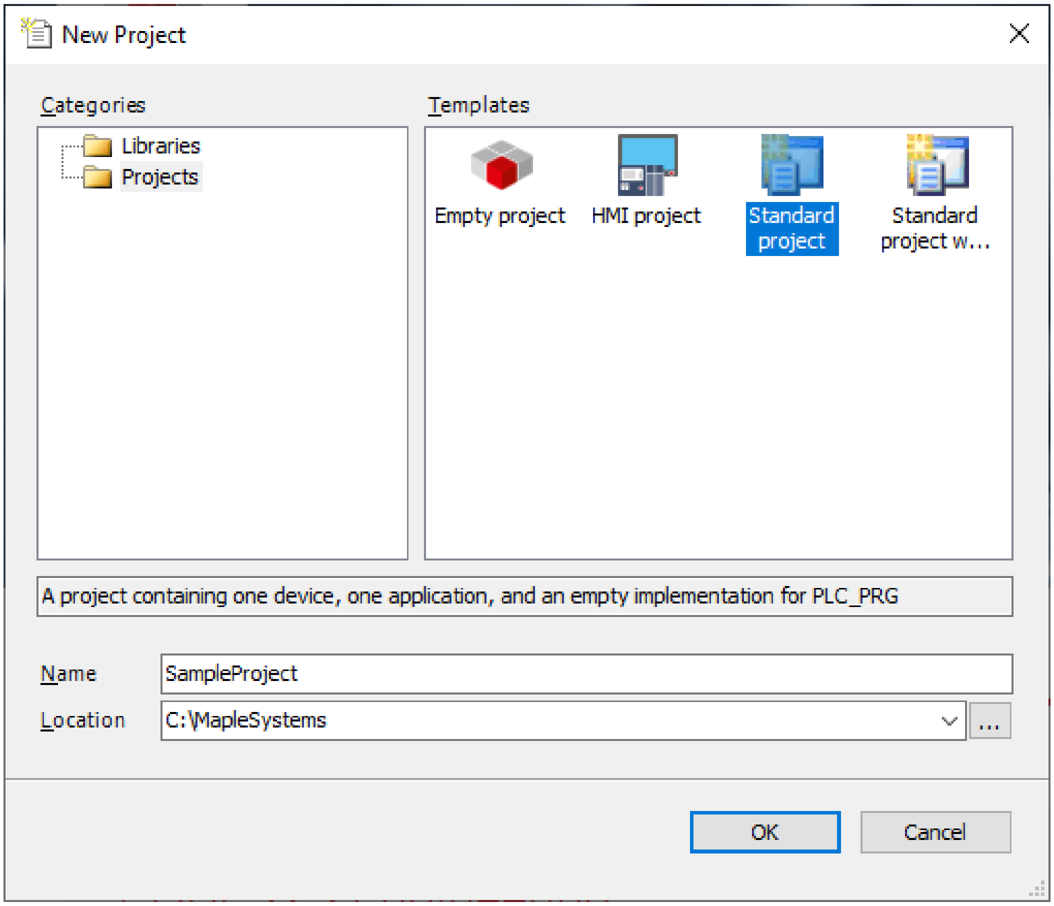
Name	Version	Installation date	Update info
CODESYS Automation Server Connector	1.8.0.0	6/9/2020	Version 1.9.0.0 available
CODESYS SoftMotion	4.6.3.0	6/9/2020	Free version 4.7.0.0 available
Weintek CODESYS and Remote IO	1.0.0.235	6/9/2020	

☐ Display versions ☑ Search updates in background

3. Activate CODESYS on your cMT device by connecting it to the internet, opening the HMI system settings menu, unlocking it, select the Network tab and ensure Obtain an IP Address Automatically is enabled. Then open the CODESYS tab and enter the CODESYS Activation Code and click Active.

Creating a CODESYS Project

1. Create a new project in CODESYS using the Weintek Built-in CODESYS device.
    a. Select File -> New Project, then select Standard Project from the menu:



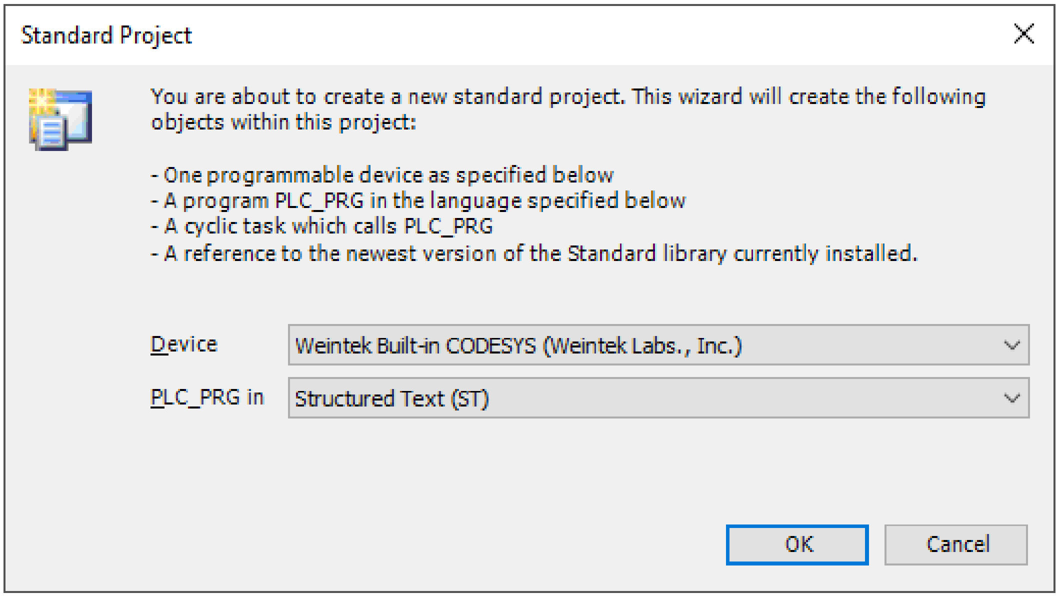
New Project

A project containing one device, one application, and an empty implementation for PLC_PRG

Name: SampleProject

Location: C:\MapleSystems

    b. In the Standard Project menu, select the Weintek Built-in CODESYS (Weintek Labs., Inc.) device:



Standard Project

You are about to create a new standard project. This wizard will create the following objects within this project:

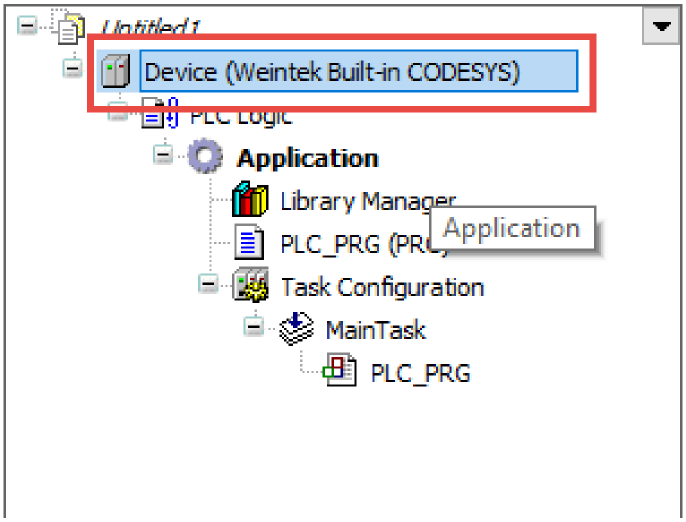
- One programmable device as specified below
- A program PLC_PRG in the language specified below
- A cyclic task which calls PLC_PRG
- A reference to the newest version of the Standard library currently installed.

Device: Weintek Built-in CODESYS (Weintek Labs., Inc.)

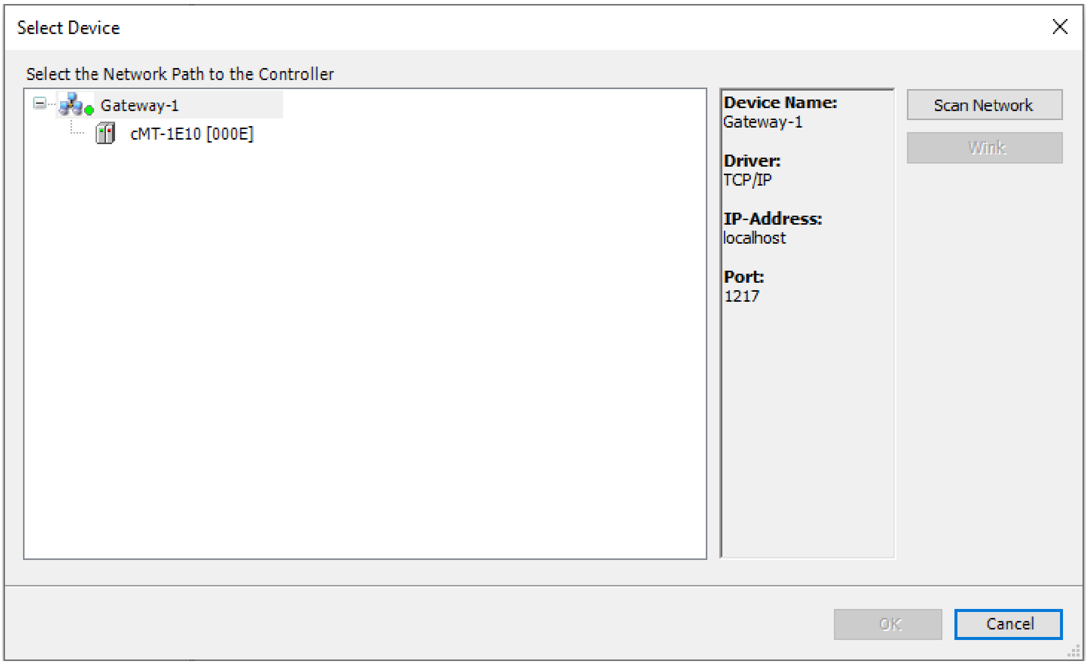
PLC_PRG in: Structured Text (ST)

2. Scan for your newly Activated HMI and connect to it.

   a. Double click on the Device in the Devices pane:



   b. Click Scan Network and select the cMT-X device. Note that the last two IP address octets are converted to hex and used the identifier in square brackets seen here as cMT-1E10 **[000E]**. This makes the IP address of this cMT device xxx.xxx.0.14:



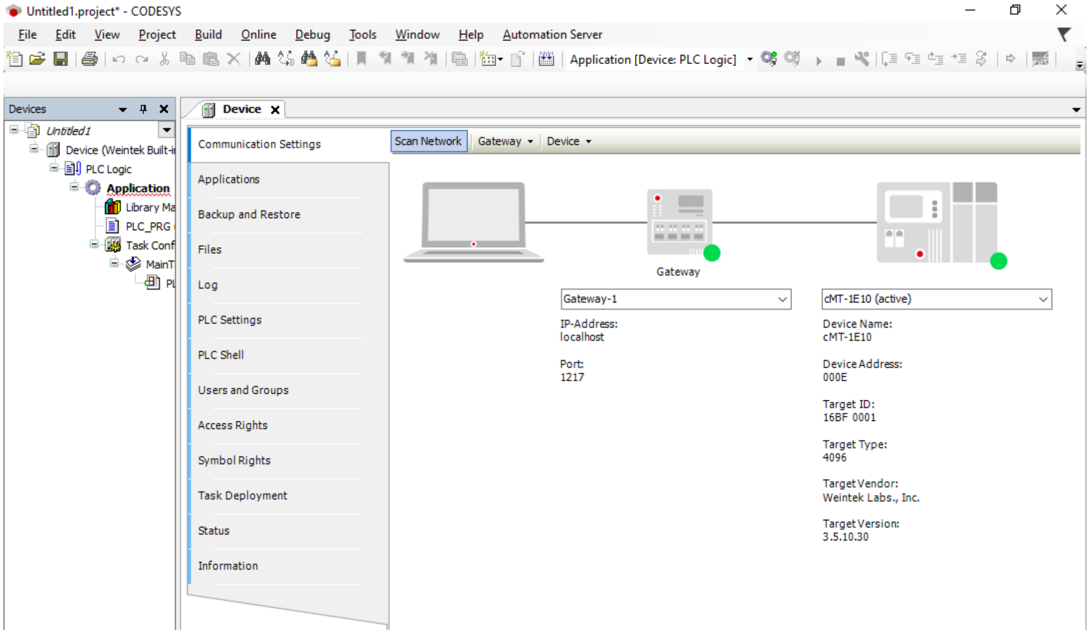
Device Name:
Gateway-1

Driver:
TCP/IP

IP-Address:
localhost

Port:
1217

c. Now you should see the connection from PC to cMT-X in the Scan Network tab:



Gateway

Gateway-1

IP-Address:
localhost

Port:
1217

cMT-1E10 (active)

Device Name:
cMT-1E10

Device Address:
000E

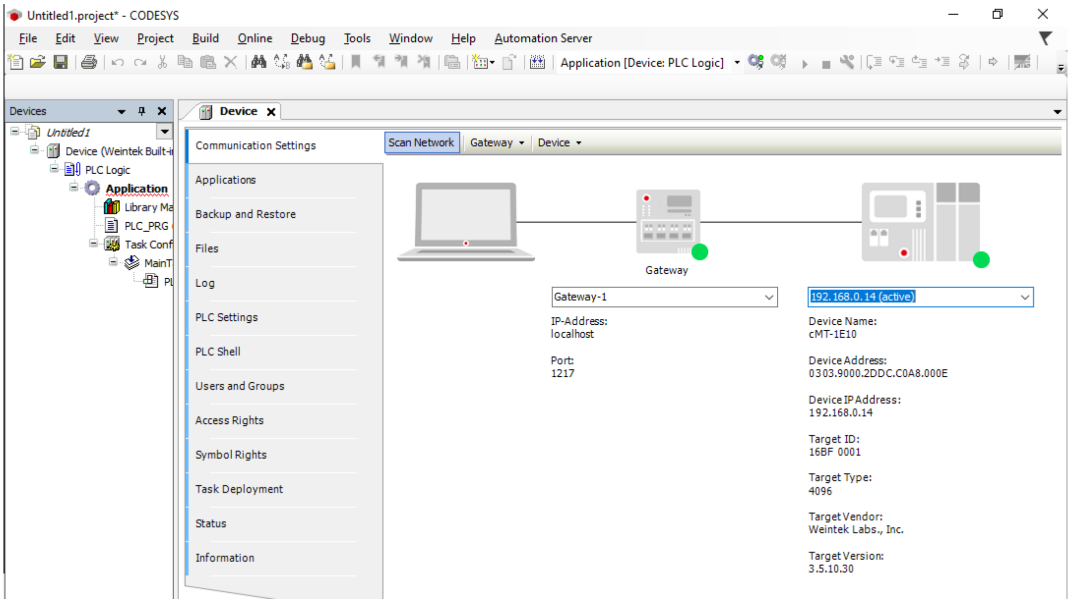
Target ID:
16BF 0001

Target Type:
4096

Target Vendor:
Weintek Labs., Inc.

Target Version:
3.5.10.30

d. Note that it is also possible to simply type the IP address of the cMT-X device into the Scan Network tab device section:



Gateway

Gateway-1

IP-Address:
localhost

Port:
1217

192.168.0.14 (active)

Device Name:
cMT-1E10

Device Address:
0303.9000.2DDC.C0A8.000E

Device IP Address:
192.168.0.14

Target ID:
16BF 0001

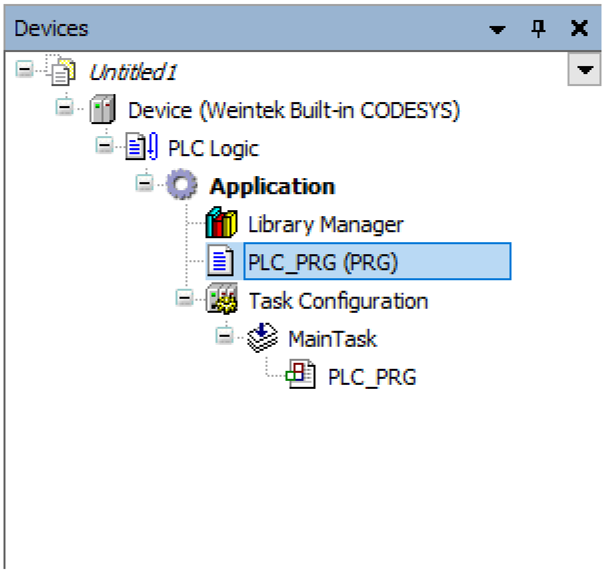
Target Type:
4096

Target Vendor:
Weintek Labs., Inc.

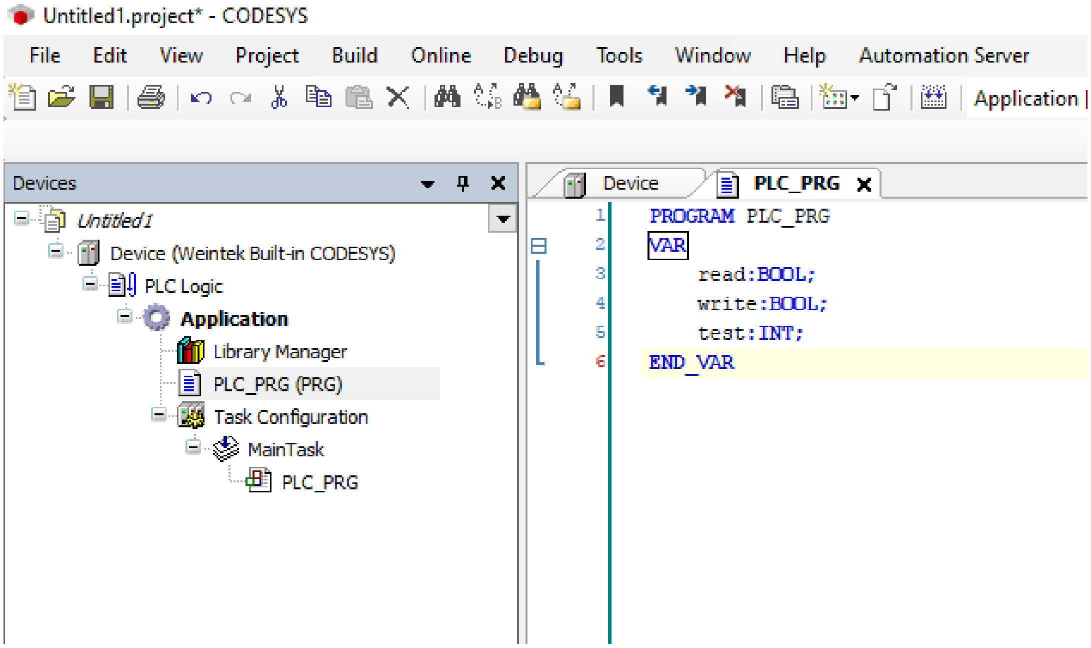
Target Version:
3.5.10.30

Connect CODESYS to EBPro

1. Create three tags in the CODESYS project.
    a. Double click on PLC_PRG(PRG) in the Devices pane:

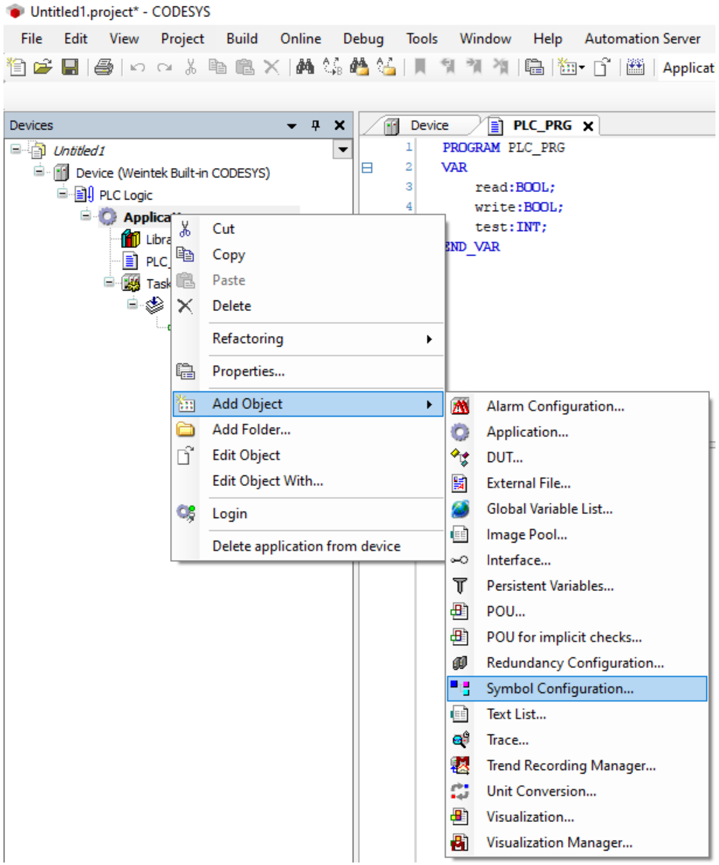


    b. Add ST code to create three tags:

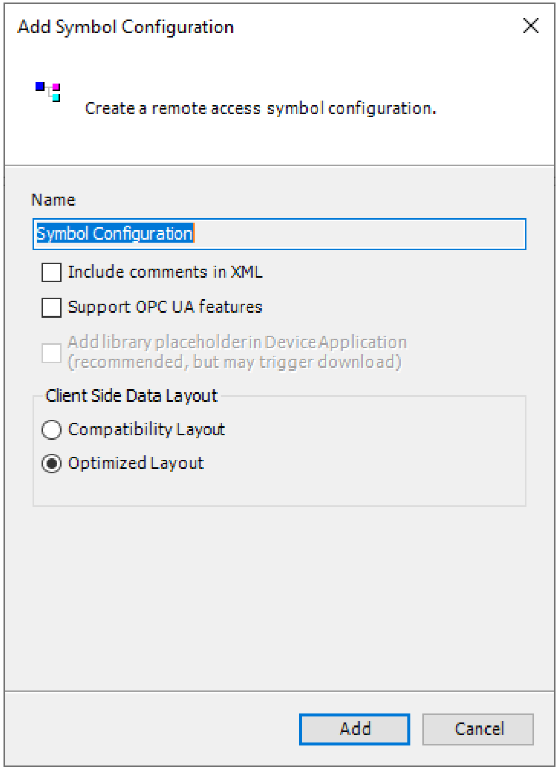


```
PROGRAM PLC_PRG
VAR
    read:BOOL;
    write:BOOL;
    test:INT;
END_VAR
```

c. Right click on Application in the Devices pane and select Add Object -> Symbol Configuration, using the default values:



```
PROGRAM PLC_PRG
VAR
    read:BOOL;
    write:BOOL;
    test:INT;
END_VAR
```



Add Symbol Configuration

Create a remote access symbol configuration.

Name

Symbol Configuration

□ Include comments in XML

□ Support OPC UA features

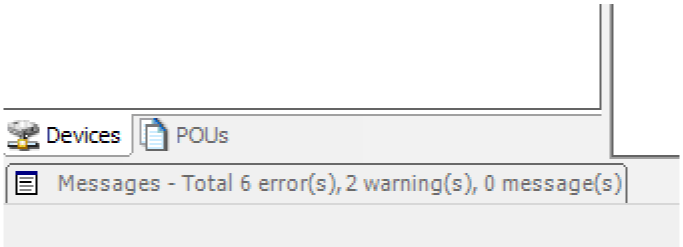
□ Add library placeholder in Device Application (recommended, but may trigger download)

Client Side Data Layout

○ Compatibility Layout

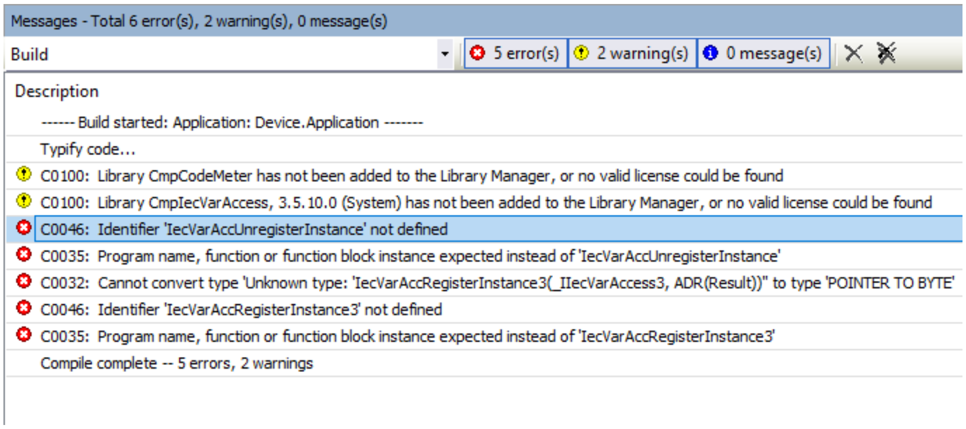
● Optimized Layout

d. Note, when done, the project automatically builds. If there are build errors, they display in the bottom left corner:



Messages - Total 6 error(s), 2 warning(s), 0 message(s)

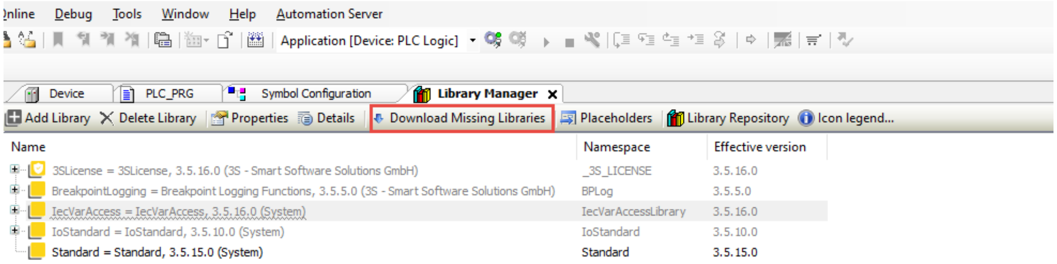
Clicking on this will open the errors and warnings. If there are any errors, and this is the first CODESYS project created, build errors are likely due to missing libraries. Open the errors and double click one to open the Library Manager:



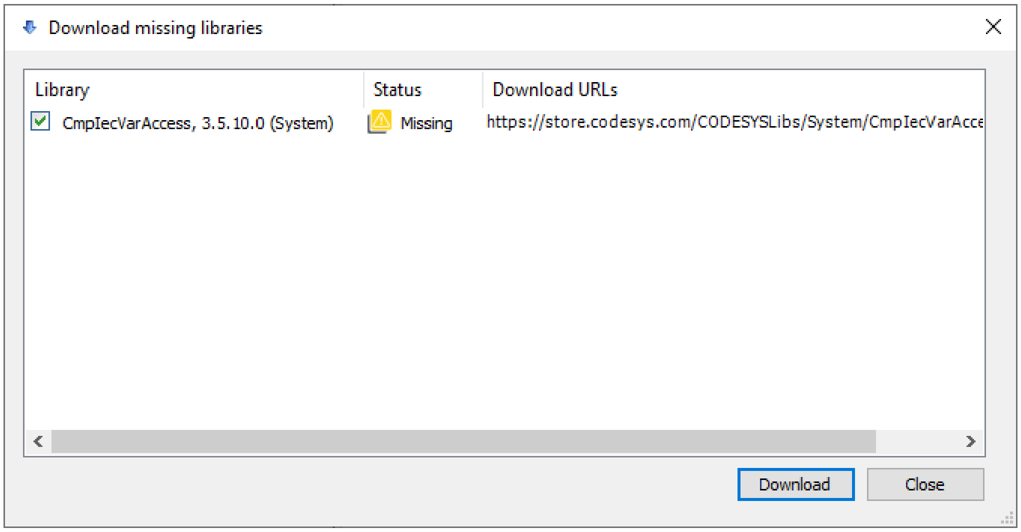
Messages - Total 6 error(s), 2 warning(s), 0 message(s)

```
Description
------ Build started: Application: Device.Application -------
Typify code...
C0100: Library CmpCodeMeter has not been added to the Library Manager, or no valid license could be found
C0100: Library CmpIecVarAccess, 3.5.10.0 (System) has not been added to the Library Manager, or no valid license could be found
C0046: Identifier 'IecVarAccUnregisterInstance' not defined
C0035: Program name, function or function block instance expected instead of 'IecVarAccUnregisterInstance'
C0032: Cannot convert type 'Unknown type: 'IecVarAccRegisterInstance3(_IIecVarAccess3, ADR(Result))'' to type 'POINTER TO BYTE'
C0046: Identifier 'IecVarAccRegisterInstance3' not defined
C0035: Program name, function or function block instance expected instead of 'IecVarAccRegisterInstance3'
Compile complete -- 5 errors, 2 warnings
```

To fix this, simply click the Download Missing Libraries button, then with all libraries selected, click Download:

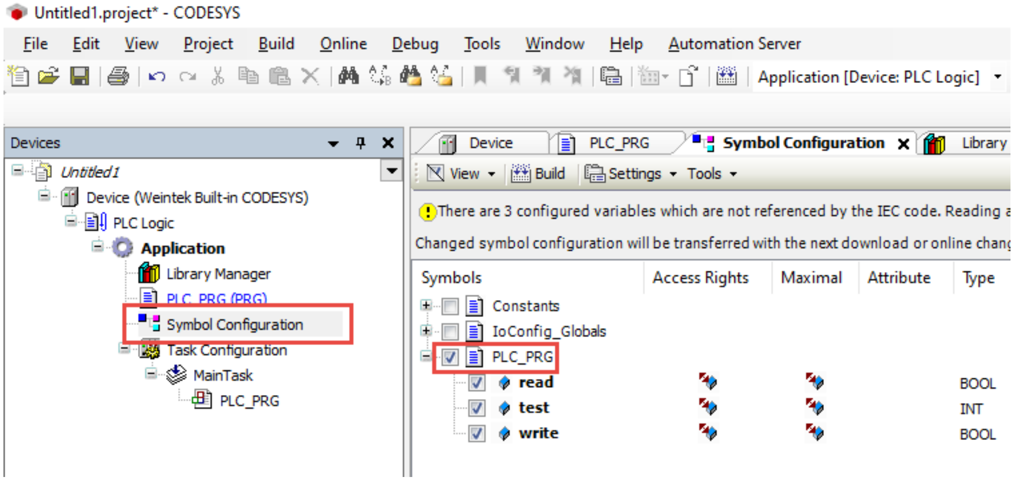


Name	Namespace	Effective version
3SLicense = 3SLicense, 3.5.16.0 (3S - Smart Software Solutions GmbH)	_3S_LICENSE	3.5.16.0
BreakpointLogging = Breakpoint Logging Functions, 3.5.5.0 (3S - Smart Software Solutions GmbH)	BPLog	3.5.5.0
IecVarAccess = IecVarAccess, 3.5.16.0 (System)	IecVarAccessLibrary	3.5.16.0
IoStandard = IoStandard, 3.5.10.0 (System)	IoStandard	3.5.10.0
Standard = Standard, 3.5.15.0 (System)	Standard	3.5.15.0



Library	Status	Download URLs
☑ CmpIecVarAccess, 3.5.10.0 (System)	Missing	https://store.codesys.com/CODESYSLibs/System/CmpIecVarAcce

2. Export the CODESYS tags to an XML file.
    a. With the new Symbol Configuration selected in the Devices pane, check the PLC_PRG box to add all the new tags to export:

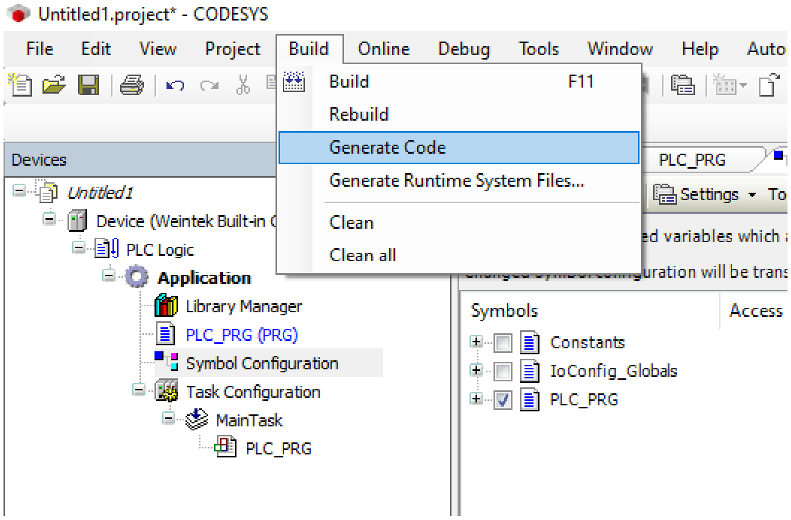


There are 3 configured variables which are not referenced by the IEC code. Reading a

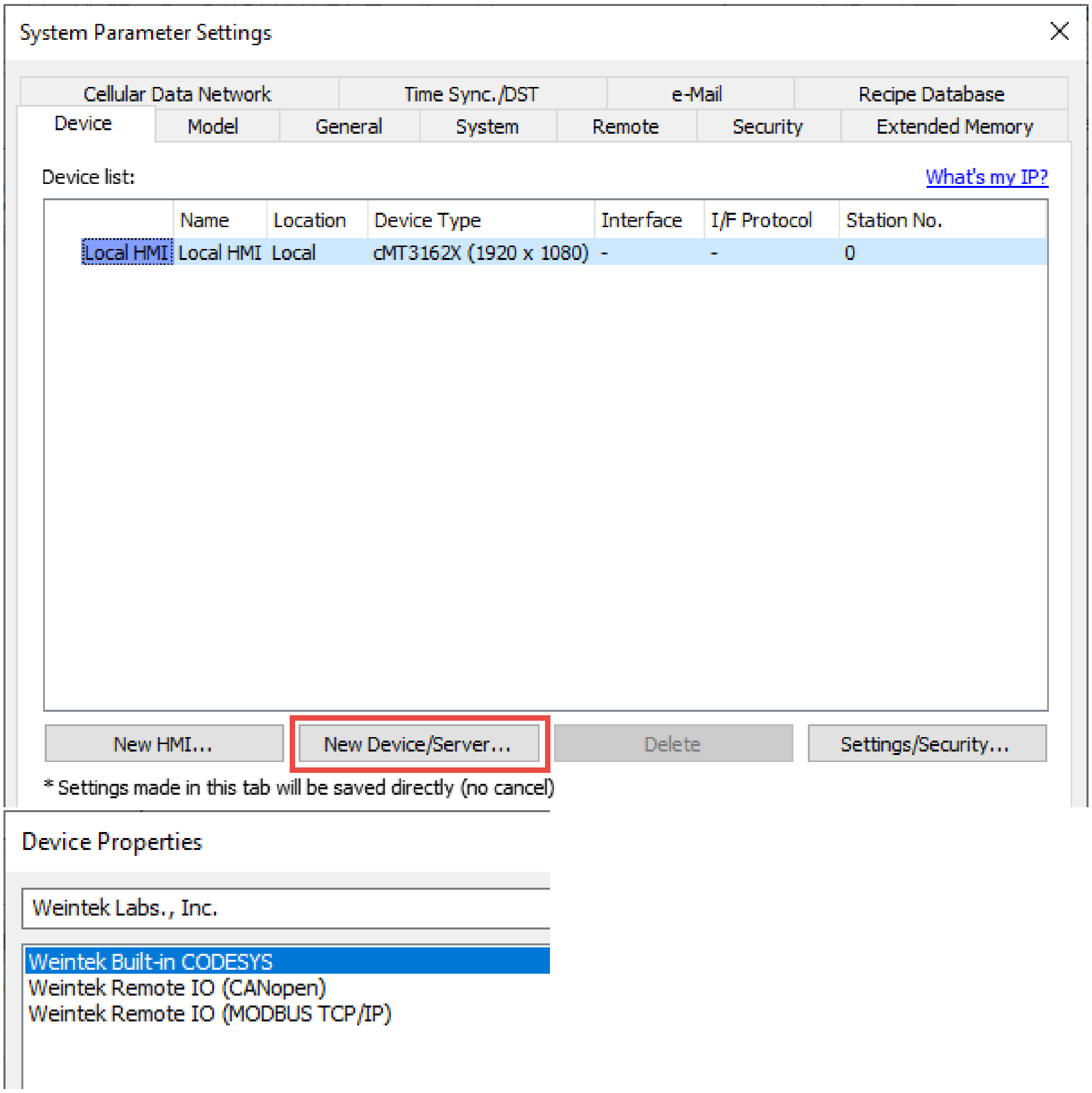
Changed symbol configuration will be transferred with the next download or online chang

Symbols	Access Rights	Maximal	Attribute	Type
□ Constants				
□ IoConfig_Globals				
☑ PLC_PRG				
☑ read				BOOL
☑ test				INT
☑ write				BOOL

    b. Select Build -> Generate Code to generate the XML file, which can be found in the project directory:



3. Add a Weintek Built-in CODESYS device to your EBPro project and import the XML file of CODESYS tags.
    a. Add a Weintek Built-in CODESYS device to your EBPro project:



Device list:

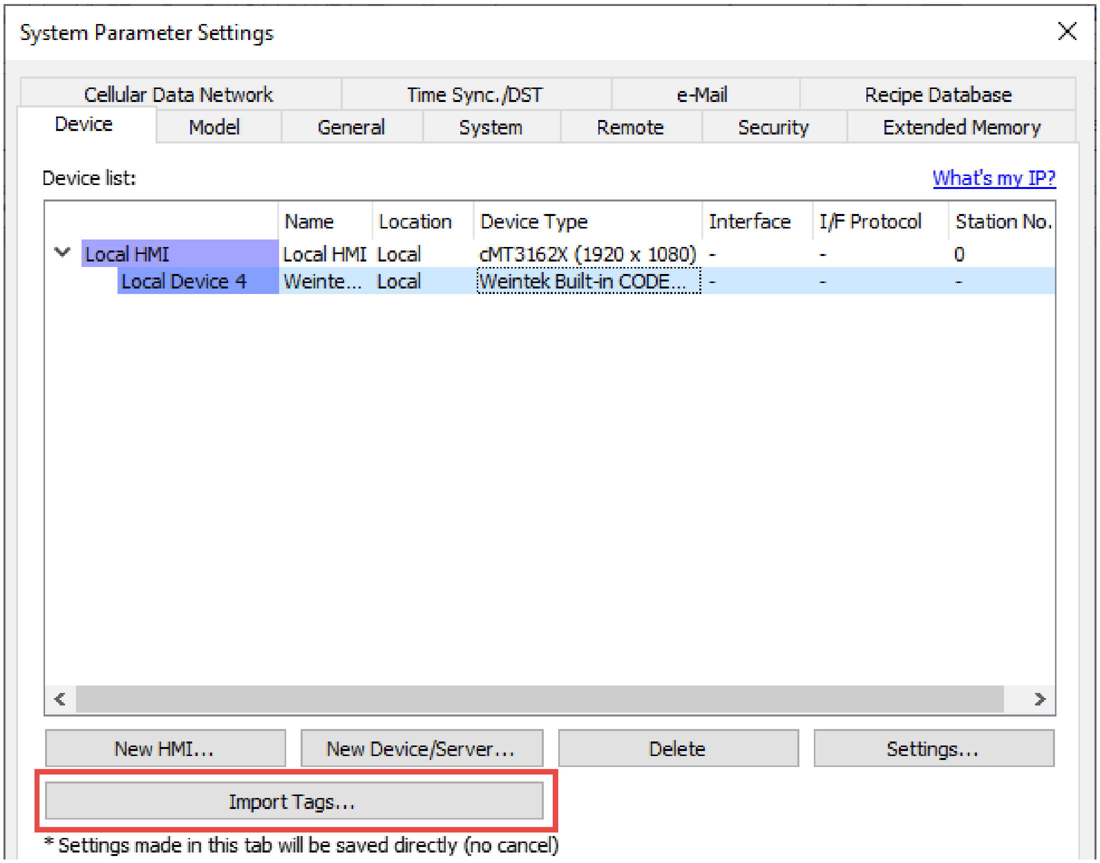
	Name	Location	Device Type	Interface	I/F Protocol	Station No.
Local HMI	Local HMI	Local	cMT3162X (1920 x 1080)	-	-	0

* Settings made in this tab will be saved directly (no cancel)

Weintek Labs., Inc.

Weintek Built-in CODESYS
Weintek Remote IO (CANopen)
Weintek Remote IO (MODBUS TCP/IP)

b. Click the Import Tags button and navigate to the XML tag export file created for the CODESYS project previously. It will be in the CODESYS project directory:

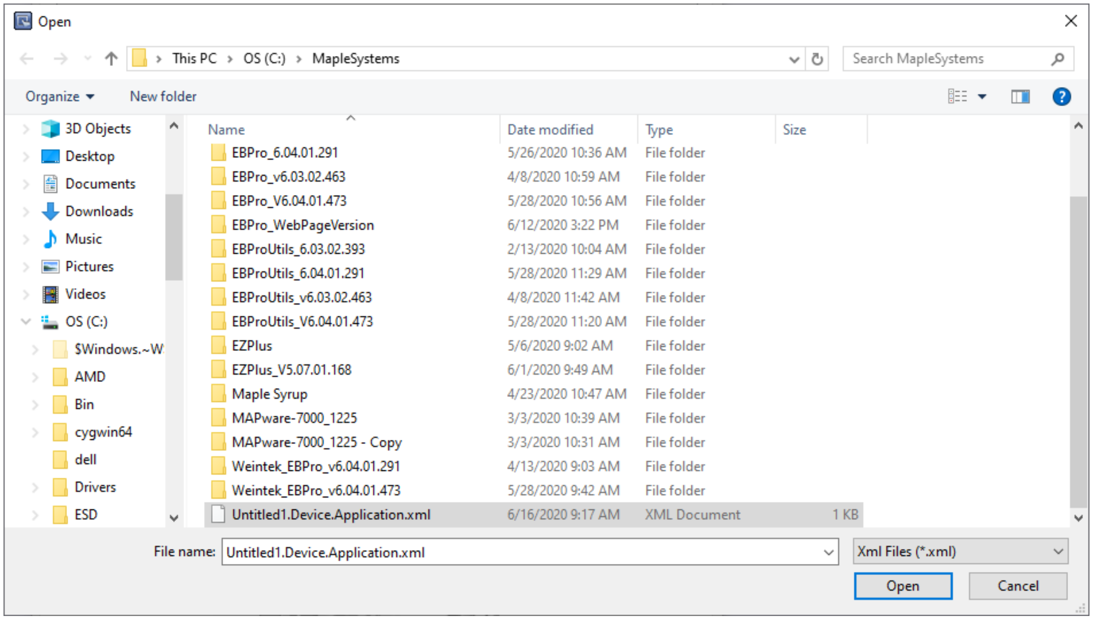


System Parameter Settings

Device list:

	Name	Location	Device Type	Interface	I/F Protocol	Station No.
Local HMI	Local HMI	Local	cMT3162X (1920 x 1080)	-	-	0
Local Device 4	Weinte...	Local	Weintek Built-in CODE...	-	-	-

* Settings made in this tab will be saved directly (no cancel)



Open

This PC › OS (C:) › MapleSystems

Name	Date modified	Type	Size
EBPro_6.04.01.291	5/26/2020 10:36 AM	File folder	
EBPro_v6.03.02.463	4/8/2020 10:59 AM	File folder	
EBPro_V6.04.01.473	5/28/2020 10:56 AM	File folder	
EBPro_WebPageVersion	6/12/2020 3:22 PM	File folder	
EBProUtils_6.03.02.393	2/13/2020 10:04 AM	File folder	
EBProUtils_6.04.01.291	5/28/2020 11:29 AM	File folder	
EBProUtils_v6.03.02.463	4/8/2020 11:42 AM	File folder	
EBProUtils_V6.04.01.473	5/28/2020 11:20 AM	File folder	
EZPlus	5/6/2020 9:02 AM	File folder	
EZPlus_V5.07.01.168	6/1/2020 9:49 AM	File folder	
Maple Syrup	4/23/2020 10:47 AM	File folder	
MAPware-7000_1225	3/3/2020 10:39 AM	File folder	
MAPware-7000_1225 - Copy	3/3/2020 10:31 AM	File folder	
Weintek_EBPro_v6.04.01.291	4/13/2020 9:03 AM	File folder	
Weintek_EBPro_v6.04.01.473	5/28/2020 9:42 AM	File folder	
Untitled1.Device.Application.xml	6/16/2020 9:17 AM	XML Document	1 KB

File name: Untitled1.Device.Application.xml

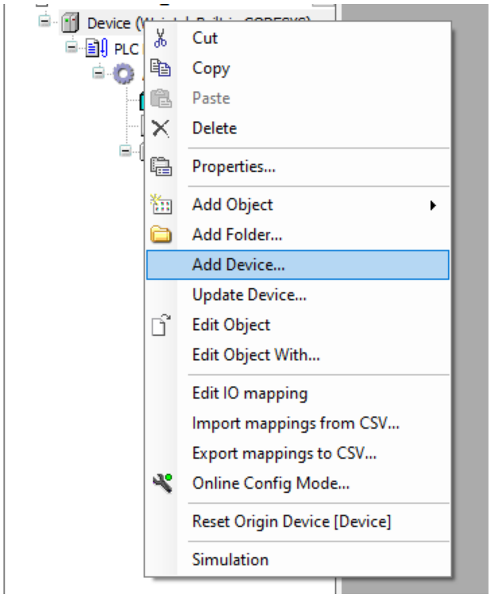
Xml Files (*.xml)

c. You can now access all tags from your CODESYS project in EBPro.

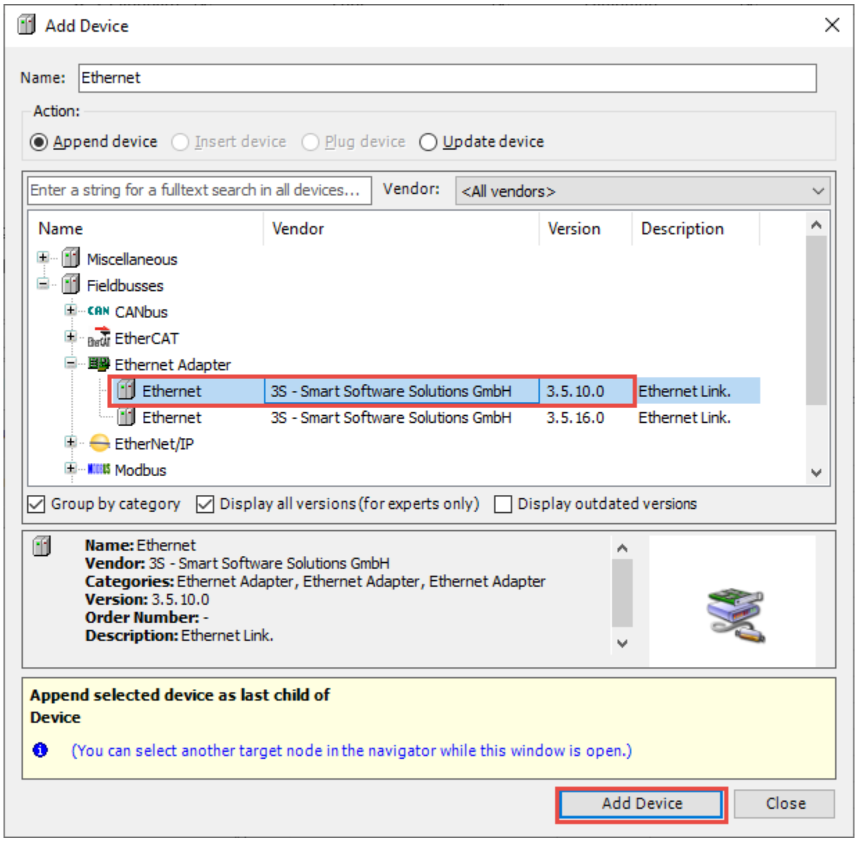
Connect iR-ETN to CODESYS

Before setting up a CODESYS project to communicate with an iR-ETN module, it is assumed that the development PC running CODESYS, the cMT device running the CODESYS runtime, and the iR-ETN module have all been connected via Ethernet and are on the same IP subnet. If this is not the case, the devices will be unable to communicate.

1. Right click on Device (Weintek Built-in CODESYS) and select Add Device:



2. In the Add Device window, select Fieldbuses -> Ethernet Adapter -> Ethernet version 3.5.10 and click Add Device:



Add Device

Name: Ethernet

Action:

● Append device ○ Insert device ○ Plug device ○ Update device

Enter a string for a fulltext search in all devices... Vendor: <All vendors>

Name	Vendor	Version	Description
Miscellaneous			
Fieldbusses			
CANbus			
EtherCAT			
Ethernet Adapter			
Ethernet	3S - Smart Software Solutions GmbH	3.5.10.0	Ethernet Link.
Ethernet	3S - Smart Software Solutions GmbH	3.5.16.0	Ethernet Link.
EtherNet/IP			
Modbus			

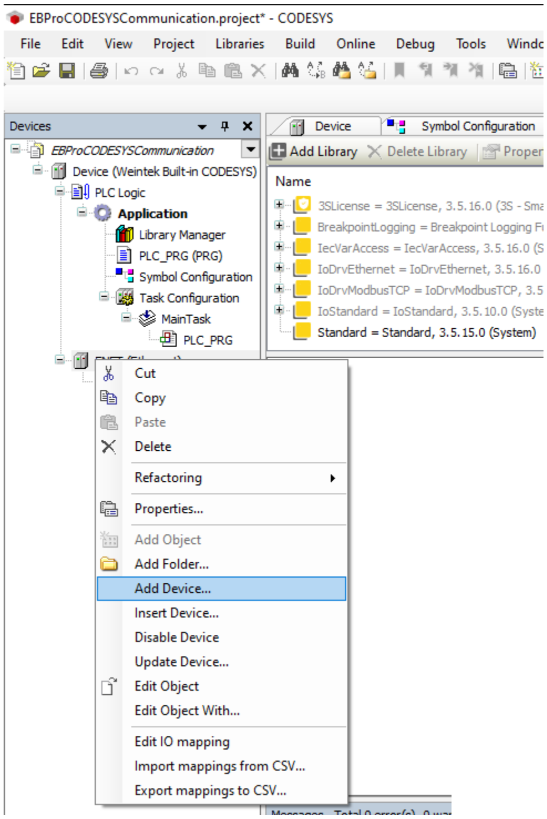
☑ Group by category ☑ Display all versions (for experts only) ☐ Display outdated versions

Name: Ethernet
Vendor: 3S - Smart Software Solutions GmbH
Categories: Ethernet Adapter, Ethernet Adapter, Ethernet Adapter
Version: 3.5.10.0
Order Number: -
Description: Ethernet Link.

Append selected device as last child of
Device

(You can select another target node in the navigator while this window is open.)

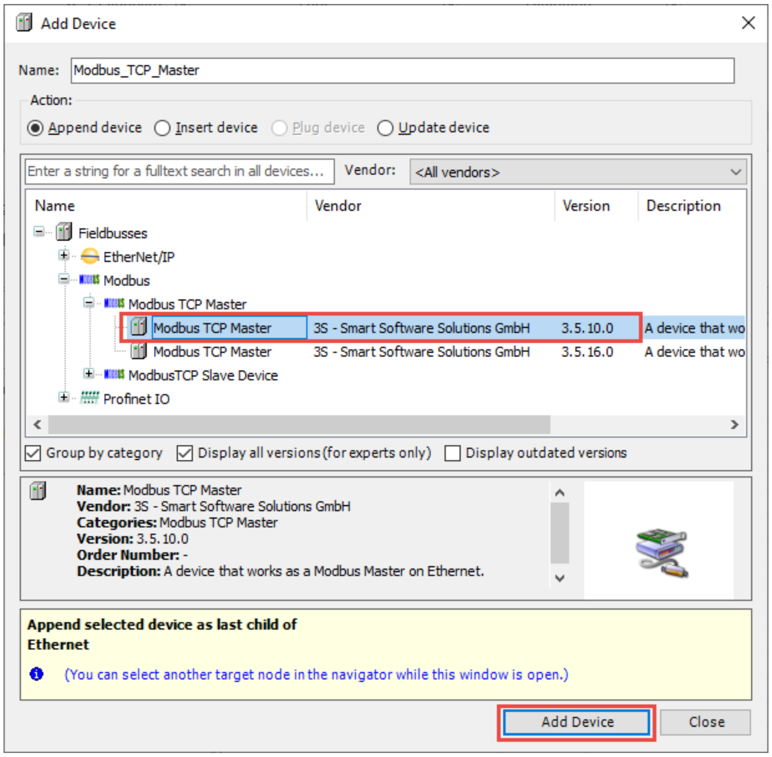
3. Right click on the newly added Ethernet device and select Add Device:



EBProCODESYSCommunication.project* - CODESYS

3SLicense = 3SLicense, 3.5.16.0 (3S - Sma
BreakpointLogging = Breakpoint Logging F
IecVarAccess = IecVarAccess, 3.5.16.0 (S
IoDrvEthernet = IoDrvEthernet, 3.5.16.0
IoDrvModbusTCP = IoDrvModbusTCP, 3.5
IoStandard = IoStandard, 3.5.10.0 (Syste
Standard = Standard, 3.5.15.0 (System)

4. Select Fieldbuses -> Modbus -> Modbus TCP Master -> Modbus TCP Master and click Add Device:



Add Device

Name: Modbus_TCP_Master

Action:

● Append device ○ Insert device ○ Plug device ○ Update device

Enter a string for a fulltext search in all devices... Vendor: <All vendors>

Name	Vendor	Version	Description
Fieldbusses			
EtherNet/IP			
Modbus			
Modbus TCP Master			
Modbus TCP Master	3S - Smart Software Solutions GmbH	3.5.10.0	A device that wo
Modbus TCP Master	3S - Smart Software Solutions GmbH	3.5.16.0	A device that wo
ModbusTCP Slave Device			
Profinet IO			

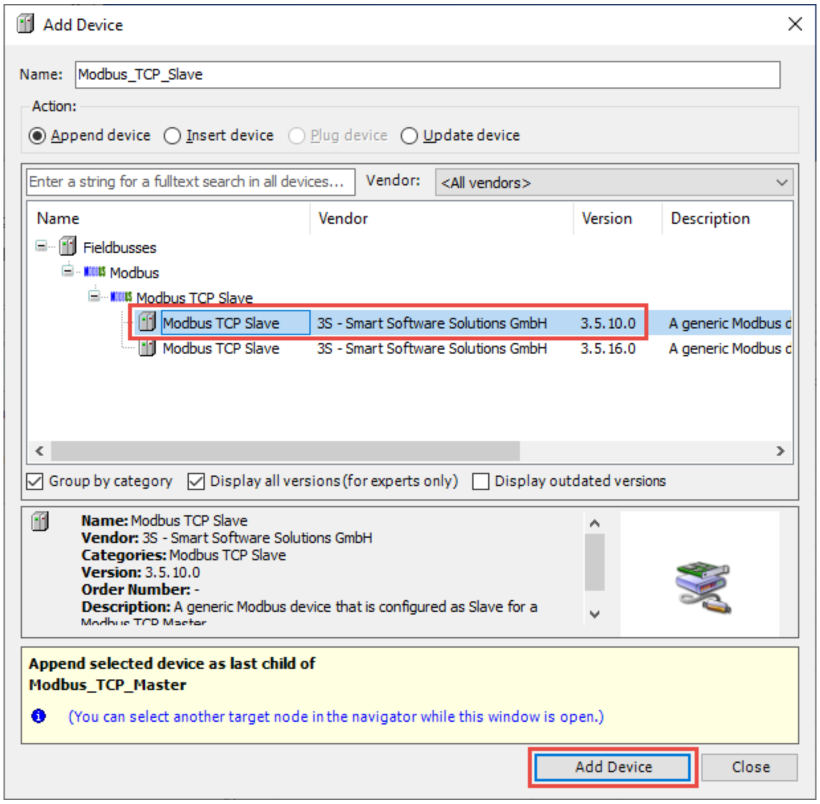
☑ Group by category ☑ Display all versions (for experts only) ☐ Display outdated versions

Name: Modbus TCP Master
Vendor: 3S - Smart Software Solutions GmbH
Categories: Modbus TCP Master
Version: 3.5.10.0
Order Number: -
Description: A device that works as a Modbus Master on Ethernet.

Append selected device as last child of
Ethernet

(You can select another target node in the navigator while this window is open.)

5. Select the new Modbus TCP Master device, then select Fieldbuses -> Modbus -> Modbus TCP Slave -> Modbus TCP Slave and click Add Device:



Add Device

Name: Modbus_TCP_Slave

Action:

● Append device ○ Insert device ○ Plug device ○ Update device

Enter a string for a fulltext search in all devices... Vendor: <All vendors>

Name	Vendor	Version	Description
Fieldbusses			
Modbus			
Modbus TCP Slave			
Modbus TCP Slave	3S - Smart Software Solutions GmbH	3.5.10.0	A generic Modbus d
Modbus TCP Slave	3S - Smart Software Solutions GmbH	3.5.16.0	A generic Modbus d

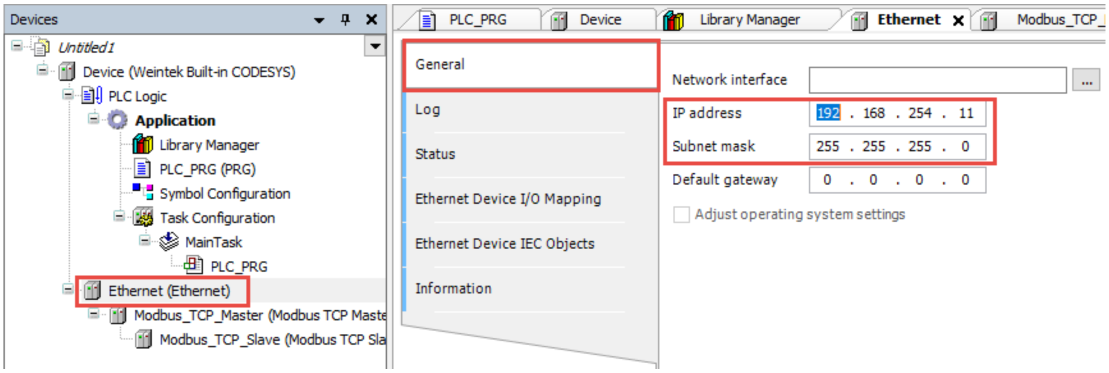
☑ Group by category ☑ Display all versions (for experts only) ☐ Display outdated versions

Name: Modbus TCP Slave
Vendor: 3S - Smart Software Solutions GmbH
Categories: Modbus TCP Slave
Version: 3.5.10.0
Order Number: -
Description: A generic Modbus device that is configured as Slave for a Modbus TCP Master

Append selected device as last child of
Modbus_TCP_Master

(You can select another target node in the navigator while this window is open.)

6. Double click the newly added Ethernet device to open the Ethernet device configuration. In the General tab, enter the IP address and Subnet mask to match your iR-ETN's configuration:



Network interface

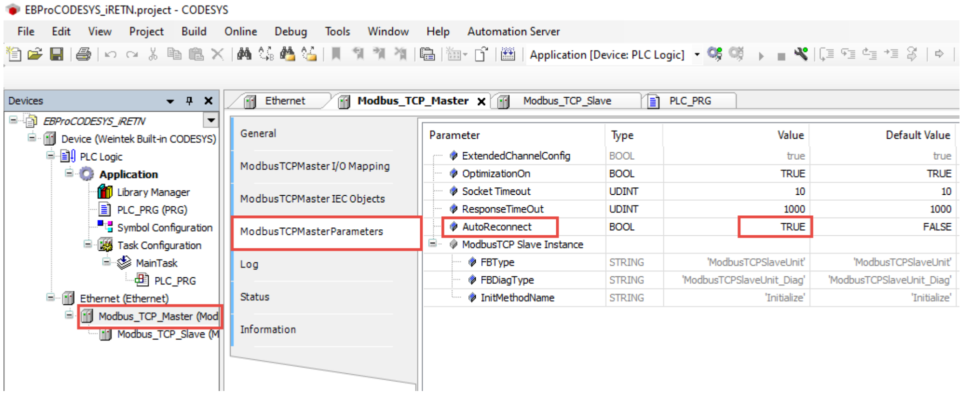
IP address 192 . 168 . 254 . 11

Subnet mask 255 . 255 . 255 . 0

Default gateway 0 . 0 . 0 . 0

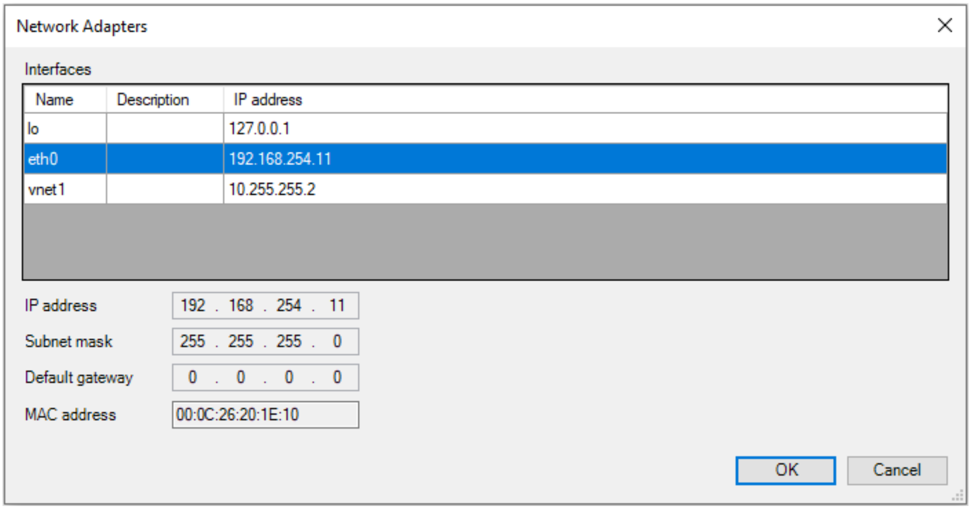
□ Adjust operating system settings

7. Double click the Modbus TCP Master device and navigate to the ModbusTCPMasterParameters tab and set AutoReconnect to TRUE:



Parameter	Type	Value	Default Value
ExtendedChannelConfig	BOOL	true	true
OptimizationOn	BOOL	TRUE	TRUE
Socket Timeout	UDINT	10	10
ResponseTimeOut	UDINT	1000	1000
AutoReconnect	BOOL	TRUE	FALSE
ModbusTCP Slave Instance			
FBType	STRING	'ModbusTCPSlaveUnit'	'ModbusTCPSlaveUnit'
FBDiagType	STRING	'ModbusTCPSlaveUnit_Diag'	'ModbusTCPSlaveUnit_Diag'
InitMethodName	STRING	'Initialize'	'Initialize'

8. With CODESYS connected to the base device, i.e. Device (Weintek Built-in CODESYS), click […] in the Ethernet device General tab and select the Network interface corresponding to the Ethernet device's IP address:



Name	Description	IP address
lo		127.0.0.1
eth0		192.168.254.11
vnet1		10.255.255.2

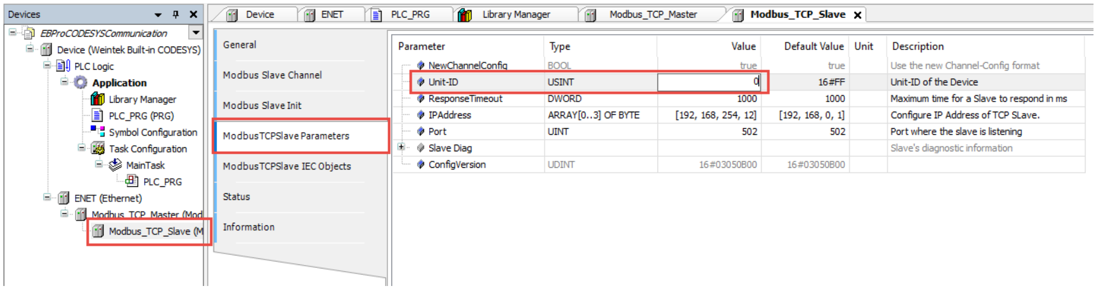
IP address 192 . 168 . 254 . 11

Subnet mask 255 . 255 . 255 . 0

Default gateway 0 . 0 . 0 . 0

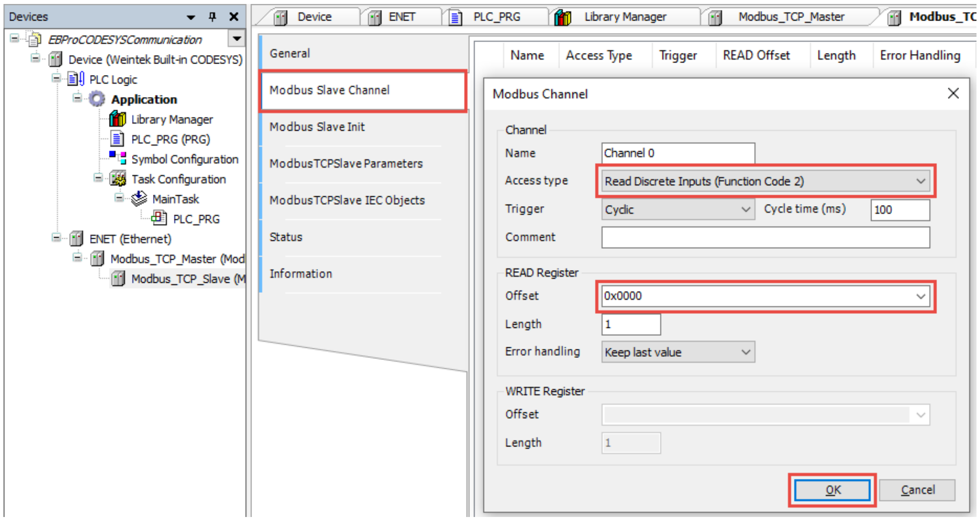
MAC address 00:0C:26:20:1E:10

9. Double click on the Modbus TCP Slave device and go to the ModbusTCPSlave Parameters tab. There, change the Unit-ID Parameter to match the Unit ID on the iR-ETN module:



Parameter	Type	Value	Default Value	Unit	Description
NewChannelConfig	BOOL	true	true		Use the new Channel-Config format
Unit-ID	USINT	0	16#FF		Unit-ID of the Device
ResponseTimeout	DWORD	1000	1000		Maximum time for a Slave to respond in ms
IPAddress	ARRAY[0..3] OF BYTE	[192, 168, 254, 12]	[192, 168, 0, 1]		Configure IP Address of TCP SLave.
Port	UINT	502	502		Port where the slave is listening
Slave Diag					Slave's diagnostic information
ConfigVersion	UDINT	16#03050B00	16#03050B00		

10. To add a tag to the Modbus device, go to the Modbus Slave Channel tab and click Add Channel to open the Modbus Channel window. Select the access type to match the data type of the tag. In this case, a bool-type tag is being added, so the Read Discrete Input type is used:

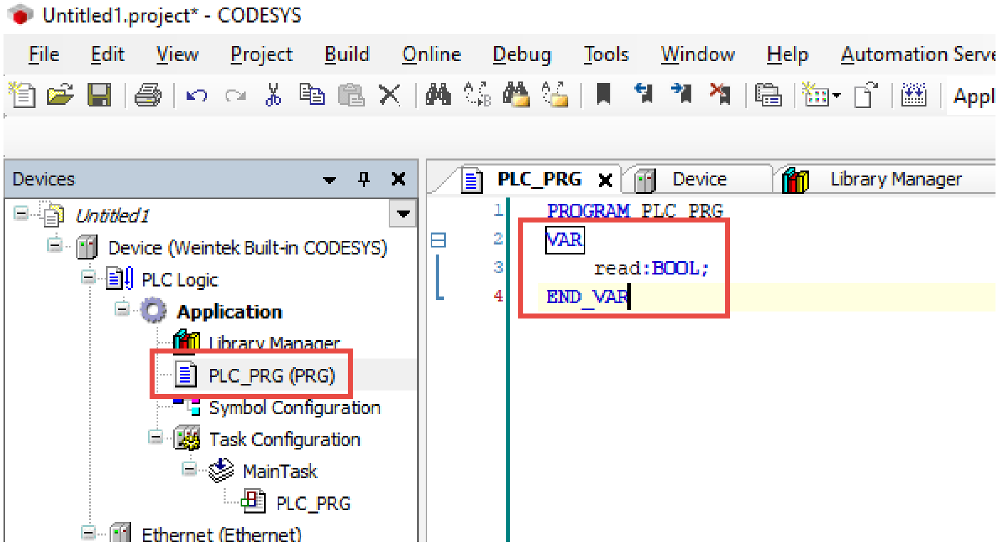


Channel
Name: Channel 0
Access type: Read Discrete Inputs (Function Code 2)
Trigger: Cyclic Cycle time (ms): 100
Comment:

READ Register
Offset: 0x0000
Length: 1
Error handling: Keep last value

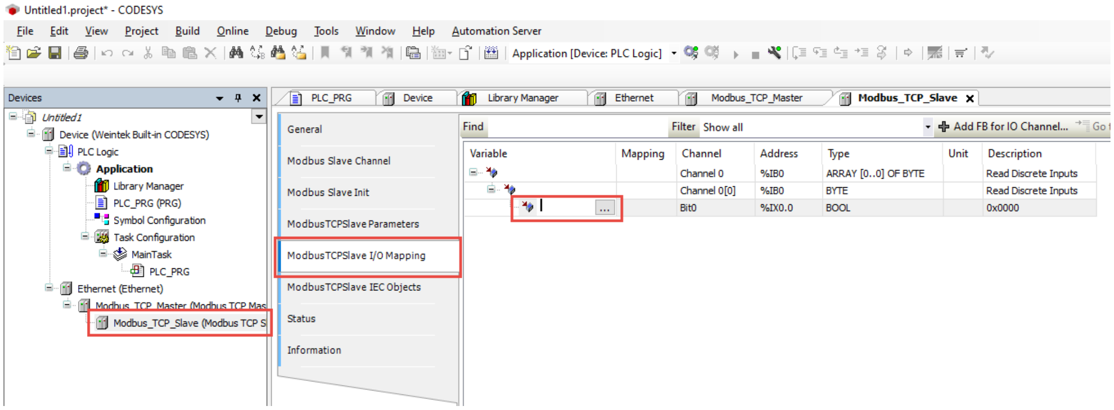
WRITE Register
Offset:
Length: 1

11. Double click on PLC_PRG in the Devices pane and add a Boolean tag:



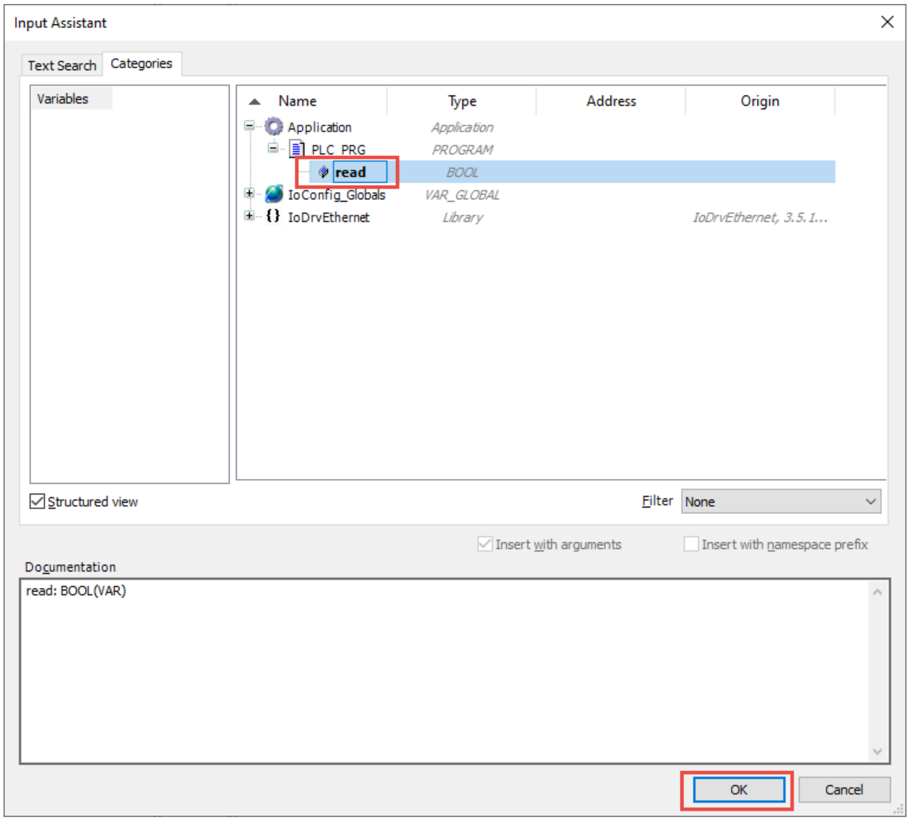
```
PROGRAM PLC_PRG
VAR
    read:BOOL;
END_VAR
```

12. With the tag added, double click on the Modbus TCP Slave device once more, go to the ModbusTCPSlave I/O Mapping tab, expand the Variable tree entirely and click the […] button to connect it to the new read Boolean tag:



Variable	Mapping	Channel	Address	Type	Unit	Description
		Channel 0	%IB0	ARRAY [0..0] OF BYTE		Read Discrete Inputs
		Channel 0[0]	%IB0	BYTE		Read Discrete Inputs
...		Bit0	%IX0.0	BOOL		0x0000

13. In the Input Assistant window, select Application -> PLC_PRG -> read to attach the read Bool tag to the Modbus channel created prior.



Name	Type	Address	Origin
Application	Application		
PLC_PRG	PROGRAM		
read	BOOL		
IoConfig_Globals	VAR_GLOBAL		
IoDrvEthernet	Library		IoDrvEthernet, 3.5.1...

☑ Structured view

Filter None

☑ Insert with arguments ☐ Insert with namespace prefix

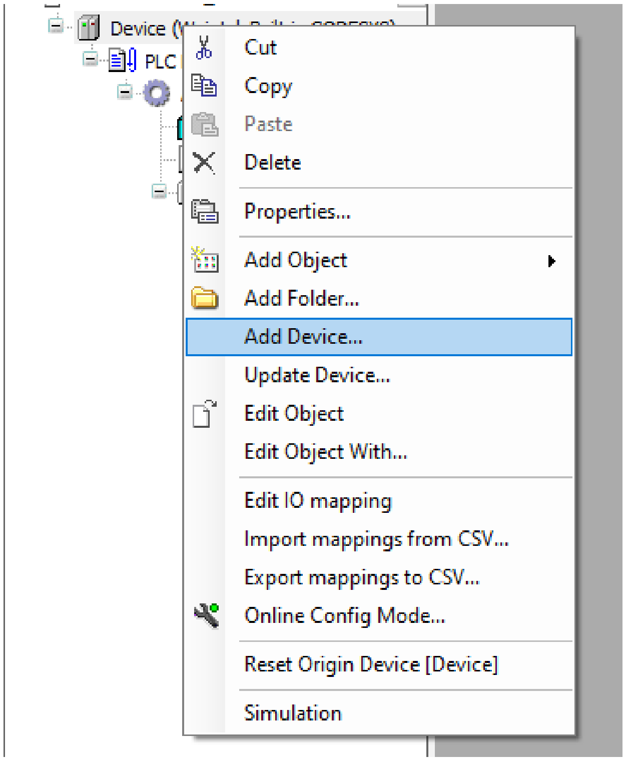
Documentation

read: BOOL(VAR)

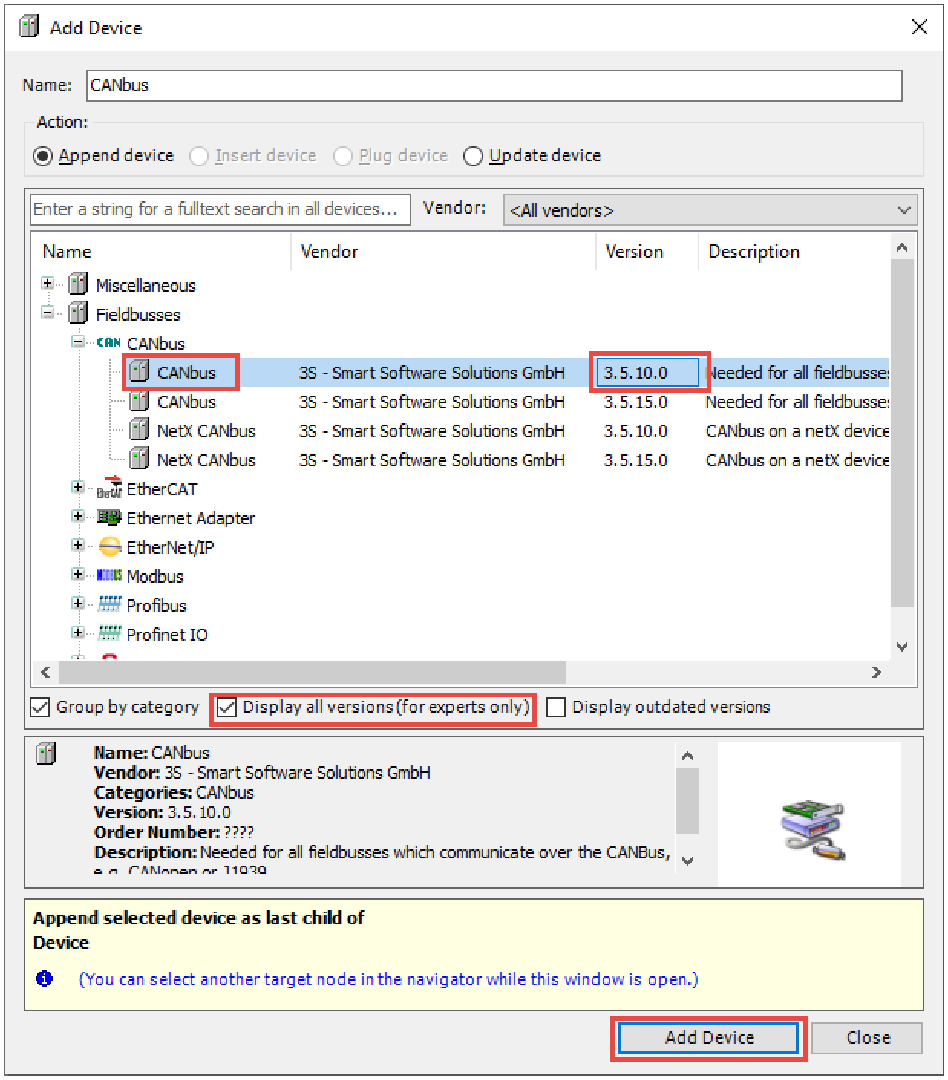
Connect iR-COP to CODESYS

Before setting up a CODESYS project to communicate with an iR-COP module, it is assumed that the development PC running CODESYS and the cMT device running the CODESYS runtime are connected via Ethernet, and the cMT device is connected to the iR-COP module using the CAN bus. For information on how to wire the CAN bus, please see the installation guide pinout diagrams for the cMT device in use, as well as the installation guide and user manual for the iR-COP on DIP switch settings and wiring.

1. Right click on Device (Weintek Built-in CODESYS) and select Add Device:



2. In the Add Device window, first check the Display all versions checkbox, and then select Fieldbusses -> CANbus -> CANbus version 3.5.10 and click Add Device:



Add Device

Name: CANbus

Action:

● Append device ○ Insert device ○ Plug device ○ Update device

Enter a string for a fulltext search in all devices... Vendor: <All vendors>

Name	Vendor	Version	Description
Miscellaneous			
Fieldbusses			
CANbus			
CANbus	3S - Smart Software Solutions GmbH	3.5.10.0	Needed for all fieldbusse
CANbus	3S - Smart Software Solutions GmbH	3.5.15.0	Needed for all fieldbusse
NetX CANbus	3S - Smart Software Solutions GmbH	3.5.10.0	CANbus on a netX device
NetX CANbus	3S - Smart Software Solutions GmbH	3.5.15.0	CANbus on a netX device
EtherCAT			
Ethernet Adapter			
EtherNet/IP			
Modbus			
Profibus			
Profinet IO			

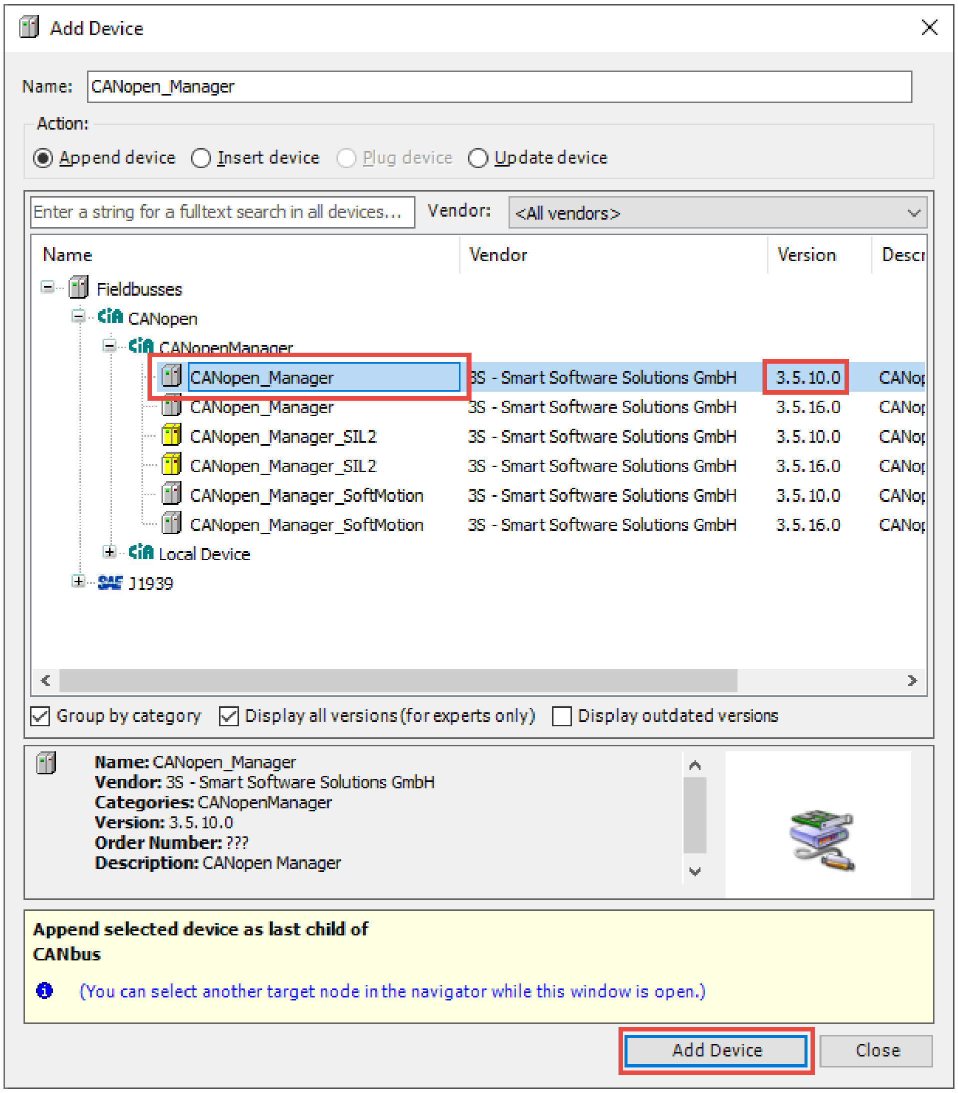
☑ Group by category ☑ Display all versions (for experts only) □ Display outdated versions

Name: CANbus
Vendor: 3S - Smart Software Solutions GmbH
Categories: CANbus
Version: 3.5.10.0
Order Number: ????
Description: Needed for all fieldbusses which communicate over the CANBus, e.g. CANopen or J1939

Append selected device as last child of Device

(You can select another target node in the navigator while this window is open.)

3. Select the newly added CANbus (CANbus) device, and then in the Add Device window, select FieldBuses -> CANopen -> CANopenManager -> CANopen_Manager version 3.5.10:



Add Device

Name: CANopen_Manager

Action:

● Append device ○ Insert device ○ Plug device ○ Update device

Enter a string for a fulltext search in all devices... Vendor: <All vendors>

Name	Vendor	Version	Descr
Fieldbusses			
CANopen			
CANopenManager			
CANopen_Manager	3S - Smart Software Solutions GmbH	3.5.10.0	CANop
CANopen_Manager	3S - Smart Software Solutions GmbH	3.5.16.0	CANop
CANopen_Manager_SIL2	3S - Smart Software Solutions GmbH	3.5.10.0	CANop
CANopen_Manager_SIL2	3S - Smart Software Solutions GmbH	3.5.16.0	CANop
CANopen_Manager_SoftMotion	3S - Smart Software Solutions GmbH	3.5.10.0	CANop
CANopen_Manager_SoftMotion	3S - Smart Software Solutions GmbH	3.5.16.0	CANop
Local Device			
J1939			

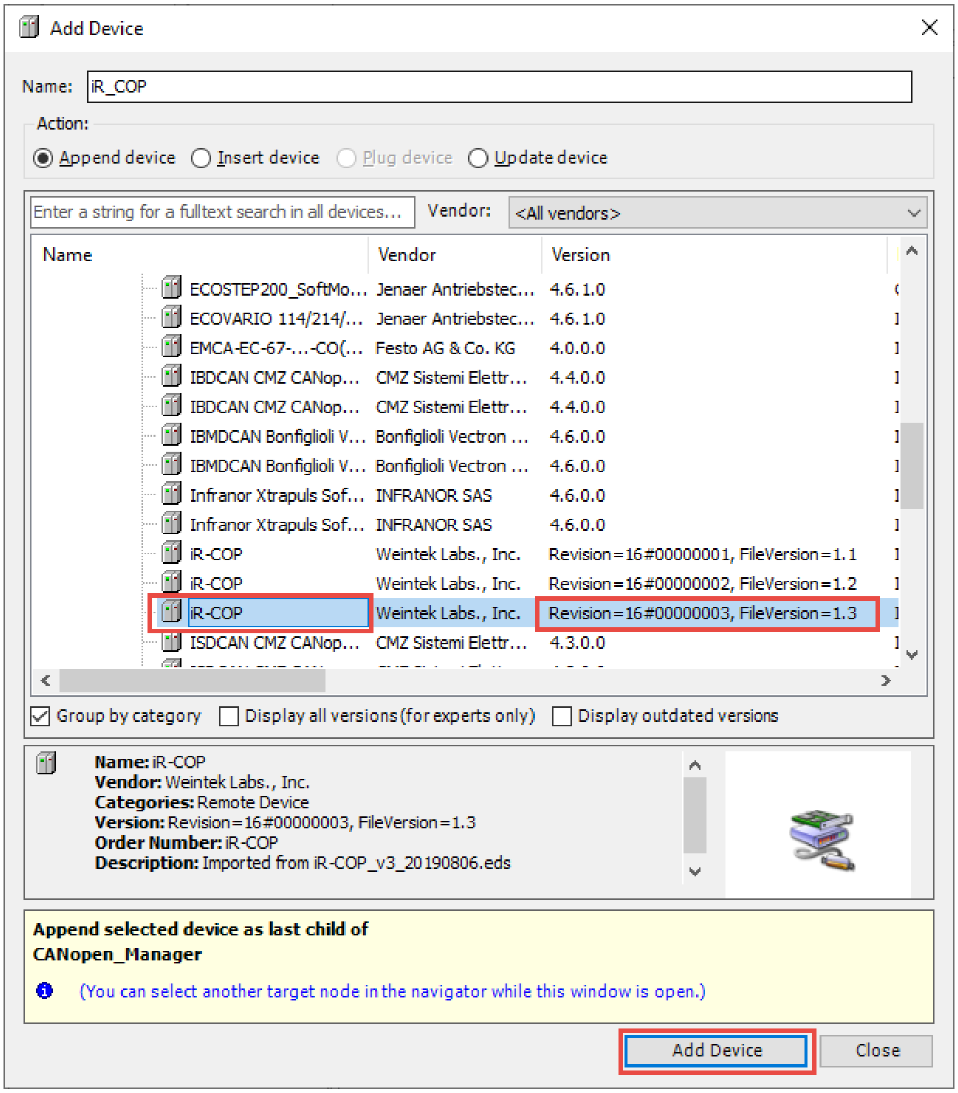
☑ Group by category ☑ Display all versions (for experts only) ☐ Display outdated versions

Name: CANopen_Manager
Vendor: 3S - Smart Software Solutions GmbH
Categories: CANopenManager
Version: 3.5.10.0
Order Number: ???
Description: CANopen Manager

Append selected device as last child of
CANbus

(You can select another target node in the navigator while this window is open.)

4. Select the newly added CANopen_Manager, and then in the Add Device window, select Fieldbusses -> CANopen -> Remote Device -> iR-COP Revision 3, FileVersion 1.3:



Name: iR_COP

Action:

● Append device ○ Insert device ○ Plug device ○ Update device

Enter a string for a fulltext search in all devices... Vendor: <All vendors>

Name	Vendor	Version
ECOSTEP200_SoftMo...	Jenaer Antriebstec...	4.6.1.0
ECOVARIO 114/214/...	Jenaer Antriebstec...	4.6.1.0
EMCA-EC-67-...-CO(...	Festo AG & Co. KG	4.0.0.0
IBDCAN CMZ CANop...	CMZ Sistemi Elettr...	4.4.0.0
IBDCAN CMZ CANop...	CMZ Sistemi Elettr...	4.4.0.0
IBMDCAN Bonfiglioli V...	Bonfiglioli Vectron ...	4.6.0.0
IBMDCAN Bonfiglioli V...	Bonfiglioli Vectron ...	4.6.0.0
Infranor Xtrapuls Sof...	INFRANOR SAS	4.6.0.0
Infranor Xtrapuls Sof...	INFRANOR SAS	4.6.0.0
iR-COP	Weintek Labs., Inc.	Revision=16#00000001, FileVersion=1.1
iR-COP	Weintek Labs., Inc.	Revision=16#00000002, FileVersion=1.2
iR-COP	Weintek Labs., Inc.	Revision=16#00000003, FileVersion=1.3
ISDCAN CMZ CANop...	CMZ Sistemi Elettr...	4.3.0.0

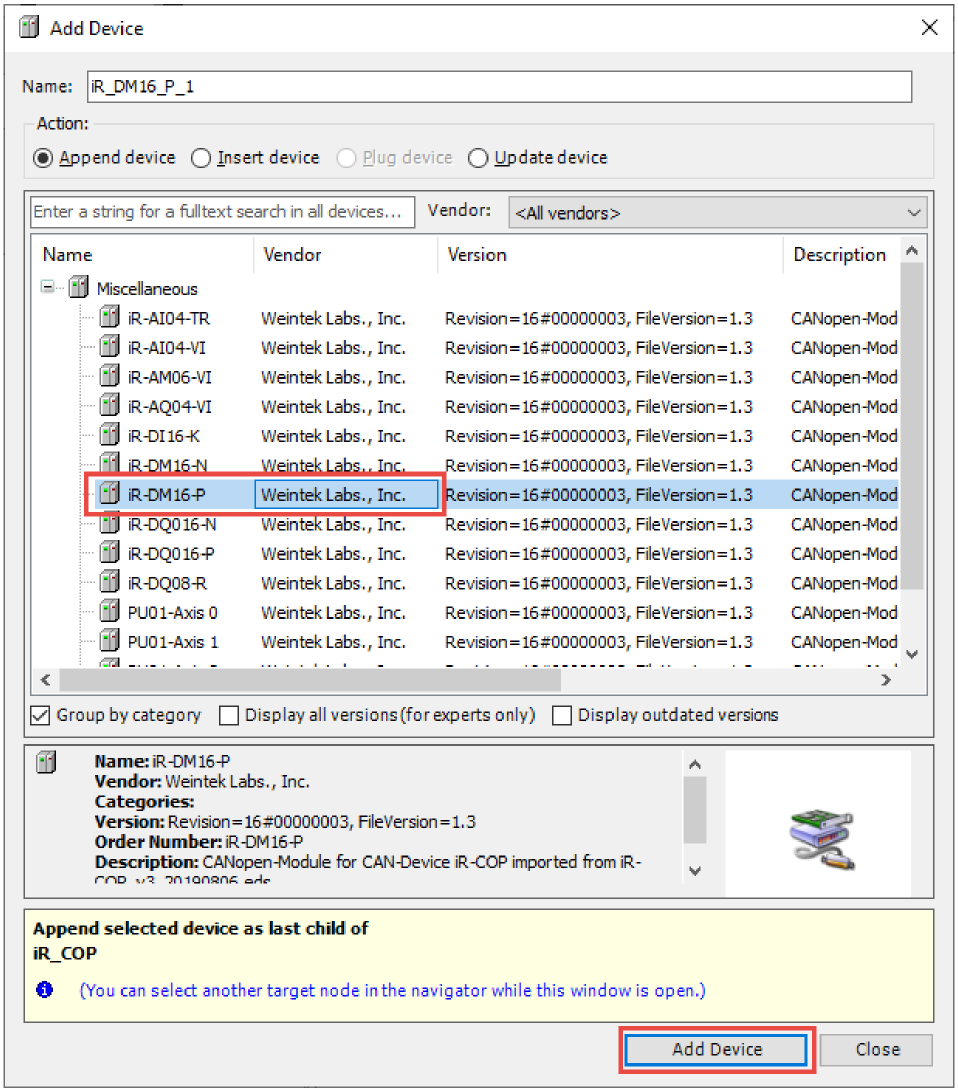
☑ Group by category ☐ Display all versions (for experts only) ☐ Display outdated versions

Name: iR-COP
Vendor: Weintek Labs., Inc.
Categories: Remote Device
Version: Revision=16#00000003, FileVersion=1.3
Order Number: iR-COP
Description: Imported from iR-COP_v3_20190806.eds

Append selected device as last child of
CANopen_Manager

(You can select another target node in the navigator while this window is open.)

5. Select the newly added iR-COP device, and then in the Add Device window, add each module connected to the iR-COP in the order connected. In this example, we only have an iR-DM16-P connected:



Name: iR_DM16_P_1

Action:

● Append device ○ Insert device ○ Plug device ○ Update device

Enter a string for a fulltext search in all devices... Vendor: <All vendors>

Name	Vendor	Version	Description
Miscellaneous			
iR-AI04-TR	Weintek Labs., Inc.	Revision=16#00000003, FileVersion=1.3	CANopen-Mod
iR-AI04-VI	Weintek Labs., Inc.	Revision=16#00000003, FileVersion=1.3	CANopen-Mod
iR-AM06-VI	Weintek Labs., Inc.	Revision=16#00000003, FileVersion=1.3	CANopen-Mod
iR-AQ04-VI	Weintek Labs., Inc.	Revision=16#00000003, FileVersion=1.3	CANopen-Mod
iR-DI16-K	Weintek Labs., Inc.	Revision=16#00000003, FileVersion=1.3	CANopen-Mod
iR-DM16-N	Weintek Labs., Inc.	Revision=16#00000003, FileVersion=1.3	CANopen-Mod
iR-DM16-P	Weintek Labs., Inc.	Revision=16#00000003, FileVersion=1.3	CANopen-Mod
iR-DQ016-N	Weintek Labs., Inc.	Revision=16#00000003, FileVersion=1.3	CANopen-Mod
iR-DQ016-P	Weintek Labs., Inc.	Revision=16#00000003, FileVersion=1.3	CANopen-Mod
iR-DQ08-R	Weintek Labs., Inc.	Revision=16#00000003, FileVersion=1.3	CANopen-Mod
PU01-Axis 0	Weintek Labs., Inc.	Revision=16#00000003, FileVersion=1.3	CANopen-Mod
PU01-Axis 1	Weintek Labs., Inc.	Revision=16#00000003, FileVersion=1.3	CANopen-Mod

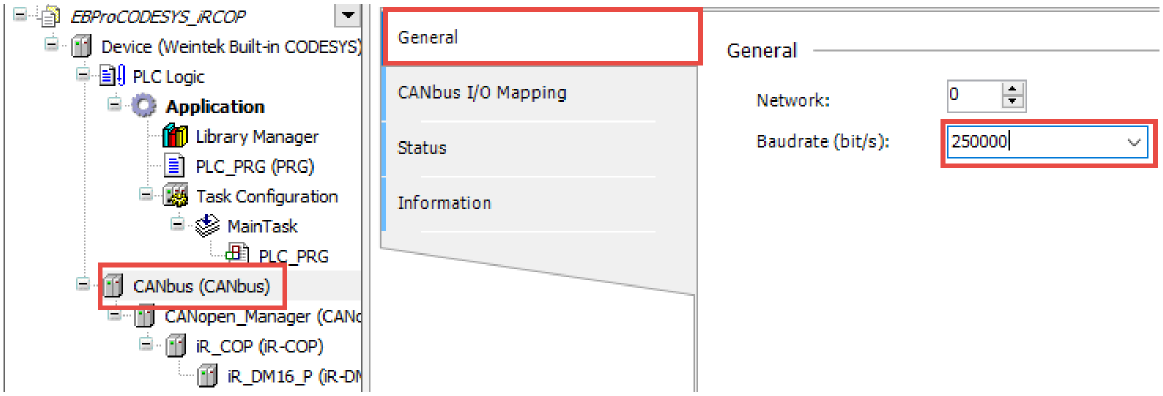
☑ Group by category ☐ Display all versions (for experts only) ☐ Display outdated versions

Name: iR-DM16-P
Vendor: Weintek Labs., Inc.
Categories:
Version: Revision=16#00000003, FileVersion=1.3
Order Number: iR-DM16-P
Description: CANopen-Module for CAN-Device iR-COP imported from iR-COP_v3_20190806.eds

Append selected device as last child of
iR_COP

(You can select another target node in the navigator while this window is open.)

6. Double click on the CANbus (CANbus) device and configure the correct baud rate for the iR-COP in the General tab. This should match the baud rate set on the DIP switches of the iR-COP:

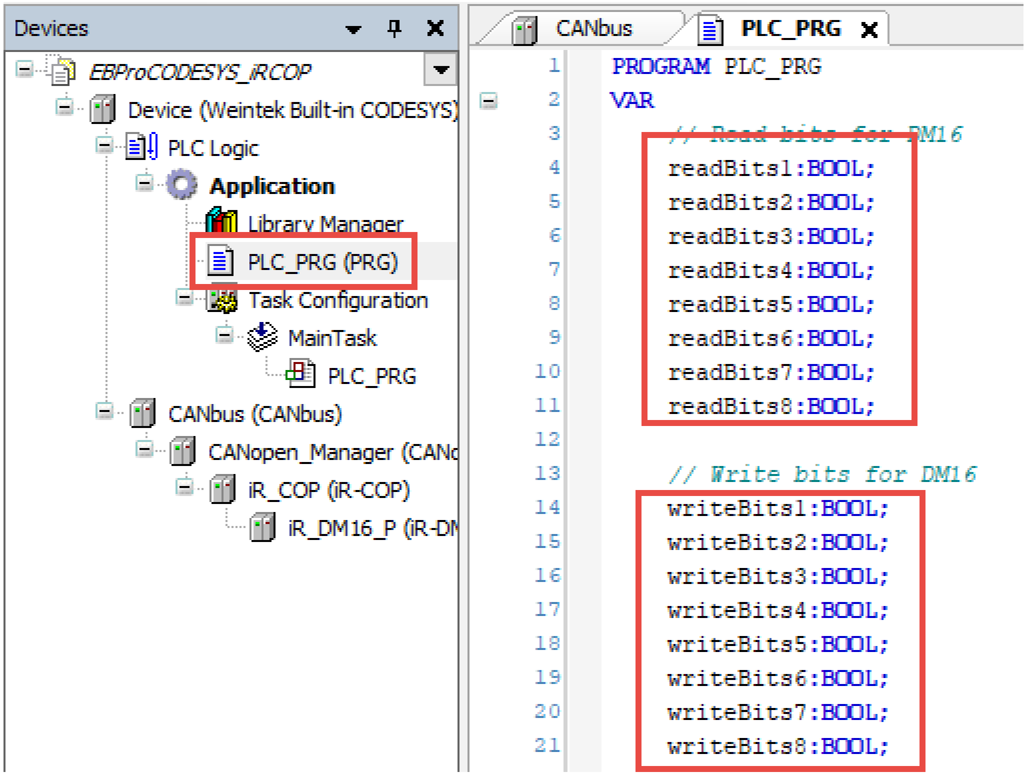


General

Network: 0

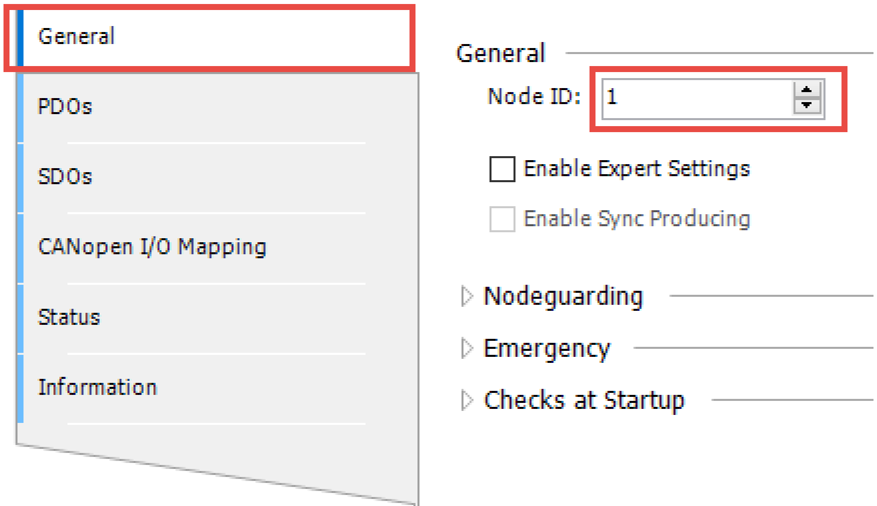
Baudrate (bit/s): 250000

7. To map tags to the CANopen device, first add tags to the PLC_PRG application. In this example, BOOL tags are used as the only IO module connected to the iR-COP is an iR-DM16-P:



```
PROGRAM PLC_PRG
VAR
    // Read bits for DM16
    readBits1:BOOL;
    readBits2:BOOL;
    readBits3:BOOL;
    readBits4:BOOL;
    readBits5:BOOL;
    readBits6:BOOL;
    readBits7:BOOL;
    readBits8:BOOL;

    // Write bits for DM16
    writeBits1:BOOL;
    writeBits2:BOOL;
    writeBits3:BOOL;
    writeBits4:BOOL;
    writeBits5:BOOL;
    writeBits6:BOOL;
    writeBits7:BOOL;
    writeBits8:BOOL;
```

8. Double click on the iR_COP device and go to the General tab. Here, set the Node ID to match the X1 and X10 DIP switch Node setting on the iR-COP device. In this example, we have the Node set to 00 01, so we set the Node ID to 1:

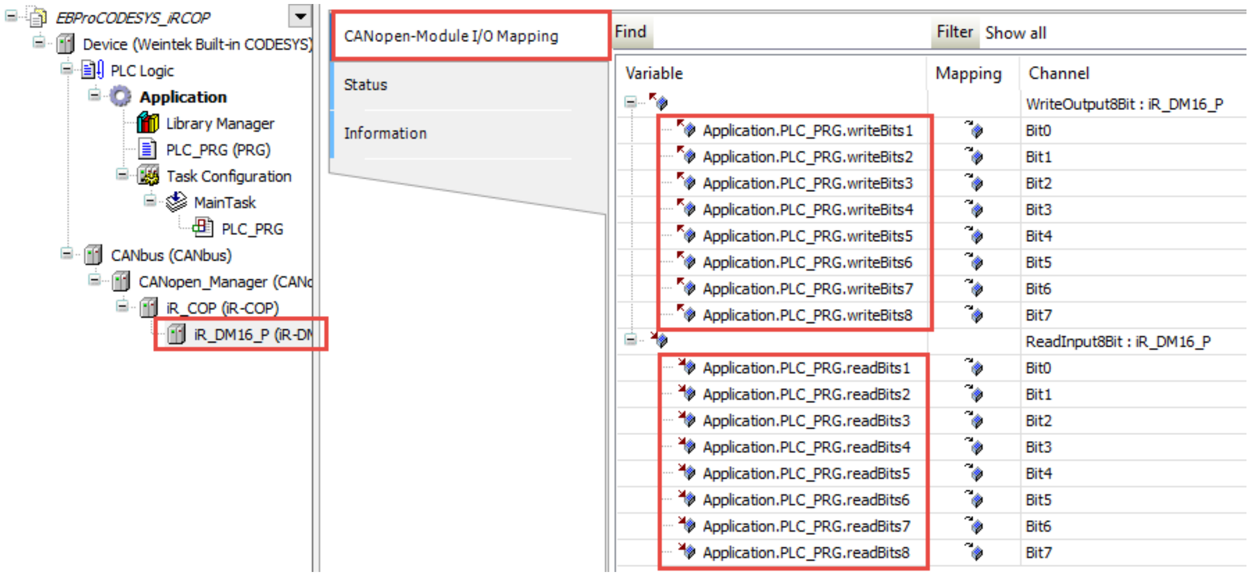


Node ID: 1

□ Enable Expert Settings

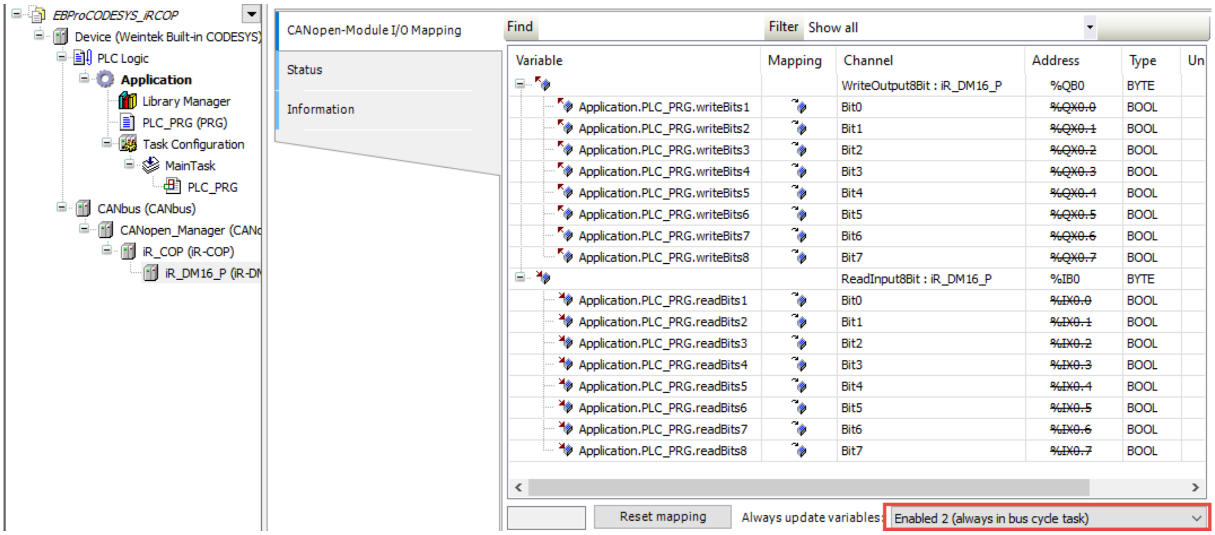
□ Enable Sync Producing

9. Now map the variables in PLC_PRG to the IO modules attached. In this example, we are only using a iR-DM16-P, so we will double click that module, navigate to the CANopen-Module I/O Mapping tab, and connect each created Boolean variable and attach them to the corresponding IO:



Variable	Mapping	Channel
		WriteOutput8Bit : iR_DM16_P
Application.PLC_PRG.writeBits1		Bit0
Application.PLC_PRG.writeBits2		Bit1
Application.PLC_PRG.writeBits3		Bit2
Application.PLC_PRG.writeBits4		Bit3
Application.PLC_PRG.writeBits5		Bit4
Application.PLC_PRG.writeBits6		Bit5
Application.PLC_PRG.writeBits7		Bit6
Application.PLC_PRG.writeBits8		Bit7
		ReadInput8Bit : iR_DM16_P
Application.PLC_PRG.readBits1		Bit0
Application.PLC_PRG.readBits2		Bit1
Application.PLC_PRG.readBits3		Bit2
Application.PLC_PRG.readBits4		Bit3
Application.PLC_PRG.readBits5		Bit4
Application.PLC_PRG.readBits6		Bit5
Application.PLC_PRG.readBits7		Bit6
Application.PLC_PRG.readBits8		Bit7

10. Still on the CANopen I/O Mapping tab, set Always update variables to Enabled 2 (always in bus cycle task).

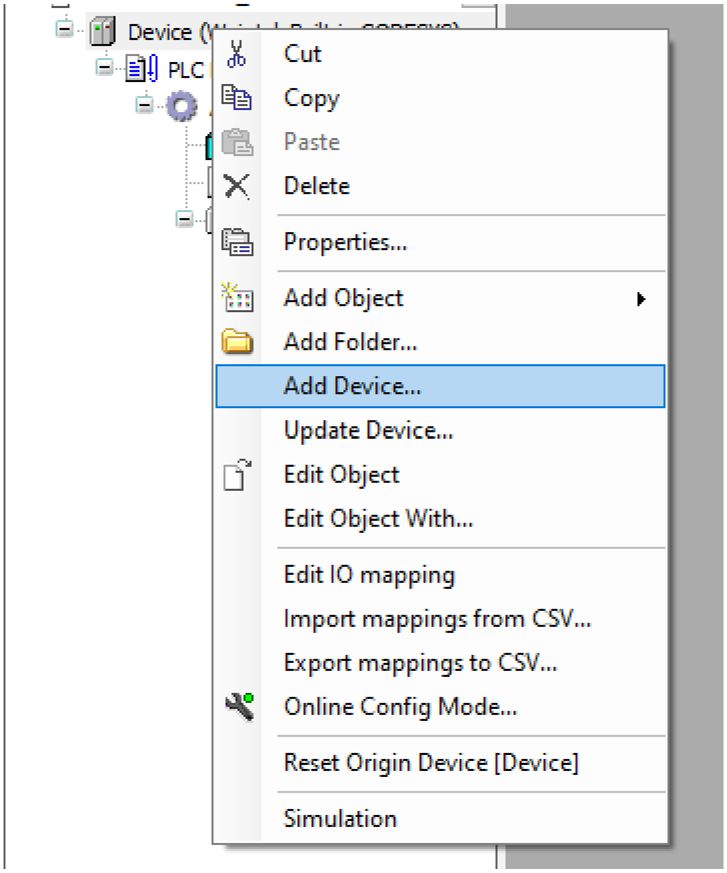


Variable	Mapping	Channel	Address	Type	Un
		WriteOutput8Bit : iR_DM16_P	%QB0	BYTE	
Application.PLC_PRG.writeBits1		Bit0	~~%QX0.0~~	BOOL	
Application.PLC_PRG.writeBits2		Bit1	~~%QX0.1~~	BOOL	
Application.PLC_PRG.writeBits3		Bit2	~~%QX0.2~~	BOOL	
Application.PLC_PRG.writeBits4		Bit3	~~%QX0.3~~	BOOL	
Application.PLC_PRG.writeBits5		Bit4	~~%QX0.4~~	BOOL	
Application.PLC_PRG.writeBits6		Bit5	~~%QX0.5~~	BOOL	
Application.PLC_PRG.writeBits7		Bit6	~~%QX0.6~~	BOOL	
Application.PLC_PRG.writeBits8		Bit7	~~%QX0.7~~	BOOL	
		ReadInput8Bit : iR_DM16_P	%IB0	BYTE	
Application.PLC_PRG.readBits1		Bit0	~~%IX0.0~~	BOOL	
Application.PLC_PRG.readBits2		Bit1	~~%IX0.1~~	BOOL	
Application.PLC_PRG.readBits3		Bit2	~~%IX0.2~~	BOOL	
Application.PLC_PRG.readBits4		Bit3	~~%IX0.3~~	BOOL	
Application.PLC_PRG.readBits5		Bit4	~~%IX0.4~~	BOOL	
Application.PLC_PRG.readBits6		Bit5	~~%IX0.5~~	BOOL	
Application.PLC_PRG.readBits7		Bit6	~~%IX0.6~~	BOOL	
Application.PLC_PRG.readBits8		Bit7	~~%IX0.7~~	BOOL	

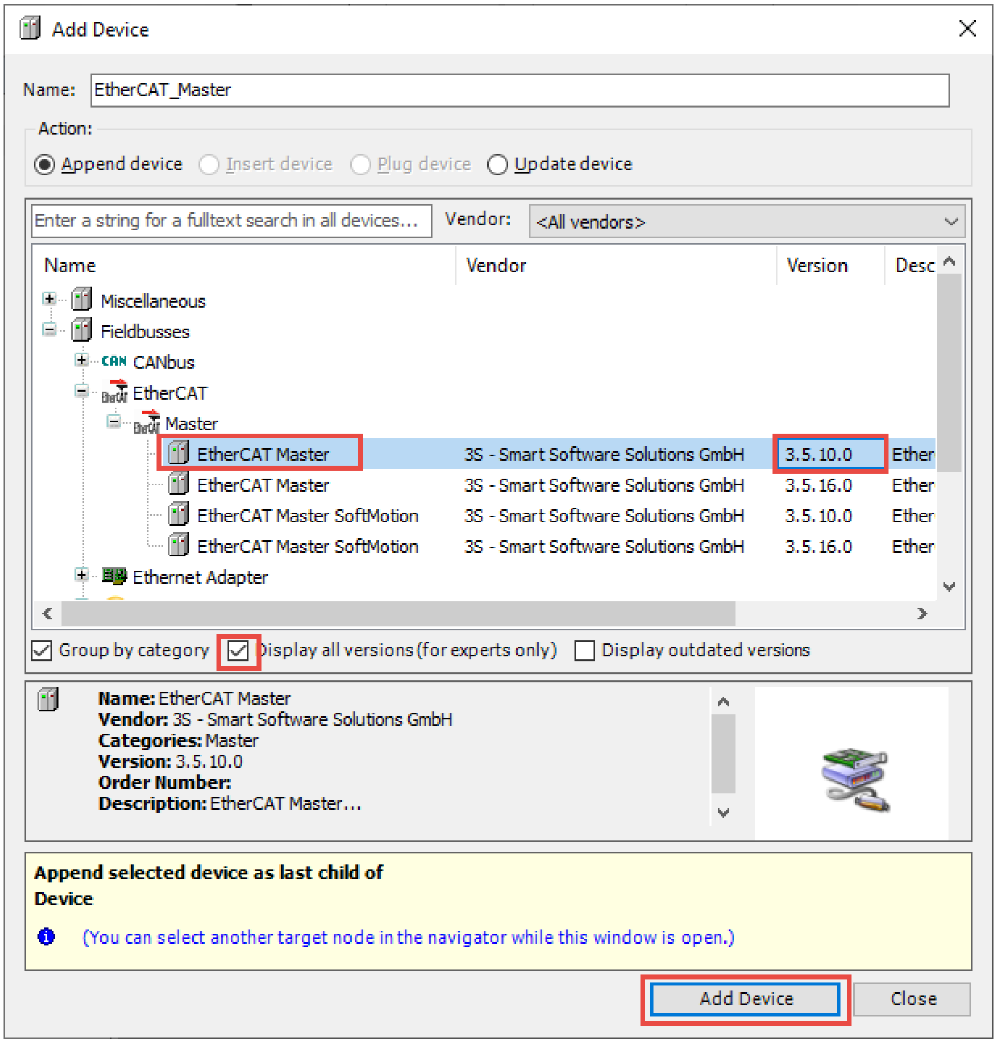
Always update variables: Enabled 2 (always in bus cycle task)

Connect iR-ECAT to CODESYS

1. Right click on Device (Weintek Built-in CODESYS) and click Add Device:



2. In the Add Device window, check the Display all versions checkbox and then select FieldBusses -> EtherCAT -> Master -> EtherCAT Master Version 3.5.10.0 and click Add Device:



Add Device

Name: EtherCAT_Master

Action:

● Append device ○ Insert device ○ Plug device ○ Update device

Enter a string for a fulltext search in all devices... Vendor: <All vendors>

Name	Vendor	Version	Desc
Miscellaneous			
Fieldbusses			
CANbus			
EtherCAT			
Master			
EtherCAT Master	3S - Smart Software Solutions GmbH	3.5.10.0	Ether
EtherCAT Master	3S - Smart Software Solutions GmbH	3.5.16.0	Ether
EtherCAT Master SoftMotion	3S - Smart Software Solutions GmbH	3.5.10.0	Ether
EtherCAT Master SoftMotion	3S - Smart Software Solutions GmbH	3.5.16.0	Ether
Ethernet Adapter			

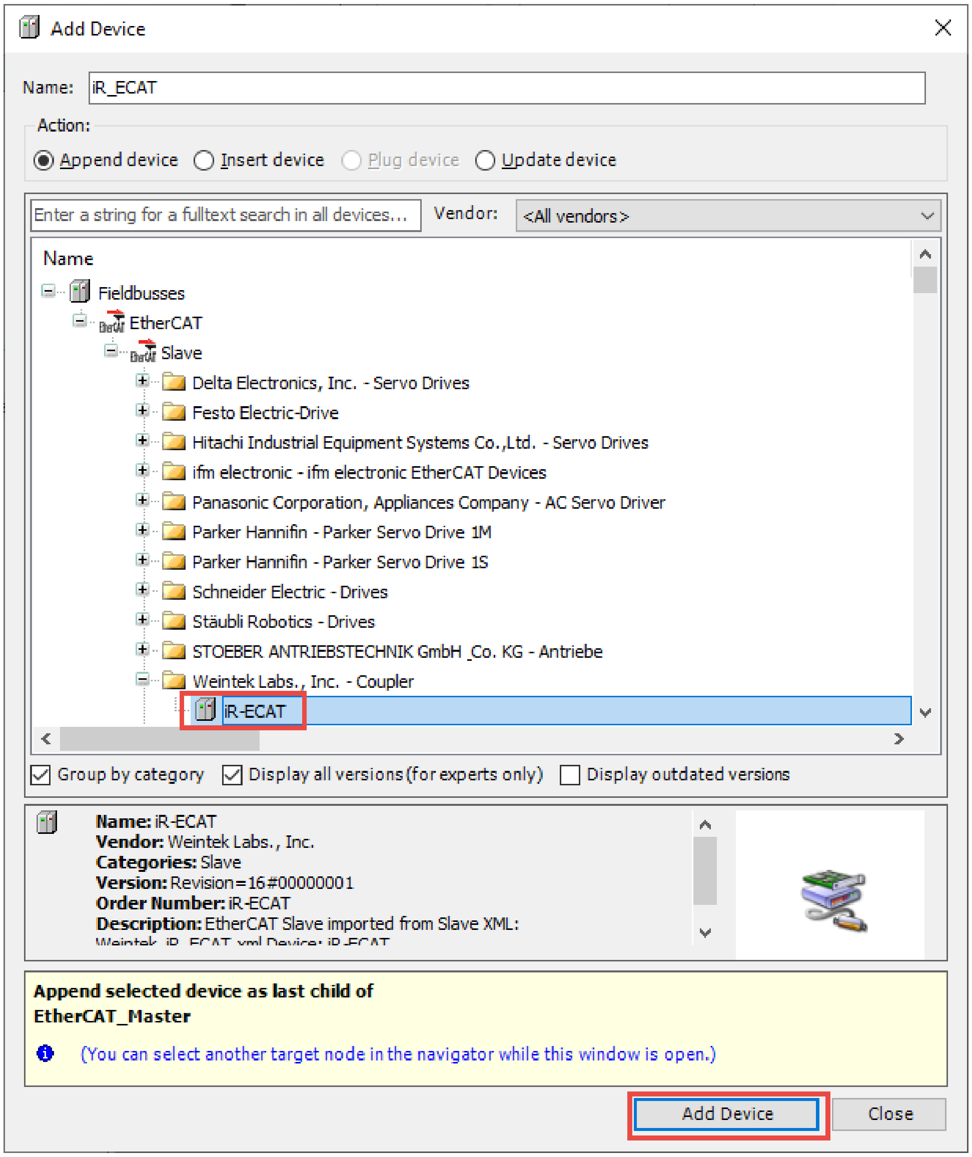
☑ Group by category ☑ Display all versions (for experts only) □ Display outdated versions

Name: EtherCAT Master
Vendor: 3S - Smart Software Solutions GmbH
Categories: Master
Version: 3.5.10.0
Order Number:
Description: EtherCAT Master...

Append selected device as last child of
Device

(You can select another target node in the navigator while this window is open.)

3. Select the newly added EtherCAT Master device, and then in the Add Device window, select Fieldbusses -> EtherCAT -> Slave -> Weintek Labs., Inc. – Coupler -> iR-ECAT and click Add Device:



Add Device

Name: iR_ECAT

Action:

● Append device ○ Insert device ○ Plug device ○ Update device

Enter a string for a fulltext search in all devices... Vendor: <All vendors>

Name
- Fieldbusses
  - EtherCAT
    - Slave
      - Delta Electronics, Inc. - Servo Drives
      - Festo Electric-Drive
      - Hitachi Industrial Equipment Systems Co.,Ltd. - Servo Drives
      - ifm electronic - ifm electronic EtherCAT Devices
      - Panasonic Corporation, Appliances Company - AC Servo Driver
      - Parker Hannifin - Parker Servo Drive 1M
      - Parker Hannifin - Parker Servo Drive 1S
      - Schneider Electric - Drives
      - Stäubli Robotics - Drives
      - STOEBER ANTRIEBSTECHNIK GmbH _Co. KG - Antriebe
      - Weintek Labs., Inc. - Coupler
        - iR-ECAT

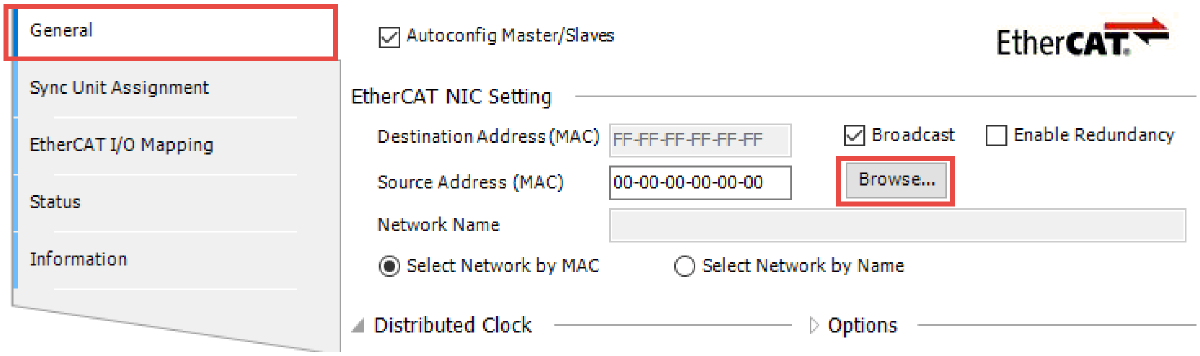
☑ Group by category ☑ Display all versions (for experts only) □ Display outdated versions

Name: iR-ECAT
Vendor: Weintek Labs., Inc.
Categories: Slave
Version: Revision=16#00000001
Order Number: iR-ECAT
Description: EtherCAT Slave imported from Slave XML:
Weintek_iR_ECAT.xml Device: iR-ECAT

Append selected device as last child of
EtherCAT_Master

(You can select another target node in the navigator while this window is open.)

4. Double click on the newly added EtherCAT Master device to open the settings. In the General settings tab, click the Source Address (MAC) Browse button to set the gateway address to use for the EtherCAT interface. This should match the MAC address of the cMT-X device's CODESYS LAN port:



☑ Autoconfig Master/Slaves

EtherCAT NIC Setting

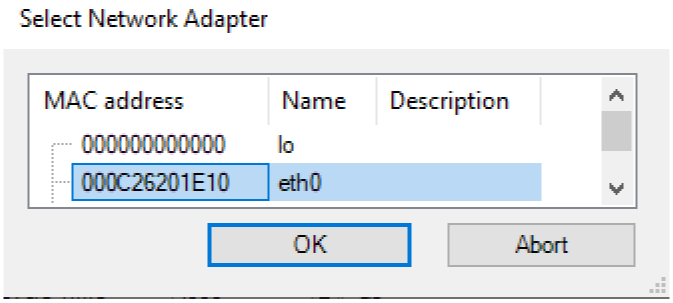
Destination Address (MAC) FF-FF-FF-FF-FF-FF ☑ Broadcast □ Enable Redundancy

Source Address (MAC) 00-00-00-00-00-00 Browse...

Network Name

● Select Network by MAC ○ Select Network by Name

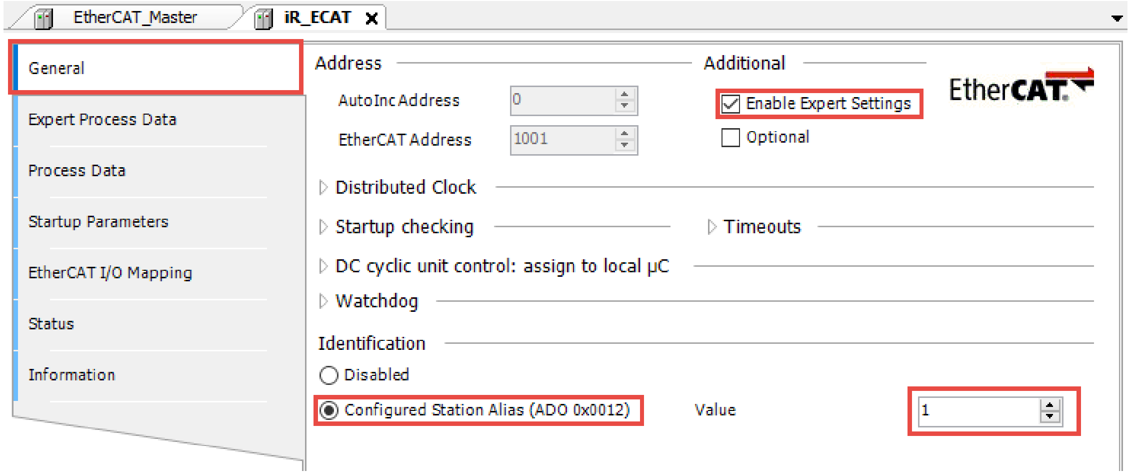
Distributed Clock Options



Select Network Adapter

MAC address	Name	Description
000000000000	lo	
000C26201E10	eth0	

5. Double click on the iR_ECAT device to open the device settings. In the General tab, check the Enable Expert Settings checkbox. In the Identification section, select the Configured Station Alias radio button, and for the value field, enter the node ID set on the X1 and X10 dip switches on your iR-ECAT device. These may be set to any ID except 00 00. Our example is set to 00 01:



AutoInc Address: 0

EtherCAT Address: 1001

☑ Enable Expert Settings

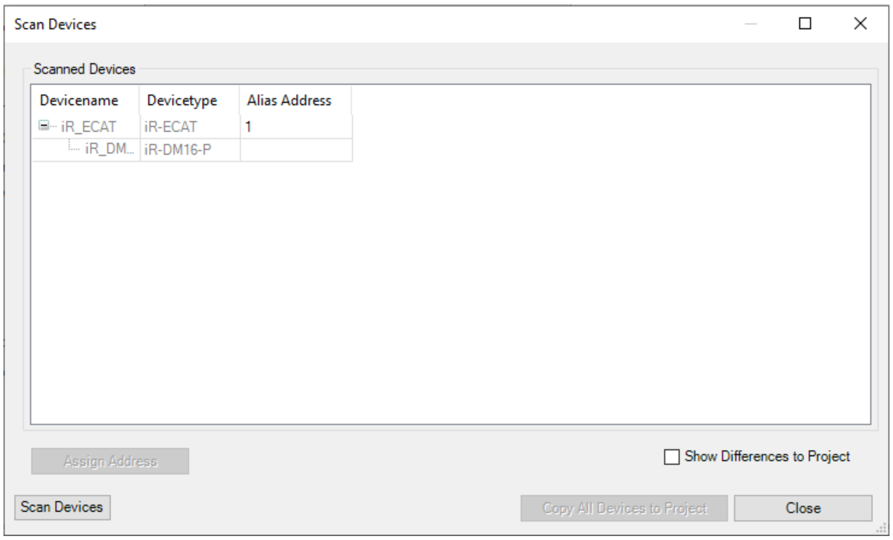
□ Optional

○ Disabled

● Configured Station Alias (ADO 0x0012)

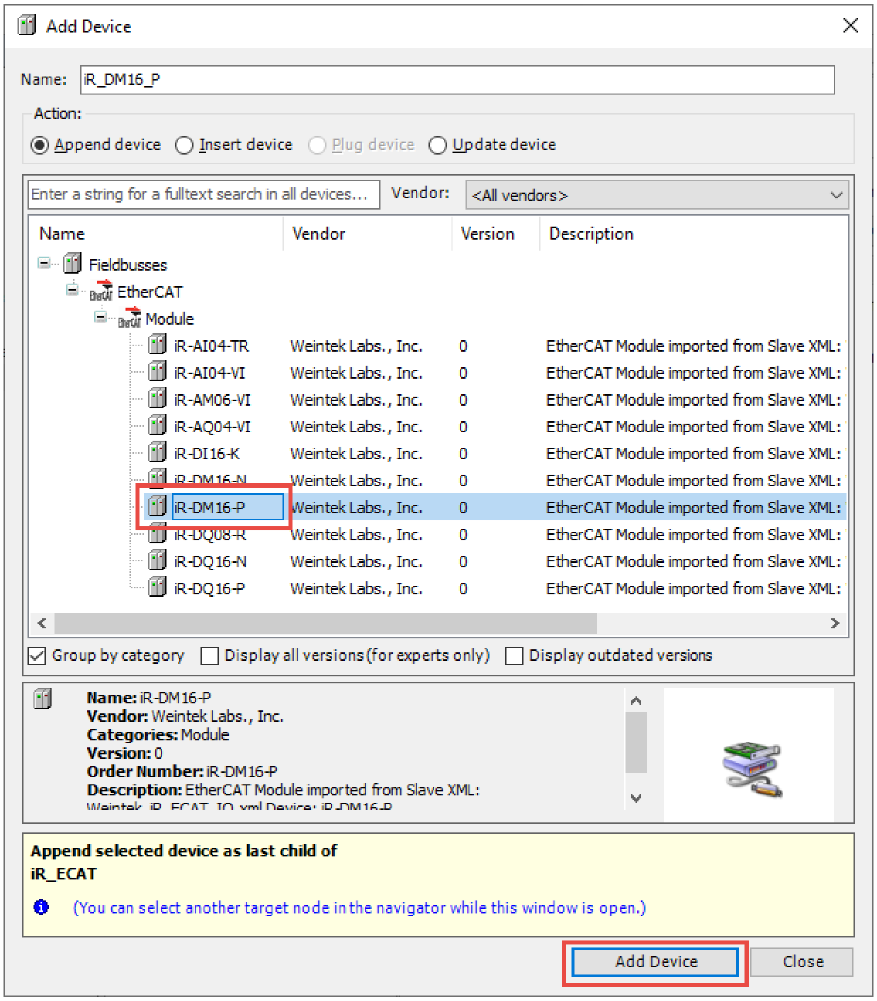
Value: 1

6. Add all attached IO modules in order. This can be done in two ways:
   a. Scan for Devices
      i. Right click the EtherCAT Master device and click Scan For Devices. If the gateway for the EtherCAT Master device is set up, and the PC is able to login to the CODESYS device, this will automatically scan the connected iR-ECAT module and find all attached IO modules, allowing them to be added all at once. In this example, only a DM16-P is connected:



Devicename	Devicetype	Alias Address
iR_ECAT	iR-ECAT	1
iR_DM...	iR-DM16-P	

b. Add each IO module by hand in order.
   i. Right click the iR_ECAT device and click Add Device. In the Add Device window, select Fieldbusses -> EtherCAT -> Module and then add each connected IO module in the order they are connected to the base module. In this example, only a DM16-P is connected:



Add Device

Name: iR_DM16_P

Action:

● Append device ○ Insert device ○ Plug device ○ Update device

Enter a string for a fulltext search in all devices... Vendor: <All vendors>

Name	Vendor	Version	Description
Fieldbusses			
EtherCAT			
Module			
iR-AI04-TR	Weintek Labs., Inc.	0	EtherCAT Module imported from Slave XML:
iR-AI04-VI	Weintek Labs., Inc.	0	EtherCAT Module imported from Slave XML:
iR-AM06-VI	Weintek Labs., Inc.	0	EtherCAT Module imported from Slave XML:
iR-AQ04-VI	Weintek Labs., Inc.	0	EtherCAT Module imported from Slave XML:
iR-DI16-K	Weintek Labs., Inc.	0	EtherCAT Module imported from Slave XML:
iR-DM16-N	Weintek Labs., Inc.	0	EtherCAT Module imported from Slave XML:
iR-DM16-P	Weintek Labs., Inc.	0	EtherCAT Module imported from Slave XML:
iR-DQ08-R	Weintek Labs., Inc.	0	EtherCAT Module imported from Slave XML:
iR-DQ16-N	Weintek Labs., Inc.	0	EtherCAT Module imported from Slave XML:
iR-DQ16-P	Weintek Labs., Inc.	0	EtherCAT Module imported from Slave XML:

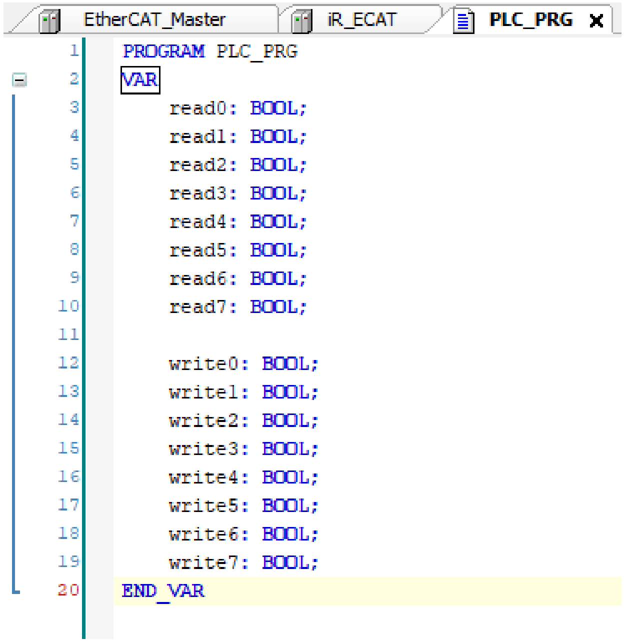
☑ Group by category ☐ Display all versions (for experts only) ☐ Display outdated versions

Name: iR-DM16-P
Vendor: Weintek Labs., Inc.
Categories: Module
Version: 0
Order Number: iR-DM16-P
Description: EtherCAT Module imported from Slave XML:
Weintek_iR_ECAT_IO.xml Device: iR-DM16-P

Append selected device as last child of
iR_ECAT

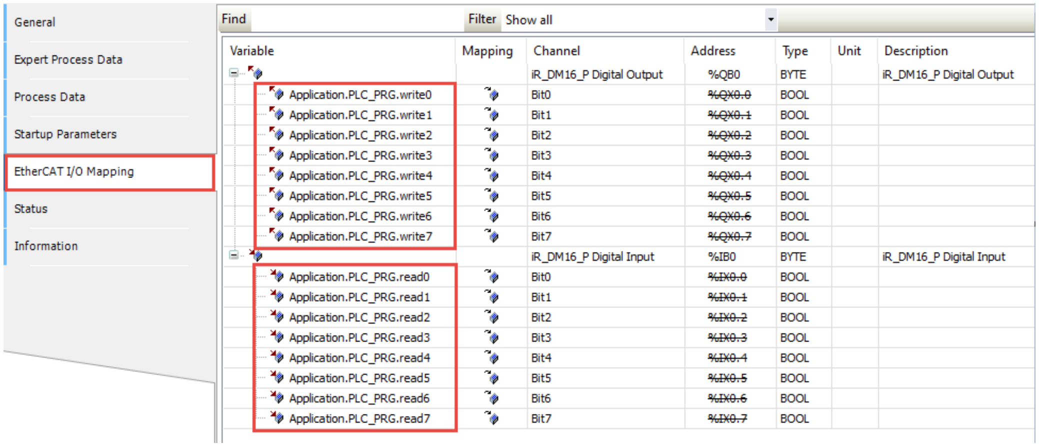
(You can select another target node in the navigator while this window is open.)

7. Add variables in the PLC_PRG program to channel to the connected IO. In this example, we will simply add one Boolean for each IO:



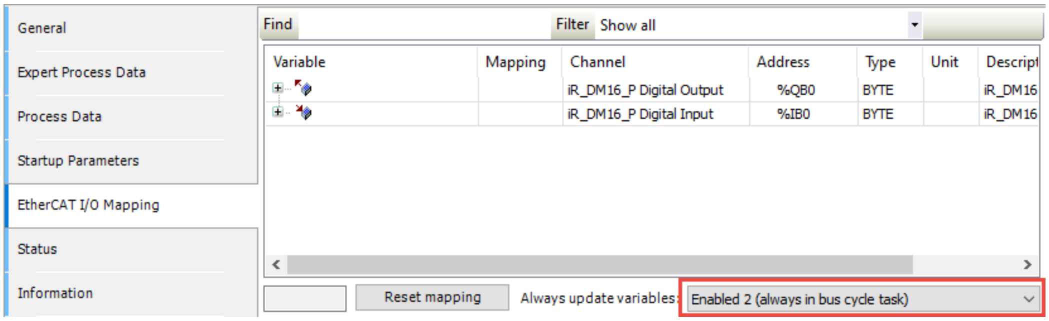
```
PROGRAM PLC_PRG
VAR
    read0: BOOL;
    read1: BOOL;
    read2: BOOL;
    read3: BOOL;
    read4: BOOL;
    read5: BOOL;
    read6: BOOL;
    read7: BOOL;

    write0: BOOL;
    write1: BOOL;
    write2: BOOL;
    write3: BOOL;
    write4: BOOL;
    write5: BOOL;
    write6: BOOL;
    write7: BOOL;
END_VAR
```

8. Double click in the iR_ECAT device and go to the EtherCAT I/O Mapping tab. There, map the newly created variables to the IO connected. In this example, we only have an iR-DM16-P connected, so we will connect our 8 read and write variables to the input and output bits:



Variable	Mapping	Channel	Address	Type	Unit	Description
		iR_DM16_P Digital Output	%QB0	BYTE		iR_DM16_P Digital Output
Application.PLC_PRG.write0		Bit0	~~%QX0.0~~	BOOL		
Application.PLC_PRG.write1		Bit1	~~%QX0.1~~	BOOL		
Application.PLC_PRG.write2		Bit2	~~%QX0.2~~	BOOL		
Application.PLC_PRG.write3		Bit3	~~%QX0.3~~	BOOL		
Application.PLC_PRG.write4		Bit4	~~%QX0.4~~	BOOL		
Application.PLC_PRG.write5		Bit5	~~%QX0.5~~	BOOL		
Application.PLC_PRG.write6		Bit6	~~%QX0.6~~	BOOL		
Application.PLC_PRG.write7		Bit7	~~%QX0.7~~	BOOL		
		iR_DM16_P Digital Input	%IB0	BYTE		iR_DM16_P Digital Input
Application.PLC_PRG.read0		Bit0	~~%IX0.0~~	BOOL		
Application.PLC_PRG.read1		Bit1	~~%IX0.1~~	BOOL		
Application.PLC_PRG.read2		Bit2	~~%IX0.2~~	BOOL		
Application.PLC_PRG.read3		Bit3	~~%IX0.3~~	BOOL		
Application.PLC_PRG.read4		Bit4	~~%IX0.4~~	BOOL		
Application.PLC_PRG.read5		Bit5	~~%IX0.5~~	BOOL		
Application.PLC_PRG.read6		Bit6	~~%IX0.6~~	BOOL		
Application.PLC_PRG.read7		Bit7	~~%IX0.7~~	BOOL		

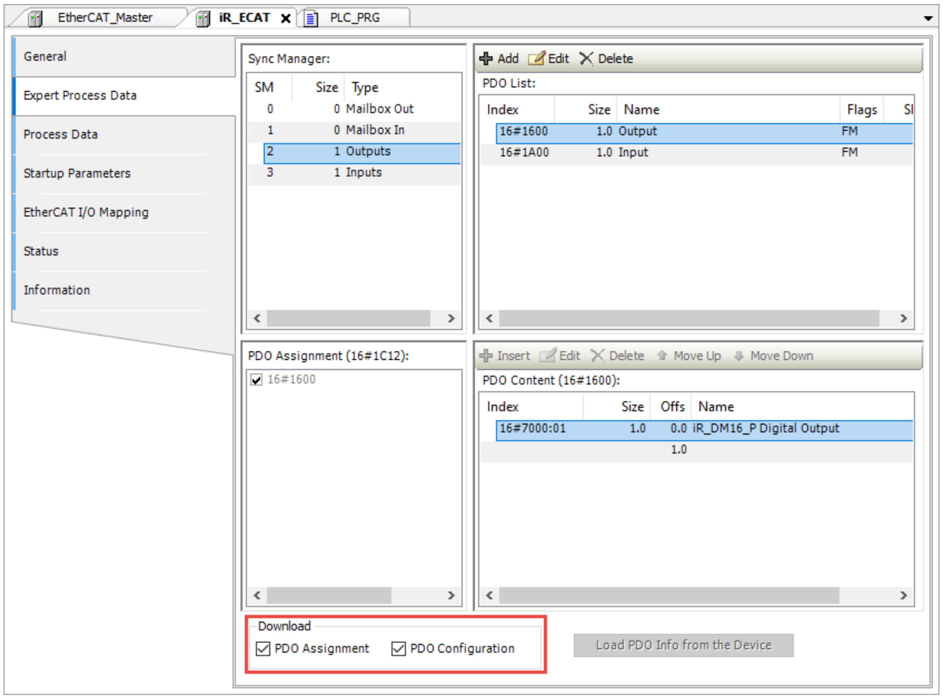
9. While in the EtherCAT I/O Mapping tab of the iR_ECAT device, set the Always update variables to Enabled 2 (always in bus cycle task):



Variable	Mapping	Channel	Address	Type	Unit	Descript
		iR_DM16_P Digital Output	%QB0	BYTE		iR_DM16
		iR_DM16_P Digital Input	%IB0	BYTE		iR_DM16

Always update variables: Enabled 2 (always in bus cycle task)

10. Finally, in the iR_ECAT device settings, go to the Expert Process Data tab and check the PDO Assignment and PDO Configuration checkboxes in the Download section:



Sync Manager:

SM	Size	Type
0	0	Mailbox Out
1	0	Mailbox In
2	1	Outputs
3	1	Inputs

PDO List:

Index	Size	Name	Flags	SI
16#1600	1.0	Output	FM	
16#1A00	1.0	Input	FM	

PDO Assignment (16#1C12):

☑ 16#1600

PDO Content (16#1600):

Index	Size	Offs	Name
16#7000:01	1.0	0.0	iR_DM16_P Digital Output
		1.0	

Download

☑ PDO Assignment ☑ PDO Configuration