User Manual

iR-ETN

This guide walks through important information about iR-ETN

V1.00

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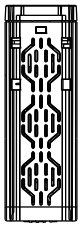
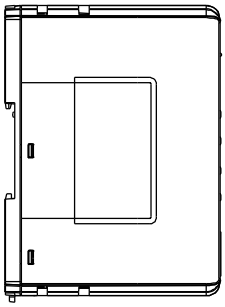
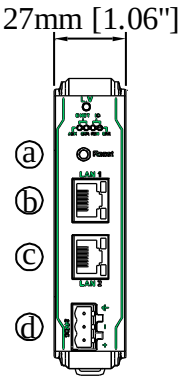
1. Product Overview



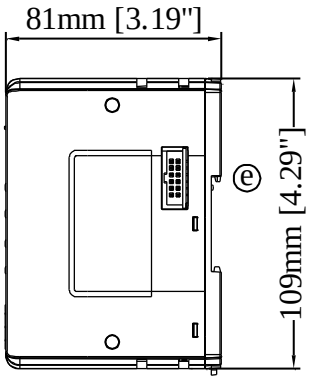
Top View



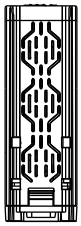
Side View



Front View



Side View



Bottom View

a	Reset Button	*e*	Expansion Connector
b	LAN 1		
c	LAN 2		
d	Power Connector		

2. Specifications

Communication Interface Specifications		
Model	iR-ETN	
Expansion I/O Module	Number of Bus Terminals	Depends on Power Consumption
	Digital Input Point	Max. 512
	Digital Output Point	Max. 512
	Analog Input Channel	Max. 64
	Analog Output Channel	Max. 64
Indicators	ENET ACK (Green)	Device Status Indicator
	ENET ERR (Red)	Device Error Indicator
	L.V (Red)	Low Voltage Status Indicator
	IO RUN (Green)	Module Status Indicator
	IO ERR (Red)	Module Error Indicator
Data Transfer Rate	10/100 Mbps	
Data Transfer Medium	4 x 2 twisted pair copper cable; category 3 (10 Mbps), category 5 (100 Mbps)	
Distance Between Stations	100 m between hub/switch and Bus Coupler or between Bus Coupler and Bus Coupler	
Protocol	Modbus TCP/IP	
Max. Number of TCP/IP Connections	8 connections	
Topology	line or star wiring	
General Specification		
Power	Power Supply	24 VDC (-15%/+20%)
	Power Dissipation	Nominal 100mA @ 24VDC
	Current for-Internal Bus	Max 2A @ 5VDC
	Current Consumption	220mA @ 5VDC
	Electrical Isolation	Network to Logic : Isolation Logic to Field power : Isolation
	Back-up Fuse	≤ 1.6A Self-recovery
Specification	PCB Coating	Yes
	Enclosure	Plastic
	Dimensions WxHxD	27 x 109 x 81 mm
	Weight	Approx. 0.15 kg
	Mount	35mm DIN rail mounting
Environment	Protection Structure	IP20
	Storage Temperature	-20° ~ 70°C (-4° ~ 158°F)
	Operating Temperature	0° ~ 55°C (32° ~ 131°F)
	Relative Humidity	10% ~ 90% (non-condensing)
	Vibration Resistance	conforms to EN 60068-2-6 / EN 60068-2-27
Certification	EMC Immunity	Conforms to EN 55032: 2012+AC: 2013, Class A EN 61000-6-4: 2007+A1:2011 EN 55024: 2010+A1: 2015 EN 61000-6-2:2005

3. LED Insicators

3.1 L.V LED

L.V LED state	Description
OFF	24V power normal
Blinking	Detect 24V power
ON	24V power error

3.2 IO RUN/ERR LED

RUN LED	ERR LED	Description
OFF	OFF	Power off or no power
Blinking	OFF	IO initiating
Blinking	ON	IO initiation error
ON	OFF	IO working
ON	Blinking	IO module alarm
ON	ON	IO communication fault
Blinking	Blinking	Exceeding power limit or too many modules

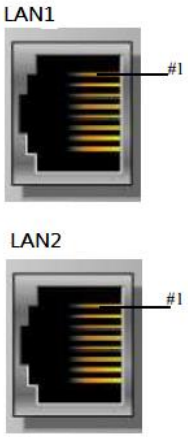
3.3 ENET RUN/ERR

Run LED	Err LED	Description
OFF	OFF	Power off or no power
Blinking	OFF	Modbus TCP communicating
ON	OFF	The device is in the OPERATIONAL state
OFF	ON	Hardware error, communication fault
ON	Blinking	Reset button is triggered

3.4 RJ45

Speed LED	
OFF	Operating as a 10-Mbps connection
Green ON	Operating as a 100-Mbps connection
LINK /ACT LED	
OFF	No link is established.
Blinking	There is activity on this port.

4. RJ45 Interface



RJ-45	Signal Name	Descriptions
1	TD+	Transmit +
2	TD-	Transmit +
3	RD+	Receive +
4	****	
5	****	
6	RD-	Receive -
7	****	
8	****	
Case	Shield	

5. Reset Button

Press and hold the reset button for more than 2 seconds after the unit starts running properly, and wait until ENET ERR LED blinks. The default parameters are shown below, the settings will take effect after cold reset.

Item	Description	Default
1	IP Address	192.168.0.212
2	Netmask	255.255.255.0

6. MODBUS/TCP IP Address Setup

6.1 Reset Button

Item	Description	Default
1	IP Address	192.168.0.212
2	Netmask	255.255.255.0

6.2 MODBUS Mapping

6.2.1 Bit Mapping

Parameter	Start address	Read/Write	Function Code
Digital Input	0x0000~0x0200	Read	2
	0x0320~0x035F	Read	3,23
Digital Output	0x0000~0x0200	Read	1
	0x0000~0x0200	Write	5,15
	0x0360~0x039F	Write	6,16,23

6.2.2 Register Mapping

Parameter	Start address	Read/Write	Function Code
Input register	0x0000~0x00FF	Read	3,4,23
Output register	0x0100~0x01FF	Read	3,23
		Write	6,16,23
Special registers	----------	Read	3,4,23
	---------	Write	6,16,23

*Analog Input/Output: Input Register/Output Register

7. Specifal Registers

7.1 TCP/IP Special Register

Address		Read/Write	Data Size	Description
Dec	Hex			
1000	03E8	Read	3word	(MAC-address).Ethernet physical address If 00-0C-26-01-02-03, then 0x000C, 0x2601, 0x0203.
1003	03EB	Read/Write	2word	IP address if 192.168.0.212, then 0xC0A8, 0x00D4.
1005	03ED	Read/Write	2word	subnet mask if 255.255.255.0, then 0xFFFF, 0xFF00
1011	03F3	Read	1word	Number of TCP connected

*TCP/IP Register Settings will take effect after cold reset or after giving Device Reset Warm command.

7.2 Device Information Special Register

Address		Read/Write	Data size	Description
Dec	Hex			
3000	0BB8	Read	4word	Vendor name string 8 char: “weintek”
3004	0BBC	Read	1word	Product Code of iR-ETN is 0x0702
3005	0BBD	Read	1word	Firmware revision V1.23.4, 0x1234
3006	0BBE	Read	1word	Hardware revision V1.23.4, 0x1234
3007	0BBF	Read	1word	Power consumption unit mW
3008-3023	0BC0-0BCF	R/W	16word	Product name, default=“iR-ETN”

7.3 iBus Information Special Register

Address		Read/Write	Data size	Description
Dec	Hex			
10000	2710	Read	1word	Slot 0 Product code (iR-ETN)
10001	2711	Read	1word	Slot 1 Module Product code
10001~10016	2712~2720	Read	1word	Slot 2~Slot 16 Module Product code
10033	2731	Read	1word	Number of modules
10035	2733	Read	1word	Point of Digital Input
10036	2734	Read	1word	Point of Digital Output
10037	2735	Read	1word	Input register number of Analog channels
10038	2736	Read	1word	Output register number of Analog channels
10045	273D	Read/Write	1word	0: ibus stops when one of the modules is disconnected. 1: ibus continues running when one of the modules is disconnected.

7.4 Module Information Special Register

The data size of the information register of each module is 100word. If the first module starts from address 30000 to 30099, then the second module starts from address 30100 to 30199, and so on.

Address		Read/Write	Data size	Description
Dec	Hex			
30000 ~30099	7530~ 7594	Read	100word	Module information of Slot 1
30100 ~31599	7535~ 7B6F	Read	100word	Module information of Slot 2~16

Ex: Module information of slot 1

Address		Read/Write	Data size	Description
Dec	Hex			
30000	7530	Read	1word	Product code, please see Product Code List.
30001	7531	Read	1word	Firmware version V1.23.4, value 0x1234
30002	7532	Read	1word	Hardware version V1.23.4, value 0x1234
30003	7533	Read	1word	Power consumption unit mW
30038	7556	Read	1word	Point of Digital Output
30039	7557	Read	1word	Point of Digital Input
30040	7558	Read	1word	Input register number of Analog channels
30041	7559	Read	1word	Output register number of Analog channels

7.5 Product Code List

Item	Product	Code
1	iR-DI16-K	0x0154
2	iR-DM16-P	0x0351
3	iR-DQ16-P	0x0251
4	iR-DM16-N	0x0352
5	iR-DQ16-N	0x0252
6	iR-DQ08-R	0x0243
8	iR-COP	0x0701
9	iR-ETN	0x0702

7.6 Special Register

Address		Read/Write	Data size	Description
Dec	Hex			
5000	1388	Read	1word	Device Error code
5001	1389	Read	1word	Reserved
5002	138A	Read	1word	Slot1~16 of Module disconnect
5003	138B	Read	1word	Reserved
5004	138C	Read	1word	Slot1~16 of Module Alarm
5005 ~5020	138D 139C	Read	1word	Module1~16 Alarm Code
5021 ~5036	139D 13AC	Read	1word	Reserved
5100~ 5612	13EC~ 15EC	Read/Write	512word	Setting the time filter (digital input, unit: ms). The time filter is disabled when it is set to less than 5ms. The time filter remains at 1000ms when it is set to

				longer than 1000ms. (digital input 0-512)
6000	1770	Write	1word	Device Command 0x5269：Reset iBus 0x5250：Parameter to default without TCP/IP 0x5257：Device Reset Warm

7.7 Life Guarding

If the communication was missing for longer than the Life Guarding Time, a Life Guard Event is indicated. The output behavior is determined by whether Error Mode is enabled or disabled. Enabling Error Mode will output an Error Value when an event occurs. Disabling Error Mode will keep the last value (for both digital and analog).

Address		Read/Write	Data size	Description	
Dec	Hex				
6100	17D4	Read/Write	1word	Life Guarding Time, unit: ms, 0: Disabled	
6101	17D5	Read/Write	1word	Digital Output Error Mode (bit15-0)	0:Keep last value 1:Error value
6102	17D6	Read/Write	1word	Digital Output Error Mode (bit31-16)	
.....	.....	.....	.....	.....	
6132	17F4	Read/Write	1word	Digital Output Error Mode (bit511-495)	
6133	17F5	Read/Write	1word	Digital Output Error Value (bit15-0)	0:Low 1:High
6134	17F6	Read/Write	1word	Digital Output Error Value (bit31-16)	
.....	.....	.....	.....	.....	
6164	1814	Read/Write	1word	Digital Output Error Value (bit511-495)	
6165	1815	Read/Write	1word	Analog Output Error Mode (channel 15-0)	0:Keep last value 1:Error value
6166	1816	Read/Write	1word	Analog Output Error Mode (channel 31-16)	
6167	1817	Read/Write	1word	Analog Output Error Mode (channel 47-32)	
6168	1818	Read/Write	1word	Analog Output Error Mode (channel 63-48)	
6169~6232	1819~1858	Read/Write	64word	Analog Output Error Value (channel 63-0)	-32768~32768

7.8 The Default Item

Address		Read/Write	Data size	Description	Default
Dec	Hex				
3008-3023	0BC0-0BCF	Read/Write	16word	Product name	“iR-ETN”
5100~5612	13EC~15EC	Read/Write	512word	Setting the time filter (Digital input 0-512)	0
6100	17D4	Read/Write	1word	Life Guarding Time	0
6101-6132	17D4-17F4	Read/Write	32 word	Digital Output Error Mode	0xFF
6133-6164	17F5-1814	Read/Write	32 word	Digital Output Error Value	0
6165-6168	1815-1818	Read/Write	4word	Analog Output Error Mode	0xFF
6169-6232	1819~1858	Read/Write	64word	Analog Output Error Value	0

7.9 Device Error Code List

Bit Number	Description
Bit0	Low power alarm
Bit1	iBus initialization fault
Bit2	Hardware error
Bit3	Module lost connection
Bit4	Module alarm
Bit5	Number of iBus exceeds 16
Bit6	Power consumption exceeded at iBus system
Bit7~15	Reserved

8. Example of Mapping

The following is an example showing that when iR-ETN is connected with multiple modules, the address mapping and input/output bit mapping can be as follows:

item	Product
Slot#1	iR-DI16-K
Slot#2	iR-DQ16-P
Slot#3	iR-DM16-P
Slot#4	iR-DQ08-R

8.1 iBus Information Special Register

Address		Description	Value
Dec	Hex		
10000	2710	Slot 0 Product code (Device)	0x0702 (iR-ETN)
10001	2711	Slot 1 Product code (Module)	0x0154 (iR-DI16-K)
10002	2712	Slot 2 Product code (Module)	0x0251 (iR-DQ16-P)
10003	2713	Slot 3 Product code (Module)	0x0351 (iR-DM16-P)
10004	2714	Slot 4 Product code (Module)	0x0243 (iR-DQ08-R)
10033	2731	Number of modules	4
10035	2733	Point of Digital Input	24
10036	2734	Point of Digital Output	32
10037	2735	Channels of register input	0
10038	2736	Channels of register output	0

8.2 Digital Input Bit Mapping

Slot	Module	Bit offset (0x0000~0x0017)
Slot#1	iR-DI16-K	0x0000~0x000F (X0~X15)
Slot#2	iR-DQ16-P	N/A

Slot#3	iR-DM16-P	0x0010~0x0017 (X0~X7)
Slot#4	iR-DQ08-R	N/A

8.3 Digital Output Bit Mapping

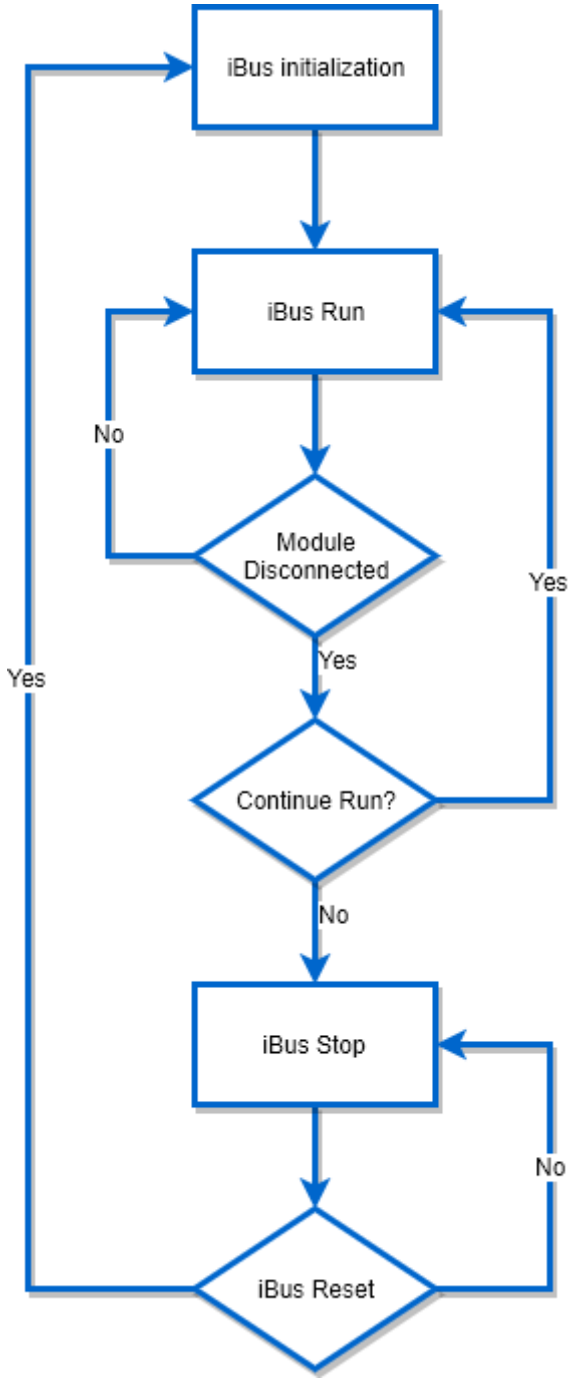
Slot	Module	Bit offset (0x0000~0x0027)
Slot#1	iR-DI16-K	N/A
Slot#2	iR-DQ16-P	0x0000~0x000F (Y0~Y15)
Slot#3	iR-DM16-P	0x0010~0x0017 (Y0~Y7)
Slot#4	iR-DQ08-R	0x0018~0x001F (Y0~Y7)

9. iBus Error Handling

When communication with the module is lost, iR-ETN can report an error and stop module communication. The following actions can be taken:

- Set Special Register #10045 to 1 to ignore this error.
- Set Special Register #10045 to 0 to report this error.
- Send Device Command Special Register #6000 to reboot iBus.

iBus Error Flowchart:



10.Power Consumption

Type	Device	Consumption(5V)	Power Supply(5V)
Coupler	iR-ETN	220mA/1.1w	2A/10w
	iR-COP	170mA/0.85w	2A/10w
Digital I/O	iR-DM16-P	130mA/0.65w	--
	iR-DM16-N	130mA/0.65w	--
	iR-DQ08-R	220mA/1.1w	--
	iR-DQ16-N	205mA/1.02w	
	iR-DQ16-P	196mA/0.984w	
	iR-DI16-K	83mA/0.418w	

Note:

The coupler is the only power supply for the modules in this system. Please consider power requirements when connecting multiple modules.

Example:

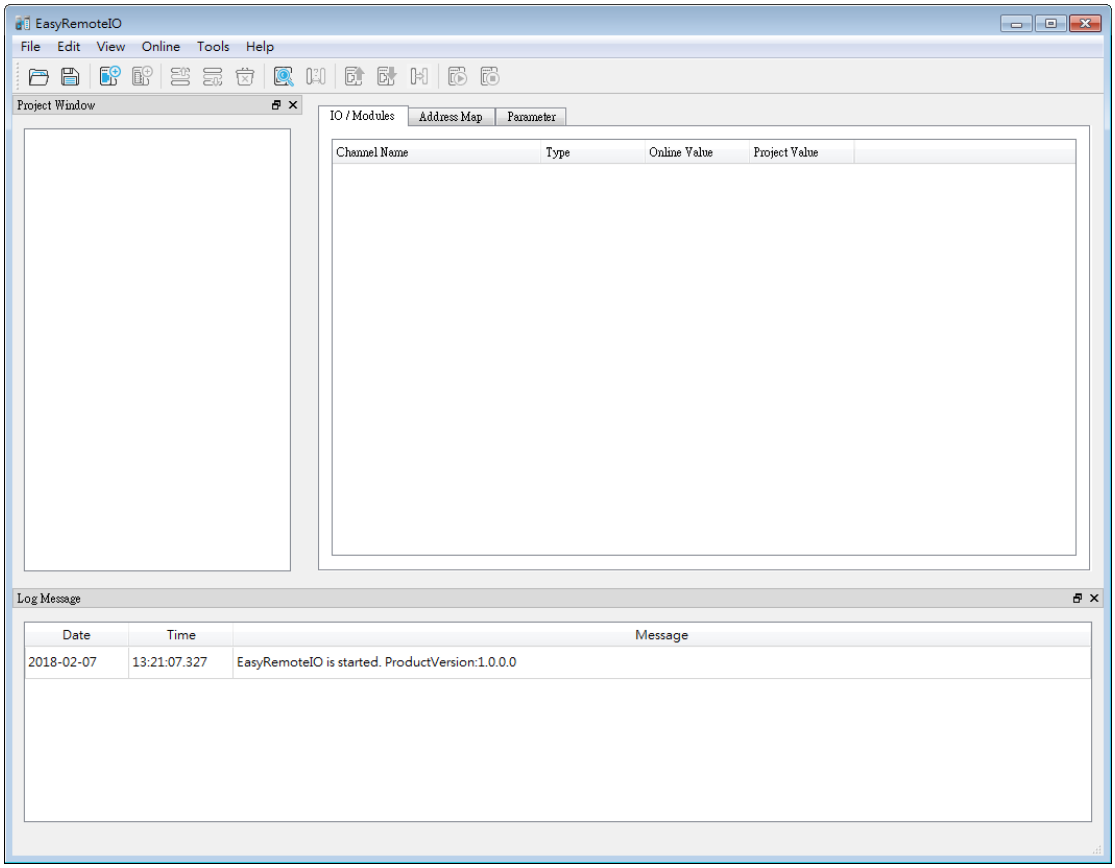
Device	Name	Consumption	Power Supply
Coupler	iR-ETN	220mA/1.1w	2A/10w
Module	iR-DM16-P *13	130mA*13=1.69A	X
System	Power consumption：220mA + 1.69A = 1.91 A Power supply: 2A > 1.91A		

11.Ethernet Cascading

- Daisy-chained your Ethernet devices
- Last Ethernet port can be used as a diagnosis port

12.EasyRemoteIO

EasyRemoteIO is an easy-to-use tool for configuring the parameters of iR-ETN. This tool can be found in the installation file of the latest version of EasyBuilder Pro. For more information on EasyRemoteIO, please see EasyRemoteIO User Manual.

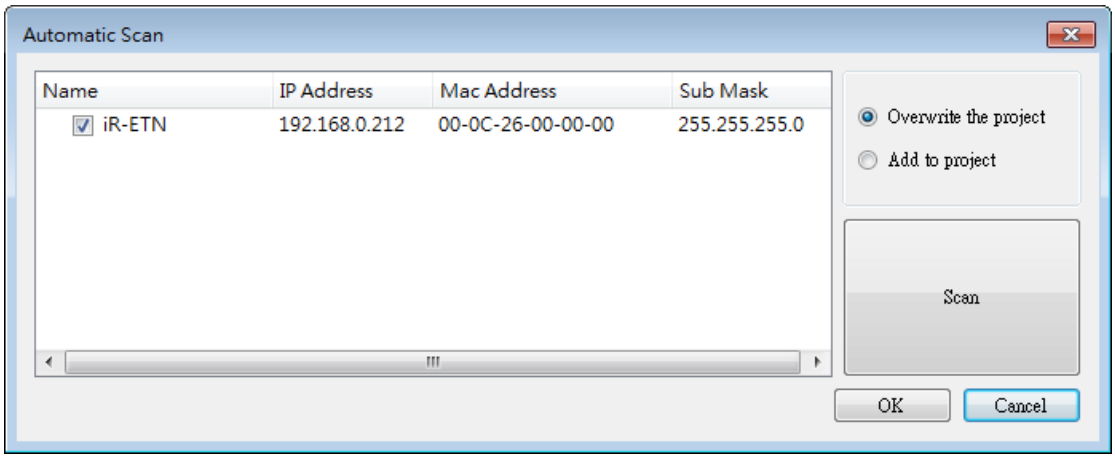


12.1 Preparation

The default domain of iR-ETN is 192.168.0.212, please set computer's IP to 192.168.0.**.

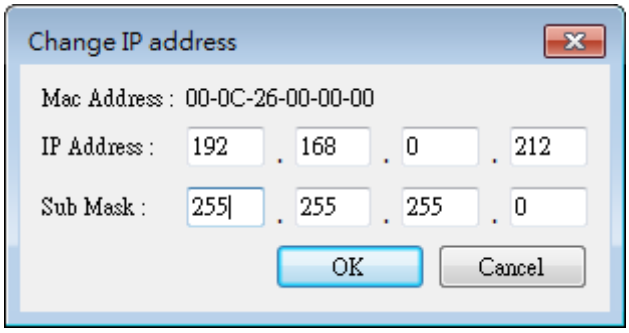
12.2 Scan iR-ETN

Select [Online] » [Automatic Scan] or press Shift + S on the keyboard to open the following window to scan the iR-ETN connected with PC.



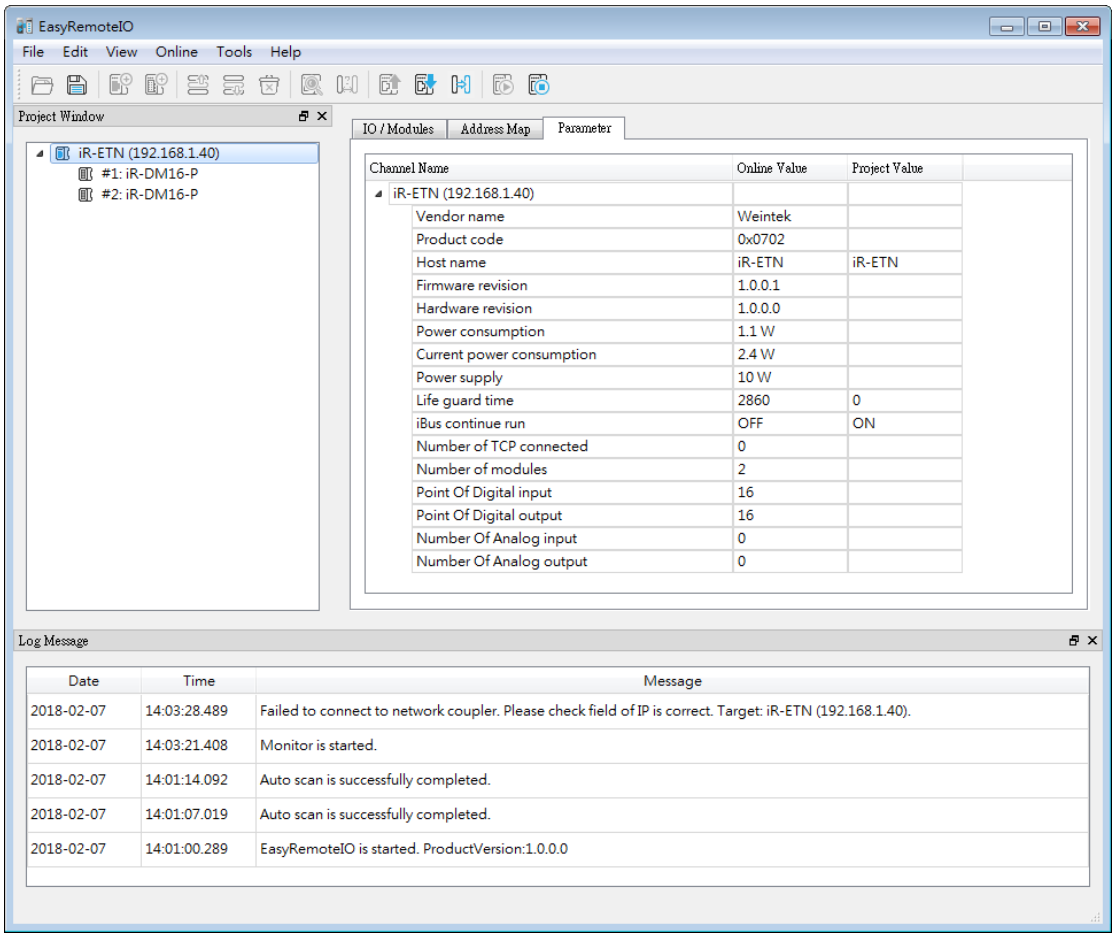
12.3 Change IP to Current Domain

Select [Online] » [Change IP] to set the iR-ETN's IP address.



12.4 Check Parameter with Monitor

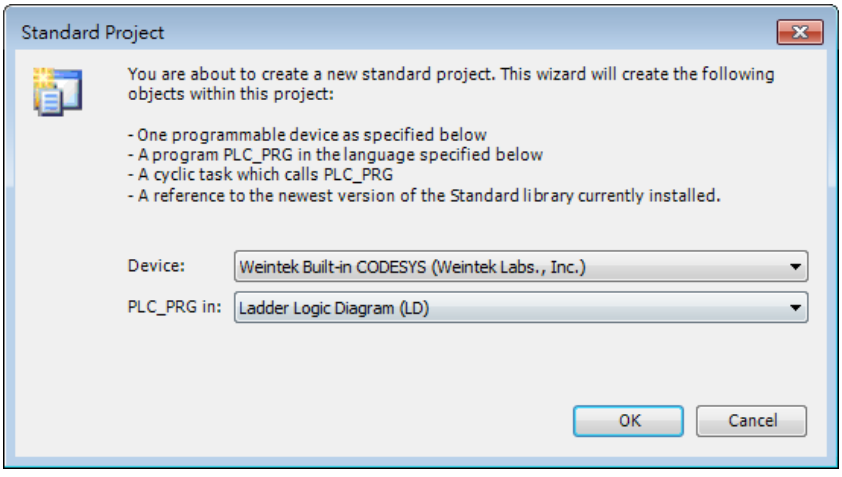
Select [Online] » [Start Monitoring] or press Shift + M on the keyboard to activate the connection with iR-ETN. The device status and module status can be viewed via EasyRemoteIO.



13.Connecting with CODESYS

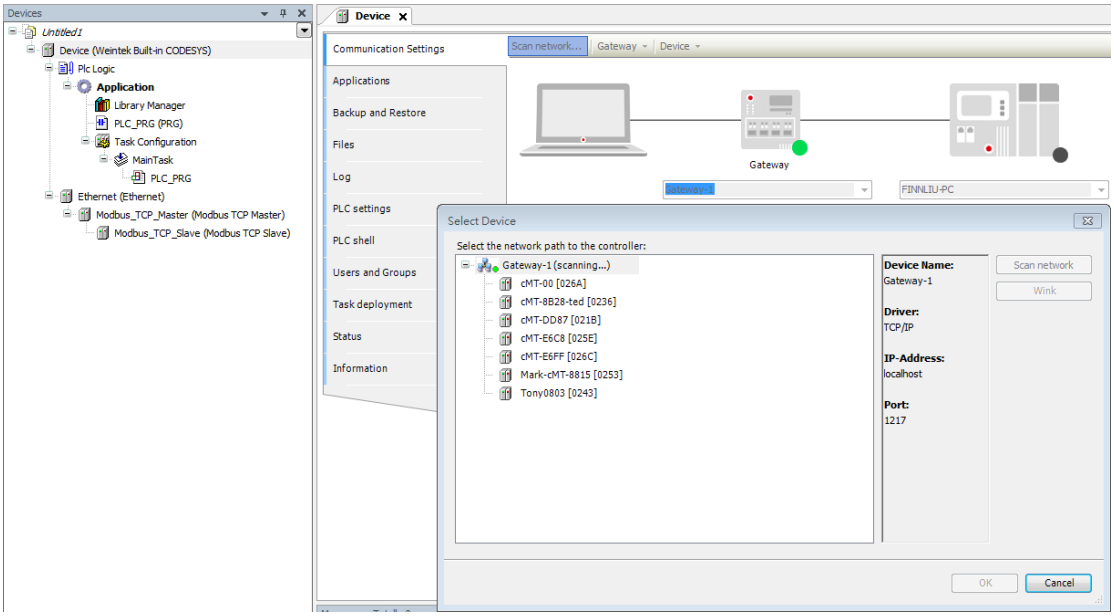
13.1 Preparation

Please add Weintek Built-in CODESYS device following the instructions in this document.



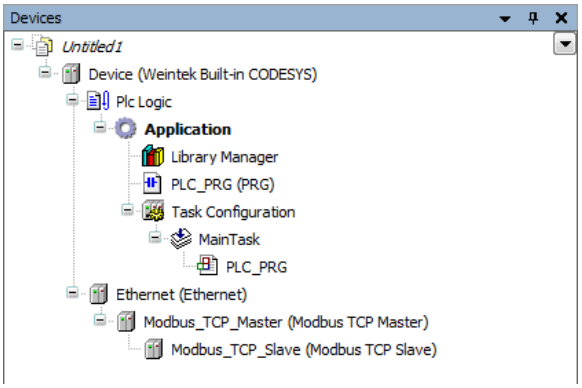
13.2 Connecting with CODESYS Device

Double click [Device] and select [Scan network] to find the cMT device you want to connect.



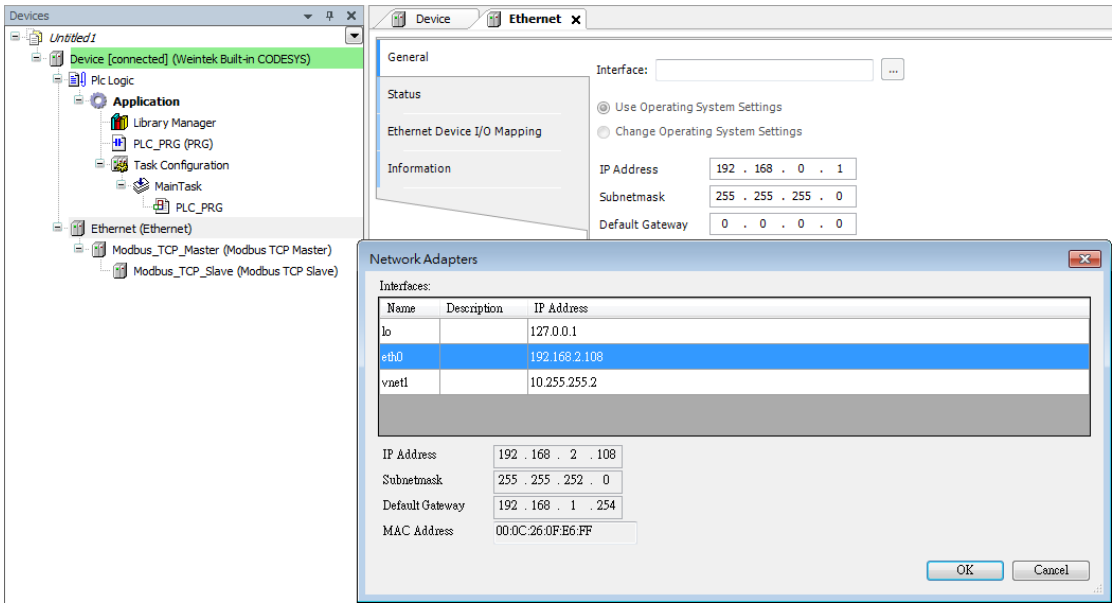
13.3 Creating Ethernet Device

Under Ethernet (Ethernet) create a Modbus_TCP_Master device which represents CODESYS Ethernet Port of the cMT device, and create a Modbus_TCP_Slave device which represents iR-ETN's Ethernet Port.



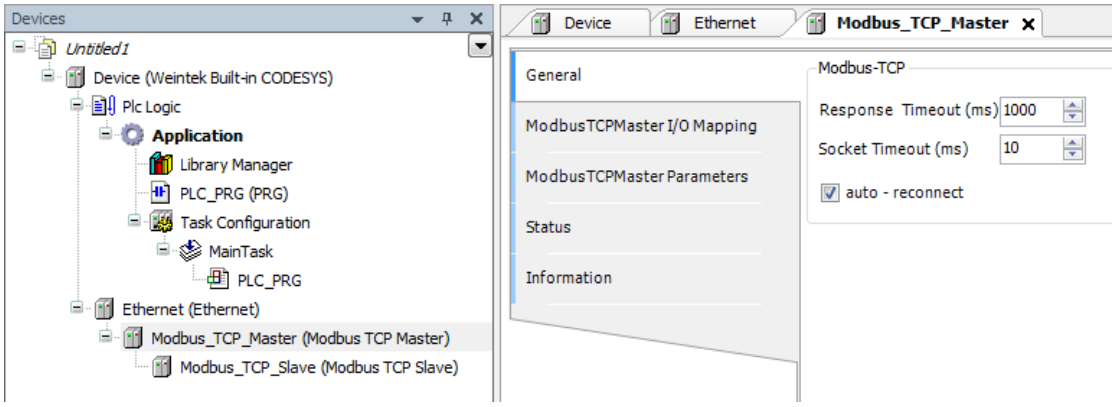
13.3.1 Parameter setting (Ethernet)

Double click [Ethernet] and select [Interface] to find the cMT device connected just now.



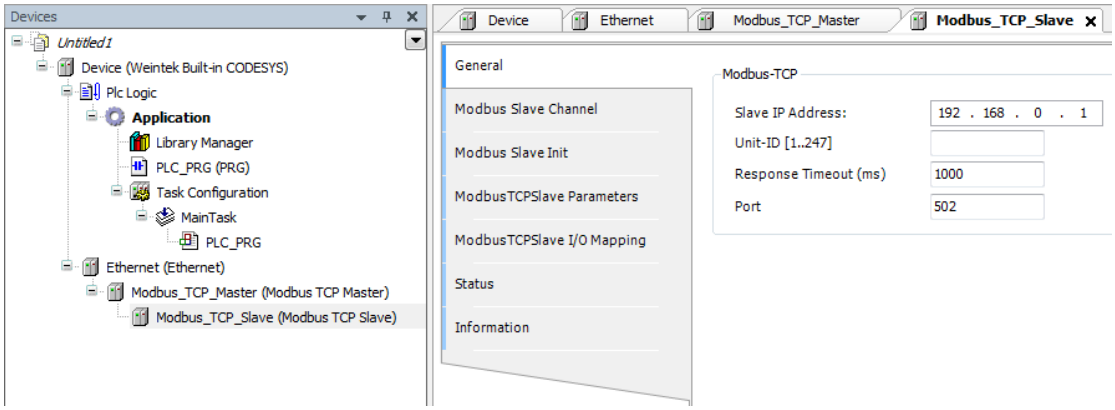
13.3.2 Parameter setting (Modbus_TCP Master)

Select auto-reconnect.



13.3.3 Parameter setting (Modbus_TCP Slave)

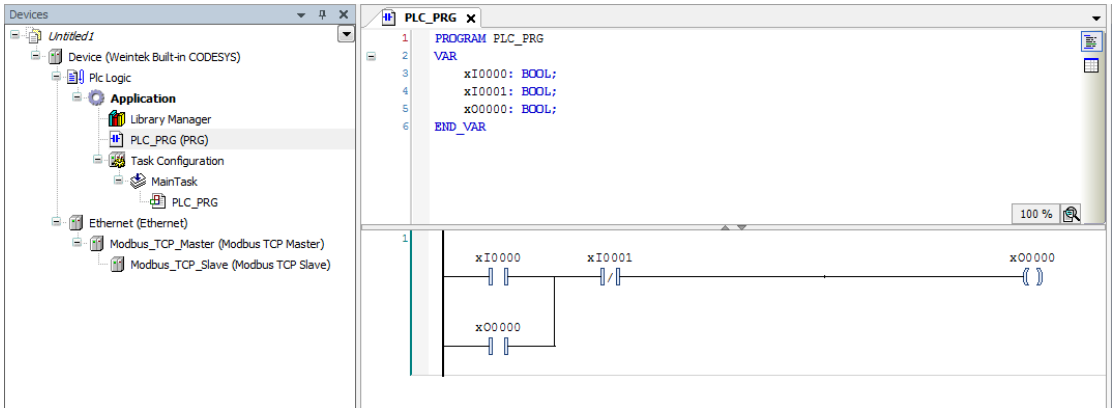
Set the iR-ETN IP and set Unit-ID to 1.



13.4 Modbus Slave Channel

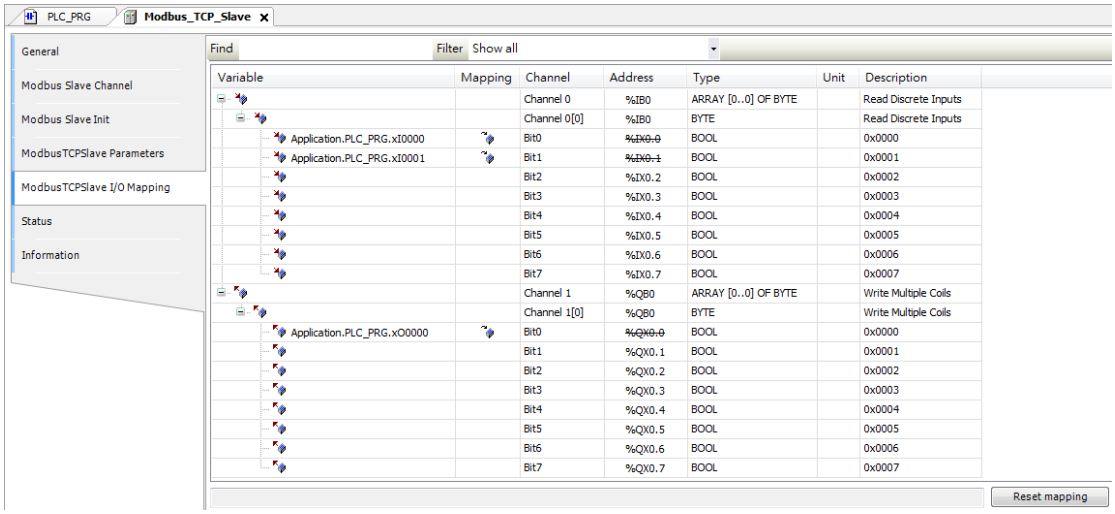
Add Remote I/O module channels here. Use Read Discrete Inputs (Function Code 2) for input and use Write Multiple Coils (Function Code 15) for output. Please set correct offset and length for each channel, or see an example shown in Chapter 8 in this manual.

13.5 Edit CODESYS Program



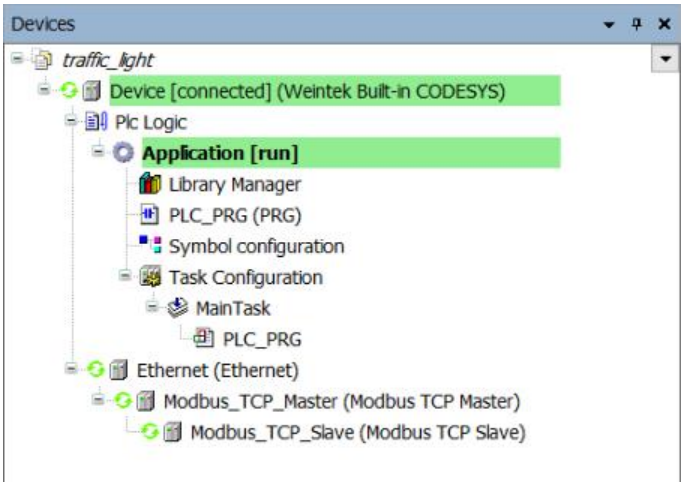
13.6 Modbus TCP Slave I/O Mapping

Variables specified here can map to Remote I/O.



13.7 Download Program and Run

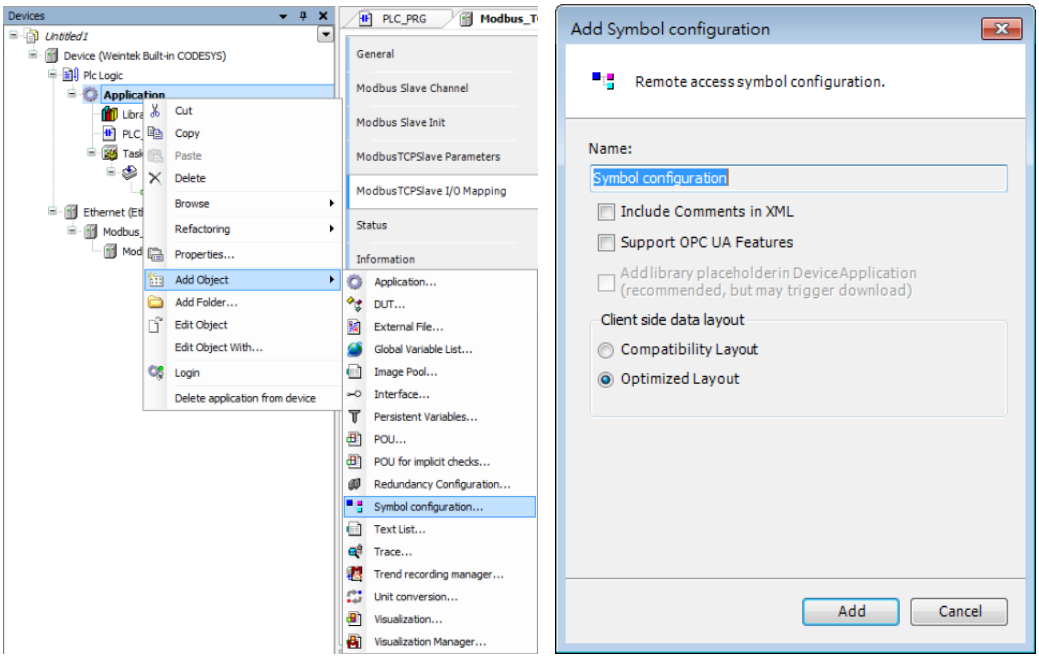
Follow the steps: [Build] » [Login] » [Run]. Devices successfully connected will have a green circle mark.



14.Connecting CODESYS with EasyBuilder Pro

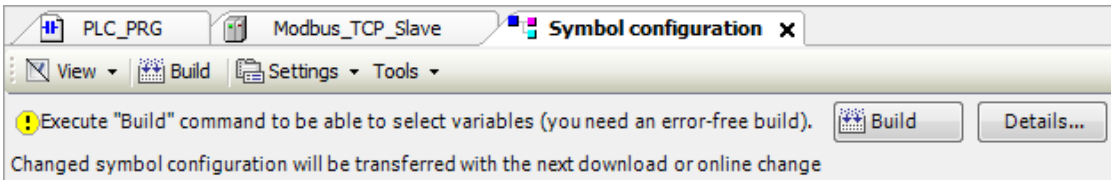
14.1 Symbol Configuration

Create a [Symbol configuration] object under Application.

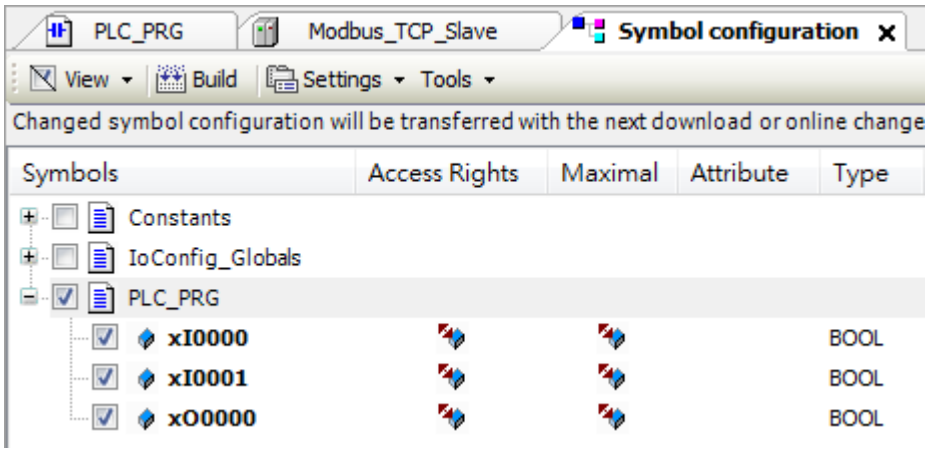


14.2 Creating .xml File

14.2.1 "Build" Command for Selecting Variables



14.2.2 Selecting PLC_PRG Variables



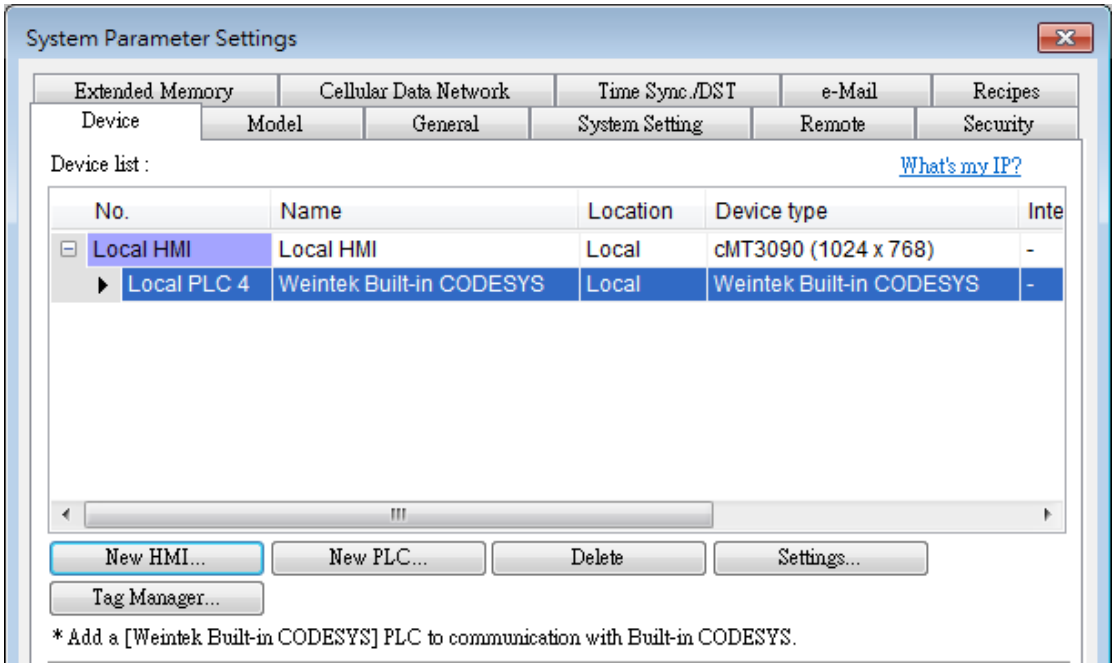
14.2.3 Creating .xml File

Click [Build] » [Generation code] and find the .xml file in program saving location.

14.3 Importing .xml File in EasyBuilder Pro

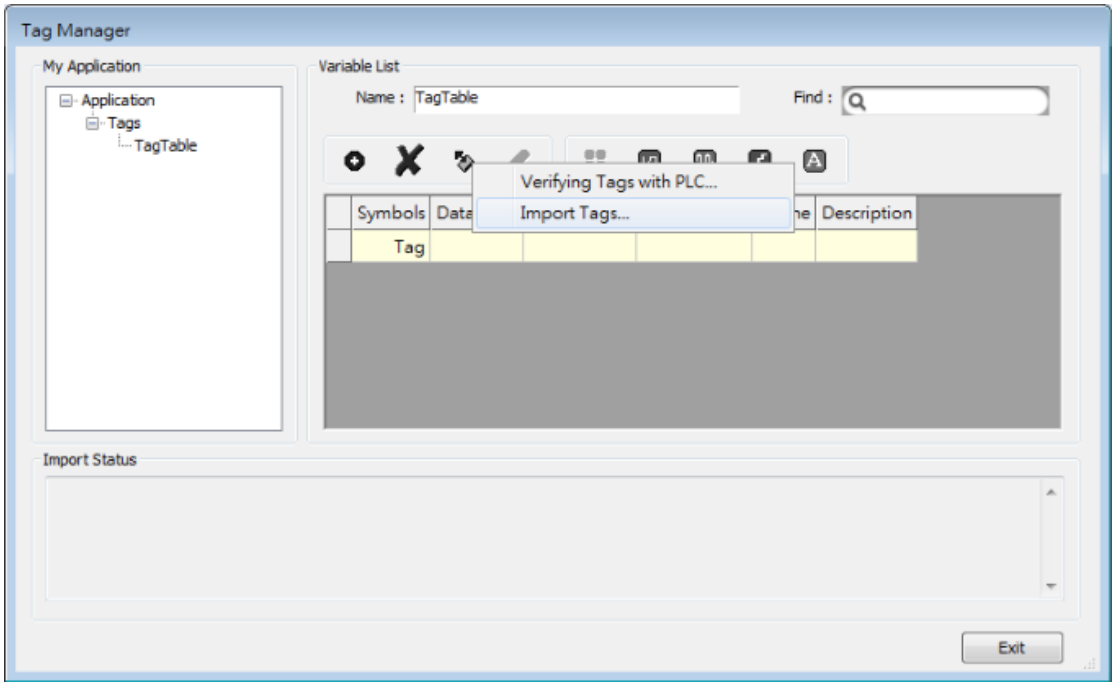
14.3.1 Adding a Device

Add Weintek Built-in CODESYS driver into the device list.



14.3.2 Importing Tags

Use Tag Manager to import .xml file.



14.3.3 Selecting Tag in Object Settings Dialog